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Natural
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Conservation
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In cooperation with
United States Department
of Agriculture, Forest
Service; North Carolina
Department of
Environment, Health, and
Natural Resources; North
Carolina Agricultural
Research Service; North
Carolina Cooperative
Extension Service;
Haywood Soil and Water
Conservation District; and
Haywood County Board
of Commissioners

Soil Survey of Haywood County Area, North Carolina

How To Use This Soil Survey

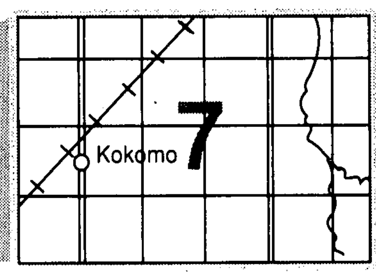
General Soil Map

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

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

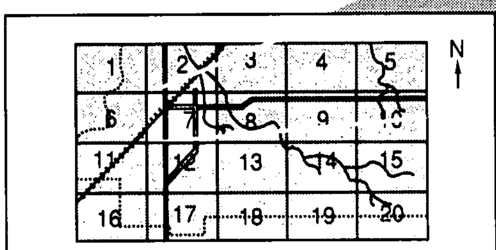
Detailed Soil Maps

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



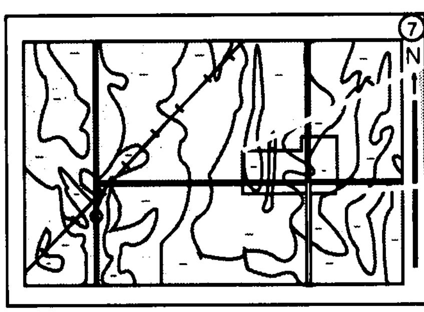
MAP SHEET

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

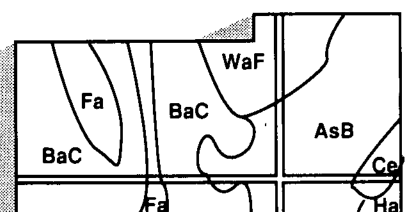


INDEX TO MAP SHEETS

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



MAP SHEET



AREA OF INTEREST

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

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

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the North Carolina Agricultural Research Service, and local agencies. The Natural Resources 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 1990. This soil survey was made cooperatively by the Natural Resources Conservation Service; the United States Department of Agriculture, Forest Service; North Carolina Department of Environment, Health, and Natural Resources; North Carolina Agricultural Research Service; North Carolina Cooperative Extension Service; Haywood Soil and Water Conservation District; and Haywood County Board of Commissioners. The survey is part of the technical assistance furnished to the Haywood Soil and Water Conservation District. The Haywood County Board of Commissioners provided financial assistance for the survey.

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.

The previous soil survey of Haywood County Area was published in 1954 by the U.S. Department of Agriculture. This survey updates the previous survey, provides more detailed maps on aerial photographs, and contains more interpretive information *(11)*.

Cover: Typical land use pattern in Haywood County. Row crops are on the flood plains and low terraces, pasture and hayland are on the intermountain hills and the lower mountain slopes, and woodland is on the mountains.

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Foreword

This soil survey contains information that can be used in land-planning programs in the survey area. 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. Wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

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

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Soil Survey of Haywood County Area, North Carolina

By John B. Allison, North Carolina Department of Environment, Health, and Natural Resources, and L. Brooks Hale, Natural Resources Conservation Service

Fieldwork assisted by Steve T. Evans, Natural Resources Conservation Service

Maps compiled by Brian A. Wood, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
United States Department of Agriculture, Forest Service; North Carolina Department of Environment, Health, and Natural Resources; North Carolina Agricultural Research Service; North Carolina Cooperative Extension Service; Haywood Soil and Water Conservation District; and Haywood County Board of Commissioners

Haywood County is located in the mountains of western North Carolina, which include the Great Smoky Mountains to the north, the Newfound Mountains to the east, Pisgah Ridge to the south, and the Balsam Mountains to the west (fig. 1). The landscape consists of rugged mountains, intermountain hills, and fertile valleys. It covers 355,168 acres, or approximately 546 square miles. Elevations range from about 1,400 feet at Waterville along the Pigeon River to 6,621 feet at the top of Mount Guyot. The county has 19 mountain peaks at elevations above 5,000 feet.

About 61,225 acres of Haywood County is in the Great Smoky Mountains National Park. This area is not included in the soil survey. About 68,175 acres of the county is in the Pisgah National Forest, and about 3,588 acres is part of the Blue Ridge Parkway.

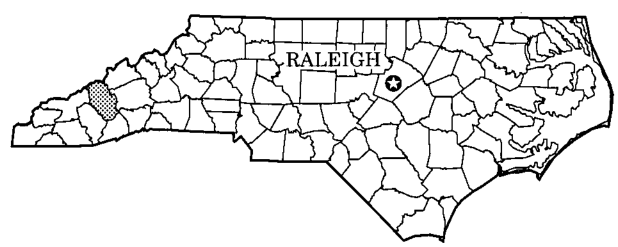

Figure 1.—Location of Haywood County in North Carolina.

General Nature of the Survey Area

This section gives general information about the survey area. It describes history and economic development; drainage, relief, and physiography; and climate.

History and Economic Development

The Haywood County Chamber of Commerce helped prepare this section.

All of Haywood County originally was part of the Cherokee Indian Nation. After the end of the Revolutionary War, a great number of English, Scotch-Irish, German, and Dutch settlers moved to this area. Many of these settlers had been given land grants. The Cherokees gave up much of their land and moved west to the Tuckasegee River. Haywood County was formed from part of Buncombe County in March 1809. It was named in honor of John Haywood, who was State Treasurer from 1787 to 1827.

In 1980, the county had a population of approximately 45,000 *(21)*. About 40 percent of the population lives in urban areas, 35 percent lives in rural nonfarm areas, and 25 percent lives in rural farm areas *(17)*. The county has five incorporated towns, namely Canton, Clyde, Hazelwood, Maggie Valley, and Waynesville. Waynesville, originally known as Mount Prospect, is the county seat. Haywood is one of the most economically balanced counties in North Carolina because agriculture, industry, and tourism each make up about one third of the economy.

Drainage, Relief, and Physiography

Haywood County is drained by the Pigeon River. The headwaters of this river gather along the southern boundary of the county, and the river flows northwest through the county and into Cocke County, Tennessee. In the southern part of the county, some of the larger streams that feed the river are Jonathan, Allens, Richland, Crawford, Pisgah, and Cold Creeks and the East Fork, West Fork, Little East Fork, and Middle Prong of the Pigeon River. The northern part of the county is drained by Sterling, Indian, Cataloochee, Cove, Fines, Big, and Crabtree Creeks.

Relief is characterized by landscape position and is related to slope. In the survey area, the general direction of slope is northwest. Most of the landscapes have slopes ranging from gently sloping to very steep. The terraces and flood plains have slopes ranging from nearly level to moderately steep.

The physiography of the survey area consists of mountain ranges, intermountain hills, coves, flood plains, and stream terraces that are associated with the Pigeon River and its tributaries.

The mountains have steep or very steep side slopes and gently sloping to steep ridges. The soils on the side slopes and ridges are well drained. They range from very deep to shallow over hard bedrock, saprolite, or soft bedrock. High mountains are above 4,800 feet in elevation. The soils on side slopes and ridges above 4,800 feet are subject to extreme cold temperatures and high winds. Intermediate mountains are between 3,500 and 4,800 feet in elevation. Low mountains are between 2,500 and 3,500 feet in elevation *(6)*.

The areas of intermountain hills are mainly between Canton and Waynesville and in the communities of Iron Duff, White Oak, and Fines Creek. The intermountain hills generally range from 1,400 to 2,500 feet in elevation. The soils on the strongly sloping to steep side slopes and the gently sloping to moderately steep ridges are very deep, deep, or moderately deep, are well drained, and in many places are eroded.

The coves have gently sloping to steep landscapes. The soils in these areas are very deep and well drained. They commonly have an organic-rich topsoil.

The flood plains are broadest along the Pigeon River near the communities of Center Pigeon and Bethel. The soils adjacent to stream channels are generally better drained than the soils farther away from the channels. High and low stream terraces are associated with many of the flood plains. The soils in these areas are nearly level to moderately steep. They are well drained, moderately well drained, or very poorly drained.

Climate

The climate in the survey area varies greatly from the high mountains to the flood plains along creeks and rivers. It is influenced by elevation, aspect, and the moisture-rich winds from the Gulf of Mexico. Annual precipitation, temperature, freeze dates, and length of the growing season also vary significantly throughout the survey area. Generally, as elevation increases the amount of rainfall and snowfall increases and the temperature and the length of the growing season decrease. Slow air drainage allows frost pockets to form in late spring and early fall in the lower landscape positions.

Areas at the higher elevations receive significant, unmeasured amounts of precipitation in the form of fog in the warmer months and rime ice in the colder months. Precipitation is heavy and evenly distributed throughout the year. Precipitation in summer occurs mainly during thunderstorms. In the valleys, precipitation in winter occurs mainly as rain and occasionally as snow. In the higher mountains, it occurs mainly as snow although rainfall is frequent. Snow does not remain on the ground for long periods, except at the highest elevations in some winters.

In winter, the valleys generally are very cool and occasionally have a cold or warm spell. The upper slopes and mountaintops are generally cold and windy, especially on the prominent, north-and south-trending mountains. In summer, the valleys are generally very warm. They are frequently hot during the day and become cool at night when the temperature drops and the air from the mountains collects in the valleys.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Canton, North Carolina, in the period 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season. The data in tables 1, 2 and 3 reflects the climate of the valleys in the eastern part of the county and may not apply to other parts of the county.

In winter, the average temperature is 37.1 degrees F and the average daily minimum temperature is 25.3 degrees. The lowest temperature on record, which occurred at Canton on January 21, 1985, is -20 degrees. In summer, the average temperature is 69.6 degrees and the average daily maximum temperature is 81.6 degrees. The highest recorded temperature, which occurred at Canton on August 23, 1983, is 96.0 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 average annual precipitation is about 41.75 inches. Of this, 22.07 inches, or about 53 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 12.81 inches. The heaviest 1-day rainfall during the period of record was 4.94 inches at Canton on June 16, 1949. Thunderstorms occur on about 45 days each year, and most occur in July.

The average seasonal snowfall is 8.5 inches. The greatest snow depth at any one time during the period of record was 17 inches. On an average of 9 days each year, 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 58 percent. Humidity is higher at night, and the average at dawn is about 90 percent. The sun shines 58 percent of the time possible in summer and 57 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 9.7 miles per hour, in January.

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 studied many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the material from which the soil formed.

Soils occur in an orderly pattern that results from the combined influence over time of climate, parent material, relief, and plants and animals. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils and relating their position to specific segments of the landscape, soil scientists develop a concept, or model, of how the soils were formed. This model enables the soil scientists 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 the soils. After describing the soils 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. The data from these analyses and tests and from field-observed characteristics and soil properties are used to predict behavior of the soils under different uses. Interpretations 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.

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 relatively 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 be at a specific level in the soil on a specific date.

Soil boundaries are drawn on aerial photographs and each delineation is identified as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in accurately locating boundaries.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one or more major kinds 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 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 minor soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are identified 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 areas that are less than 2 to 5 acres in size.

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

1. Wayah

Gently sloping to very steep, very deep, well drained, loamy soils that are underlain by felsic to mafic high-grade metamorphic and igneous rocks; on ridges and side slopes of high mountains

This map unit occurs mainly in the southern part of Haywood County from Mount Pisgah to Water Rock Knob along the Transylvania and Jackson County lines. The landscape is characterized by rugged high mountains that are more than 4,800 feet in elevation and have narrow ridges and broad, dissected side slopes. This unit includes the headwaters of the major streams in the county. Slope ranges from 2 to 95 percent.

This map unit makes up about 10 percent of the survey area. It is about 77 percent Wayah soils and 23 percent soils of minor extent.

Wayah soils are very deep and well drained. They are on ridges and side slopes. Typically, the surface layer is very dark brown and dark brown sandy loam. The subsoil is yellowish brown and dark yellowish brown sandy loam.

The minor soils include Burton and Craggey soils near rock outcrops, Tanasee and Balsam soils in coves, and Humaquepts at the head of drainageways. Humaquepts are poorly drained. In the area of Graveyard Fields and Sam Knob, most of the soils have a thin surface layer and are gullied in places because of past fires and the subsequent erosion in unprotected areas. Also included in this unit are areas of rock outcrops.

Most of this map unit is forested. The common trees are red spruce, Fraser fir, northern red oak, yellow birch, sweet birch, black cherry, sugar maple, eastern hemlock, and yellow buckeye. Red spruce and Fraser fir generally grow on the higher ridges and peaks. On ridges and high peaks, trees are stunted by high winds and frequent ice storms in winter. In the area of Graveyard Fields and Sam Knob, blueberry, mountain ash, yellow birch, and scrub hardwoods are dominant because of past fires and present management practices.

Most of the forest land occurs in a federally designated wilderness area and is not available for timber production. It is used for outdoor recreational activities, such as hiking and camping. Privately owned tracts in this unit are used for woodland or for the production of Fraser fir for Christmas trees. The slope and a harsh climate are the main limitations affecting use and management.

2. Plott-Edneyville-Chestnut

Strongly sloping to very steep, very deep and moderately deep, well drained, loamy soils that are underlain by felsic to mafic high-grade metamorphic and igneous rocks; on ridges and side slopes of intermediate mountains

This map unit is mainly in the southern part of Haywood County, south of U.S. Highway 276, and in areas in the northern and eastern parts of the county along the Buncombe and Madison County lines. The landscape is characterized by mountains that have long narrow ridges and broad, dissected side slopes. Slope ranges from 8 to 95 percent.

This map unit makes up about 42 percent of the

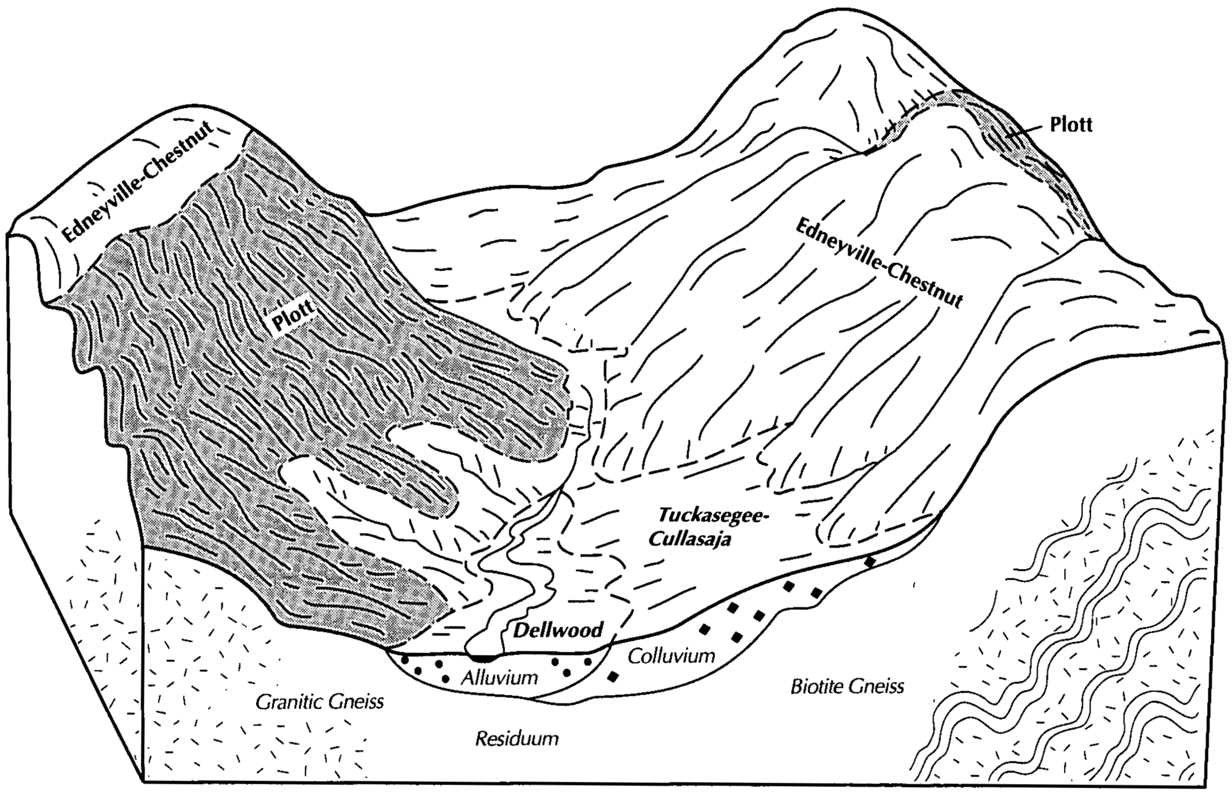

Figure 2.—Typical relationship between soils, aspect, landscape position, and parent material of intermediate mountains in an area of the Plott-Edneyville-Chestnut general soil map unit.

survey area. It is about 30 percent Plott soils, 28 percent Edneyville soils, 18 percent Chestnut soils, and 35 percent soils of minor extent (fig. 2).

Plott soils are very deep and well drained. They are dominantly on north- to east-facing side slopes. Typically, the surface layer is very dark brown fine sandy loam. The subsoil is dark yellowish brown and yellowish brown loam and sandy loam.

Edneyville soils are very deep and well drained. They are on ridges and south- to west-facing side slopes. Typically, the surface layer is brown gravelly loam. The subsoil is yellowish brown sandy loam.

Chestnut soils are moderately deep and well drained. They are on ridges and south- to west-facing side slopes. Typically, the surface layer is dark brown gravelly loam. The subsoil is dark yellowish brown gravelly loam. Weathered bedrock is at a depth of 30 inches.

The minor soils include Tuckasegee and Cullasaja soils in steep drainageways and the upper parts of coves, Saunook soils in the strongly sloping to steep coves, Fannin soils intermingled with the major soils on the lower side slopes, and Dellwood soils on narrow flood plains. Also included in this unit are areas of rock outcrops.

Most of this map unit is forested. The common trees on the Plott soils are northern red oak, black cherry, yellow-poplar, sugar maple, and eastern hemlock. The common trees on the Edneyville and Chestnut soils are northern red oak, scarlet oak, chestnut oak, shortleaf pine, and eastern white pine. The soils of this unit are suitable for timber production. Productivity is higher in areas of the Plott soils than in areas of the Edneyville and Chestnut soils. The areas of National forest land in this unit are used for woodland, wilderness preservation, and recreational development. The slope is the main limitation affecting timber production and recreational development.

Cleared areas are used mainly as pasture. A few areas are used for urban development. Most of the included areas in coves and on flood plains have been cleared and are used as cropland. The slope and a hazard of erosion are the main limitations.

3. Evard-Cowee-Hayesville-Trimont

Gently sloping to very steep, very deep and moderately deep, well drained, loamy and clayey soils that are underlain by felsic to mafic high-grade metamorphic and igneous rocks; on ridges and side slopes of intermountain hills and low mountains

This map unit is mainly in the central part of Haywood County. It extends east to Buncombe County and north into the communities of Crabtree, Iron Duff, and Fines Creek. The landscape is characterized by low mountains and intermountain hills that have narrow, gently sloping to moderately steep ridges and moderately steep to very steep side slopes. Slope ranges from 2 to 95 percent.

This map unit makes up about 20 percent of the survey area. It is about 26 percent Evard soils, 22 percent Cowee soils, 16 percent Hayesville soils, 10 percent Trimont soils, and 26 percent soils of minor extent.

Evard soils are very deep and well drained. They are on ridges and generally on south- to west-facing side slopes. Typically, the surface layer is dark brown gravelly loam. The subsoil is strong brown, yellowish red, and red loam.

Cowee soils are moderately deep and well drained. They are on main ridges, on spur ridges, and generally on south- to west-facing side slopes. Typically, the surface layer is dark yellowish brown gravelly loam. The subsoil is yellowish red and red clay loam and sandy clay loam. Weathered bedrock is at a depth of 28 inches.

Hayesville soils are very deep and well drained. They are on intermountain hills, spur ridges, and side slopes. These soils are eroded. Typically, the surface layer is reddish brown clay loam. The subsoil is red clay and clay loam.

Trimont soils are very deep and well drained. They are generally on north- to east-facing side slopes. Typically, the surface layer is dark brown gravelly loam. The subsoil is strong brown loam.

The minor soils include Edneyville and Chestnut soils on the steepest side slopes, Saunook soils on gently sloping to steep slopes in coves, Fannin soils intermingled with the major soils on side slopes, and Dellwood soils on flood plains.

Most of this map unit is forested. The common trees on the Evard, Cowee, and Hayesville soils are scarlet oak, white oak, hickory, eastern white pine, and shortleaf pine. The common trees on the Trimont soils are yellow-poplar, black cherry, red maple, hemlock, and northern red oak. Productivity is higher in areas of the Trimont soils than in areas of the Evard, Cowee, and Hayesville soils. The slope is the main limitation affecting timber production.

Areas on the less-sloping ridges are used as pasture or cropland (fig. 3). Included areas on flood plains and in coves also are used as pasture or cropland. Many areas in this map unit are used for urban development, ornamental crops, or orchards. The slope and a hazard of erosion are the main limitations. A high content of clay in the subsoil of the Hayesville soils and a moderate depth to soft bedrock in the Cowee soils can also affect urban development. The Fannin soils are unstable because of a high content of mica.

4. Dillsboro-Dellwood-Braddock

Nearly level to moderately steep, moderately well drained and well drained, sandy, loamy, and clayey soils that are shallow to very deep to strata of sand, gravel, and cobbles; formed in recent and old alluvium washed from landscapes that are underlain by felsic to mafic high-grade metamorphic and igneous rocks; on flood plains and high stream terraces

This map unit occurs along the Pigeon River and its tributaries. The landscape consists of high stream terraces and long, wide flood plains. Slope ranges from 0 to 30 percent. Elevation ranges from 2,000 to 3,000 feet.

This map unit makes up about 5 percent of the survey area. It is about 23 percent Dillsboro soils, 19 percent Dellwood soils, 18 percent Braddock soils, and 40 percent soils of minor extent (fig. 4).

Dillsboro soils are very deep and well drained. They are on gently sloping to strongly sloping, slightly concave, high stream terraces. Typically, the surface layer is dark yellowish brown loam. The subsoil is strong brown clay and clay loam.

Dellwood soils are shallow to stratified sand, gravel, and cobbles and are moderately well drained. They are on the nearly level and slightly undulating flood plains of fast-flowing streams. Typically, the surface layer is dark brown cobbly sandy loam. The subsoil is dark yellowish brown and yellowish brown, stratified sand, gravel, and cobbles.

Braddock soils are very deep and well drained. They are on gently sloping to moderately steep high stream terraces. Typically, the surface layer is yellowish red clay loam. The subsoil is red clay and clay loam.

The minor soils include Cullowhee, Nikwasi, and Rosman soils on narrow flood plains, Statler soils on low stream terraces, and Saunook soils in colluvial areas.

Most of this map unit is used as cropland. The major crops are tomatoes, burley tobacco, silage corn, and

Figure 3.—An area of Hayesville clay loam, 8 to 15 percent slopes, eroded, in the Evard-Cowee-Hayesville-Trimont general soil map unit. This Hayesville soil is commonly used for cultivated crops or pasture.

pasture, hay, and ornamental crops. A major part of this unit is urbanized and occupied by the towns of Canton, Waynesville, Hazelwood, Clyde, and Maggie Valley and by other smaller communities. A very small part is used as woodland. The common trees are yellow-poplar, sycamore, and river birch.

In areas of the Braddock and Dillsboro soils, the slope and a hazard of erosion are the major limitations affecting cropland and urban development. In areas of the Dellwood soils, flooding is the main limitation affecting these uses. Some areas of the Dellwood soils may need artificial drainage. A high content of clay in the subsoil of the Braddock and Dillsboro soils can also affect urban development.

5. Soco-Stecoah-Cheoah

Moderately steep to very steep, deep and moderately deep, well drained, loamy soils that are underlain by low-grade metasedimentary rocks; on ridges and side slopes of intermediate and low mountains

This map unit generally is in the western and northwestern parts of Haywood County along the gorge of the Pigeon River, the boundary of the Great Smoky

Mountains National Park, and the Tennessee State line. A moderately sized area of this unit is northwest of Maggie Valley. The landscape is characterized by long narrow ridges and broad, dissected side slopes. Slopes range from 15 to 95 percent.

This map unit makes up about 8 percent of the survey area. It is about 35 percent Soco soils, 21 percent Stecoah soils, 19 percent Cheoah soils, and 25 percent soils of minor extent.

Soco soils are moderately deep and well drained. They are generally on south- to west-facing side slopes. Typically, the surface layer is dark yellowish brown channery sandy loam. The subsoil is yellowish brown flaggy loam and flaggy sandy loam. Weathered bedrock is at a depth of 26 inches.

Stecoah soils are deep and well drained. They are generally on south- to west-facing side slopes. Typically, the surface layer is dark brown channery loam. The subsoil is yellowish brown loam and fine sandy loam. Weathered bedrock is at a depth of 44 inches.

Cheoah soils are deep and well drained. They are mainly on north- to east-facing side slopes. Typically, the surface layer is black channery loam. The subsoil is yellowish brown loam. Weathered bedrock is at a depth of 51 inches.

The minor soils include Whiteoak soils in the steep draws and narrow coves, Junaluska and Brasstown soils on ridges of intermediate mountains and on ridges and side slopes of intermountain hills and low mountains, Oconaluftee soils on high mountains, and Cataska soils near rock outcrops.

Most of this map unit is owned by the U.S. Forest Service and is used for timber production and recreational development. The common trees on the Soco and Stecoah soils are scarlet oak, white oak, chestnut oak, and eastern white pine. The common trees on the Cheoah soils are yellow-poplar, black cherry, and northern red oak. Productivity is higher in areas of the Cheoah soils than in areas of the Soco and Stecoah soils. The slope is the main limitation affecting timber production and recreational development.

Privately owned areas of this map unit are used for woodland, pasture, urban development, or commercial recreational development. The slope, soil instability, and a moderate depth to soft bedrock in the Soco soils are limitations affecting urban and recreational development.

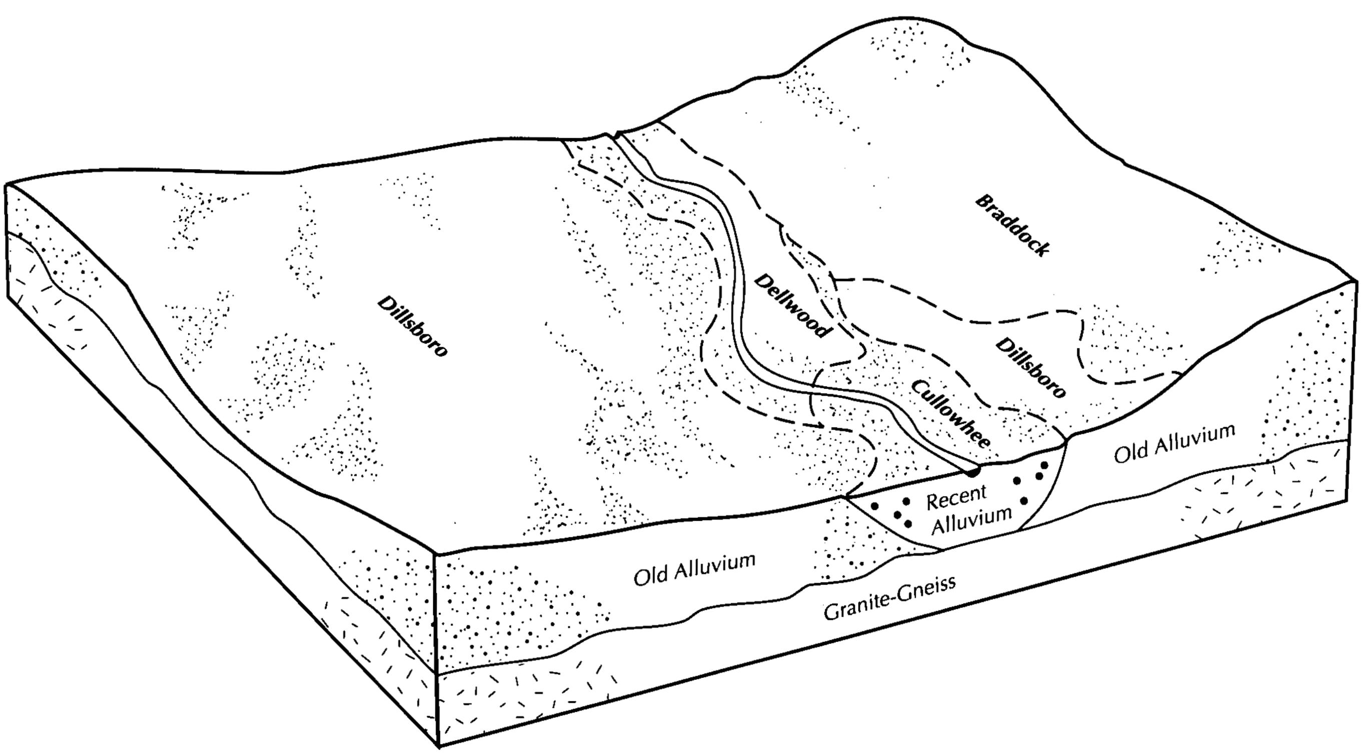

Figure 4.—Typical relationship between soils, landscape position, and parent material on terraces and flood plains in an area of the Dillsboro-Dellwood-Braddock general soil map unit.

6. Brasstown-Junaluska-Whiteoak

Strongly sloping to steep, deep, moderately deep, and very deep, well drained, loamy soils that are underlain by low-grade metasedimentary rocks; on ridges and side slopes of low mountains and intermountain hills and in coves

This map unit is mainly in the northwestern part of Haywood County near the Tennessee State line and along the boundary of the Great Smoky Mountains National Park. The landscape is characterized by narrow ridges and short, dissected side slopes. Slope ranges from 8 to 50 percent.

This map unit makes up about 7 percent of the survey area. It is about 26 percent Brasstown soils, 21 percent Junaluska soils, 16 percent Whiteoak soils, and 37 percent soils of minor extent.

Brasstown soils are deep and well drained. They are on ridges and side slopes. Typically, the surface layer is dark brown channery loam. The subsoil is yellowish red and red loam. Weathered bedrock is at a depth of 45 inches.

Junaluska soils are moderately deep and well drained. They are on ridges and side slopes. Typically, the surface layer is dark yellowish brown channery loam. The subsoil is red and yellowish red loam and silt loam. Weathered bedrock is at a depth of 28 inches.

Whiteoak soils are very deep and well drained. They are in coves and drainageways. Typically, the surface layer is very dark grayish brown cobbly loam. The subsoil is yellowish brown loam, channery loam, and very flaggy loam.

The minor soils include Soco and Stecoah soils on the steeper side slopes, Cheoah soils on north-facing side slopes and at the head of drainageways, and Spivey soils along drainageways and in coves.

Most of this map unit is owned by the U.S. Forest Service and is used for timber production and outdoor recreational activities. The common trees on the Brasstown and Junaluska soils are scarlet oak, white oak, chestnut oak, and eastern white pine. The common trees on the Whiteoak soils are yellow-poplar, northern red oak, eastern white pine, American beech, eastern hemlock, and red maple. Productivity is higher in areas of the Whiteoak soils than in areas of the Brasstown and Junaluska soils. The slope is the main limitation affecting timber production.

Privately owned areas in this map unit are used for timber production, pasture, cropland, building site development, or recreational development. The slope, soil instability, a hazard of erosion, and a moderate depth to soft bedrock in the Junaluska soils are the main limitations.

7. Saunook

Gently sloping to steep, very deep, well drained, loamy soils that are underlain by loamy alluvium and colluvium; in drainageways and coves

This map unit is in large coves in places scattered throughout the survey area. The landscape is characterized by broad, dissected coves and drainageways. Slope ranges from 2 to 50 percent.

This map unit makes up about 6 percent of the survey area. It is about 80 percent Saunook soils and 20 percent soils of minor extent.

Saunook soils are very deep and well drained. Typically, the surface layer is very dark brown loam. The subsoil is dark yellowish brown and yellowish brown loam, cobbly loam, and cobbly sandy loam.

The minor soils include Dillsboro soils on high stream terraces and benches, Cullowhee and Nikwasi soils on narrow flood plains, and Cowee, Evard, and Hayesville soils on residual side slopes at the edges of coves.

Most of this map unit is cleared and used for cropland, hayland, orchards, ornamental crops, or urban development. The steep areas are used mainly for pasture or timber production. The slope and a hazard of erosion are the main limitations.

8. Oconaluftee

Moderately steep to very steep, very deep, well drained, loamy soils that are underlain by low-grade metasedimentary rocks; on ridges and side slopes of high mountains

This map unit occurs in the southwestern part of Haywood County along the Jackson County line and in the northern part along the boundary of the Great Smoky Mountains National Park. The landscape is characterized by long narrow ridges and broad, dissected side slopes of rugged high mountains. Elevation is more than 4,800 feet. Slope ranges from 8 to 95 percent.

This unit makes up about 2 percent of the survey area. It is about 65 percent Oconaluftee soils and 35 percent soils of minor extent.

Oconaluftee soils are very deep and well drained. They are on ridges and side slopes. Typically, the surface layer is black and dark brown channery loam. The subsoil is dark yellowish brown channery fine sandy loam.

The minor soils include Wayah soils, which formed in felsic to mafic high-grade metamorphic and igneous rocks, and Cheoah soils at the lower elevations. Also included in this unit are areas of rock outcrops.

Most of this map unit is forested. The common trees are red spruce, Fraser fir, northern red oak, yellow birch, sweet birch, black cherry, sugar maple, eastern hemlock, and yellow buckeye. Red spruce and Fraser fir are generally on the higher ridges and peaks. Most of the woodland is not available for timber production because it is in areas along the Blue Ridge Parkway. Areas along high ridges and peaks are not used for commercial timber production because the trees are stunted and twisted by high winds and a harsh climate. These areas are used for outdoor recreational activities, such as hiking and camping.

Privately owned areas of this map unit are used for outdoor recreational activities, pasture, or building site development for summer homes. The slope, soil instability, the high winds, and the harsh climate are the main limitations.

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 the dominant soils within the map unit for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit is given under the heading "Use and Management of the Soils."

The map units on the detailed soil maps represent areas on the landscape and consist mainly of the dominant soils for which the units are named.

Symbols identifying the soils precede the map unit names in the map unit descriptions. The descriptions include general facts about the soils and give the principal hazards and limitations to be considered in planning for specific uses.

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are named as phases of soil series. The name of a soil phase commonly indicates a feature or features that affect use or management. For example, Plott fine sandy loam, 30 to 50 percent slopes, stony, is a phase of the Plott 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 contrasting soils or miscellaneous areas 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. Evard-Cowee complex, 15 to 30 percent slopes, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major 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 may be 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. Pits 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 suitabilities for many uses. The Glossary defines many of the terms used in describing the soils.

BkB2—Braddock clay loam, 2 to 8 percent slopes, eroded. This gently sloping, well drained, very deep soil is on high stream terraces, in coves, and on foot slopes. Individual areas are oblong and narrow and range from 2 to 30 acres in size. Elevation ranges from 2,000 to 3,000 feet.

Typically, the sequence, depth, and composition of the layers of this Braddock soil are as follows—

Surface layer:
0 to 6 inches—yellowish red clay loam

Subsoil:
6 to 31 inches—red clay
31 to 40 inches—red clay loam

Underlying material:
40 to 49 inches—yellowish red loam
49 to 60 inches—multicolored loam

Air and water move through this soil at a moderate rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The shrink-swell potential of the subsoil is moderate. The content of organic matter in the surface layer is low. The load-supporting capacity of the soil when wet is low. The rooting depth is more than 60 inches. A surface crust can form after rains in cultivated fields. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Dillsboro soils in depressions. These soils have a subsoil that is browner than that of the Braddock soil and a darker surface layer. They are not eroded. Also included are some soils that have major soil properties similar to those of the Braddock soil and have similar use and management. These soils are underlain by saprolite and have a subsoil that is thinner than that of the Braddock soil. Contrasting inclusions make up about 15 percent of this map unit.

This map unit is mainly used for cropland, hay, pasture, or building site development. Some areas are used for ornamental crop production or orchards.

This Braddock soil is moderately suited to woodland, but it generally is not used for timber production in the survey area.

This soil is moderately suited to cropland because of a hazard of erosion. The major crops are silage corn, tobacco, and trellis tomatoes. Because the hazard of erosion is severe, erosion-control measures, such as conservation tillage, cover crops, crop rotations that include grasses and legumes, grassed waterways, and field borders, should be used. These measures help to conserve moisture, increase the content of organic matter in the surface layer, and improve tilth and the rate of water intake. This soil is subject to the formation of clods and crusting, which result in poor tilth, a high rate of seedling mortality, reduced infiltration, and an increased runoff rate. Plowing or tilling only when the soil is dry helps to prevent clodding.

This soil is well suited to hay and pasture. Adapted forage species include mixtures of tall fescue or orchardgrass and legumes for spring and fall production and sudangrass and alfalfa for summer production. The hazard of erosion is severe where sod in not yet established and where the sod is broken. It also is severe in areas along streambanks where livestock destroy plant cover. Preventing overgrazing, preventing grazing along streambanks, and grazing only when the soil is dry help to control erosion. This soil is susceptible to compaction when wet. Heavy grazing during wet periods increases compaction and surface runoff.

This soil is moderately suited to ornamental crops and orchards because of the hazard of erosion and the clayey subsoil. Sod should be established and maintained on farm paths and between rows. Because of slow air drainage, late spring frost may damage young growth in some years. The high content of clay in the subsoil adversely affects ball and burlap harvesting.

This soil is moderately suited to building site development because of the moderate shrink-swell potential and the high content of clay in the subsoil. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The subsoil has low strength when wet. Special design is needed for the construction of buildings on fill slopes consisting of subsoil material. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

This soil is moderately suited to septic tank absorption fields because of the moderate permeability in the subsoil. Increasing the size of the absorption field helps to overcome this limitation. Trench walls are susceptible to smearing when the trench is dug. Raking the trench walls removes smeared surfaces.

This soil is poorly suited to access roads because of low strength. The moderate potential for frost action is an additional limitation. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance.

The capability subclass is IIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4C.

BkC2—Braddock clay loam, 8 to 15 percent slopes, eroded. This strongly sloping, well drained, very deep soil is on high stream terraces, in coves, and on foot slopes. Individual areas are narrow and oblong and range from 2 to 30 acres in size. Elevation ranges from 2,000 to 3,000 feet.

Typically, the sequence, depth, and composition of the layers of this Braddock soil are as follows—

Surface layer:
0 to 6 inches—yellowish red clay loam

Subsoil:
6 to 31 inches—red clay
31 to 40 inches—red clay loam

Underlying material:
40 to 49 inches—yellowish red loam
49 to 60 inches—multicolored loam

Air and water move through this soil at a moderate rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The shrink-swell potential of the subsoil is moderate. The content of organic matter in the surface layer is low. The load-supporting capacity of the soil when wet is low. The rooting depth is more than 60 inches. A surface crust can form after rains in cultivated fields. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Dillsboro soils in concave areas. Dillsboro soils have a subsoil that is browner than that of the Braddock soil and a darker surface layer. They are not eroded. Also included are some soils that have major soil properties similar to those of the Braddock soil and have similar use and management. These soils are underlain by saprolite and have a subsoil that is thinner than that of the Braddock soil. Contrasting inclusions make up about 15 percent of this map unit.

This map unit is used mainly for cropland, hay, pasture, or building site development. Some areas are used for ornamental crop production or orchards.

This Braddock soil is moderately suited to woodland, but it generally is not used for timber production in the survey area.

This soil is moderately suited to cropland because of the slope and a hazard of erosion. The major crops are silage corn, burley tobacco, and trellis tomatoes. Because the hazard of erosion is severe, erosion-control measures, such as conservation tillage, cover crops, crop rotations that include grasses and legumes, grassed waterways, and field borders, should be used. These measures help to conserve moisture, increase the content of organic matter in the surface layer, and improve tilth and the rate of water intake. Plowing or tilling only when the soil is dry helps to prevent clodding.

This soil is well suited to hay and pasture. Adapted forage species include mixtures of tall fescue or orchardgrass and legumes for spring and fall production and sudangrass and alfalfa for summer production. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along streambanks where livestock destroy plant cover. Preventing overgrazing, preventing grazing along streambanks, and grazing only when the soil is dry help to control erosion. The soil is susceptible to compaction when wet. Heavy grazing during wet periods increases compaction and surface runoff.

This soil is moderately suited to ornamental crops and orchards because of the slope, the hazard of erosion, and the clayey subsoil. Sod should be established and maintained between rows and on farm paths. The high content of clay in the subsoil adversely affects ball and burlap harvesting.

This soil is moderately suited to building site development because of the slope, the moderate shrink-swell potential, and the high content of clay in the subsoil. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The subsoil has low strength when wet. Special design is needed for the construction of buildings on fill slopes consisting of subsoil material. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

This soil is moderately suited to septic tank absorption fields because of the moderate permeability in the subsoil and the slope. Increasing the size of the absorption field and installing absorption lines on the contour help to overcome these limitations. Trench walls are susceptible to smearing when the trench is dug. Raking the trench walls removes smeared surfaces.

This soil is poorly suited to access roads because of low strength. The moderate potential for frost action is an additional limitation. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance.

The capability subclass is IVe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4C.

BoD2—Braddock clay loam, 15 to 30 percent slopes, eroded, stony. This moderately steep, well drained, very deep soil is on high stream terraces, in coves, and on foot slopes. Stones are scattered on the surface. Individual areas are long and narrow and range from 2 to 30 acres in size. Elevation ranges from 2,000 to 3,000 feet.

Typically, the sequence, depth, and composition of the layers of this Braddock soil are as follows—

Surface layer:
0 to 6 inches—yellowish red clay loam

Subsoil:
6 to 31 inches—red clay
31 to 40 inches—red clay loam

Underlying material:
40 to 49 inches—yellowish red loam
49 to 60 inches—multicolored loam

Air and water move through this soil at a moderate rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The shrink-swell potential of the subsoil is moderate. The content of organic matter in the surface layer is low. The load-supporting capacity of the soil when wet is low. The rooting depth is more than 60 inches. A surface crust can form after rains in unvegetated areas. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Dillsboro soils in concave areas and Saunook soils in drainageways. Dillsboro soils have a subsoil that is browner than that of the Braddock soil and a darker surface layer. They are not eroded. Saunook soils have a surface layer that is darker than that of the Braddock soil and a browner subsoil that has less than 35 percent clay. They are not eroded. Also included are some soils that have major soil properties similar to those of the Braddock soil and have similar use and management. These soils are underlain by saprolite and have a subsoil that is thinner than that of the Braddock soil. Contrasting inclusions make up about 15 percent of this map unit.

This map unit is used mainly for hay, pasture, cropland, or building site development. Some areas are used for ornamental crop production or orchards.

This Braddock soil is moderately suited to woodland, but it generally is not used for timber production in the survey area.

This soil is poorly suited to cropland because of the slope, a severe hazard of erosion, and scattered stones on the surface. Erosion-control measures are expensive and difficult to establish and maintain in areas of this soil.

This soil is moderately suited to hay and pasture because of the slope and the stones scattered on the surface. Adapted forage species include mixtures of tall fescue or orchardgrass and legumes for spring and fall production and sudangrass and alfalfa for summer production. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. The soil is susceptible to compaction when wet. Heavy grazing during wet periods increases compaction and surface runoff.

This soil is moderately suited to ornamental crops and orchards because of the slope, the hazard of erosion, and the high content of clay in the subsoil. Sod should be established and maintained on farm paths and between rows. The high content of clay in the subsoil adversely affects ball and burlap harvesting.

This soil is poorly suited to building site development because of the slope. Additional problems are the moderate shrink-swell potential and the high content of clay in the subsoil. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The subsoil has low strength when wet. Special design is needed for the construction of buildings on fill slopes consisting of subsoil material. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

This soil is poorly suited to septic tank absorption fields because of the slope. An additional limitation is the moderate permeability in the subsoil. Increasing the size of the absorption field and installing absorption lines on the contour help to overcome these limitations. Trench walls are susceptible to smearing when the trench is dug. Raking the trench walls removes smeared surfaces.

This soil is poorly suited to access roads because of the slope and low strength. The moderate potential for frost action is an additional limitation. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance.

The capability subclass is VIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

BrC—Braddock-Urban land complex, 2 to 15 percent slopes. This map unit occurs as areas of a gently sloping to strongly sloping, well drained, very deep, eroded Braddock soil and areas of Urban land. This unit is on high stream terraces, in coves, and on foot slopes. Typically, it is about 50 percent Braddock soil and 35 percent Urban land. The Braddock soil and the Urban land occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 2 to 20 acres in size. Elevation ranges from 2,000 to 3,000 feet.

Typically, the sequence, depth, and composition of the layers of this Braddock soil are as follows—

Surface layer:
0 to 6 inches—yellowish red clay loam

Subsoil:
6 to 31 inches—red clay
31 to 40 inches—red clay loam

Underlying material:
40 to 49 inches—yellowish red loam
49 to 60 inches—multicolored loam

Urban land consists of areas covered by closely spaced houses, paved streets, parking lots, driveways, shopping plazas, industrial buildings, schools, churches, and apartment complexes. Because these areas have impermeable surfaces, runoff is high during rainstorms.

Air and water move through the Braddock soil at a moderate rate. Surface runoff is rapid in bare areas. The shrink-swell potential of the subsoil is moderate.

The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is low. The load-supporting capacity of the soil when wet is low. The rooting depth is more than 60 inches. A surface crust can form after rains in unvegetated areas. The potential for frost action is moderate.

Included in this unit in mapping are areas where some or all of the natural soil has been altered or covered as the result of grading and digging. Around commercial buildings, grading, cutting, and filling are likely to have been extensive. Around homes, soil disturbance may largely occur as soil compaction. Also included are small areas of Dillsboro soils in depressions and some soils that have major soil properties similar to those of the Braddock soil and have similar use and management. Dillsboro soils have a subsoil that is browner than that of the Braddock soil and a darker or thicker surface layer. They are not eroded. The similar soils are underlain by saprolite and have a subsoil that is thinner than that of the Braddock soil. Contrasting inclusions make up about 15 percent of this map unit.

This map unit is moderately suited to building site development because of the slope, the moderate shrink-swell potential, and the high content of clay in the subsoil. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The subsoil has low strength when wet. Special design is needed for the construction of buildings on fill slopes consisting of subsoil material. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

This map unit is moderately suited to septic tank absorption fields because of the moderate permeability in the subsoil and the slope in areas with more than 8 percent slope. Increasing the size of the absorption field helps to overcome the moderate permeability. Trench walls are susceptible to smearing when the trench is dug. Raking the trench walls removes smeared surfaces.

This map unit is poorly suited to access roads because of low strength. The moderate potential for frost action is an additional limitation. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance.

The capability subclass is IVe in areas of the Braddock soil and VIIIs in areas of the Urban land. No woodland ordination symbol has been assigned to this map unit.

BsC—Brasstown-Junaluska complex, 8 to 15 percent slopes. This map unit consists of strongly sloping, well drained Brasstown and Junaluska soils. The Brasstown soil is deep, and the Junaluska soil is moderately deep. These soils are on ridges of intermountain hills and low mountains. Typically, the unit is about 55 percent Brasstown soil and 30 percent Junaluska soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are long and narrow and range from 3 to 20 acres in size. Elevation ranges from 1,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Brasstown soil are as follows—

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

Subsurface layer:
4 to 7 inches—yellowish brown loam

Subsoil:
7 to 13 inches—yellowish red loam
13 to 31 inches—red loam

Underlying material:
31 to 45 inches—yellowish red silt loam

Bedrock:
45 to 60 inches—weathered, multicolored low-grade metasedimentary bedrock

Typically, the sequence, depth, and composition of the layers of this Junaluska soil are as follows—

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

Subsoil:
2 to 25 inches—red loam
25 to 28 inches—yellowish red silt loam

Bedrock:
28 to 60 inches—weathered, multicolored low-grade metasedimentary bedrock

Air and water move through these soils at a moderate rate. Surface runoff is medium in bare areas. The depth to soft bedrock ranges from 40 to 60 inches in the Brasstown soil and from 20 to 40 inches in the Junaluska soil. The content of organic matter in the surface layer of both soils ranges from low to high. The rooting depth ranges from 40 to 60 inches in the Brasstown soil and from 20 to 40 inches in the Junaluska soil. The soils are subject to downslope movement when lateral support is removed and may settle unevenly when used for fill slopes. The potential for frost action is moderate.

Included in this unit in mapping are small areas of soils that have more than 35 percent clay in the subsoil or soils that have soft bedrock within a depth of 20 inches. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest and is used for timber production, wildlife habitat, or recreation. The privately owned areas are used for woodland, hay, pasture, cropland, orchards, ornamental crops, or building site development.

These Brasstown and Junaluska soils are well suited to timber production. Upland hardwoods, such as white oak, hickory, scarlet oak, and chestnut oak, and eastern white pine and yellow pines are common. Planting eastern white pine is the best method of reforestation. The main concerns in timber management are a moderate hazard of windthrow on the Junaluska soil and soil instability. Wheeled and tracked equipment can be used on these soils. Using standard wheeled and tracked equipment when the soils are wet causes rutting and compaction. Soil compaction can be reduced by using low-pressure ground equipment, laying out skid trails in advance, and harvesting timber when the soils are dry. The hazard of erosion can be reduced by vegetating all disturbed areas. Site preparation for pines, such as burning and herbicide application, helps to reduce immediate plant competition and improve seedling survival. Burning also helps to minimize debris and lower planting costs. Ripping skid trails and landings when the soils are dry breaks up compacted layers, improves tilth, and increases seedling survival.

These soils are moderately suited to cropland because of the slope and the hazard of erosion. Erosion-control measures are expensive and difficult to install and maintain in areas of this map unit.

These soils are well suited to pasture and hay. Adapted forage species include tall fescue and orchardgrass for spring and fall production and sudangrass and alfalfa for summer production. The hazard of erosion is severe in unvegetated areas. Eroded sites can crust or become sealed, and the result is poor infiltration of water. The hazard of erosion also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soils are dry help to control erosion.

These soils are well suited to orchards and ornamental crop production. The hazard of erosion is severe in unvegetated areas. To reduce the hazard of erosion, sod should be established and maintained between rows and on farm paths. The soils are suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

These soils are moderately suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

The Junaluska soil is poorly suited to septic tank absorption fields because of the moderate depth to soft bedrock. The Brasstown soil is moderately suited to this use because of the slope, the depth to soft bedrock, and the moderate permeability. Onsite investigation is needed to locate sites on the Brasstown soil for sewage disposal. The design of septic tank absorption fields should consider the limitations of these soils. Trench walls may smear if constructed when these soils are too wet. Raking the trench walls removes smeared surfaces. Untreated effluent can move along the surface of the restrictive layer and seep downslope, thus creating a health hazard. Absorption fields should be installed on the contour.

These soils are moderately suited to access roads because of the slope, the moderate potential for frost action, and low strength. During rainy periods, roads in bare areas are slippery and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. Road construction may also expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

The capability subclass is IVe. Based on scarlet oak as the indicator species, the woodland ordination symbol is 4A in areas of the Brasstown soil and 3D in areas of the Junaluska soil.

BsD—Brasstown-Junaluska complex, 15 to 30 percent slopes. This map unit consists of moderately steep, well drained Brasstown and Junaluska soils. The Brasstown soil is deep, and the Junaluska soil is moderately deep. These soils are on ridges and side slopes of intermountain hills and low mountains. Typically, the unit is about 45 percent Brasstown soil and 40 percent Junaluska soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 3 to 100 acres in size. Elevation ranges from 1,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Brasstown soil are as follows—

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

Subsurface layer:
4 to 7 inches—yellowish brown loam

Subsoil:
7 to 13 inches—yellowish red loam
13 to 31 inches—red loam

Underlying material:
31 to 45 inches—yellowish red silt loam

Bedrock:
45 to 60 inches—weathered, multicolored low-grade metasedimentary bedrock

Typically, the sequence, depth, and composition of the layers of this Junaluska soil are as follows—

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

Subsoil:
2 to 25 inches—red loam
25 to 28 inches—yellowish red silt loam

Bedrock:
28 to 60 inches—weathered, multicolored low-grade metasedimentary bedrock

Air and water move through these soils at a moderate rate. Surface runoff is rapid in bare areas. The depth to soft bedrock ranges from 40 to 60 inches in the Brasstown soil and from 20 to 40 inches in the Junaluska soil. The content of organic matter in the surface layer of both soils ranges from low to high. The rooting depth ranges from 40 to 60 inches in the Brasstown soil and from 20 to 40 inches in the Junaluska soil. These soils are subject to downslope movement when lateral support is removed and may settle unevenly when used for fill slopes. The potential for frost action is moderate.

Included in this unit in mapping are small areas of soils that have more than 35 percent clay in the subsoil or soils that have soft bedrock within a depth of 20 inches. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest and is used for timber production, wildlife habitat, or recreation. The privately owned areas are used for woodland, hay, pasture, cropland, ornamental crop production, orchards, or building site development.

These soils are moderately suited to timber production because of a windthrow hazard in areas of the Junaluska soil and the slope. Upland hardwoods, such as white oak, hickory, scarlet oak, and chestnut oak, eastern white pine, and yellow pines are the common trees. Planting eastern white pine is the best method of reforestation. The main concerns in timber management are the hazard of erosion, soil instability, and the slope. A moderate hazard of windthrow is an additional limitation in areas of the Junaluska soil. Wheeled and tracked equipment can be used on these soils. Using standard wheeled and tracked equipment when the soils are wet causes rutting and compaction. Soil compaction can be reduced by using low-pressure ground equipment, laying out skid trails in advance, and harvesting timber when the soils are dry. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. Site preparation for pines, such as burning and herbicide application, helps to reduce immediate plant competition and improve seedling survival. Burning also helps to minimize debris and lower planting costs. Ripping skid trails and landings when the soils are dry breaks up compacted layers, improves tilth, and increases seedling survival.

These soils are poorly suited to cropland because of the slope and the hazard of erosion. Erosion-control measures are expensive and difficult to install and maintain on these soils.

These soils are moderately suited to pasture and hay because of the slope. Adapted forage species include tall fescue and orchardgrass for spring and fall production and sudangrass and alfalfa for summer production. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Eroded sites can crust or become sealed, and the result is poor infiltration of water. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soils are dry help to prevent erosion.

These soils are moderately suited to orchards and ornamental crop production because of the hazard of erosion. Sod should be established and maintained between rows and on farm paths. The soils are suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

These soils are poorly suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The soils are subject to downslope movement in cutbanks and may settle unevenly when used for fill slopes. Permanent retaining walls may be needed to increase soil strength. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete. The soils are very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Construction can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

These soils are poorly suited to septic tank absorption fields because of the moderate depth to soft bedrock in the Junaluska soil and the slope. Untreated effluent can move along the surface of the restrictive layer and seep downslope, thus creating a health hazard. Onsite investigation is needed to locate sites on the Brasstown soil for sewage disposal. Septic tank absorption fields should be installed on the contour. Trench walls may smear if constructed when the soils are too wet. Raking the trench walls removes smeared surfaces.

These soils are poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. During rainy periods, roads in bare areas are slippery and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. Because of the natural instability of these soils, cut and fill slopes are subject to sliding and slumping. Regular maintenance of cut and fill slopes, the road surface, and water-control structures is needed. Surface water should not be diverted across fill slopes. Road construction may also expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

The capability subclass is VIe. Based on scarlet oak as the indicator species, the woodland ordination symbol is 4R in areas of the Brasstown soil and 3R in areas of the Junaluska soil.

BsE—Brasstown-Junaluska complex, 30 to 50 percent slopes. This map unit consists of steep, well drained Brasstown and Junaluska soils. The Brasstown soil is deep, and the Junaluska soil is moderately deep. These soils are on side slopes of intermountain hills and low mountains. Typically, the unit is about 45 percent Brasstown soil and 40 percent Junaluska soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 3 to 100 acres in size. Elevation ranges from 1,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Brasstown soil are as follows—

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

Subsurface layer:
4 to 7 inches—yellowish brown loam

Subsoil:
7 to 13 inches—yellowish red loam
13 to 31 inches—red loam

Underlying material:
31 to 45 inches—yellowish red silt loam

Bedrock:
45 to 60 inches—weathered, multicolored low-grade metasedimentary bedrock

Typically, the sequence, depth, and composition of the layers of this Junaluska soil are as follows—

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

Subsoil:
2 to 25 inches—red loam
25 to 28 inches—yellowish red silt loam

Bedrock:
28 to 60 inches—weathered, multicolored low-grade metasedimentary bedrock

Air and water move through these soils at a moderate rate. Surface runoff is rapid in bare areas. The depth to soft bedrock ranges from 40 to 60 inches in the Brasstown soil and from 20 to 40 inches in the Junaluska soil. The content of organic matter in the surface layer of both soils ranges from low to high. The rooting depth ranges from 40 to 60 inches in the Brasstown soil and from 20 to 40 inches in the Junaluska soil. These soils are subject to downslope movement when lateral support is removed and may settle unevenly when used for fill slopes. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Soco and Stecoah soils on side slopes and Spivey and Whiteoak soils in drainageways. Soco, Spivey, and Stecoah soils have a subsoil that is browner and has less clay than that of the Brasstown and Junaluska soils. Spivey soils have more stones throughout than the Brasstown and Junaluska soils. Whiteoak soils have a surface layer that is thicker or darker than that of the Junaluska and Brasstown soils. Also included are small areas of soils that have soft bedrock within a depth of 20 inches or below a depth of 60 inches. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest and is used for timber production, wildlife habitat, or recreation. The privately owned areas are used for woodland, pasture, ornamental crops, orchards, or building site development.

These Brasstown and Junaluska soils are poorly suited to timber production because of the slope. Upland hardwoods, such as white oak, hickory, scarlet oak, and chestnut oak, eastern white pine, and yellow pines are the common trees. Planting eastern white pine is the best method of reforestation. The main concerns in timber management are erosion, soil instability, and the slope. Wheeled and tracked equipment can be used in the less steep areas, but cable yarding generally is safer to use and does not disturb the soils as much in the steeper areas. Using standard wheeled and tracked equipment when the soils are wet causes rutting and compaction. Soil compaction can be reduced by using low-pressure ground equipment, laying out skid trails in advance, and harvesting timber when the soils are dry. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. Site preparation for pines, such as burning and herbicide application, helps to reduce immediate plant competition and improve seedling survival. Burning also helps to minimize debris and lower planting costs. Ripping skid trails and landings when the soils are dry breaks up compacted layers, improves tilth, and increases seedling survival.

These soils are poorly suited to pasture and unsuited to hay because of the slope and a severe hazard of erosion. Adapted forage species include tall fescue and orchardgrass. The hazard of erosion is severe in unvegetated areas. Eroded sites can crust or become sealed, and the result is poor infiltration of water. The hazard of erosion also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soils are dry help to control erosion. Operating farm equipment on slopes greater than 30 percent is unsafe. Hand application of lime, fertilizers, seeds, and herbicides is necessary because of the slope.

These soils are poorly suited to orchards and ornamental crop production because of the hazard of erosion and the slope. Sod should be established and maintained between rows and on farm paths to control erosion. The soils are suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

These soils are poorly suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The soils are subject to downslope movement in cutbanks and may settle unevenly when used for fill slopes. Permanent retaining walls may be needed to increase soil strength. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete. The soils are very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Construction may expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

These soils are poorly suited to septic tank absorption fields because of the moderate depth to soft bedrock in the Junaluska soil and the slope. Untreated effluent can move along the surface of the restrictive layer and seep downslope, thus creating a health hazard. Onsite investigation is needed to locate sites on the Brasstown soil for sewage disposal. Because the slope can cause effluent to seep to the surface, septic tank absorption fields should be installed on the contour. Trench walls may smear if constructed when the soils are wet. Raking the trench walls removes smeared surfaces.

These soils are poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. During rainy periods, roads in bare areas are slippery and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. Because of the natural instability of these soils, cut and fill slopes are subject to sliding and slumping. Regular maintenance of cut and fill slopes, the road surface, and water-control structures is needed. Surface water should not be diverted across fill slopes. Road construction may expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

The capability subclass VIIe. Based on scarlet oak as the indicator species, the woodland ordination symbol is 4R in areas of the Brasstown soil and 3R in areas of the Junaluska soil.

BuD—Burton-Craggey-Rock outcrop complex, windswept, 8 to 30 percent slopes, stony. This map unit occurs as areas of a moderately deep, well drained Burton soil and a shallow, somewhat excessively drained Craggey soil and areas of Rock outcrop. This map unit is strongly sloping to moderately steep and occurs on ridges of high mountains. Typically, the unit is about 35 percent Burton soil, 25 percent Craggey soil, and 25 percent Rock outcrop. The Burton and Craggey soils and the Rock outcrop occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are long and narrow and range from 5 to 50 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Burton soil are as follows—

Surface layer:

0 to 7 inches—black gravelly loam

7 to 14 inches—very dark grayish brown gravelly loam

Subsoil:

14 to 26 inches—dark yellowish brown gravelly sandy loam

26 to 32 inches—yellowish brown cobbly sandy loam

Bedrock:

32 inches—unweathered high-grade metamorphic and igneous bedrock

Typically, the sequence, depth, and composition of the layers of this Craggey soil are as follows—

Surface layer:

0 to 6 inches—very dark brown gravelly sandy loam

6 to 15 inches—very dark grayish brown sandy loam

Bedrock:

15 inches—unweathered granite gneiss

Air and water move through the Burton soil at a moderate to moderately rapid rate and through the Craggey soil at a moderately rapid rate. Surface runoff is medium or rapid in bare areas of both soils. The content of organic matter in the surface layer is very high. The depth to hard bedrock ranges from 20 to 40 inches in the Burton soil and from 10 to 20 inches in the Craggey soil. The climate is severe. It is cold, icy, and very windy in winter and rainy, foggy, and cool during the rest of the year. The soils remain frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Wayah soils on ridges and Tanasee and Balsam soils along drainageways. These soils are very deep. Balsam soils have more than 35 percent rock fragments in the subsoil. Also included are some soils that have major soil properties similar to those of the Burton and Craggey soils and have similar use and management. These soils have a dark surface layer that is more than 20 inches thick or less than 10 inches thick. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest. It is used for wildlife habitat or recreation or is in a federally designated wilderness area.

This map unit is not used for commercial timber production. The trees have been stunted by high winds and ice damage. Northern red oak is the most common tree. Fraser fir, red spruce, black birch, yellow birch, black cherry, and sugar maple also grow in areas of this map unit.

This map unit is poorly suited to building site development because of the depth to bedrock, a severe hazard of erosion, the harsh climate, and soil freezing. Access is very difficult in winter. Revegetating disturbed areas is a problem because of the slope, limited amounts of soil material, and freezing and thawing in spring and fall. Excavation for dwellings with basements is hindered by bedrock. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

This map unit is poorly suited to septic tank absorption fields because of the slope, soil freezing, and depth to bedrock. The risk of ground water contamination or stream pollution is high. Untreated effluent can move along the surface of the restrictive layer and seep downslope, thus creating a health hazard. Septic tank absorption fields should be installed on the contour.

This map unit is poorly suited to access roads. The depth to hard bedrock and the slope are the main limitations. Freezing and thawing in spring and fall and frequent ice storms in winter increase road maintenance costs. Drilling and blasting hard rock are commonly needed. Roads in bare areas are slick when wet and can be impassable. Surfacing with gravel is required for year-round use. Revegetating cuts and fills is a problem because of the slope, limited amounts of soil material, and freezing and thawing in spring and fall. Roadbeds should be built on natural soil, where possible, to reduce slumping.

The capability subclass is VIe in areas of the Burton soil, VIIs in areas of the Craggey soil, and VIIIs in areas of the Rock outcrop. Based on northern red oak as the indicator species, the woodland ordination symbol is 3R in areas of the Burton soil and 3D in areas of the Craggey soil. No woodland ordination symbol has been assigned to the Rock outcrop.

ChE—Cheoah channery loam, 30 to 50 percent slopes. This steep, deep, well drained soil is on north- to east-facing head slopes and side slopes of intermediate mountains. Individual areas are irregular in shape and range from 5 to 100 acres in size. Elevation ranges from 3,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Cheoah soil are as follows—

Surface layer:

0 to 15 inches—black channery loam

Subsoil:

15 to 35 inches—yellowish brown loam

Underlying material:

35 to 47 inches—yellowish brown channery loam

47 to 51 inches—olive brown very channery fine sandy loam

Bedrock:

51 to 60 inches—olive brown, weathered low-grade metasedimentary bedrock

Air and water move through this soil at moderately rapid rate. Surface runoff is rapid in bare areas. The depth to soft bedrock ranges from 40 to 60 inches. The content of organic matter in the surface layer is high or very high. The rooting depth ranges from 40 to 60 inches. This soil is subject to downslope movement when lateral support is removed and may settle unevenly when used for fill slopes. It is subject to frequent fog in summer and rime ice in winter. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Cataska soils near rock outcrops, Soco and Stecoah soils at the lower elevations and on the warmer aspects, and Whiteoak and Spivey soils along drainageways. Cataska, Soco, and Stecoah soils have a surface layer that is lighter colored or thinner than that of the Cheoah soil. Cataska soils are shallow, and Soco soils are moderately deep to soft bedrock. Whiteoak and Spivey soils are very deep and are along drainageways. Spivey soils have more than 35 percent rock fragments in subsoil. Also included are areas of rock outcrops and some areas of soils that have major soil properties similar to those of the Cheoah soil and have similar use and management. The similar soils have a surface layer that is more than 20 inches thick or less than 10 inches thick. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest and is used for timber production, wildlife habitat, or recreation. Privately owned tracts are used for woodland, pasture, orchards, ornamental crops, or building site development.

This Cheoah soil is poorly suited to timber production because of the slope. Productivity, however, is high. Northern hardwoods, such as northern red oak, sweet birch, black cherry, and white ash, are the common trees. Managing the natural regeneration of hardwoods is the best method of reforestation. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration. The main concerns in timber management are erosion, the slope, and soil instability. Wheeled and tracked equipment can be used in the less steep areas, but cable yarding generally is safer to use and does not disturb the soil as much in the steeper areas. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams.

This soil is poorly suited to pasture and unsuited to hay because of the slope and a severe hazard of erosion. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. Operating farm equipment on slopes greater than 30 percent is unsafe. Hand application of lime, fertilizer, seeds, and herbicides may be necessary on these slopes. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is poorly suited to orchards and ornamental crop production because of the hazard of erosion and the slope. Sod should be established and maintained between rows and on farm paths. The soil is suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is poorly suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The soil is subject to downslope movement in cutbanks and may settle unevenly when used for fill slopes. Permanent retaining walls may be needed to increase soil strength. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete. The soil is very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Construction can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

This soil is poorly suited to septic tank absorption fields because of the slope. Because the slope can cause effluent to seep to the surface, septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Access roads are subject to downslope movement on cut slopes and to differential settling on fill slopes. Permanent retaining walls may be needed to increase soil strength. The soil is very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Road construction can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

ChF—Cheoah channery loam, 50 to 95 percent slopes. This very steep, deep, well drained soil is on north- to east-facing head slopes and side slopes of intermediate mountains. Individual areas are irregular in shape and range from 5 to 150 acres in size. Elevation ranges from 3,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Cheoah soil are as follows—

Surface layer:
0 to 15 inches—black channery loam

Subsoil:
15 to 35 inches—yellowish brown loam

Underlying material:
35 to 47 inches—yellowish brown channery loam
47 to 51 inches—olive brown very channery fine sandy loam

Bedrock:
51 to 60 inches—olive brown, weathered low-grade metasedimentary bedrock

Air and water move through this soil at moderately rapid rate. Surface runoff is rapid in bare areas. The depth to soft bedrock ranges from 40 to 60 inches. The content of organic matter in the surface layer is high or very high. The rooting depth ranges from 40 to 60 inches. This soil is subject to downslope movement when lateral support is removed and may settle unevenly when used for fill slopes. It is subject to frequent fog in summer and rime ice in winter. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Cataska soils near rock outcrops, Soco and Stecoah soils at the lower elevations and on the warmer aspects, and Whiteoak and Spivey soils along drainageways. Cataska, Soco, and Stecoah soils have a surface layer that is lighter colored or thinner than that of the Cheoah soil. Cataska soils are shallow, and Soco soils are moderately deep to soft bedrock. Whiteoak and Spivey soils are very deep. Spivey soils have more than 35 percent rock fragments in subsoil. Also included are areas of rock outcrops and some areas of soils that have major soil properties similar to those of the Cheoah soil and have similar use and management. The similar soils have a surface layer that is more than 20 inches thick or less than 10 inches thick. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest and is used for timber production, wildlife habitat, or recreation. Privately owned tracts are used mainly as woodland or pasture. A few areas are used as building sites.

This Cheoah soil is poorly suited to timber production because of the slope. Productivity, however, is high. Northern hardwoods, such as northern red oak, sweet birch, black cherry, and white ash, are common on this soil. Managing the natural regeneration of hardwoods is the best method of reforestation. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration. The main concerns in timber management are erosion, the slope, and soil instability. The use of wheeled and tracked equipment is dangerous. Cable yarding generally is safer to use, requires fewer roads, and causes less damage to the soil. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams.

This soil is poorly suited to pasture because of the slope and a severe hazard of erosion. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. Operating farm equipment on slopes greater than 50 percent is unsafe. Hand application of lime, fertilizer, seeds, and herbicides is necessary on these slopes. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is poorly suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The soil is subject to downslope movement in cutbanks and may settle unevenly when used for fill slopes. Permanent retaining walls may be needed to increase soil strength. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete. The soil is very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Construction can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

This soil is poorly suited to septic tank absorption fields because of the slope. Because the slope can cause effluent to seep to the surface, septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Access roads are subject to downslope movement on cut slopes and to differential settling on fill slopes. Permanent retaining walls may be needed to increase soil strength. The soil is very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Road construction can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

CtD—Cullasaja very cobbly loam, 15 to 30 percent slopes, extremely bouldery. This moderately steep, very deep, well drained soil is on benches, in coves, and in drainageways downslope from rock outcrops in areas of intermediate mountains. Many boulders and stones are scattered on the surface. Individual areas are oblong or long and narrow and range from 5 to 25 acres in size. Elevation ranges from 3,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Cullasaja soil are as follows—

Surface layer:

0 to 14 inches—black very cobbly loam

14 to 20 inches—dark brown very cobbly loam

Subsoil:

20 to 60 inches—dark yellowish brown very cobbly loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is high or very high. The rooting depth is greater than 60 inches. Stones and boulders average about 2 feet apart and cover about 15 percent of the surface. This map unit contains many springs, and flowing water is common under the surface during wet periods. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Ashe, Chestnut, Cleveland, Edneyville, and Plott soils along the edge of the unit and Tuckasegee soils intermingled with the Cullasaja soil. The included soils have less than 35 percent rock fragments in the subsoil. Ashe and Chestnut soils are moderately deep over bedrock, and Cleveland soils are shallow. Also included are some soils that have major soil properties similar to those of the Cullasaja soil and have similar use and management. These soils have a surface layer that is more than 20 inches thick. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is woodland and is used mainly for timber production or wildlife habitat.

This Cullasaja soil is poorly suited to timber production because of the extremely bouldery surface. Productivity, however, is high. Cove hardwoods, such as yellow-poplar, northern red oak, black cherry, and sweet birch, are the common trees. Managing the natural regeneration of hardwoods is the best method of reforestation. Cutting all of the trees can increase the natural regeneration of hardwoods. The main concerns in timber management are the numerous stones and boulders, which interfere with logging activities, the slope, plant competition, and a hazard of erosion. Cable yarding may be better to use than conventional harvesting methods because it causes less damage to timber and equipment. The hazard of erosion can be reduced by vegetating all of the disturbed areas. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams.

This soil is unsuited to pasture, hay, ornamental crops, row crops, and building sites mainly because of the many boulders and stones on the surface. The slope is an additional limitation.

This soil is poorly suited to access roads. The boulders, the slope, runoff from adjacent higher areas, and seeps and springs are the main problems affecting construction and maintenance. Because of the boulders and stones, building roads is difficult and expensive. Falling rock makes access roads dangerous, especially during intense and prolonged periods of rainfall. The moderate potential for frost action is an additional limitation. Cutbanks are unstable. Road sites must be designed so that storm water flowing from the adjacent higher areas is diverted away from access roads and springs and seeps are avoided.

The capability subclass is VIIs. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8X.

CtE—Cullasaja very cobbly loam, 30 to 50 percent slopes, extremely bouldery. This steep, very deep, well drained soil is on benches, in coves, and in drainageways downslope from rock outcrops in areas of intermediate mountains. Many boulders and stones are scattered on the surface. Individual areas are oblong or long and narrow and range from 5 to 25 acres in size. Elevation ranges from 3,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Cullasaja soil are as follows—

Surface layer:

0 to 14 inches—black very cobbly loam

14 to 20 inches—dark brown very cobbly loam

Subsoil:

20 to 60 inches—dark yellowish brown very cobbly loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is high or very high. The rooting depth is greater than 60 inches. Stones and boulders average about 2 feet apart and cover about 15 percent of the surface. This map unit contains many springs, and flowing water is common under the surface during wet periods. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Ashe, Chestnut, Cleveland, Edneyville, and Plott soils along the edge of the unit and Tuckasegee soils intermingled with the Cullasaja soil. The included soils have less than 35 percent rock fragments in the subsoil. Ashe and Chestnut soils are moderately deep over bedrock, and Cleveland soils are shallow. Also included are some soils that have major soil properties similar to those of the Cullasaja soil and have similar use and management. These soils have a surface layer that is more than 20 inches thick. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is woodland and is used for timber production and wildlife habitat.

This Cullasaja soil is poorly suited to timber production because of the slope and the extremely bouldery surface. Productivity, however, is high. Cove hardwoods, such as yellow-poplar, northern red oak, black cherry, and sweet birch, are the common trees. Managing the natural regeneration of hardwoods is the best method of reforestation. Cutting all of the trees can increase the natural regeneration of hardwoods. The main concerns in timber management are the numerous stones and boulders, which interfere with logging activities, the slope, plant competition, and a hazard of erosion. Cable yarding may be better to use than conventional harvesting methods because it causes less damage to timber and equipment. The hazard of erosion can be reduced by vegetating all disturbed areas. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams.

This soil is unsuited to pasture, hay, ornamental crops, row crops, and building sites because of the many boulders and stones on the surface and the slope.

This soil is poorly suited to access roads. The boulders, the slope, runoff from adjacent higher areas, and seeps and springs are the main problems affecting construction and maintenance. Because of the boulders and stones, building roads is difficult and expensive. Falling rock makes access roads dangerous, especially during intense and prolonged periods of rainfall. The moderate potential for frost action is an additional limitation. Cutbanks are unstable. Road sites must be designed so that storm water flowing from the adjacent higher areas is diverted away from access roads and springs and seeps are avoided.

The capability subclass is VIIs. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

CxA—Cullowhee-Nikwasi complex, 0 to 2 percent slopes, frequently flooded. This map unit consists of a nearly level, somewhat poorly drained Cullowhee soil and a nearly level, poorly drained and very poorly drained Nikwasi soil. These soils are on narrow flood plains. The Cullowhee soil generally occurs closer to stream channels and higher on the landscape than the Nikwasi soil. The soils are very deep over bedrock and moderately deep to strata of gravel, cobbles, and sand. Typically, the unit is about 50 percent Cullowhee soil and 35 percent Nikwasi soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are long and narrow and range from 5 to 50 acres in size. Elevation ranges from 1,500 to 3,000 feet.

Typically, the sequence, depth, and composition of the layers of this Cullowhee soil are as follows—

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

Subsoil:
10 to 14 inches—brown sandy loam

Underlying material:
14 to 31 inches—brown sandy loam
31 to 60 inches—gray very gravelly loamy sand

Typically, the sequence, depth, and composition of the layers of this Nikwasi soil are as follows—

Surface layer:
0 to 6 inches—very dark grayish brown loam
6 to 21 inches—very dark gray loam
21 to 28 inches—very dark grayish brown loamy sand

Underlying material:
28 to 60 inches—dark grayish brown very gravelly loamy sand

Air and water move through these soils at a moderately rapid rate above the gravelly material and at a rapid rate through the gravelly material. Surface runoff is slow even in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer ranges from moderate to very high. The rooting depth ranges from 20 to 40 inches. A seasonal high water table is at a depth of 1.5 to 2.0 feet in the Cullowhee soil and within a depth of 1.0 foot in the Nikwasi soil. The potential for frost action is low in both soils.

Included in this unit in mapping are small areas of Dellwood soils in the slightly higher areas and Hemphill soils in areas where the unit joins a low stream terrace. Dellwood soils are moderately well drained. They are shallow to sandy strata containing more than 35 percent gravel and cobbles. Hemphill soils have more than 35 percent clay in the subsoil. Also included are soils that have major soil properties similar to those of the Cullowhee and Nikwasi soils and have similar use and management. These soils have as much as 18 inches of sandy or loamy overwash material on the surface. Contrasting inclusions make up about 15 percent of this map unit.

This map unit is used mainly for cropland, pasture, or hay.

The Nikwasi soil is hydric. Undrained, noncropland areas of this soil generally are natural wetlands. Artificial drainage of such areas is subject to regulations affecting wetlands and may require special permits and extra planning. Recommendations for installing artificial drainage systems in areas of this soil pertain only to those areas that are currently used as cropland.

If artificially drained, this Cullowhee soil is moderately suited to cropland. This Nikwasi soil is poorly suited to cropland because of the wetness. The flooding also is a major limitation. Tilth can be improved or maintained by cropping systems that include grasses, legumes, or grass-legume mixtures, crop rotations, and cover crops. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

Because of the wetness and the flooding, the Cullowhee soil is moderately suited to pasture and hay and the Nikwasi soil is poorly suited to these uses. Adapted forage species include tall fescue and reed canarygrass. Installing artificial drainage systems can improve the quality and quantity of forage. Fencing livestock away from streams helps to prevent erosion of the streambank and improve water quality.

These soils are unsuited to building sites and septic tank absorption fields because of the flooding and the wetness.

These soils are poorly suited to access roads because of the wetness and the flooding. They are subject to flash flooding. Constructing the roads above the level of potential floodwaters is necessary for safety and helps to prevent damage and reduce maintenance.

The capability subclass is IIIw in areas of the Cullowhee soil and VIw in areas of the Nikwasi soil. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8W in areas of the Cullowhee soil and 6W in areas of the Nikwasi soil.

DeA—Dellwood cobbly sandy loam, 0 to 3 percent slopes, occasionally flooded. This nearly level, moderately well drained soil is on flood plains of fast-flowing streams. This soil is very deep over bedrock but shallow to strata of gravel, cobbles, and sand. Individual areas parallel streams, are irregular in shape, and range from 10 to 100 acres in size. Elevation ranges from 2,000 to 3,000 feet.

Typically, the sequence, depth, and composition of the layers of this Dellwood soil are as follows—

Surface layer:

0 to 8 inches—dark brown cobbly sandy loam

8 to 14 inches—dark brown very gravelly loamy sand

14 to 24 inches—dark yellowish brown extremely gravelly coarse sand

Underlying material:

24 to 33 inches—dark yellowish brown extremely gravelly coarse sand

33 to 50 inches—yellowish brown extremely gravelly coarse sand

50 to 60 inches—dark yellowish brown extremely gravelly coarse sand

Air and water move through this soil at a moderately rapid rate above the gravelly material and at a rapid rate through the gravelly material. The depth to bedrock is more than 60 inches. Surface runoff is slow even in bare areas. The content of organic matter in the surface layer is moderate or high. The rooting depth is greater than 60 inches. The depth to a seasonal high water table ranges from 2 to 4 feet. The potential for frost action is low.

Included in this unit in mapping are small areas of Cullowhee and Nikwasi soils in depressions. These soils are moderately deep to sandy strata containing more than 35 percent gravel and cobbles. Cullowhee soils are somewhat poorly drained, and Nikwasi soils are poorly drained or very poorly drained. Also included are some small gravel pits and small areas of moderately well drained soils having loamy horizons that are 20 to 40 inches thick over strata of sand, gravel, and cobbles. Contrasting inclusions make up about 15 percent of this map unit.

This map unit is used mainly for cropland, pasture, hay, or building site development. It is not used for woodland in the survey area.

This Dellwood soil is moderately suited to cropland. The major crops are silage corn, burley tobacco, tomatoes, and some fruit and vegetable crops. In depressions, artificial drainage may be needed to control water flowing through the underlying material. On knolls, irrigation may be needed to overcome the very low available water capacity. The removal of the surface cobbles may be needed to prevent damage to farm equipment. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution. Tilth can be improved or maintained by cropping systems that include grasses, legumes, or grass-legume mixtures, crop rotations, cover crops, and applications of manure. Nutrients are easily leached from this soil. Split applications of fertilizers can maximize use of the fertilizers and help to control contamination of ground water. Crops are susceptible to occasional flood damage.

This soil is moderately suited to pasture and hay because of the cobbles on the surface and droughtiness. Adapted forage species include tall fescue, orchardgrass, and legumes. The removal of the surface cobbles may be needed to prevent damage to farm equipment. Fencing livestock away from streams helps to prevent erosion of the streambank and improve water quality. Because of the very low available water capacity, yields may be reduced during dry periods. Rotating grazing and applying fertilizers help to maintain the quality and quantity of forage.

This soil is poorly suited to building site development because of the flooding. Many homesites, farm buildings, commercial buildings, and roads, however, are located in areas of this soil. Building site developments need protection from flooding. Corrosivity and the wetness are additional limitations. If suitable outlets are available, drainage tile should be installed around building foundations. Retainer walls are needed for all excavations to prevent cutbanks from caving. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is poorly suited to septic tank absorption fields because of the wetness, the flooding, and poor filtering of effluent. Special design is needed for the absorption fields.

This soil is poorly suited to access roads because of the flooding. It is subject to flash flooding. Constructing roads above the level of potential floodwaters is necessary for safety and helps to prevent road damage and reduce maintenance.

This soil is moderately suited to most recreational facilities because of the flooding.

The capability subclass is IVs. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8F.

DhA—Dellwood-Urban land complex, 0 to 3 percent slopes, occasionally flooded. This map unit occurs as areas of a nearly level, moderately well drained Dellwood soil and areas of Urban land. This unit is on flood plains of fast-flowing streams. The Dellwood soil is very deep over bedrock but is shallow to strata of gravel, cobbles, and sand. Typically, the unit is about 50 percent Dellwood soil and 35 percent Urban land. The Dellwood soil and the Urban land occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 10 to 50 acres in size. Elevation ranges from 2,000 to 3,000 feet.

Typically, the sequence, depth, and composition of the layers of this Dellwood soil are as follows—

Surface layer:

0 to 8 inches—dark brown cobbly sandy loam
8 to 14 inches—dark brown very gravelly loamy sand
14 to 24 inches—dark yellowish brown extremely gravelly coarse sand

Underlying material:

24 to 33 inches—dark yellowish brown extremely gravelly coarse sand
33 to 50 inches—yellowish brown extremely gravelly coarse sand
50 to 60 inches—dark yellowish brown extremely gravelly coarse sand

Urban land consists of areas covered by closely spaced houses, paved streets, parking lots, driveways, shopping plazas, industrial buildings, schools, churches, and apartment complexes. Because these areas have impermeable surfaces, runoff is high during rainstorms.

Air and water move through the Dellwood soil at a moderately rapid rate above the gravelly material and at a very rapid rate through the gravelly material. The depth to bedrock is more than 60 inches. Surface runoff is slow in bare areas. The content of organic matter in the surface layer is moderate or high. The rooting depth is greater than 60 inches. The depth to a seasonal high water table is 2 to 4 feet. The potential for frost action is low.

Included in this unit in mapping are small areas of Cullowhee and Nikwasi soils in depressions. These soils are moderately deep to sandy strata containing more than 35 percent gravel and cobbles. Cullowhee soils are somewhat poorly drained, and Nikwasi soils are poorly drained or very poorly drained. Also included are some small gravel pits and small areas of moderately well drained soils having loamy horizons that are 20 to 40 inches thick over strata of sand, gravel, and cobbles. Contrasting inclusions make up about 15 percent of this map unit.

This map unit is poorly suited to building site development because of the flooding. Retainer walls are needed for all excavations to prevent cutbacks from caving. Buildings need protection from the wetness and the flooding. If suitable outlets are available, drainage tile should be installed around the foundation. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This map unit is poorly suited to septic tank absorption fields because of the wetness, the flooding, and poor filtering of effluent. Special design is needed for the absorption fields.

This map unit is poorly suited to access roads because of the flooding. It is subject to flash flooding. Constructing roads above the level of potential floodwaters is necessary for safety and helps to prevent road damage and reduce maintenance.

The capability subclass is IVs in areas of the Dellwood soil and VIIIs in areas of the Urban land. No woodland ordination symbol has been assigned to this map unit.

DsB—Dillsboro loam, 2 to 8 percent slopes. This gently sloping, very deep, well drained soil is in coves, on benches, on toe slopes, and on high stream terraces. Individual areas are irregular in shape and range from 5 to 50 acres in size. Elevation ranges from 2,000 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Dillsboro soil are as follows—

Surface layer:

0 to 9 inches—dark yellowish brown loam

Subsoil:

9 to 44 inches—strong brown clay
44 to 60 inches—strong brown clay loam

Air and water move through this soil at a moderate rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The shrink-swell potential of the subsoil is moderate. The content of organic matter in the surface layer is moderate or high. The load-supporting capacity of the soil when wet is low. The rooting depth is more than 60 inches. This soil is subject to seeps and springs. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Braddock soils intermingled with the Dillsboro soil on eroded knolls, Saunook soils along the edge of drainageways, and Statler soils in the flatter low areas. Braddock soils have a red subsoil. Saunook and Statler soils have less than 35 percent clay in the subsoil. Also included are small areas of moderately well drained soils in depressions. Contrasting inclusions make up about 15 percent of this map unit.

This map unit is used for cropland, hay, pasture, orchards, ornamental crops, or building site development.

This Dillsboro soil is well suited to woodland, but it

Figure 5.—An area of Dillsboro loam, 2 to 8 percent slopes, that is used for winter wheat after silage corn is harvested. A conservation plan for cultivated land commonly includes a winter cover crop.

generally is not used for timber production in the survey area.

This soil is well suited to cropland. The hazard of erosion is moderate. Cover crops, crop rotations that include grasses and legumes, conservation structures, such as grassed waterways and field borders, and conservation tillage practices help to control erosion (fig. 5). Tilth and the rate of water intake are improved by erosion-control measures. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is well suited to hay and pasture. Adapted forage species include mixtures of tall fescue or orchardgrass and legumes for spring and fall production and sudangrass and alfalfa for summer production. The hazard of erosion is moderate in unvegetated areas. It is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. The soil is susceptible to compaction when wet.

This soil is well suited to orchards and moderately well suited to ornamental crops because of the high content of clay in the subsoil. Establishing sod as soon as possible helps to control erosion. The sod should be maintained on farm paths and between rows by mowing, applying fertilizer, liming, and controlling weeds and pests. The high content of clay in the subsoil adversely affects ball and burlap harvesting. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is moderately suited to building site development because of the shrink-swell potential. Special designs for building foundations are needed to overcome this limitation. All excavated areas are susceptible to moderate erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

This soil is moderately suited to septic tank absorption fields because of the moderate permeability in the subsoil. Increasing the size of the absorption field helps to overcome this limitation. Trench walls are susceptible to smearing when the trench is dug. Raking the trench walls removes smeared surfaces.

This soil is poorly suited to access roads because of low strength. The moderate potential for frost action is an additional limitation. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. After an access road is built, cut and fill slopes and the roadbed should be vegetated as soon as possible.

The capability subclass is IIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7A.

DsC—Dillsboro loam, 8 to 15 percent slopes. This strongly sloping, very deep, well drained soil is in coves, on benches, on toe slopes, and on high stream terraces. Individual areas are irregular in shape and range from 5 to 50 acres in size. Elevation ranges from 2,000 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Dillsboro soil are as follows—

Surface layer:

0 to 9 inches—dark yellowish brown loam

Subsoil:

9 to 44 inches—strong brown clay
44 to 60 inches—strong brown clay loam

Air and water move through this soil at a moderate rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The shrink-swell potential of the subsoil is moderate. The content of organic matter in the surface layer is moderate or high. The load-supporting capacity of the soil when wet is low. The rooting depth is more than 60 inches. This soil is subject to seeps and springs. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Braddock soils intermingled with the Dillsboro soil on eroded knolls and Saunook soils along the edge of drainageways. Braddock soils have a red subsoil. Saunook soils have less than 35 percent clay in the subsoil. Also included are small areas of moderately well drained soils in depressions. Contrasting inclusions make up about 15 percent of this map unit.

This map unit is used mainly for cropland, pasture, hay, orchards, ornamental crops, or building site development.

This Dillsboro soil is well suited to woodland, but it generally is not used for timber production in the survey area.

This soil is moderately suited to cropland because of the slope and a severe hazard of erosion. Cover crops, crop rotations that include grasses and legumes, conservation structures, such as grassed waterways and field borders, and conservation tillage practices help to control erosion. Tilth and the rate of water intake are improved by erosion-control measures. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is well suited to hay and pasture. Adapted forage species include mixtures of tall fescue or orchardgrass and legumes for spring and fall production and sudangrass and alfalfa for summer production. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. The soil is susceptible to compaction when wet.

This soil is moderately suited to ornamental crops because of the high content of clay in the subsoil. It is well suited to orchards. The hazard of erosion is severe in unvegetated areas. To reduce this hazard, sod should be established and maintained between rows and on farm paths. The high content of clay in the subsoil adversely affects ball and burlap harvesting. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is moderately suited to building site development because of the slope and the shrink-swell potential. The special design of building foundations is needed to overcome these limitations. All excavated areas are susceptible to moderate erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

This soil is moderately suited to septic tank absorption fields because of the moderate permeability in the subsoil and the slope. Increasing the size of the absorption field can help to overcome the percolation problem. The trench walls are susceptible to smearing when the trench is dug. Raking the trench walls removes smeared surfaces.

This soil is poorly suited to access roads because of low strength. The moderate potential for frost action is an additional limitation. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. After an access road is built, cut and fill slopes and the roadbed should be vegetated as soon as possible.

The capability subclass is IIIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7A.

DuC—Dillsboro-Urban land complex, 2 to 15 percent slopes. This map unit occurs as areas of a very deep, well drained Dillsboro soil and areas of Urban land. This unit is gently sloping to strongly sloping and occurs in coves and on high stream terraces. Typically, it is about 50 percent Dillsboro soil and 30 percent Urban land. The Dillsboro soil and the Urban land occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 5 to 25 acres in size. Elevation ranges from 2,000 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Dillsboro soil are as follows—

Surface layer:

0 to 9 inches—dark yellowish brown loam

Subsoil:

9 to 44 inches—strong brown clay
44 to 60 inches—strong brown clay loam

Urban land consists of areas covered by closely spaced houses, paved roads, parking lots, driveways, shopping plazas, industrial buildings, schools, churches, and apartment complexes. Because these areas have impermeable surfaces, runoff is high during rainstorms.

Air and water move through the Dillsboro soil at a moderate rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The shrink-swell potential of the subsoil is moderate. The content of organic matter in the surface layer is moderate or high. The load-supporting capacity of the soil when wet is low. The rooting depth is more than 60 inches. This soil is subject to seeps and springs. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Braddock soils intermingled with the Dillsboro soil on eroded knolls, Saunook soils along the edge of drainageways, and Statler soils in the flatter low areas. Braddock soils have a red subsoil. Saunook and Statler soils have less than 35 percent clay in the subsoil. Also included are small areas of moderately well drained soils in depressions. Contrasting inclusions make up about 15 percent of this map unit.

This map unit is moderately suited to building site development because of the slope and the shrink-swell potential. The special design of building foundations is needed to overcome the shrink-swell potential. All excavated areas are susceptible to moderate erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

This map unit is moderately suited to septic tank absorption fields because of the moderate permeability in the subsoil and the slope. Increasing the size of the absorption field helps to overcome the percolation problem. The trench walls are susceptible to smearing when the trench is dug. Raking the trench walls removes smeared surfaces.

This map unit is poorly suited to access roads because of low strength. The moderate potential for frost action is an additional limitation. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. After an access road is built, cut and fill slopes and the roadbed should be vegetated as soon as possible.

The capability subclass is IIIe in areas of the Dillsboro soil and VIIIs in areas of the Urban land. No woodland ordination symbol has been assigned to this map unit.

EdC—Edneyville-Chestnut complex, 8 to 15 percent slopes, stony. This map unit consists of strongly sloping, well drained Edneyville and Chestnut soils. The Edneyville soil is very deep, and the Chestnut soil is moderately deep. These soils are on ridges of intermediate mountains. Stones and boulders are scattered on the surface. Typically, the unit is about 50 percent Edneyville soil and 35 percent Chestnut soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are long and narrow and range from 5 to 25 acres in size. Elevation ranges from 3,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Edneyville soil are as follows—

Surface layer:
0 to 3 inches—brown gravelly loam

Subsoil:
3 to 34 inches—yellowish brown sandy loam

Underlying material:
34 to 60 inches—multicolored saprolite of gravelly loamy sand

Typically, the sequence, depth, and composition of the layers of this Chestnut soil are as follows—

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

Subsoil:
4 to 21 inches—dark yellowish brown gravelly loam

Underlying material:
21 to 30 inches—yellowish brown gravelly sandy loam

Bedrock:
30 to 60 inches—weathered, multicolored high-grade metamorphic and igneous bedrock

Air and water move through these soils at a moderately rapid rate. Surface runoff is medium in bare areas. The depth to soft bedrock is more than 60 inches in the Edneyville soil and ranges from 20 to 40 inches in the Chestnut soil. The content of organic matter in the surface layer of both soils ranges from low to high. The rooting depth is greater than 60 inches in the Edneyville soil and ranges from 20 to 40 inches in the Chestnut soil. The potential for frost action is moderate in both soils.

Included in this unit in mapping are small areas of Ashe and Cleveland soils near rock outcrops and Cowee and Evard soils on ridges and nose slopes. Ashe soils are moderately deep to hard bedrock, and Cleveland soils are shallow to hard bedrock. Cowee and Evard soils have a subsoil that is redder than that of the Edneyville and Chestnut soils and has more than 18 to 35 percent clay. Some prominent exposed ridgetops are windswept. Also included are small areas of soils that have soft bedrock at a depth of 40 to 60 inches, areas of rock outcrops, and some small areas of soils that have a high content of mica. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is used as woodland. The rest is used for pasture, hay, orchards, ornamental crops, or building site development.

These Edneyville and Chestnut soils are well suited to timber production, but windthrow is a hazard in areas of the Chestnut soil. Upland hardwoods, such as white oak, hickory, scarlet oak, and chestnut oak, eastern white pine, and yellow pines are the common trees. Managing the natural regeneration of hardwoods is the best method of reforestation. Cutting all of the trees can increase the natural regeneration of hardwoods. The main concern in managing timber is a moderate hazard of windthrow on the Chestnut soil. Wheeled and tracked equipment can be used on these soils, but stones may limit the ground clearance of some vehicles.

These soils are moderately suited to cropland because of the slope and a hazard of erosion. This map unit is used for cropland in only a few small areas because of poor accessibility.

These soils are well suited to pasture and hay. Adapted forage species include tall fescue, orchardgrass, native bluegrass, and legumes. The hazard of erosion is severe in unvegetated areas. It also is severe where livestock destroy plant cover. Preventing overgrazing and grazing only when the soils are dry help to control erosion.

These soils are well suited to orchards and ornamental crops. The hazard of erosion is severe in unvegetated areas. To reduce this hazard, sod should be established and maintained between rows and on farm paths. The soils are suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

These soils are moderately suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete may be damaged by the high corrosivity of the soils. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

The Edneyville soil is moderately suited to septic tank absorption fields because of the slope. The Chestnut soil is poorly suited to this use because of the slope and the moderate depth to soft bedrock. Special design is needed for the absorption fields. Untreated effluent can move along the surface of the restrictive layer and seep downslope, thus creating a health hazard. Onsite investigation is needed to locate sites on the Edneyville soil for sewage disposal. Septic tank absorption fields should be installed on the contour.

These soils are moderately suited to access roads because of the slope and the moderate potential for frost action. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. The soft bedrock in the Chestnut soil is difficult to excavate, and chunks of soft bedrock are hard to pack or difficult to vegetate on fill slopes. Frost action may damage unprotected road surfaces.

The capability subclass is IVe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4A in areas of the Edneyville soil and 4D in areas of the Chestnut soil.

EdD—Edneyville-Chestnut complex, 15 to 30 percent slopes, stony. This map unit consists of moderately steep, well drained Edneyville and Chestnut soils. The Edneyville soil is very deep, and the Chestnut soil is moderately deep. These soils are on ridges and south- to west-facing side slopes of intermediate mountains. Stones and boulders are scattered on the surface. Typically, the unit is about 50 percent Edneyville soil and 35 percent Chestnut soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are long and narrow or irregular in shape and range from 5 to 50 acres in size. Elevation ranges from 3,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Edneyville soil are as follows—

Surface layer:
0 to 3 inches—brown gravelly loam

Subsoil:
3 to 34 inches—yellowish brown sandy loam

Underlying material:
34 to 60 inches—multicolored saprolite of gravelly loamy sand

Typically, the sequence, depth, and composition of the layers of this Chestnut soil are as follows—

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

Subsoil:
4 to 21 inches—dark yellowish brown gravelly loam

Underlying material:
21 to 30 inches—yellowish brown gravelly sandy loam

Bedrock:
30 to 60 inches—weathered, multicolored high-grade metamorphic and igneous bedrock

Air and water move through these soils at a moderately rapid rate. Surface runoff is rapid in bare areas. The depth to soft bedrock is more than 60 inches in the Edneyville soil and ranges from 20 to 40 inches in the Chestnut soil. The content of organic matter in the surface layer of both soils ranges from low to high. The rooting depth is greater than 60 inches in the Edneyville soil and ranges from 20 to 40 inches in the Chestnut soil. The potential for frost action is moderate in both soils.

Included in this unit in mapping are small areas of Ashe and Cleveland soils near rock outcrops, Tuckasegee and Cullasaja soils in narrow drainageways, and Cowee and Evard soils on ridges and nose slopes. Ashe soils are moderately deep to hard bedrock, and Cleveland soils are shallow to hard bedrock. Cowee and Evard soils have a subsoil that is redder than that of the Edneyville and Chestnut soils and has 18 to 35 percent clay. Tuckasegee and Cullasaja soils have a dark surface layer that is thicker than that of the Edneyville and Chestnut soils. Cullasaja soils have more than 35 percent rock fragments in the subsoil. Some prominent exposed ridgetops are windswept. Also included are soils that have soft bedrock at a depth of 40 to 60 inches, areas of rock outcrops, and some small areas of soils that have a high content of mica. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is used as woodland. The rest is used for pasture, hay, orchards, ornamental crops, or building site development.

The Edneyville and Chestnut soils are moderately suited to timber production because of a hazard of windthrow in areas of Chestnut soil and the slope. Upland hardwoods, such as white oak, hickory, scarlet oak, and chestnut oak, eastern white pine, and yellow pines are the common trees. Managing the natural regeneration of hardwoods is the best method of reforestation. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration. The main concerns in timber management are the hazard of erosion and the slope. A moderate hazard of windthrow is an additional limitation on the Chestnut soil. Wheeled and tracked equipment can be used on these soils, but stones may limit the ground clearance of some vehicles. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams.

These soils are poorly suited to cropland because of the slope, a severe hazard of erosion, and limited access. Conservation practices are expensive to install and maintain on these soils.

These soils are moderately suited to pasture and hay because of the slope. Adapted forage species include tall fescue, orchardgrass, native bluegrass, and legumes. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soils are dry help to control erosion.

These soils are moderately suited to orchards and ornamental crops because of the slope and the hazard of erosion. Sod should be established and maintained between rows and on farm paths to help control erosion. The soils are suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

These soils are poorly suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete foundations may be damaged by the high corrosivity of the soils. Corrosion-resistant material should be used.

These soils are poorly suited to septic tank absorption fields because of the moderate depth to soft bedrock in the Chestnut soil and the slope. Untreated effluent can move along the surface of the restrictive layer and seep downslope, thus creating a health hazard. Onsite investigation is needed to locate sites on the Edneyville soil for sewage disposal. Septic tank absorption fields should be installed on the contour.

These soils are poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Access roads should be designed to remove runoff safely. Frost action may damage unprotected road surfaces. The hazard of erosion can be reduced by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Regular maintenance of cut and fill slopes, the road surface, and water-control structures is needed. Surface water should not be diverted across fill slopes. The soft bedrock in the Chestnut soil is difficult to excavate, and chunks of soft bedrock are hard to pack or difficult to vegetate on fill slopes.

The capability subclass is VIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

EdE—Edneyville-Chestnut complex, 30 to 50 percent slopes, stony. This map unit consists of steep, well drained Edneyville and Chestnut soils. The Edneyville soil is very deep, and the Chestnut soil is moderately deep. These soils are on south- to west-facing side slopes of intermediate mountains. Stones and boulders are scattered on the surface. Typically, the unit is about 50 percent Edneyville soil and 35 percent Chestnut soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 5 to 200 acres in size. Elevation ranges from 3,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Edneyville soil are as follows—

Surface layer:
0 to 3 inches—brown gravelly loam

Subsoil:
3 to 34 inches—yellowish brown sandy loam

Underlying material:
34 to 60 inches—multicolored saprolite of gravelly loamy sand

Typically, the sequence, depth, and composition of the layers of this Chestnut soil are as follows—

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

Subsoil:
4 to 21 inches—dark yellowish brown gravelly loam

Underlying material:
21 to 30 inches—yellowish brown gravelly sandy loam

Bedrock:
30 to 60 inches—weathered, multicolored high-grade metamorphic and igneous bedrock

Air and water move through these soils at a moderately rapid rate. Surface runoff is rapid in bare areas. The depth to soft bedrock is more than 60 inches in the Edneyville soil and ranges from 20 to 40 inches in the Chestnut soil. The content of organic matter in the surface layer of both soils ranges from low to high. The rooting depth is greater than 60 inches in the Edneyville soil and ranges from 20 to 40 inches in the Chestnut soil. The potential for frost action is moderate in both soils.

Included in this unit in mapping are small areas of Ashe and Cleveland soils near rock outcrops, Evard and Cowee soils on nose slopes, Plott soils on cool aspects, and Tuckasegee and Cullasaja soils in narrow drainageways. Ashe soils are moderately deep to hard bedrock, and Cleveland soils are shallow to hard bedrock. Cowee and Evard soils have a subsoil that is redder than that of the Edneyville and Chestnut soils and has 18 to 35 percent clay. Plott, Tuckasegee, and Cullasaja soils have a surface layer that is thicker than that of the Edneyville and Chestnut soils. Cullasaja soils have more than 35 percent rock fragments in the subsoil. Some prominent exposed ridgetops are windswept. Also included are soils that have soft bedrock at a depth of 40 to 60 inches, areas of rock outcrops, and some small areas of soils that have a high content of mica. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is used as woodland. The rest is used for pasture, orchards, ornamental crops, or building site development.

These Edneyville and Chestnut soils are poorly suited to timber production because of the slope. Upland hardwoods, such as white oak, hickory, scarlet oak, and chestnut oak, are the common trees. Eastern white pine and yellow pines also grow on these soils. Managing the natural regeneration of hardwoods is the best method of reforestation. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration. The main concerns in timber management are a hazard of erosion and the slope. Wheeled and tracked equipment can be used in the less steep areas, but cable yarding generally is safer to use and does not disturb the soils as much in the steeper areas. Stones can limit the ground clearance of some vehicles. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams.

These soils are poorly suited to pasture and unsuited to hay because of the slope. Adapted forage species include tall fescue, orchardgrass, native bluegrass, and legumes. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soils are dry help to control erosion. Operating farm machinery on slopes greater than 30 percent is unsafe.

These soils are poorly suited to orchards and ornamental crops because of the slope. Sod should be established and maintained between rows and on farm paths to help control erosion. The soils are suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

These soils are poorly suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete foundations may be damaged by the high corrosivity of the soils. Corrosion-resistant material should be used.

These soils are poorly suited to septic tank absorption fields because of the moderate depth to soft bedrock in the Chestnut soil and the slope. Untreated effluent can move along the surface of the restrictive layer and seep downslope, thus creating a health hazard. Onsite investigation is needed to locate sites on the Edneyville soil for sewage disposal. Because the slope can cause seepage, the absorption fields should be installed on the contour.

These soils are poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Access roads should be designed to remove runoff safely. The soft bedrock in the Chestnut soil is difficult to excavate, and chunks of soft bedrock are hard to pack or difficult to vegetate on fill slopes. Frost action may damage unprotected road surfaces. The hazard of erosion can be reduced by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Regular maintenance of cut and fill slopes, the road surface, and water-control structures is needed. Surface water should not be diverted across fill slopes.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

EdF—Edneyville-Chestnut complex, 50 to 95 percent slopes, stony. This map unit consists of very steep, well drained Edneyville and Chestnut soils. The Edneyville soil is very deep, and the Chestnut soil is moderately deep. These soils are on south- to west-facing side slopes of intermediate mountains. Stones and boulders are scattered on the surface. Typically, the unit is about 50 percent Edneyville soil and 35 percent Chestnut soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 5 to 200 acres in size. Elevation ranges from 3,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Edneyville soil are as follows—

Surface layer:
0 to 3 inches—brown gravelly loam

Subsoil:
3 to 34 inches—yellowish brown sandy loam

Underlying material:
34 to 60 inches—multicolored saprolite of gravelly loamy sand

Typically, the sequence, depth, and composition of the layers of this Chestnut soil are as follows—

Surface layer:

0 to 4 inches—dark brown gravelly loam

Subsoil:

4 to 21 inches—dark yellowish brown gravelly loam

Underlying material:

21 to 30 inches—yellowish brown gravelly sandy loam

Bedrock:

30 to 60 inches—weathered, multicolored high-grade metamorphic and igneous bedrock

Air and water move through these soils at a moderately rapid rate. Surface runoff is very rapid in bare areas. The depth to soft bedrock is more than 60 inches in the Edneyville soil and ranges from 20 to 40 inches in the Chestnut soil. The content of organic matter in the surface layer of both soils ranges from low to high. The rooting depth is greater than 60 inches in the Edneyville soil and ranges from 20 to 40 inches in the Chestnut soil. The potential for frost action is moderate in both soils.

Included in this unit in mapping are small areas of Ashe and Cleveland soils near rock outcrops, Cowee and Evard soils on nose slopes, Plott soils on cool aspects, and Tuckasegee and Cullasaja soils in narrow drainageways. Ashe soils are moderately deep to hard bedrock, and Cleveland soils are shallow to hard bedrock. Cowee and Evard soils have a subsoil that is redder than that of the Edneyville and Chestnut soils and has 18 to 35 percent clay. Plott, Tuckasegee, and Cullasaja soils have a surface layer that is thicker than that of the Edneyville and Chestnut soils. Cullasaja soils have more than 35 percent rock fragments in the subsoil. Some prominent exposed ridgetops are windswept. Also included are soils that have soft bedrock at a depth of 40 to 60 inches, areas of rock outcrops, and some small areas of soils that have a high content of mica. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is used for timber production. Cleared areas are used for pasture. A few areas are used for building site development.

These Edneyville and Chestnut soils are poorly suited to timber production because of the slope. Upland hardwoods, such as white oak, hickory, scarlet oak, and chestnut oak, eastern white pine, and yellow pines are the common trees. Managing the natural regeneration of hardwoods is the best method of reforestation. Cutting all of the trees can increase the natural regeneration of hardwoods. The main concerns in timber management are the hazard of erosion and the slope. The use of wheeled and tracked equipment is dangerous on these soils. Cable yarding generally is safer to use, requires fewer roads, and causes less damage to the soils. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams.

These soils are poorly suited to pasture because of the slope. Adapted forage species include tall fescue, orchardgrass, native bluegrass, and legumes. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soils are dry help to control erosion. Operating farm machinery on these soils is dangerous. Hand application of lime, fertilizer, seed, and herbicides is necessary because of the slope.

These soils are poorly suited to building site development because of the slope. Any excavation increases the hazard of erosion. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete foundations may be damaged by the high corrosivity of the soils. Corrosion-resistant material should be used.

These soils are poorly suited to septic tank absorption fields because of the moderate depth to soft bedrock in the Chestnut soil and the slope. Untreated effluent can move along the surface of the restrictive layer and seep downslope, thus creating a health hazard. Onsite investigation is needed to locate sites on the Edneyville soil for sewage disposal. Because the slope can cause seepage, absorption fields should be installed on the contour.

These soils are poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Access roads should be designed to remove runoff safely. The soft bedrock in the Chestnut soil is difficult to excavate, and chunks of soft bedrock are hard to pack or difficult to vegetate on fill slopes. Frost action may damage unprotected road surfaces. The hazard of erosion can be reduced by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Regular maintenance of cut and fill slopes, the road surface, and water-control structures is needed. Surface water should not be diverted across fill slopes.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

EvD—Evard-Cowee complex, 15 to 30 percent slopes. This map unit consists of moderately steep, well drained Evard and Cowee soils. The Evard soil is very deep, and the Cowee soil is moderately deep. These soils are on ridges and side slopes of intermountain hills and low mountains. Typically, the unit is about 45 percent Evard soil and 40 percent Cowee soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 3 to 50 acres in size. Elevation ranges from 2,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Evard soil are as follows—

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

Subsoil:
2 to 11 inches—strong brown loam
11 to 27 inches—yellowish red loam
27 to 40 inches—red loam

Underlying material:
40 to 60 inches—multicolored saprolite of gravelly sandy loam

Typically, the sequence, depth, and composition of the layers of this Cowee soil are as follows—

Surface layer:
0 to 3 inches—dark yellowish brown gravelly loam

Subsurface layer:
3 to 6 inches—strong brown gravelly loam

Subsoil:
6 to 11 inches—yellowish red gravelly loam
11 to 24 inches—red clay loam
24 to 28 inches—red sandy clay loam

Bedrock:
28 to 60 inches—weathered, multicolored high-grade metamorphic and igneous bedrock

Air and water move through these soils at a moderate rate. Surface runoff is rapid in bare areas. The depth to soft bedrock is more than 60 inches in the Evard soil and ranges from 20 to 40 inches in the Cowee soil. The content of organic matter in the surface layer of both soils ranges from low to high. The rooting depth is greater than 60 inches in the Evard soil and ranges from 20 to 40 inches in the Cowee soil. The potential for frost action is moderate in both soils.

Included in this unit in mapping are small areas of Hayesville soils on the wider main ridges and on spur ridges and Saunook soils in narrow drainageways. Hayesville soils have more than 35 percent clay in the subsoil. Saunook soils have a dark surface layer that is thicker than that of the Evard and Cowee soils and a browner subsoil. Also included are areas of soils that have soft bedrock at a depth of 40 to 60 inches or at a depth of 10 to 20 inches and areas of rock outcrops. Contrasting inclusions make up about 15 percent of this map unit.

About half of the acreage of this map unit is used as woodland. The rest is used for pasture, hay, orchards, ornamental crops, or building site development.

These Evard and Cowee soils are moderately suited to timber production because of the hazard of windthrow in areas of the Cowee soil and the slope. Upland hardwoods, such as white oak, hickory, scarlet oak, and chestnut oak, eastern white pine, and yellow pines are the common trees. Planting eastern white pine is the best method of reforestation. The main concerns in timber management are a hazard of erosion and the slope. A moderate hazard of windthrow is an additional limitation on the Cowee soil. Wheeled and tracked equipment can be used on these soils. When the soils are wet, logging activities cause rutting and compaction. Soil compaction can be reduced by using low-pressure ground equipment, laying out skid trails in advance, and harvesting timber when the soils are dry. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. Site preparation for pines, such as burning and herbicide application, helps to reduce immediate plant competition and improve seedling survival. Burning also helps to minimize debris and lower planting costs. Ripping skid trails and landings when the soils are dry breaks up compacted layers, improves tilth, and increases seedling survival.

These soils are poorly suited to cropland because of the slope and a severe hazard of erosion. Installing and maintaining erosion-control measures on these soils are difficult and expensive.

These soils are moderately suited to pasture and hay because of the slope. Adapted forage species include mixtures of tall fescue or orchardgrass and legumes for spring and fall production and sudangrass and alfalfa for summer production. The hazard of erosion is severe in unvegetated areas. Eroded sites can crust or become sealed, and the result is poor infiltration of water. The hazard of erosion also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soils are dry help to control erosion.

These soils are moderately suited to ornamental crops and orchards because of the hazard of erosion. Sod should be established and maintained between rows and on farm paths to help control erosion. Significant droughts of short duration may limit plant growth and production in some years. The soils are suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

These soils are poorly suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete. The soft bedrock in the Cowee soil is difficult to excavate, and chunks of soft bedrock are hard to pack or difficult to vegetate on fill slopes.

These soils are poorly suited to septic tank absorption fields because of the moderate depth to soft bedrock in the Cowee soil and the slope. Untreated effluent can move along the surface of the restrictive layer and seep downslope, thus creating a health hazard. Onsite investigation is needed to locate sites on the Evard soil for sewage disposal. Septic tank absorption fields should be installed on the contour.

These soils are poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. During rainy periods, roads in bare areas are slippery and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. Regular maintenance of cut and fill slopes, the road surface, and water-control structures is needed. Surface water should not be diverted across fill slopes.

The capability subclass is VIe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 4R in areas of the Evard soil and 3R in areas of the Cowee soil.

EvE—Evard-Cowee complex, 30 to 50 percent slopes. This map unit consists of steep, well drained Evard and Cowee soils. The Evard soil is very deep, and the Cowee soil is moderately deep. These soils are on side slopes of intermountain hills and low mountains. Typically, the unit is about 45 percent Evard soil and 40 percent Cowee soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 5 to 100 acres in size. Elevation ranges from 2,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Evard soil are as follows—

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

Subsoil:
2 to 11 inches—strong brown loam
11 to 27 inches—yellowish red loam
27 to 40 inches—red loam

Underlying material:
40 to 60 inches—multicolored saprolite of gravelly sandy loam

Typically, the sequence, depth, and composition of the layers of this Cowee soil are as follows—

Surface layer:
0 to 3 inches—dark yellowish brown gravelly loam

Subsurface layer:
3 to 6 inches—strong brown gravelly loam

Subsoil:
6 to 11 inches—yellowish red gravelly loam
11 to 24 inches—red clay loam
24 to 28 inches—red sandy clay loam

Bedrock:
28 to 60 inches—weathered, multicolored high-grade metamorphic and igneous bedrock

Air and water move through these soils at a moderate rate. Surface runoff is rapid in bare areas. The depth to soft bedrock is more than 60 inches in the Evard soil and ranges from 20 to 40 inches in the Cowee soil. The content of organic matter in the surface layer of both soils ranges from low to high. The rooting depth is greater than 60 inches in the Evard soil and ranges from 20 to 40 inches in the Cowee soil. The potential for frost action is moderate in both soils.

Included in this unit in mapping are small areas of Hayesville soils on spur ridges, Fannin soils intermingled with the Evard and Cowee soils on side slopes, Saunook soils along drainageways, and Trimont soils on the cooler side slopes. Hayesville soils have more than 35 percent clay in the subsoil. Fannin soils have a high content of mica. Saunook and Trimont soils have a surface layer that is thicker and darker than that of the Evard and Cowee soils. Saunook soils have a subsoil that is browner than that of the Evard and Cowee soils. Also included are areas of soils that have soft bedrock at a depth of 40 to 60 inches or at a depth of 10 to 20 inches, severely eroded areas, and areas of rock outcrops. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is used as woodland. The rest is used for pasture, orchards, ornamental crops, or building site development.

These Evard and Cowee soils are poorly suited to timber production because of the slope. Upland hardwood, such as white oak, hickory, scarlet oak, and chestnut oak, eastern white pine, and yellow pines are the common trees. Planting eastern white pine is the best method of reforestation. The main concerns in timber management are the hazard of erosion and the slope. Wheeled and tracked equipment can be used in the less steep areas, but cable yarding generally is safer to use and does not disturb the soils as much in the steeper areas. Using standard wheeled and tracked equipment when the soils are wet causes rutting and compaction. Soil compaction can be reduced by using low-pressure ground equipment, laying out skid trails in advance, and harvesting timber when the soils are dry. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. Site preparation for pines, such as burning and herbicide application, helps to reduce immediate plant competition and improve seedling survival. Burning also helps to minimize debris and lower planting costs. Ripping skid trails and landings when the soils are dry breaks up compacted layers, improves tilth, and increases seedling survival.

These soils are poorly suited to pasture and unsuited to hay because of the slope and a severe hazard of erosion. Adapted forage species include mixtures of tall fescue or orchardgrass and legumes. The hazard of erosion is severe in unvegetated areas. Eroded sites can crust or become sealed and thus cause poor infiltration of water. The hazard of erosion also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soils are dry help to control erosion. Operating farm machinery on slopes greater than 30 percent is unsafe. Hand application of lime, fertilizer, seeds, and herbicides is necessary because of the slope.

These soils are poorly suited to orchards and ornamental crops because of the slope and the hazard of erosion. Sod should be established and maintained between rows and on farm paths to control erosion. The soils are suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

These soils are poorly suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete. The soft bedrock in the Cowee soil can hinder excavation, and chunks of soft bedrock are hard to pack or difficult to vegetate on fill slopes.

These soils are poorly suited to septic tank absorption fields because of the moderate depth to soft bedrock in the Cowee soil and the slope. Untreated effluent can move along the surface of the restrictive layer and seep downslope, thus creating a health hazard. Onsite investigation is needed to locate sites on the Evard soil for sewage disposal. Because the slope can cause effluent to seep to the surface, septic tank absorption fields should be installed on the contour.

These soils are poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. During rainy periods, roads in bare areas are slippery and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. Regular maintenance of cut and fill slopes, the road surface, and water-control structures is needed. Surface water should not be diverted across fill slopes.

The capability subclass is VIIe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 4R in areas of the Evard soil and 3R in areas of the Cowee soil.

EwF—Evard-Cowee complex, 50 to 95 percent slopes, stony. This map unit consists of very steep, well drained Evard and Cowee soils. The Evard soil is very deep, and the Cowee soil is moderately deep. These soils are on side slopes of intermountain hills and low mountains. Stones are scattered on the surface. Elevation ranges from 2,500 to 3,500 feet. Typically, the unit is about 45 percent Evard soil and 40 percent Cowee soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the sequence, depth, and composition of the layers of this Evard soil are as follows—

Surface layer:

0 to 2 inches—dark brown gravelly loam

Subsoil:
2 to 11 inches—strong brown loam
11 to 27 inches—yellowish red loam
27 to 40 inches—red loam

Underlying material:
40 to 60 inches—multicolored saprolite of gravelly sandy loam

Typically, the sequence, depth, and composition of the layers of this Cowee soil are as follows—

Surface layer:
0 to 3 inches—dark yellowish brown gravelly loam

Subsurface layer:
3 to 6 inches—strong brown gravelly loam

Subsoil:
6 to 11 inches—yellowish red gravelly loam
11 to 24 inches—red clay loam
24 to 28 inches—red sandy clay loam

Bedrock:
28 to 60 inches—weathered, multicolored high-grade metamorphic and igneous bedrock

Air and water move through these soils at a moderate rate. Surface runoff is very rapid in bare areas. The depth to soft bedrock is more than 60 inches in the Evard soil and ranges from 20 to 40 inches in the Cowee soil. The content of organic matter in the surface layer of both soils ranges from low to high. The rooting depth is greater than 60 inches in the Evard soil and ranges from 20 to 40 inches in the Cowee soil. The potential for frost action is moderate in both soils.

Included in this unit in mapping are small areas of Fannin soils intermingled with the Evard and Cowee soils on side slopes, Saunook soils along drainageways, and Trimont soils on the cooler side slopes. Fannin soils have more mica in the subsoil than the Evard and Cowee soils. Saunook and Trimont soils have a dark surface layer that is thicker than that of the Evard and Cowee soils. Saunook soils have a subsoil that is browner than that of the Evard and Cowee soils. Also included are areas of soils that have soft bedrock at a depth of 40 to 60 inches or at a depth of 10 to 20 inches, a few severely eroded areas, and areas of rock outcrops. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is used as woodland. The rest is used for pasture or, in some places, building site development.

These Evard and Cowee soils are poorly suited to timber production because of the slope. Upland hardwoods, such as white oak, hickory, scarlet oak, and chestnut oak, eastern white pine, and yellow pines are the common trees. Planting eastern white pine is the best method of reforestation. The main concerns in timber management are a hazard of erosion and the slope. The use of wheeled and tracked equipment is dangerous on these soils. Cable yarding generally is safer to use, requires fewer roads, and causes less damage to the soils. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. Site preparation for pines, such as burning and herbicide application, helps to reduce immediate plant competition and improve seedling survival. Burning also helps to minimize debris and lower planting costs. Ripping skid trails and landings when the soils are dry breaks up compacted layers, improves tilth, and increases seedling survival.

These soils are poorly suited to pasture because of the slope and the hazard of erosion. Adapted forage species include mixtures of tall fescue or orchardgrass and legumes. The hazard of erosion is very severe in unvegetated areas. It is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soils are dry help to control erosion. Operating farm machinery on very steep slopes is unsafe. Hand application of lime, fertilizer, seeds, and herbicides is necessary because of the slope.

These soils are poorly suited to building site development because of the slope. All excavated areas are susceptible to very severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Using corrosion-resistant material for foundations and basements helps to offset the risk of corrosion to steel and concrete. The soft bedrock in the Cowee soil is difficult to excavate, and chunks of soft bedrock are hard to pack or difficult to vegetate on fill slopes.

These soils are poorly suited to septic tank absorption fields because of the moderate depth to soft bedrock in the Cowee soil and the slope. Untreated effluent can move along the surface of the restrictive layer and seep downslope, thus creating a health hazard. Onsite investigation is needed to locate sites on the Evard soil for sewage disposal. Because the slope can cause effluent to seep to the surface, absorption fields should be installed on the contour.

These soils are poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. During rainy periods, roads in bare areas are slippery and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. Regular maintenance of cut and fill slopes, the road surface, and water-control structures is needed. Surface water should not be diverted across fill slopes.

The capability subclass is VIIe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 4R in areas of the Evard soil and 3R in areas of the Cowee soil.

ExD—Evard-Cowee-Urban land complex, 15 to 30 percent slopes. This map unit occurs as areas of a very deep, well drained Evard soil and a moderately deep, well drained Cowee soil and areas of Urban land. This unit is moderately steep and occurs on ridges and side slopes of intermountain hills and low mountains. Typically, the unit is about 35 percent Evard soil, 30 percent Cowee soil, and 20 percent Urban land. The Evard and Cowee soils and the Urban land occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 3 to 20 acres in size. Elevation ranges from 2,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Evard soil are as follows—

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

Subsoil:
2 to 11 inches—strong brown loam
11 to 27 inches—yellowish red loam
27 to 40 inches—red loam

Underlying material:
40 to 60 inches—multicolored saprolite of gravelly sandy loam

Typically, the sequence, depth, and composition of the layers of this Cowee soil are as follows—

Surface layer:
0 to 3 inches—dark yellowish brown gravelly loam

Subsurface layer:
3 to 6 inches—strong brown gravelly loam

Subsoil:
6 to 11 inches—yellowish red gravelly loam
11 to 24 inches—red clay loam
24 to 28 inches—red sandy clay loam

Bedrock:
28 to 60 inches—weathered, multicolored high-grade metamorphic and igneous bedrock

Urban land consists of areas covered by closely spaced houses, paved streets, parking lots, driveways, shopping plazas, industrial buildings, schools, churches, and apartment complexes. Because these areas have impermeable surfaces, runoff is high during rainstorms.

Air and water move through the Evard and Cowee soils at a moderate rate. Surface runoff is rapid in bare areas. The depth to soft bedrock is more than 60 inches in the Evard soil and ranges from 20 to 40 inches in the Cowee soil. The content of organic matter in the surface layer of both soils ranges from low to high. The rooting depth is greater than 60 inches in the Evard soil and ranges from 20 to 40 inches in the Cowee soil. The potential for frost action is moderate in both soils.

Included in this unit in mapping are small areas of Hayesville soils on the wider main ridges and on spur ridges and Saunook soils in narrow drainageways. Hayesville soils have more than 35 percent clay in the subsoil. Saunook soils have a dark surface layer that is thicker than that of the Evard and Cowee soils and a browner subsoil. Also included are areas of soils that have soft bedrock at a depth of 40 to 60 inches or at a depth of 10 to 20 inches and areas of rock outcrops. Contrasting inclusions make up about 15 percent of this map unit.

This map unit is poorly suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete. The soft bedrock in the Cowee soil is difficult to excavate, and chunks of soft bedrock are hard to pack or difficult to vegetate on fill slopes.

This map unit is poorly suited to septic tank absorption fields because of the moderate depth to soft bedrock in the Cowee soil and the slope. Untreated effluent can move along the surface of the restrictive layer and seep downslope, thus creating a health hazard. Onsite investigation is needed to locate sites on the Evard soil for sewage disposal. Septic tank absorption fields should be installed on the contour.

This map unit is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. During rainy periods, roads in bare areas are slippery and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. Regular maintenance of cut and fill slopes, the road surface, and water-control structures is needed. Surface water should not be diverted across fill slopes.

The capability subclass is VIe in areas of the Evard and Cowee soils and VIIIs in areas of the Urban land. No woodland ordination symbol has been assigned to this map unit.

FnE2—Fannin loam, 30 to 50 percent slopes, eroded. This steep, very deep, well drained soil is on side slopes of low mountains and intermountain hills. Individual areas are irregular in shape and range from 5 to 50 acres in size. Elevation ranges from 2,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Fannin soil are as follows—

Surface layer:
0 to 3 inches—reddish brown loam

Subsoil:
3 to 18 inches—red sandy clay loam
18 to 31 inches—red sandy loam

Underlying material:
31 to 60 inches—multicolored saprolite of sandy loam

Air and water move through this soil at a moderate rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer ranges from low to high. The rooting depth is greater than 60 inches. The soil has a high content of mica and is subject to downslope movement when lateral support is removed. The load-supporting capacity of the soil when wet is low. The soil may settle unevenly when used for fill slopes. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Hayesville soils on spur ridges, Evard soils intermingled with the Fannin soil, and Cowee soils on ridge noses and shoulders. Hayesville soils have more than 35 percent clay in the subsoil. Hayesville, Evard, and Cowee soils have less mica in the subsoil than the Fannin soil. Cowee soils have soft bedrock within a depth of 20 to 40 inches. Also included are severely eroded spots where the underlying material is exposed at the surface. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is used as pasture. The rest is used for woodland, ornamental crops, orchards, or building site development.

This Fannin soil is poorly suited to timber production because of the slope. Upland hardwoods, such as white oak, scarlet oak, hickory, and chestnut oak, are the common trees. Yellow pines and eastern white pine also grow on this soil. Planting eastern white pine is the best method of reforestation. The main concerns in timber management are the slope, soil instability, and a hazard of erosion. Wheeled and tracked equipment can be used in the less steep areas, but cable yarding generally is safer to use and does not disturb the soil as much in the steeper areas. When the soil is wet, logging activities cause rutting and compaction. Soil compaction can be reduced by using low-pressure ground equipment, laying out skid trails in advance, and harvesting timber when the soil is dry. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. Site preparation for pines, such as burning and herbicide application, helps to reduce immediate plant competition and improve seedling survival. Burning also helps to minimize debris and lower planting costs. Ripping skid trails and landings when the soil is dry breaks up compacted layers, improves tilth, and increases seedling survival.

These soils are poorly suited to pasture and unsuited to hay because of the slope and the hazard of erosion. The hazard of erosion is very severe in unvegetated areas. It is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. Eroded sites can crust over, causing poor infiltration and increased runoff. Operating farm machinery on this soil is unsafe. Hand application of lime, fertilizer, seeds, and herbicides is necessary because of the slope.

This soil is poorly suited to orchards and ornamental crops because of the slope and the hazard of erosion. Sod should be established and maintained between rows and on farm paths to control erosion. The soil is suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

This soil is poorly suited to building site development because of the slope. All excavated areas are susceptible to very severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The soil may be subject to downslope movement in cutbanks and may settle unevenly when used for fill slopes. Low strength when the soil is wet and moderate corrosivity are additional limitations. Permanent retaining walls may be needed to give lateral strength to the soil. Using corrosion-resistant materials helps to offset the risk of corrosion to steel and concrete.

This soil is poorly suited to septic tank absorption fields because of the slope. Because the slope can cause effluent to seep to the surface, septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope and the low strength caused by the high content of mica. The moderate potential for frost action is an additional limitation. The soil is subject to downslope movement on cut slopes and to differential settling in fill slopes. Cut and fill slopes are subject to sliding and slumping. During rainy periods, roads in bare areas are very slippery and can be impassable. Access roads should be designed to remove runoff safely. The hazard of erosion can be reduced by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. Regular maintenance of cut and fill slopes, the road surface, and water-control structures is needed. Surface water should not be diverted across fill slopes.

The capability subclass is VIIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7R.

HaB2—Hayesville clay loam, 2 to 8 percent slopes, eroded. This gently sloping, very deep, well drained soil is on ridges of intermountain hills and low mountains. Individual areas are long and narrow and range from 2 to 10 acres in size. Elevation ranges from 2,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Hayesville soil are as follows—

Surface layer:
0 to 4 inches—reddish brown clay loam

Subsoil:
4 to 24 inches—red clay
24 to 32 inches—red clay loam

Underlying material:
32 to 52 inches—white saprolite of loam
52 to 60 inches—multicolored saprolite of fine sandy loam

Air and water move through this soil at a moderate rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is low to moderate. The rooting depth is greater than 60 inches. The load-supporting capacity of the soil when wet is low. A surface crust can form after rains in cultivated fields. The potential for frost action is moderate.

Included in this unit in mapping are small areas of soils that have soft bedrock at a depth of 20 to 40 inches and severely eroded spots where the underlying material is at the surface. Also included are some soils that have major soil properties similar to those of the Hayesville soil and have similar use and management. These soils are not underlain by saprolite and have a subsoil that is thicker than that of the Hayesville soil. Contrasting inclusions make up about 10 percent of this map unit.

This map unit is mainly used for pasture, hay, or building site development. Some areas are used for cropland, orchards, ornamental crops, or woodland.

This Hayesville soil is moderately suited to woodland, but it generally is not used for timber production in the survey area.

This soil is moderately suited to cropland because of a hazard of erosion. The major crops include burley tobacco, silage corn, tomatoes, and vegetables. Because the hazard of erosion is severe, erosion-control measures, such as conservation tillage, cover crops, crop rotations that include grasses and legumes, grassed waterways, and field borders, should be used. These measures help to conserve moisture, increase the content of organic matter in the surface layer, and improve tilth and the rate of water intake. This soil is subject to the formation of clods and crusting, which result in poor tilth, a high rate of seedling mortality, reduced infiltration, and an increased runoff rate. Plowing or tilling only when the soil is dry helps to prevent clodding.

This soil is well suited to pasture and hay. Adapted forage species include alfalfa, tall fescue, orchardgrass, and clover. The risk of further damage from erosion is severe in unvegetated areas. The soil is susceptible to compaction when wet. Heavy grazing during wet periods increases compaction and surface runoff. Preventing overgrazing helps to reduce these hazards.

This soil is well suited to orchards and moderately suited to ornamental crop production because of the high content of clay in the subsoil. Sod should be established and maintained between rows and on farm paths. The high content of clay in the subsoil adversely affects ball and burlap harvesting.

This soil is moderately suited to building site development because of the high content of clay in the subsoil. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The subsoil has low strength when wet. Special design is needed for the construction of buildings on fill slopes consisting of subsoil material.

Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

This soil is moderately suited to septic tank absorption fields because of the moderate permeability in the subsoil. Increasing the size of the absorption field helps to overcome this limitation. Trench walls are susceptible to smearing when the trench is dug. Raking the trench walls removes smeared surfaces.

This soil is moderately suited to access roads because of low strength and the moderate potential for frost action. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance.

The capability subclass is IIIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 6C.

HaC2—Hayesville clay loam, 8 to 15 percent slopes, eroded. This strongly sloping, very deep, well drained soil is on ridges of intermountain hills and low mountains. Individual areas are long and narrow and range from 2 to 50 acres in size. Elevation ranges from 2,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Hayesville soil are as follows—

Surface layer:
0 to 4 inches—reddish brown clay loam

Subsoil:
4 to 24 inches—red clay
24 to 32 inches—red clay loam

Underlying material:
32 to 52 inches—white saprolite of loam
52 to 60 inches—multicolored saprolite of fine sandy loam

Air and water move through this soil at a moderate rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is low to moderate. The rooting depth is greater than 60 inches. The load-supporting capacity of the soil when wet is low. A surface crust can form after rains in cultivated fields. The potential for frost action is moderate.

Included in this unit in mapping are small areas of soils that have soft bedrock at a depth of 20 to 40 inches and severely eroded spots where the underlying material is at the surface. Also included are some soils that have major soil properties similar to those of the Hayesville soil and have similar use and management. These soils are not underlain by saprolite and have a subsoil that is thicker than that of the Hayesville soil. Contrasting inclusions make up about 10 percent of this map unit.

This map unit is used mainly for cropland, pasture, hay, orchards, ornamental crops, or building site development.

This Hayesville soil is moderately suited to woodland, but it generally is not used for timber production in the survey area.

This soil is moderately suited to cropland because of the slope and a hazard of erosion. The major crops include burley tobacco, silage corn, tomatoes, and vegetables. Because the hazard of erosion is severe, erosion-control measures, such as conservation tillage, cover crops, crop rotations that include grasses and legumes, grassed waterways, and field borders, should be used. These measures help to conserve moisture, increase the content of organic matter in the surface layer, and improve tilth and the rate of water intake. This soil is subject to the formation of clods and crusting, which result in poor tilth, a high rate of seedling mortality, reduced infiltration, and an increased runoff rate. Plowing or tilling only when the soil is dry helps to prevent clodding.

This soil is well suited to pasture and hay. Adapted forage species include alfalfa, tall fescue, orchardgrass, and clover. The risk of further damage from erosion is severe in unvegetated areas. The soil is susceptible to compaction when wet. Heavy grazing during wet periods increases compaction and surface runoff. Preventing overgrazing helps to reduce these hazards.

This soil is moderately suited to orchards and ornamental crop production because of the slope, the hazard of erosion, and the high content of clay in the subsoil. Sod should be established and maintained between rows and on farm paths. The high content of clay in the subsoil adversely affects ball and burlap harvesting.

This soil is moderately suited to building site development because of the slope and the high content of clay in the subsoil. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The subsoil has low strength when wet. Special design is needed for the construction of buildings on fill slopes consisting of subsoil material. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

This soil is moderately suited to septic tank absorption fields because of the moderate permeability in the subsoil and the slope. Increasing the size of the absorption field helps to overcome the moderate permeability. Trench walls are susceptible to smearing when the trench is dug. Raking the trench walls removes smeared surfaces.

This map unit is moderately suited to access roads because of low strength, the slope, and the moderate potential for frost action. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance.

The capability subclass is IVe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 6C.

HaD2—Hayesville clay loam, 15 to 30 percent slopes, eroded. This moderately steep, very deep, well drained soil is on ridges and side slopes of intermountain hills and low mountains. Individual areas are long and narrow or oblong and range from 2 to 50 acres in size. Elevation ranges from 2,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Hayesville soil are as follows—

Surface layer:
0 to 4 inches—reddish brown clay loam

Subsoil:
4 to 24 inches—red clay
24 to 32 inches—red clay loam

Underlying material:
32 to 52 inches—white saprolite of loam
52 to 60 inches—multicolored saprolite of fine sandy loam

Air and water move through this soil at a moderate rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is low to moderate. The rooting depth is greater than 60 inches. The load-supporting capacity of the soil when wet is low. A surface crust can form after rains in cultivated fields. The potential for frost action is moderate.

Included in this unit in mapping are Evard, Cowee, and Fannin soils intermingled with the Hayesville soil, Braddock soils where the unit borders large streams, and Saunook soils in narrow drainageways. Braddock soils have a subsoil that is thicker than that of the Hayesville soil. Evard, Cowee, Fannin, and Saunook soils have less than 35 percent clay in the subsoil. Fannin soils have a high content of mica. Saunook soils have a subsoil that is browner than that of the Hayesville soil. Also included are clayey soils that have soft bedrock at a depth of 20 to 40 inches, severely eroded areas where the underlying material is exposed at the surface, and some soils that have major soil properties similar to those of the Hayesville soil and have similar use and management. The similar soils are not underlain by saprolite and have a subsoil that is thicker than that of the Hayesville soil. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is used for pasture and hay. The rest is used for building site development, orchards, or ornamental crops.

This Hayesville soil is moderately suited to woodland, but it generally is not used for timber production in the survey area.

This soil is poorly suited to cropland because of the slope and a very severe hazard of erosion. Erosion-control measures are expensive and difficult to install and maintain on this soil.

This soil is moderately suited to pasture and hay because of the slope. Adapted forage species include alfalfa, tall fescue, orchardgrass, and clover. The hazard of further erosion is very severe in unvegetated areas. The hazard of erosion is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. The soil is susceptible to compaction when wet. Heavy grazing during wet periods increases compaction and surface runoff.

This soil is moderately suited to orchards and ornamental crops because of the slope, the hazard of erosion, and the high content of clay in the subsoil. Sod should be established and maintained between rows and on farm paths. The high content of clay in the subsoil adversely affects ball and burlap harvesting.

This soil is poorly suited to building site development because of the slope. The high content of clay in the subsoil is an additional limitation. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The subsoil has low strength when wet. Special design is needed for the construction of buildings on fill slopes consisting of subsoil material. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

This soil is poorly suited to septic tank absorption fields because of the slope. An additional limitation is the moderate permeability in the subsoil. Increasing the size of the absorption field helps to overcome this limitation. Trench walls are susceptible to smearing when the trench is dug. Raking the trench walls removes smeared surfaces.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action and low strength are additional limitations. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance.

The capability subclass is VIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 6R.

HeC—Hayesville-Urban land complex, 2 to 15 percent slopes. This map unit occurs as areas of a very deep, well drained Hayesville soil and areas of Urban land. This unit is gently sloping to strongly sloping and occurs on ridges and side slopes of intermountain hills and low mountains. Typically, it is about 50 percent Hayesville soil and 35 percent Urban land. The Hayesville soil and the Urban land occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are long and narrow and range from 2 to 25 acres in size. Elevation ranges from 2,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Hayesville soil are as follows—

Surface layer:
0 to 4 inches—reddish brown clay loam

Subsoil:
4 to 24 inches—red clay
24 to 32 inches—red clay loam

Underlying material:
32 to 52 inches—white saprolite of loam
52 to 60 inches—multicolored saprolite of fine sandy loam

Urban land consists of areas covered by closely spaced houses, paved roads, parking lots, driveways, shopping plazas, industrial buildings, schools, churches, and apartment complexes. Because these areas have impermeable surfaces, runoff is high during rainstorms.

Air and water move through the Hayesville soil at a moderate rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is low to moderate. The rooting depth is greater than 60 inches. The load-supporting capacity of the soil when wet is low. A surface crust can form after rains in unvegetated areas. The potential for frost action is moderate.

Included in this unit in mapping are small areas of soils that have soft bedrock at a depth of 20 to 40 inches and severely eroded spots where the underlying material is at the surface. Also included are some soils that have major soil properties similar to those of the Hayesville soil and have similar use and management. These soils are not underlain by saprolite and have a subsoil that is thicker than that of the Hayesville soil. Contrasting inclusions make up about 10 percent of this map unit.

This map unit is moderately suited to building site development because of the slope and the high content of clay in the subsoil. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The subsoil has low strength when wet. Special design is needed for the construction of buildings on fill slopes consisting of subsoil material. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

This map unit is moderately suited to septic tank absorption fields because of the moderate permeability and the slope in areas with more than 8 percent slopes. Increasing the size of the absorption field helps to overcome the moderate permeability. Trench walls are susceptible to smearing when the trench is dug. Raking the trench walls removes smeared surfaces.

This map unit is moderately suited to access roads because of low strength, the slope in areas with more than 8 percent slopes, and the moderate potential for frost action. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance.

The capability subclass is IVe in areas of the Hayesville soil and VIIIs in areas of the Urban land. No woodland ordination symbol has been assigned to this map unit.

HeD—Hayesville-Urban land complex, 15 to 30 percent slopes. This map unit occurs as areas of a very deep, well drained Hayesville soil and areas of Urban land. This unit is moderately steep and occurs on ridges and side slopes of intermountain hills and low mountains. Typically, it is about 50 percent Hayesville soil and 35 percent Urban land. The Hayesville soil and the Urban land occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are long and narrow or oblong and range from 2 to 25 acres in size. Elevation ranges from 2,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Hayesville soil are as follows—

Surface layer:
0 to 4 inches—reddish brown clay loam

Subsoil:
4 to 24 inches—red clay
24 to 32 inches—red clay loam

Underlying material:
32 to 52 inches—white saprolite of loam
52 to 60 inches—multicolored saprolite of fine sandy loam

Urban land consists of areas covered by closely spaced houses, paved streets, parking lots, driveways, shopping plazas, industrial buildings, schools, churches, and apartment complexes. Because these areas have impermeable surfaces, runoff is high during rainstorms.

Air and water move through the Hayesville soil at a moderate rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is low to moderate. The rooting depth is greater than 60 inches. The load-supporting capacity of the soil when wet is low. A surface crust can form after rains in unvegetated areas. The potential for frost action is moderate.

Included in this unit in mapping are Evard, Cowee, and Fannin soils intermingled with the Hayesville soil and Saunook soils in narrow drainageways. Evard, Cowee, Fannin, and Saunook soils have less than 35 percent clay in the subsoil. Fannin soils have a high content of mica. Saunook soils have a subsoil that is browner than that of the Hayesville soil. Also included are clayey soils that have soft bedrock at a depth of 20 to 40 inches, severely eroded areas where the underlying material is exposed at the surface, and some soils that have major soil properties similar to those of the Hayesville soil and have similar use and management. These similar soils are not underlain by saprolite and have a subsoil that is thicker than that of the Hayesville soil. Contrasting inclusions make up about 15 percent of this map unit.

This map unit is poorly suited to building site development because of the slope. The high content of clay in the subsoil is an additional limitation. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The subsoil has low strength when wet. Special design is needed for the construction of buildings on fill slopes consisting of subsoil material. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

This map unit is poorly suited to septic tank absorption fields because of the slope. The moderate permeability is an additional limitation. Increasing the size of the absorption field helps to overcome the moderate permeability. Trench walls are susceptible to smearing when the trench is dug. Raking the trench walls removes smeared surfaces.

This map unit is poorly suited to access roads because of low strength. Low strength and the moderate potential for frost action are additional limitations. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance.

The capability subclass is VIe in areas of the Hayesville soil and VIIIs in areas of the Urban land. No woodland ordination symbol has been assigned to this map unit.

HmA—Hemphill loam, 0 to 3 percent slopes, rarely flooded. This nearly level, very deep, very poorly drained soil is on low stream terraces. Individual areas are oblong and range from 2 to 35 acres in size. Elevation ranges from 2,000 to 3,000 feet.

Typically, the sequence, depth, and composition of the layers of this Hemphill soil are as follows—

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

Subsoil:
12 to 47 inches—dark gray clay

Underlying material:
47 to 62 inches—dark gray fine sandy loam

Air and water move through this soil at a slow rate. Surface runoff is very slow in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer ranges from moderate to very high. A seasonal high water table is within a depth of 1 foot. The shrink-swell potential of the subsoil is high. The load-supporting capacity of the soil when wet is low. The potential for frost action is high.

Included in this unit in mapping are areas of Cullowhee and Nikwasi soils where small narrow flood plains join the low stream terraces. Cullowhee and Nikwasi soils have less clay in the subsoil than the Hemphill soil and have strata of sand, gravel, and cobbles within a depth of 20 to 40 inches. Also included are poorly drained soils in the slightly higher areas and somewhat poorly drained soils on knolls. Contrasting inclusions make up about 15 percent of this map unit.

Most areas of this map unit are used as pasture and hay. Some drained areas are used for cropland. A few areas support native vegetation and are natural wetlands.

The Hemphill soil is hydric. Undrained, noncropland areas of this soil may be natural wetlands. Artificial drainage of such areas is subject to regulations affecting wetlands and may require special permits and extra planning. Recommendations for installing artificial drainage systems in this soil pertain only to those areas that are currently used as cropland.

This Hemphill soil is moderately suited to water-tolerant row crops because of the wetness. The high content of clay and the slow permeability in the subsoil cause subsurface artificial drainage systems to perform poorly. Surface drainage is critical in the removal of excess water from cropland because prolonged rains or heavy downpours can cause surface ponding that damages crops. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is moderately suited to hay and pasture because of the wetness. Adapted forage species include tall fescue and reed canarygrass. This soil is subject to compaction if grazed when wet.

This soil is poorly suited to orchards and ornamental crops because of the wetness, poor air drainage, and the flooding.

This soil is poorly suited to building site development because of the wetness, the flooding, low strength, and the high shrink-swell potential. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete. Foundations must be designed to resist cracking because of shrinking and swelling in the subsoil. Installing perforated drainage tile around the foundations and diverting runoff from the higher areas help to somewhat reduce the wetness. Buildings should be designed to offset the limited ability of the soil to support a load.

This soil is unsuited to septic tank absorption fields because of the wetness, the slow permeability, and the flooding.

This soil is poorly suited to access roads because of shrinking and swelling, the high potential for frost action, and low strength. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. Constructing roads above the level of potential floodwaters is necessary for proper road support and helps to prevent damage and reduce maintenance.

The capability subclass is IVw. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 6W.

HwB—Humaquepts, loamy, 2 to 8 percent slopes, stony. This map unit consists of gently sloping, very deep, poorly drained, loamy soils in coves of high mountains near Sam Knob. Individual areas are oblong and range from 5 to 50 acres in size. Elevation ranges from 5,000 to 5,800 feet.

Because this unit has such variable soils, it does not have a typical profile description.

Included in this unit in mapping are areas of moderately well drained or somewhat poorly drained soils, soils that have more than 35 percent, by volume, rock fragments in the subsoil, and Tanasee soils in the more elevated areas. Also included are soils that are similar to the Humaquepts but have a surface layer that is less than 10 inches thick or more than 20 inches thick. Contrasting inclusions make up about 15 percent of this map unit.

Air and water move through the Humaquepts at a moderately rapid rate. Surface runoff is slow or very slow in bare areas. The content of organic matter in the surface layer is high or very high. The rooting depth is greater than 60 inches. The climate is severe. It is cold and icy in winter and rainy, foggy, and cool during the rest of the year. The soils remain frozen for long periods in winter. The water table is near the surface during wet periods. The map unit contains many seeps and springs. The potential for frost action is moderate.

This map unit is unavailable for cropland, pasture, orchards, ornamental crops, and building site development because it occurs in a federally designated wilderness area of the Pisgah National Forest. The soils are hydric and are undrained, natural wetlands.

The capability subclass is IVw. No woodland ordination symbol has been assigned to this map unit.

OcE—Oconaluftee channery loam, 30 to 50 percent slopes. This very deep, well drained soil is on side slopes of high mountains. Individual areas are irregular in shape and range from 3 to 100 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Oconaluftee soil are as follows—

Surface layer:

0 to 8 inches—black channery loam

8 to 19 inches—dark brown channery loam

Subsoil:

19 to 35 inches—dark yellowish brown channery fine sandy loam

Underlying material:

35 to 60 inches—multicolored saprolite of channery fine sandy loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is very high. The rooting depth is greater than 60 inches. This soil is subject to downslope movement when lateral support is removed and may settle unevenly when used for fill slopes. The climate is severe. It is cold and icy in winter and rainy, foggy, and cool during the rest of the year. The soils remain frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are areas of soils on shoulders and spur ridges that have soft bedrock at a depth of 20 and 60 inches and areas near rock outcrops that have hard bedrock at a depth of 20 to 60 inches. Also included are some areas of rock outcrops. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest and is used for timber production, wildlife habitat, or recreation. Privately owned tracts are used for woodland, the production of Christmas trees, or building site development.

This Oconaluftee soil is poorly suited to timber production because of the slope. Production is also reduced because of the harsh climate. Northern hardwoods, such as northern red oak, black cherry, American beech, sugar maple, yellow birch, and black birch, are the common trees. Red spruce and Fraser fir also grow on this soil. Areas below an elevation of 5,300 feet should be managed for hardwoods, and areas above an elevation of 5,300 feet should be managed for red spruce. Fraser fir is not used for timber production because infestations of balsam woolly adelgids kill most large trees. Thinning red spruce can increase the quality of the stand. The soil can be reforested by managing the natural regeneration of hardwoods. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration. The main concerns in timber management are the slope, the cold climate, and soil instability. Wheeled and tracked equipment can be used in the less steep areas, but cable yarding generally is safer to use and does not disturb the soil as much in the steeper areas. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams.

This soil is poorly suited to the production of Christmas trees because of the hazard of erosion and the slope. Sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is poorly suited to building site development because of the slope. An additional limitation is soil freezing. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The soil is subject to downslope movement in cutbanks and may settle unevenly when used for fill slopes. Permanent retaining walls may be needed to increase soil strength. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete. The soil is very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Construction can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

This soil is poorly suited to septic tank absorption fields because of the slope. Because the slope can cause effluent to seep to the surface, septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Access roads are subject to downslope movement on cut slopes and to differential settling on fill slopes. Permanent retaining walls may be needed to increase soil strength. The soil is very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Road construction can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

The capability subclass is VIIe. Based on red spruce as the indicator species, the woodland ordination symbol is 10R.

OcF—Oconaluftee channery loam, 50 to 95 percent slopes. This very steep, very deep, well drained soil is on side slopes of high mountains, dominantly on north- to east-facing aspects. Individual areas are irregular in shape and range from 5 to 100 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Oconaluftee soil are as follows—

Surface layer:
0 to 8 inches—black channery loam
8 to 19 inches—dark brown channery loam

Subsoil:
19 to 35 inches—dark yellowish brown channery fine sandy loam

Underlying material:
35 to 60 inches—multicolored saprolite of channery fine sandy loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is very rapid in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is very high. The rooting depth is greater than 60 inches. This soil is subject to downslope movement when lateral support is removed and may settle unevenly when used for fill slopes. The climate is severe. It is cold and icy in winter and rainy, foggy, and cool during the rest of the year. The soil remains frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are areas of soils on shoulders and spur ridges that have soft bedrock at a depth of 20 to 60 inches and areas of soils near rock outcrops that have hard bedrock at a depth of 20 to 60 inches. Also included are some areas of rock outcrops. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest and is used for timber production, wildlife habitat, or recreation. Privately owned tracts generally are used as woodland. A few areas are used for building sites.

This Oconaluftee soil is poorly suited to timber production because of the slope. Production also is reduced because of the harsh climate. Northern hardwoods, such as northern red oak, black cherry, American beech, sugar maple, yellow birch, and black birch, are the common trees. Red spruce and Fraser fir also grow on this soil. Areas below an elevation of 5,300 feet should be managed for hardwoods, and areas above an elevation of 5,300 feet should be managed for red spruce. Fraser fir is not used for timber production because infestations of balsam woolly adelgids kill most large trees. Thinning red spruce can increase the quality of the stand. The soil can be reforested by managing the natural regeneration of hardwoods. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration. The main concerns in timber management are the slope, the cold climate, and soil instability. The use of wheeled and tracked equipment is dangerous on this soil. Cable yarding generally is safer to use, requires fewer roads, and causes less damage to the soil. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams.

This soil is poorly suited to building site development because of the slope. An additional limitation is soil freezing. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The soil is subject to downslope movement in cutbanks and may settle unevenly when used for fill slopes. Permanent retaining walls may be needed to increase soil strength. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete. The soil is very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Construction can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

This soil is poorly suited to septic tank absorption fields because of the slope. Because the slope can cause effluent to seep to the surface, septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Access roads are subject to downslope movement on cut slopes and to differential settling on fill slopes. Permanent retaining walls may be needed to increase soil strength. The soil is very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Road construction can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

The capability subclass is VIIe. Based on red spruce as the indicator species, the woodland ordination symbol is 10R.

OwD—Oconaluftee channery loam, windswept, 15 to 30 percent slopes. This moderately steep, very deep, well drained soil is on ridges of high mountains. Individual areas are long and narrow and range from 5 to 30 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Oconaluftee soil are as follows—

Surface layer:
0 to 8 inches—black channery loam
8 to 19 inches—dark brown channery loam

Subsoil:
19 to 35 inches—dark yellowish brown channery fine sandy loam

Underlying material:
35 to 60 inches—multicolored saprolite of channery fine sandy loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is very high. The rooting depth is greater than 60 inches. This soil is subject to downslope movement when lateral support is removed and may settle unevenly when used for fill slopes. The climate is severe. It is cold, icy, and very windy in winter and rainy, foggy, and cool during the rest of the year. The soil remains frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are small areas of soils on shoulders and spur ridges that have soft bedrock at a depth of 20 to 60 inches and areas of soils near rock outcrops that have bedrock at a depth of 20 to 60 inches. Also included are some areas of rock outcrops. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit in the Pisgah National Forest and is used for wildlife habitat or recreation. Privately owned tracts are used for woodland or building site development.

This Oconaluftee soil is not used for commercial timber production. The trees have been stunted by high winds and ice damage. Northern red oak is the most common tree. Fraser fir, red spruce, black birch, yellow birch, black cherry, and sugar maple also grow on this soil.

This soil is poorly suited to building site development because of the slope, the harsh climate, and soil freezing. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The soil is subject to downslope movement in cutbanks and may settle unevenly when used for fill slopes. Permanent retaining walls may be needed to increase soil strength. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete. The soil is very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Construction can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

This soil is poorly suited to septic tank absorption fields because of the slope. Because the slope can cause effluent to seep to the surface, septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Access roads are subject to downslope movement on cut slopes and to differential settling on fill slopes. Permanent retaining walls may be needed to increase soil strength. The soil is very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Road construction can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

The capability subclass is VIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R.

OwE—Oconaluftee channery loam, windswept, 30 to 50 percent slopes. This steep, very deep, well drained soil is on ridges and side slopes of high mountains, on dominantly north- to east-facing aspects. Individual areas are long and narrow and range from 5 to 30 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Oconaluftee soil are as follows—

Surface layer:
0 to 8 inches—black channery loam
8 to 19 inches—dark brown channery loam

Subsoil:
19 to 35 inches—dark yellowish brown channery fine sandy loam

Underlying material:
35 to 60 inches—multicolored saprolite of channery fine sandy loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is very high. The rooting depth is greater than 60 inches. This soil is subject to downslope movement when lateral support is removed and may settle unevenly when used for fill slopes. The climate is severe. It is cold, icy, and very windy in winter and rainy, foggy, and cool during the rest of the year. The soil remains frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are small areas of soils on shoulders and spur ridges that have soft bedrock at a depth of 20 to 60 inches and areas of soils near rock outcrops that have hard bedrock at a depth of 20 to 60 inches. Also included are some areas of rock outcrops. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest and is used for wildlife habitat or recreation. Privately owned tracts are used mainly for woodland or building site development.

This Oconaluftee soil is not used for commercial timber production. The trees have been stunted by high winds and ice damage. Northern red oak is the most common tree. Fraser fir, red spruce, black birch, yellow birch, black cherry, and sugar maple also grow on this soil.

This soil is poorly suited to building site development because of the slope, the harsh climate, and soil freezing. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The soil is subject to downslope movement in cutbanks and may settle unevenly when used for fill slopes. Permanent retaining walls may be needed to increase soil strength. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete. The soil is very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Construction can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

This soil is poorly suited to septic tank absorption fields because of the slope. Because the slope can cause effluent to seep to the surface, septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Access roads are subject to downslope movement on cut slopes and to differential settling on fill slopes. Permanent retaining walls may be needed to increase soil strength. The soil is very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Road construction can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R.

Pg—Pits. This map unit consists of gravel pits along the east and west forks of the Pigeon River and rock quarries at the upper end of Allens Creek. Pits range from 2 to 10 feet in depth, and quarries range from 50 to 300 feet in depth. Individual areas range from 2 to 15 acres in size.

Gravel pits are open excavations from which water-rounded gravel and cobbles have been mined. Quarries are open excavations from which bedrock has been mined.

Included in this unit in mapping are small areas of contrasting unexcavated soils and piles of spoil material.

The suitability of this map unit for other uses is not given. Common management concerns are the slope, stoniness, exposed bedrock, and instability of pit walls. The areas along the Pigeon River are subject to occasional, brief floods. Water ponds in these areas during wet periods. Some parts of the quarries sometimes contain water. All interpretations require onsite investigation.

The capability subclass is VIIIs. No woodland ordination symbol has been assigned to this map unit.

PwC—Plott fine sandy loam, 8 to 15 percent slopes, stony. This strongly sloping, very deep, well drained soil is on ridges of intermediate mountains. Stones and boulders are scattered on the surface. Individual areas are long and narrow and range from 5 to 30 acres in size. Elevation ranges from about 3,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Plott soil are as follows—

Surface layer:
0 to 11 inches—very dark brown fine sandy loam

Subsoil:
11 to 14 inches—dark yellowish brown loam
14 to 26 inches—yellowish brown loam
26 to 38 inches—yellowish brown sandy loam

Underlying material:
38 to 60 inches—multicolored saprolite of sandy loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is very high. The rooting depth is greater than 60 inches. This soil is subject to rime ice in winter and frequent fog in summer. The potential for frost action is moderate.

Included in this unit in mapping are Edneyville and Chestnut soils on the shoulders of ridges. These soils have a surface layer that is thinner or lighter colored than that of the Plott soil. Chestnut soils have soft bedrock at a depth of 20 to 40 inches. Also included are areas that have soft bedrock at a depth of 40 to 60 inches, some areas of rock outcrops, and some soils that have major soil properties similar to those of the Plott soil and have similar use and management. The similar soils have a dark surface layer that is less than 10 inches thick or more than 20 inches thick. Some prominent exposed ridges are windswept. Contrasting inclusions make up about 15 percent of this map unit.

About half of the acreage in this map unit is in the Pisgah National Forest. It is used for timber production, wildlife habitat, or recreation or is in a federally designated wilderness area. Privately owned areas are used for woodland, pasture, orchards, ornamental crops, or building site development.

This Plott soil is well suited to timber production. Northern hardwoods, such as northern red oak, sweet birch, black cherry, and yellow-poplar, are the common trees. Managing the natural regeneration of hardwoods is the best method of reforestation. Cutting all of the trees can increase the natural regeneration of hardwoods.

This soil has no major limitations affecting timber management. Wheeled and tracked equipment can be used on this soil.

This soil is moderately suited to cropland because of the slope and a hazard of erosion. This soil is used for cropland in only a few small areas because of poor accessibility.

This soil is well suited to pasture and hay, but poor accessibility is a limitation. Adapted forage species include native bluegrass, clovers, tall fescue, and orchardgrass. The hazard of erosion is severe in unvegetated areas. Preventing overgrazing and grazing only when the soil is dry help to control erosion. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is well suited to ornamental crops and orchards. The hazard of erosion is severe in unvegetated areas. To reduce this hazard, sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution. The soil is suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

This soil is moderately suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete may be damaged by the high corrosivity of the soil. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is moderately suited to septic tank absorption fields because of the slope. Septic tank absorption fields should be installed on the contour.

This soil is moderately suited to access roads because of the slope and the moderate potential for frost action. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Frost action may damage unprotected road surfaces.

The capability subclass is IVe. Based on northern red oak as the indicator species, the woodland ordination symbol is 5A.

PwD—Plott fine sandy loam, 15 to 30 percent slopes, stony. This moderately steep, very deep, well drained soil is on ridges and side slopes of intermediate mountains, dominantly on north- to east-facing aspects. Stones and boulders are scattered on the surface. Individual areas are long and narrow and range from 5 to 50 acres in size. Elevation ranges from about 3,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Plott soil are as follows—

Surface layer:
0 to 11 inches—very dark brown fine sandy loam

Subsoil:
11 to 14 inches—dark yellowish brown loam
14 to 26 inches—yellowish brown loam
26 to 38 inches—yellowish brown sandy loam

Underlying material:
38 to 60 inches—multicolored saprolite of sandy loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is high or very high. The rooting depth is greater than 60 inches. The soil is subject to rime ice in winter and frequent fog in summer. The potential for frost action is moderate.

Included in this unit in mapping are Edneyville and Chestnut soils on the shoulders of ridges. These soils have a surface layer that is thinner or lighter colored than that of the Plott soil. Chestnut soils have soft bedrock at a depth of 20 to 40 inches. Also included are areas that have soft bedrock at a depth of 40 to 60 inches, some areas of rock outcrops, and some soils that have major soil properties similar to those of the Plott soil and have similar use and management. The similar soils have a dark surface layer that is less than 10 inches thick or more than 20 inches thick. Some prominent exposed ridges are windswept. Contrasting inclusions make up about 15 percent of this map unit.

About half of the acreage of this map unit is in the Pisgah National Forest. It is used for timber production, wildlife habitat, or recreation or is in a federally designated wilderness area. Privately owned areas are used for woodland, pasture, hay, orchards, ornamental crops, or building site development.

This Plott soil is moderately suited to timber production because of the slope. Productivity, however, is high. Northern hardwoods, such as northern red oak, sweet birch, black cherry, and yellow-poplar, are the common trees. Managing the natural regeneration of hardwoods is the best method of reforestation. Cutting all of the trees can increase the natural regeneration of hardwoods. The main concerns in timber management are a hazard of erosion and the slope. Wheeled and tracked equipment can be used on this soil.

This soil is poorly suited to cropland because of the slope, a severe hazard of erosion, and poor access. Conservation practices are expensive to install and maintain in areas of this soil.

This soil is moderately suited to pasture and hay because of the slope. Poor accessibility is an additional limitation. Adapted forage species include native bluegrass, clovers, tall fescue, and orchardgrass. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is moderately suited to orchards and ornamental crops because of the slope. The hazard of erosion is severe in unvegetated areas. To reduce this hazard, sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution. The soil is suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

This soil is poorly suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete may be damaged by the high corrosivity of the soil. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is poorly suited to septic tank absorption fields because of the slope. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Frost action may damage unprotected road surfaces.

The capability subclass is VIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 5R.

PwE—Plott fine sandy loam, 30 to 50 percent slopes, stony. This steep, very deep, well drained soil is on side slopes of intermediate mountains, dominantly on north- to east-facing aspects. Stones and boulders are scattered on the surface. Individual areas are irregular in shape and range from 5 to 250 acres in size. Elevation ranges from about 3,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Plott soil are as follows—

Surface layer:

0 to 11 inches—very dark brown fine sandy loam

Subsoil:

11 to 14 inches—dark yellowish brown loam
14 to 26 inches—yellowish brown loam
26 to 38 inches—yellowish brown sandy loam

Underlying material:

38 to 60 inches—multicolored saprolite of sandy loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is high or very high. The rooting depth is greater than 60 inches. This soil is subject to rime ice in winter and frequent fog in summer. The potential for frost action is moderate.

Included in this unit in mapping are Edneyville and Chestnut soils on the shoulders of ridges and Tuckasegee and Cullasaja soils along drainageways. Edneyville and Chestnut soils have a surface layer that is thinner or lighter colored than that of the Plott soil. Chestnut soils have soft bedrock at a depth of 20 to 40 inches. Tuckasegee and Cullasaja soils have a subsoil that is thicker than that of the Plott soil. Cullasaja soils have more than 35 percent rock fragments in the subsoil. Also included are soils that have soft bedrock at a depth of 40 to 60 inches, some areas of rock outcrops, and some soils that have major soil properties similar to those of the Plott soil and have similar use and management. The similar soils have a dark surface layer that is less than 10 inches thick or more than 20 inches thick. Some prominent exposed ridges are windswept. Contrasting inclusions make up about 15 percent of this map unit.

About half of the acreage of this map unit is in the Pisgah National Forest. It is used for timber production, wildlife habitat, or recreation or is in a federally designated wilderness area. Privately owned areas are used for woodland, pasture, orchards, ornamental crops, or building site development.

This Plott soil is poorly suited to timber production because of the slope. Productivity, however, is high. Northern hardwoods, such as northern red oak, sweet birch, black cherry, and yellow-poplar, are the common trees. Managing the natural regeneration of hardwoods is the best method of reforestation. Cutting all of the trees can increase the natural regeneration of hardwoods. The main concerns in timber management are a hazard of erosion and the slope. Wheeled and tracked equipment can be used in the less steep areas, but cable yarding generally is safer to use and does not disturb the soil as much in the steeper areas.

This soil is poorly suited to pasture and unsuited to hay because of the slope. Poor accessibility is an additional limitation. Adapted forage species include native bluegrass, clovers, tall fescue, and orchardgrass. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. Operating farm machinery on slopes greater than 30 percent may be unsafe. Hand application of lime, fertilizer, and chemicals may be necessary. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is poorly suited to orchards and ornamental crops because of the slope. The hazard of erosion is severe in unvegetated areas. To reduce this hazard, sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution. The soil is suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

This soil is poorly suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete may be damaged by the high corrosivity of the soil. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is poorly suited to septic tank absorption fields because of the slope. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Frost action may damage unprotected road surfaces.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 5R.

PwF—Plott fine sandy loam, 50 to 95 percent slopes, stony. This very steep, very deep, well drained soil is on side slopes of intermediate mountains, dominantly on north- to east-facing aspects. Stones and boulders are scattered on the surface. Individual areas are irregular in shape and range from 5 to 250 acres in size. Elevation ranges from about 3,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Plott soil are as follows—

Surface layer:

0 to 11 inches—very dark brown fine sandy loam

Subsoil:

11 to 14 inches—dark yellowish brown loam

14 to 26 inches—yellowish brown loam

26 to 38 inches—yellowish brown sandy loam

Underlying material:

38 to 60 inches—multicolored saprolite of sandy loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is very rapid in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is high or very high. The rooting depth is greater than 60 inches. This soil is subject to rime ice in winter and frequent fog in summer. The potential for frost action is moderate.

Included in this unit in mapping are Edneyville and Chestnut soils on shoulder slopes and Tuckasegee and Cullasaja soils along drainageways. Edneyville and Chestnut soils have a surface layer that is thinner or lighter colored than that of the Plott soil. Chestnut soils have soft bedrock within a depth of 20 to 40 inches. Tuckasegee and Cullasaja soils have a subsoil that is thicker than that of the Plott soil. Cullasaja soils have more than 35 percent rock fragments in the subsoil. Also included are soils that have soft bedrock at a depth of 40 to 60 inches, some areas of rock outcrops, and some soils that have major soil properties similar to those of the Plott soil and have similar use and management. The similar soils have a dark surface layer that is less than 10 inches thick or more than 20 inches thick. Some prominent exposed ridges are windswept. Contrasting inclusions make up about 15 percent of this map unit.

About half of the acreage of this map unit is in the Pisgah National Forest. It is used for timber production, wildlife habitat, or recreation or is in a federally designated wilderness area. Privately owned areas generally are used as woodland or pasture. A few areas are used for building site development.

This Plott soil is poorly suited to timber production because of the slope. Productivity, however, is high. Northern hardwoods, such as northern red oak, sweet birch, black cherry, and yellow-poplar, are the common trees. Managing the natural regeneration of hardwoods is the best method of reforestation. Cutting all of the trees can increase the natural regeneration of hardwoods. The main concerns in timber management are a hazard of erosion and the slope. The use of wheeled and tracked equipment is dangerous on this soil. Cable yarding generally is safer to use, requires fewer roads, and causes less damage to the soil.

This soil is poorly suited to pasture because of the slope. Poor accessibility is an additional limitation. Adapted forage species include native bluegrass, clovers, tall fescue, and orchardgrass. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. Operating farm machinery on slopes greater than 50 percent is unsafe. Hand application of lime, fertilizer, and chemicals is necessary. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is poorly suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete may be damaged by the high corrosivity of the soil. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is poorly suited to septic tank absorption fields because of the slope. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Frost action may damage unprotected road surfaces.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 5R.

RfF—Rock outcrop-Ashe-Cleveland complex, 30 to 95 percent slopes. This map unit occurs as areas of Rock outcrop and areas of a moderately deep, somewhat excessively drained Ashe soil and a shallow, somewhat excessively drained Cleveland soil. This unit is steep to very steep and occurs on south- to west-facing side slopes of low and intermediate mountains. Typically, it is about 40 percent Rock outcrop, 30 percent Ashe soil, and 15 percent Cleveland soil. The Rock outcrop and the Ashe and Cleveland soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 5 to 50 acres in size. Elevation ranges from 2,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Ashe soil are as follows—

Surface layer:
0 to 2 inches—dark brown gravelly sandy loam

Subsoil:
2 to 18 inches—yellowish brown sandy loam
18 to 28 inches—dark yellowish brown gravelly sandy loam

Bedrock:
28 inches—unweathered, felsic high-grade metamorphic and igneous bedrock

Typically, the sequence, depth, and composition of the layers of this Cleveland soil are as follows—

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

Subsoil:
3 to 12 inches—dark yellowish brown sandy loam

Bedrock:
12 inches—unweathered, felsic high-grade metamorphic and igneous bedrock

Air and water move through the Ashe and Cleveland soils at a moderately rapid rate above the hard bedrock. Surface runoff is very rapid in bare areas. The depth to hard bedrock ranges from 20 to 40 inches in the Ashe soil and from 10 to 20 inches in the Cleveland soil. The content of organic matter in the surface layer of both soils ranges from low to high. The potential for frost action is moderate.

Included in this unit in mapping are areas of Chestnut soils in concave landscape positions, Edneyville soils along the edge of the unit, and Cullasaja soils along the southern boundary of the unit. The very deep Edneyville soils and the moderately deep Chestnut soils are underlain by soft bedrock. Cullasaja soils have more than 35 percent rock fragments in the subsoil. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is privately owned and is poor-quality woodland. This unit is not used for commercial timber production. A few areas are used for building sites.

This map unit is unsuited to cropland, hay, orchards, ornamental crops, and timber production and poorly suited to pasture and building site development because of the slope, the Rock outcrop, a severe hazard of erosion, and the depth to bedrock. Any access road built through this unit requires extensive blasting.

The capability subclass is VIIIs in areas of the Rock outcrop and VIIe in areas of the Ashe and Cleveland soils. No woodland ordination symbol has been assigned to the Rock outcrop. Based on chestnut oak as the indicator species, the woodland ordination symbol is 3R in areas of the Ashe soil and 2R in areas of the Cleveland soil.

RgF—Rock outcrop-Cataska complex, 50 to 95 percent slopes. This map unit consists of areas of Rock outcrop and areas of a very steep, shallow, excessively drained Cataska soil. This unit is on south- to west-facing side slopes of low and intermediate mountains. Typically, it is about 45 percent Rock outcrop and 40 percent Cataska soil. The Rock outcrop and the Cataska soil occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 5 to 50 acres in size. Elevation ranges from 1,500 to 4,000 feet.

Typically, the sequence, depth, and composition of the layers of this Cataska soil are as follows—

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

Subsoil:
3 to 16 inches—yellowish brown very channery silt loam

Bedrock:

16 to 29 inches—weathered, multicolored, highly fractured low-grade metasedimentary bedrock

29 inches—unweathered, fractured low-grade metasedimentary bedrock

Air and water move through the Cataska soil at a moderately rapid rate above the soft bedrock. Surface runoff is rapid in bare areas. The depth to soft bedrock ranges from 12 to 20 inches. The content of organic matter in the surface layer ranges from low to moderate. This soil is subject to downslope movement when lateral support is removed and may settle unevenly when used for fill slopes. The potential for frost action is moderate.

Included in this unit in mapping are areas of Soco soils in concave landscape positions, Stecoah soils along the edge of the unit, and Spivey and Whiteoak soils along drainageways. Spivey, Soco, Stecoah, and Whiteoak soils are deeper over bedrock than the Cataska soil. Spivey and Whiteoak soils have a surface layer that is thicker or darker than that of the Cataska soil. Whiteoak soils have more clay in the subsoil than the Cataska soil. Also included are some soils that have major soil properties similar to those of the Cataska soil and have similar use and management. These soils have hard bedrock at a depth of 10 to 20 inches. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest. It is mostly poor-quality woodland used for recreation and wildlife habitat.

This map unit is poorly suited to recreation, woodland, wildlife habitat, and building site development because of the slope, a severe hazard of erosion, the Rock outcrop, and the shallowness to bedrock in the Cataska soil. The unit is not used for commercial timber production. Any access road built through this unit requires extensive blasting. The unit is susceptible to landslides when cuts are made for road construction (fig. 6).

The capability subclass is VIIIs in areas of the Rock outcrop and VIIs in areas of the Cataska soil. No woodland ordination symbol has been assigned to the Rock outcrop. Based on chestnut oak as the indicator species, the woodland ordination symbol is 2R in areas of the Cataska soil.

RmF—Rock outcrop-Craggey complex, windswept, 30 to 95 percent slopes. This map unit occurs as areas of Rock outcrop and areas of a shallow, somewhat excessively drained Craggey soil. This unit is steep to very steep and occurs on ridges and side slopes of high mountains. Typically, it is about 50 percent Rock outcrop and 35 percent Craggey soil. The Rock outcrop and the Craggey soil occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 5 to 50 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Craggey soil are as follows—

Surface layer:

0 to 6 inches—very dark brown gravelly sandy loam

6 to 15 inches—very dark grayish brown sandy loam

Bedrock:

15 inches—unweathered granite gneiss

Air and water move through the Craggey soil at a moderately rapid rate above the hard bedrock. Surface runoff is rapid in bare areas. Hard bedrock is at a depth of 10 to 20 inches. The content of organic matter in the surface layer is very high. The climate is severe. It is cold, icy, and very windy in winter and rainy, foggy, and cool during the rest of the year. The soil remains frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are Burton and Wayah soils along the edge of the unit and Balsam and Tanasee soils in drainageways. Balsam, Burton, Wayah, and Tanasee soils are deeper over bedrock than the Craggey soil. Balsam soils have more than 35 percent rock fragments in the subsoil. Also included are some soils that have major soil properties similar to those of the Craggey soil and have similar use and management. These soils have hard bedrock within a depth of 10 inches or have weathered bedrock and no hard bedrock within a depth of 20 inches. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest and in areas along the Blue Ridge Parkway. It is used for recreation or wildlife habitat or is in a federally designated wilderness area. It is mostly covered with rhododendron and mountain laurel.

This map unit is poorly suited to recreation, wildlife habitat, and building site development because of the slope, the Rock outcrop, a severe hazard of erosion, the depth to bedrock in the Craggey soil, high winds, and the harsh climate. The unit is not used for commercial timber production because trees are stunted and twisted by the high winds and ice. Any access road built through this unit requires extensive blasting.

The capability subclass is VIIIs in areas of the Rock

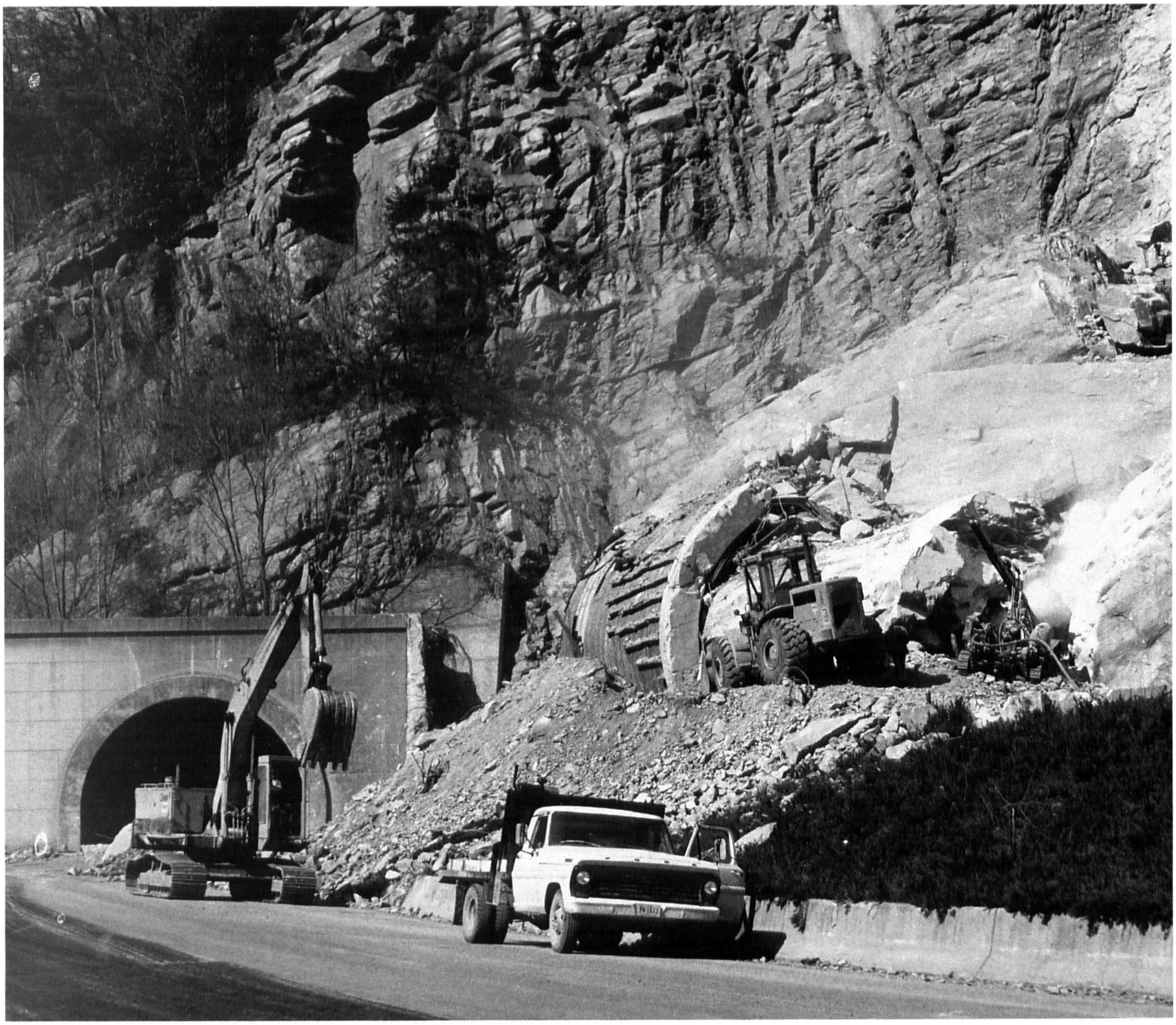

Figure 6.—An area of the Rock outcrop-Cataska complex where a major landslide occurred during construction along Interstate Highway 40. In this map unit, the soil and underlying material are unstable if lateral support is removed.

outcrop and VIIs in areas of the Craggey soil. No woodland ordination symbol has been assigned to the Rock outcrop. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R in areas of the Craggey soil.

RoA—Rosman fine sandy loam, 0 to 2 percent slopes, occasionally flooded. This nearly level, very deep, well drained or moderately well drained soil is on flood plains. Individual areas are irregular in shape and range from 10 to 100 acres in size. Elevation ranges from 2,000 to 3,000 feet.

Typically, the sequence, depth, and composition of the layers of this Rosman soil are as follows—

Surface layer:

0 to 11 inches—dark brown fine sandy loam

Subsoil:

11 to 38 inches—dark yellowish brown fine sandy loam

Underlying material:
38 to 60 inches—dark yellowish brown fine sandy loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is slow in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is moderate or high. The seasonal high water table is at a depth of 30 to 60 inches. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Cullowhee and Nikwasi soils in depressions and along small streams and Statler soils at the higher elevations along the edge of the unit. Cullowhee soils are somewhat poorly drained, and Nikwasi soils are poorly drained or very poorly drained. Statler soils have more clay in the subsoil than the Rosman soil. Also included are small areas of sandy soils having a very low content of organic matter that are adjacent to the larger stream channels and some soils that have major soil properties similar to those of the Rosman soil and have similar use and management. The similar soils have a dark surface layer that is more than 20 inches thick or less than 10 inches thick. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is used for cropland. The rest is used for pasture, hay, ornamental crops, or building site development.

This Rosman soil is well suited to woodland, but it is not used for timber production in the survey area.

This soil is moderately suited to cropland because the flooding can damage or destroy crops (fig. 7). Productivity, however, is high. Although most flooding occurs during the winter and early spring, crop loss is a risk during the growing season. Split applications of nitrogen fertilizer can help to offset the nitrogen lost from the root zone through leaching. Tilth can be improved or maintained by cropping systems that include grasses, legumes, or grass-legume mixtures, crop rotations, cover crops, minimum tillage, and applications of manure. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is well suited to hay and pasture. Adapted forage species include tall fescue, orchardgrass, and legumes, especially alfalfa. The flooding is the main limitation. Fencing cattle away from streams helps to prevent erosion of the streambank and improve water quality.

This soil is well suited to ornamental crops. Because of the flooding and poor air drainage, it is poorly suited to orchards. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution. The high content of sand in the subsoil is a problem affecting the ball and burlap harvesting of ornamental crops.

This soil is poorly suited to building site development because of the flooding. Structures are subject to damage or loss from flooding. Where development is planned, buildings should have the lowest floor higher than the 100-year flood level. Some excavations need retaining walls to keep the sides from caving. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

This soil is poorly suited to septic tank absorption fields because of the flooding and the wetness. Special design is needed for the absorption fields.

This soil is poorly suited to access roads because of the flooding. The moderate potential for frost action is an additional limitation. Constructing roads above the level of potential floodwaters is necessary for safety and helps to prevent road damage and reduce maintenance.

The capability subclass is IIw. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8A.

ScB—Saunook loam, 2 to 8 percent slopes. This gently sloping, very deep, well drained soil is in coves, in drainageways, on toe slopes, and on benches of low mountains and intermountain hills. Individual areas are irregular in shape and range from 2 to 30 acres in size. Elevation ranges from 2,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Saunook soil are as follows—

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

Subsoil:
9 to 28 inches—dark yellowish brown loam
28 to 34 inches—dark yellowish brown cobbly loam
34 to 65 inches—yellowish brown cobbly sandy loam

Air and water move through this soil at a moderate rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is moderate to very high. This soil is subject to seeps and springs below the surface and at the surface. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Dillsboro soils intermingled with the Saunook soil on

Figure 7.—An area of Rosman fine sandy loam, 0 to 2 percent slopes, occasionally flooded. Trellis tomatoes grow well on this soil.

benches and Cullowhee and Nikwasi soils along small streams. Dillsboro soils have more clay in the subsoil than the Saunook soil. Cullowhee soils are somewhat poorly drained, and Nikwasi soils are poorly drained or very poorly drained. Cullowhee and Nikwasi soils have strata of sand, gravel, and cobbles at depths of 20 to 40 inches. Also included are some soils that have more than 35 percent rock fragments in the subsoil and some soils that have major soil properties similar to those of the Saunook soil and have similar use and management. The similar soils have a subsoil that is redder than that of the Saunook soil. Contrasting inclusions make up about 15 percent of this map unit.

About half of this map unit is used for cropland, hay, pasture, orchards, or ornamental crops. The rest generally is used for woodland or building site development. Some areas are in the Pisgah National Forest and are used for timber production, wildlife habitat, or recreation.

This Saunook soil is well suited to timber production. Cove hardwoods, such as yellow-poplar, black cherry, northern red oak, and red maple, are the common trees. Eastern white pine and eastern hemlock also grow on this soil. The soil can be reforested either by natural regeneration of hardwoods or by planting eastern white pine. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration.

This soil has no major limitations affecting timber management. Wheeled and tracked equipment can be used on this soil but can cause rutting and compaction when the soil is wet. Soil compaction can be reduced by using low-pressure ground equipment, laying out skid trails in advance, and harvesting timber when the soil is dry. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. Site preparation for pines, such as burning and herbicide application, helps to reduce immediate plant competition and improve seedling survival. Burning also helps to minimize debris and lower planting costs. Ripping skid trails and landings when the soil is dry breaks up compacted layers, improves tilth, and increases seedling survival.

This soil is well suited to cropland. Erosion is the main limitation. It can be controlled by minimum tillage, stripcropping, grassed waterways, close-growing cover crops, applications of fertilizer, rotations that include legumes and grasses, and other erosion-control measures. Tilth can be maintained by the proper erosion-control measures and by additions of organic material. An artificial drainage system or diversions may be required to remove excess water from seeps and springs. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is well suited to hay and pasture. Adapted forage species include mixtures of tall fescue or orchardgrass and legumes for spring and fall production and sudangrass and alfalfa for summer production. The hazard of erosion is moderate in unvegetated areas. Erosion is also a hazard in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. Eroded sites can crust or become sealed, and the result is poor infiltration of water. Seeps and springs can be developed as water sources for livestock.

This soil is well suited to orchards and ornamental crops. Sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution. The soil is suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

This soil is well suited to building site development. All excavated areas are susceptible to moderate erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Excavation is hindered by underground springs and cobbles and stones. Building sites should be graded so that surface runoff is directed away from the structure. Using corrosion-resistant material for foundations and basements helps to offset the risk of corrosion to concrete. Installing perforated drainage tile around the foundations helps to reduce the wetness caused by underground springs.

This soil is moderately suited to septic tank absorption fields because of the moderate permeability. Areas containing springs or seeps should not be selected as sites. Trench walls are susceptible to smearing if the soil is excavated when it is too wet. Raking the trench walls removes smeared surfaces.

This soil is moderately suited to access roads because of low strength. The moderate potential for frost action is an additional limitation. During rainy periods, access roads in bare areas are slippery and can be impassable. The design of access roads should control surface runoff and help to stabilize cut and fill slopes. In some areas the deep cuts made when leveling a surface for an access road can expose cobbles and stones. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. Unless it is removed, water from seeps and springs can saturate the roadbed. The roads may need more culverts than normal. The hazard of erosion can be reduced by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads.

The capability subclass is IIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8A.

SdC—Saunook loam, 8 to 15 percent slopes, stony. This strongly sloping, very deep, well drained soil is in coves, in drainageways, on toe slopes, and on benches of low mountains and intermountain hills.

Stones are scattered on the surface. Individual areas are irregular in shape and range from 2 to 100 acres in size. Elevation ranges from 2,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Saunook soil are as follows—

Surface layer:

0 to 9 inches—very dark brown loam

Subsoil:

9 to 28 inches—dark yellowish brown loam

28 to 34 inches—dark yellowish brown cobbly loam

34 to 65 inches—yellowish brown cobbly sandy loam

Air and water move through this soil at a moderate rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is moderate to very high. This soil is subject to seeps and springs below the surface and at the surface. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Dillsboro soils intermingled with the Saunook soil, Braddock soils on knolls, and Cullowhee and Nikwasi soils along small streams. Braddock and Dillsboro soils have more clay in the subsoil than the Saunook soil. Cullowhee soils are somewhat poorly drained, and Nikwasi soils are poorly drained or very poorly drained. Cullowhee and Nikwasi soils have strata of sand, gravel, and cobbles at depths of 20 to 40 inches. Also included are some soils that have more than 35 percent rock fragments in the subsoil, some small areas that are very bouldery (fig. 8), and some soils that have major soil properties similar to those of the Saunook soil and have similar use and management. The similar soils have a subsoil that is redder than that of the Saunook soil. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is used for cropland, pasture, hay, orchards, or ornamental crops. The rest generally is used for woodland or building site development. Some areas are in the Pisgah National Forest and are used for timber production, wildlife habitat, or recreation.

This Saunook soil is well suited to timber production. Cove hardwoods, such as yellow-poplar, black cherry, northern red oak, and red maple, are the common trees. Eastern white pine and eastern hemlock also grow on this soil. The soil can be reforested either by natural regeneration of hardwoods or by planting eastern white pine. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration.

This soil has no major limitations affecting timber management. Wheeled and tracked equipment can be used on this soil but can cause rutting and compaction when the soil is wet. Soil compaction can be reduced by using low-pressure ground equipment, laying out skid trails in advance, and harvesting timber when the soil is dry. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. Site preparation for pines, such as burning and herbicide application, helps to reduce immediate plant competition and improve seedling survival. Burning also helps to minimize debris and lower planting costs. Ripping skid trails and landings when this soil is dry breaks up compacted layers, improves tilth, and increases seedling survival.

This soil is moderately suited to cropland because of the slope. Erosion is the main limitation. It can be controlled by minimum tillage, stripcropping, grassed waterways, close-growing cover crops, applications of fertilizer, rotations that include legumes and grasses, and other erosion-control measures. Tilth can be maintained by the proper erosion-control measures and by additions of organic material. An artificial drainage system or diversions may be required to remove excess water from seeps and springs. Stones on the surface should be removed to prevent damage to farm equipment. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is well suited to hay and pasture. Adapted forage species include mixtures of tall fescue or orchardgrass and legumes for spring and fall production and sudangrass and alfalfa for summer production. The hazard of erosion is moderate in unvegetated areas. Erosion is also a hazard in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. Eroded sites can crust or become sealed, and the result is poor infiltration of water. Seeps and springs can be developed as water sources for livestock. The stones on the surface should be removed to prevent damage to farm equipment.

This soil is well suited to orchards and ornamental crops. The hazard of erosion is severe in unvegetated areas. To reduce this hazard, sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental

Figure 8.—An area included in mapping with Saunook loam, 8 to 15 percent slopes, stony. It has more rocks on the surface than the Saunook soil.

pollution. The soil is suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

This soil is moderately suited to building site development because of the slope. All excavated areas are susceptible to moderate erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Excavation is hindered by underground springs and cobbles and stones. Building sites should be graded so that surface runoff is directed away from the structure. Using corrosion-resistant material for foundations and basements helps to offset the risk of corrosion to concrete. Installing perforated drainage tile around the foundations helps to reduce the wetness caused by underground springs.

This soil is moderately suited to septic tank absorption fields because of the slope and the moderate permeability. Filter fields should be installed on the contour. Areas containing seeps or springs should not be selected as sites. Trench walls are susceptible to smearing if the soil is excavated when wet. Raking the trench walls removes smeared surfaces.

This soil is moderately suited to access roads because of low strength and the slope. The moderate potential for frost action is an additional limitation. During rainy periods, access roads in bare areas are slippery and can be impassable. The design of access roads should control surface runoff and help to stabilize cut and fill slopes. In some areas the deep cuts made when leveling a surface for an access road can expose cobbles and stones. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. Unless it is removed, water from seeps and springs can saturate the roadbed. The roads may need more culverts than normal. The hazard of erosion can be reduced by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads.

The capability subclass is IVe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8A.

SdD—Saunook loam, 15 to 30 percent slopes, stony. This moderately steep, very deep, well drained soil is in coves, in drainageways, on toe slopes, and on benches of low mountains and intermountain hills. Stones are scattered on the surface. Individual areas are irregular in shape and range from 5 to 100 acres in size. Elevation ranges from 2,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Saunook soil are as follows—

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

Subsoil:
9 to 28 inches—dark yellowish brown loam
28 to 34 inches—dark yellowish brown cobbly loam
34 to 65 inches—yellowish brown cobbly sandy loam

Air and water move through this soil at a moderate rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is moderate to very high. This soil is subject to seeps and springs below the surface and at the surface. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Braddock and Dillsboro soils intermingled with the Saunook soil on benches and knolls and Hayesville soils along the edge of the unit. Hayesville, Braddock, and Dillsboro soils have more than 35 percent clay in the subsoil. Also included are some soils that have more than 35 percent rock fragments in the subsoil, some small areas that are very bouldery, and some soils that have major soil properties similar to those of the Saunook soil and have similar use and management. The similar soils have a subsoil that is redder than that of the Saunook soil. Contrasting inclusions make up about 15 percent of this map unit.

About half of this map unit is used for cropland, pasture, hay, orchards, or ornamental crops. The rest is used for woodland or building site development. Some areas are in the Pisgah National Forest and are used for timber production, wildlife habitat, or recreation.

This Saunook soil is moderately suited to timber production because of the slope. Productivity, however, is high. Cove hardwoods, such as yellow-poplar, black cherry, northern red oak, and red maple, are the common trees. Eastern white pine and eastern hemlock also grow on this soil. The soil can be reforested by managing the natural regeneration of hardwoods or by planting eastern white pine. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration. The main concerns in timber management are the slope and a hazard of erosion. Wheeled and tracked equipment can be used but can cause rutting and compaction when the soil is wet. Soil compaction can be reduced by using low-pressure ground equipment, laying out skid trails in advance, and harvesting timber when the soil is dry. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. Site preparation for pines, such as burning and herbicide application, helps to reduce immediate plant competition and improve seedling survival. Burning also helps to minimize debris and lower planting costs. Ripping skid trails and landings when the soil is dry breaks up compacted layers, improves tilth, and increases seedling survival.

This soil is poorly suited to cropland because of the slope and a severe hazard of erosion. Erosion-control measures are difficult and expensive to establish and maintain on this soil. The stones on the surface should be removed to prevent damage to farm equipment. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is moderately suited to hay and pasture because of the slope. Adapted forage species include mixtures of tall fescue or orchardgrass and legumes for spring and fall production and sudangrass and alfalfa for summer production. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. Eroded sites can crust or become sealed, and the result is poor infiltration of water. Seeps and springs can be developed as water sources for livestock. The stones on the surface should be removed to prevent damage to farm equipment.

This soil is moderately suited to orchards and ornamental crops because of the slope. Sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution. The soil is suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

This soil is poorly suited to building site development because of the slope. All excavated areas are susceptible to moderate erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Excavation is hindered by underground springs and cobbles and stones. Building sites should be graded so that surface runoff is directed away from the structure. Using corrosion-resistant material for foundations and basements helps to offset the risk of corrosion to concrete. Installing perforated drainage tile around the foundations helps to reduce the wetness caused by underground springs.

This soil is poorly suited to septic tank absorption fields because of the slope. Filter fields should be installed on the contour. Areas containing seeps or springs should not be selected as sites. Trench walls are susceptible to smearing if the soil is excavated when wet. Raking the trench walls removes smeared surfaces.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action and low strength are additional limitations. During rainy periods, access roads in bare areas are slippery and can be impassable. The design of access roads should control surface runoff and help to stabilize cut and fill slopes. In some areas the deep cuts made when leveling a surface for an access road can expose cobbles and stones. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. Unless it is removed, water from seeps and springs can saturate the roadbed. The roads may need more culverts than normal. The hazard of erosion can be reduced by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads.

The capability subclass is VIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

SeE—Saunook loam, 30 to 50 percent slopes, very stony. This steep, very deep, well drained soil is in coves, on toe slopes, and on benches of low mountains and intermountain hills. Stones and boulders are scattered on the surface. Individual areas are irregular in shape and range from 5 to 50 acres in size. Elevation ranges from 2,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Saunook soil are as follows—

Surface layer:

0 to 9 inches—very dark brown loam

Subsoil:

9 to 28 inches—dark yellowish brown loam
28 to 34 inches—dark yellowish brown cobbly loam
34 to 65 inches—yellowish brown cobbly sandy loam

Air and water move through this soil at a moderate rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is moderate to very high. This soil is subject to seeps and springs below the surface and at the surface. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Braddock soils on benches and knolls and Cowee soils on side slopes along the edge of the unit. Braddock soils have more than 35 percent clay in the subsoil. Cowee soils have weathered bedrock at a depth of 20 to 40 inches. Also included are some soils that have more than 35 percent rock fragments in the subsoil, some small areas that are very bouldery, and some soils that have major soil properties similar to those of the Saunook soil and have similar use and management. The similar soils have a subsoil that is redder than that of the Saunook soil, have a thinner surface layer, or are underlain by saprolite. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is used as woodland. The rest is used for pasture, hay, orchards, ornamental crops, or building site development. Some areas are in the Pisgah National Forest and are used for timber production, wildlife habitat, or recreation.

This Saunook soil is poorly suited to timber production because of the slope. Productivity, however, is high. Cove hardwoods, such as yellow-poplar, black cherry, northern red oak, and red maple, are the common trees. Eastern white pine and eastern hemlock also grow on this soil. The soil can be reforested by managing the natural regeneration of hardwoods or by planting eastern white pine. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration. The main concerns in timber management are the slope and the hazard of erosion. Wheeled and tracked equipment can be used, but cable yarding generally is safer to use and does not disturb the soil as much in the steeper areas. Wheeled and tracked equipment can cause rutting and compaction when the soil is wet. Soil compaction can be reduced by using low-pressure ground equipment, laying out skid trails in advance, and harvesting timber when the soil is dry. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams.

This soil is poorly suited to cropland because of the slope, stones, and a severe hazard of erosion.

This soil is poorly suited to pasture and unsuited to hay because of the slope and the many surface stones. Adapted forage species include mixtures of tall fescue or orchardgrass and legumes. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. Eroded sites can crust or become sealed, and the result is poor infiltration of water. Seeps and springs can be developed as water sources for livestock. Operating farm equipment on slopes greater than 30 percent is unsafe. It may be necessary to apply fertilizer, lime, chemicals, and seeds by hand. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is poorly suited to orchards and ornamental crops because of the slope. Sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution. The soil is suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

This soil is poorly suited to building site development because of the slope. All excavated areas are susceptible to moderate erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Excavation is hindered by underground springs and cobbles and stones. Building sites should be graded so that surface runoff is directed away from the structure. Using corrosion-resistant material for foundations and basements helps to offset the risk of corrosion to concrete. Installing perforated drainage tile around the foundations helps to reduce the wetness caused by underground springs.

This soil is poorly suited to septic tank absorption fields because of the slope. Installing filter fields on the contour helps to prevent effluent from seeping to the surface. Areas containing seeps or springs should not be selected as sites. Trench walls are susceptible to smearing if the soil is excavated when wet. Raking the trench walls removes smeared surfaces.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action and low strength are additional limitations. During rainy periods, access roads in bare areas are slippery and can be impassable. The design of access roads should control surface runoff and help to stabilize cut and fill slopes. In some areas the deep cuts made when leveling a surface for an access road can expose cobbles and stones. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. Unless it is removed, water from seeps and springs can saturate the roadbed. The roads may need more culverts than normal. The hazard of erosion can be reduced by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads.

The capability subclass is VIIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

SfC—Saunook-Urban land complex, 2 to 15 percent slopes. This map unit occurs as a very deep, well drained Saunook soil and areas of Urban land. This unit is gently sloping to strongly sloping and occurs in coves of low mountains and intermountain hills. Typically, it is about 60 percent Saunook soil and 25 percent Urban land. The Saunook soil and the Urban land occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 5 to 25 acres in size. Elevation ranges from 2,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Saunook soil are as follows—

Surface layer:

0 to 9 inches—very dark brown loam

Subsoil:

9 to 28 inches—dark yellowish brown loam

28 to 34 inches—dark yellowish brown cobbly loam

34 to 65 inches—yellowish brown cobbly sandy loam

Urban land consists of areas covered by closely spaced houses, paved streets, parking lots, driveways, shopping plazas, industrial buildings, schools, churches, and apartment complexes. Because these areas have impermeable surfaces, runoff is high during rainstorms and flooding is possible.

Air and water move through the Saunook soil at a moderate rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is moderate to very high. This soil is subject to seeps and springs below the surface and at the surface. The potential for frost action is moderate.

Included in this unit in mapping are areas of Dillsboro soils intermingled with the Saunook soil, areas of Braddock soils on knolls, and areas of Cullowhee and Nikwasi soils along small streams. Braddock and Dillsboro soils have a subsoil that is redder and has more clay than that of the Saunook soil. Cullowhee soils are somewhat poorly drained, and Nikwasi soils are poorly drained or very poorly drained. Also included are some soils that have more than 35 percent rock fragments in the subsoil. Contrasting inclusions make up about 15 percent of this map unit.

This map unit is moderately suited to building site development because of the slope. All excavated areas are susceptible to moderate erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Excavation is hindered by underground springs and cobbles and stones. Building sites should be graded so that surface runoff is directed away from the structure. Using corrosion-resistant material for foundations and basements helps to offset the risk of corrosion to concrete. Installing perforated drainage tile around the foundations helps to reduce the wetness caused by underground springs.

This map unit is moderately suited to septic tank absorption fields because of the slope and the moderate permeability. Filter fields should be installed on the contour. Areas containing seeps or springs should not be selected as sites. Trench walls are susceptible to smearing if the soil is excavated when wet. Raking the trench walls removes smeared surfaces.

This map unit is moderately suited to access roads because of low strength and the slope. The moderate potential for frost action is an additional limitation. During rainy periods, access roads in bare areas are slippery and can be impassable. The design of access roads should control surface runoff and help to stabilize cut and fill slopes. In some areas the deep cuts made when leveling a surface for an access road can expose cobbles and stones. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. Unless it is removed, water from seeps and springs can saturate the roadbed. The roads may need more culverts than normal. The hazard of erosion can be reduced by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads.

The capability subclass is IIIe in areas of the Saunook soil and VIIIs in areas of the Urban land. No woodland ordination symbol has been assigned to this map unit.

SmF—Soco-Cataska-Rock outcrop complex, 50 to 95 percent slopes. This map unit occurs as areas of a moderately deep, well drained Soco soil and a shallow, excessively drained Cataska soil and areas of Rock outcrop. This unit is very steep and occurs on south- to west-facing side slopes of low and intermediate mountains. Typically, it is about 35 percent Soco soil, 25 percent Cataska soil, and 15 percent Rock outcrop. The Soco and Cataska soils and the Rock outcrop occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 5 to 50 acres in size. Elevation ranges from 1,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Soco soil are as follows—

Surface layer:

0 to 2 inches—dark yellowish brown channery loam

Subsoil:

2 to 19 inches—yellowish brown flaggy loam

19 to 26 inches—yellowish brown flaggy sandy loam

Bedrock:

26 to 60 inches—weathered, multicolored low-grade metasedimentary bedrock

Typically, the sequence, depth, and composition of the layers of this Cataska soil are as follows—

Surface layer:

0 to 3 inches—very dark grayish brown channery silt loam

Subsoil:

3 to 16 inches—yellowish brown very channery silt loam

Bedrock:

16 to 29 inches—weathered, multicolored, highly fractured low-grade metasedimentary bedrock

29 inches—unweathered, fractured low-grade metasedimentary bedrock

Air and water move through the Soco and Cataska soils at a moderately rapid rate above the soft bedrock. Surface runoff is very rapid in bare areas. The depth to soft bedrock ranges from 20 to 40 inches in the Soco soil and from 12 to 20 inches in the Cataska soil. The content of organic matter in the surface layer of both soils ranges from low to high. The rooting depth ranges from 12 to 40 inches. The soils are subject to downslope movement when lateral support is removed and may settle unevenly when used for fill slopes. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Stecoah soils intermingled with the Soco and Cataska soils on the cooler, concave side slopes and Spivey and Whiteoak soils along drainageways. Stecoah, Spivey, and Whiteoak soils are very deep over bedrock and have a surface layer that is thicker or darker than that of the Soco and Cataska soils. Whiteoak soils have more clay in the subsoil than the Soco and Cataska soils. Also included are some soils that have major soil properties similar to those of the Cataska soil and have similar use and management. These soils have hard bedrock at a depth of 10 to 20 inches. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest. It is mainly areas of poor-quality woodland and is used for recreation or wildlife habitat. A few areas are used for building sites.

This map unit is poorly suited to recreation and wildlife habitat because of the slope, droughtiness, the shallow depth to bedrock, and the Rock outcrop.

This map unit is poorly suited to timber production because of the shallow to moderately deep depth to bedrock, the slope, the Rock outcrop, the droughtiness, soil instability, a hazard of erosion, a hazard of windthrow, and seedling mortality. It is not used for commercial timber production.

This map unit is poorly suited to building site development because of the slope, the Rock outcrop, and the depth to bedrock. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Building sites are limited by the slope, the downslope movement of the soils in cutbanks, the uneven settling of the soils in fill slopes, and high corrosivity. Permanent retaining walls may be needed to increase soil strength. Using corrosion-resistant materials helps to overcome the corrosivity of the subsoil to steel and concrete. The soils are very susceptible to landslides because of the instability of the bedrock, especially during periods of high rainfall or under heavy traffic. Excavation can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

This map unit is poorly suited to septic tank absorption fields because of the slope and the depth to bedrock. Untreated effluent can move along the surface of the restrictive layer and seep downslope, thus creating a health hazard. Because the slope can cause effluent to seep to the surface, septic tank absorption fields should be installed on the contour. Special design is needed for the absorption fields.

This map unit is poorly suited to access roads because of the slope, the Rock outcrop, and the depth to bedrock. The moderate potential for frost action is an additional limitation. Access roads built through this unit require extensive blasting. The soils are very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Road construction can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

The capability subclass is VIIe in areas of the Soco soil, VIIs in areas of the Cataska soil, and VIIIs in areas of the Rock outcrop. Based on chestnut oak as the indicator species, the woodland ordination symbol is 4R in areas of the Soco soil and 2R in areas of the

Cataska soil. No woodland ordination symbol has been assigned to the Rock outcrop.

SoE—Soco-Stecoah complex, 30 to 50 percent slopes. This map unit consists of a steep, moderately deep, well drained Soco soil and a steep, deep, well drained Stecoah soil. These soils are on south- to west-facing side slopes of low and intermediate mountains. Typically, the unit is about 60 percent Soco soil and 25 percent Stecoah soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 3 to 150 acres in size. Elevation ranges from 2,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Soco soil are as follows—

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

Subsoil:
2 to 19 inches—yellowish brown flaggy loam
19 to 26 inches—yellowish brown flaggy sandy loam

Bedrock:
26 to 60 inches—weathered, multicolored low-grade metasedimentary bedrock

Typically, the sequence, depth, and composition of the layers of this Stecoah soil are as follows—

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

Subsoil:
2 to 32 inches—yellowish brown loam

Underlying material:
32 to 44 inches—multicolored saprolite of sandy loam
44 inches—weathered, multicolored low-grade metasedimentary bedrock

Air and water move through these soils at a moderately rapid rate above the soft bedrock. Surface runoff is rapid in bare areas. The depth to soft bedrock ranges from 20 to 40 inches in the Soco soil and from 40 to 60 inches in the Stecoah soil. The content of organic matter in the surface layer of both soils ranges from low to high. The rooting depth ranges from 20 to 60 inches. The soils are subject to downslope movement when lateral support is removed, and they can settle unevenly when used for fill slopes. The potential for frost action is moderate.

Included in this unit in mapping are Cataska soils near rock outcrops, Whiteoak and Spivey soils in narrow drainageways, and Brasstown and Junaluska soils on spur ridges. Cataska soils are shallow to soft bedrock. Spivey and Whiteoak soils are very deep over bedrock and have a surface layer that is thicker or darker than that of the Soco and Stecoah soils. Spivey soils have more than 35 percent rock fragments in the subsoil. Whiteoak soils have more clay in the subsoil than the Soco and Stecoah soils. Brasstown and Junaluska soils have a subsoil that is redder than that of the Soco and Stecoah soils and has more clay. Also included are small areas that have soft bedrock within a depth of 10 inches and areas of rock outcrops. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest and is used for timber production, wildlife habitat, or recreation. Privately owned areas are used for woodland, pasture, orchards, ornamental crops, or building site development.

These Soco and Stecoah soils are poorly suited to timber production because of the slope. Upland hardwoods, such as white oak, hickory, scarlet oak, and chestnut oak, eastern white pine, and yellow pines are the common trees. The soils can be reforested by planting eastern white pine or by managing the natural regeneration of hardwoods. The main concerns in timber management are erosion, soil instability, and the slope. Wheeled and tracked equipment can be used in the less steep areas, but cable yarding generally is safer to use and does not disturb the soils as much in the steeper areas. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. Site preparation for pines, such as burning and herbicide application, helps to reduce immediate plant competition and improve seedling survival. Burning also helps to minimize debris and lower planting costs. Ripping skid trails and landings when the soils are dry breaks up compacted layers, improves tilth, and increases seedling survival.

These soils are poorly suited to pasture and unsuited to hay because of the slope and the hazard of erosion. Adapted forage species include tall fescue and orchardgrass. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soils are dry help to control erosion. Operating farm equipment on slopes greater than 30 percent is unsafe. Hand application of lime, fertilizers, seeds, and herbicides is necessary because of the slope.

These soils are poorly suited to orchards and ornamental crop production because of the hazard of erosion and the slope. Sod should be established and maintained between rows and on farm paths to control erosion. The soils are suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

These soils are poorly suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The soils are subject to downslope movement in cutbanks and may settle unevenly when used for fill slopes. Permanent retaining walls may be needed to increase soil strength. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete. The soils are very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Construction can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

These soils are poorly suited to septic tank absorption fields because of the moderate depth to soft bedrock in the Soco soil and the slope. Untreated effluent can move along the surface of the restrictive layer and seep downslope, thus creating a health hazard. Onsite investigation is needed to locate sites on the Stecoah soil for sewage disposal. Because the slope can cause effluent to seep to the surface, septic tank absorption fields should be installed on the contour.

These soils are poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. During rainy periods, roads in bare areas are slippery and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Because of the natural instability of these soils, cut and fill slopes are subject to sliding and slumping. Regular maintenance of cut and fill slopes, the road surface, and water-control structures is needed. Surface water should not be diverted across fill slopes. Road construction may expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

The capability subclass is VIIe. Based on eastern white pine as the indicator species, the woodland ordination symbol is 11R in areas of the Soco soil and 12R in areas of the Stecoah soil.

SoF—Soco-Stecoah complex, 50 to 95 percent slopes. This map unit consists of a very steep, moderately deep, well drained Soco soil and a very steep, deep, well drained Stecoah soil. These soils are on south- to west-facing side slopes of low and intermediate mountains. Typically, the unit is about 50 percent Soco soil and 35 percent Stecoah soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 3 to 200 acres in size. Elevation ranges from 2,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Soco soil are as follows—

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

Subsoil:
2 to 19 inches—yellowish brown flaggy loam
19 to 26 inches—yellowish brown flaggy sandy loam

Bedrock:
26 to 60 inches—weathered, multicolored low-grade metasedimentary bedrock

Typically, the sequence, depth, and composition of the layers of this Stecoah soil are as follows—

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

Subsoil:
2 to 32 inches—yellowish brown loam

Underlying material:
32 to 44 inches—multicolored saprolite of sandy loam
44 inches—weathered, multicolored low-grade metasedimentary bedrock

Air and water move through these soils at a moderately rapid rate above the soft bedrock. Surface runoff is very rapid in bare areas. The depth to soft bedrock ranges from 20 to 40 inches in the Soco soil and from 40 to 60 inches in the Stecoah soil. The content of organic matter in the surface layer of both soils ranges from low to high. The rooting depth ranges from 20 to 60 inches. The soils are subject to downslope movement when lateral support is removed, and they can settle unevenly when used for fill slopes. The potential for frost action is moderate.

Included in this unit in mapping are Cataska soils adjacent to rock outcrops, Cheoah soils on the cooler aspects, and Whiteoak and Spivey soils in narrow drainageways. Cataska soils are shallow to soft bedrock. Cheoah, Spivey, and Whiteoak soils have a surface layer that is thicker or darker than that of the Soco and Stecoah soils. Spivey soils have more than 35 percent rock fragments in subsoil. Whiteoak soils have more clay in the subsoil than the Soco and Stecoah soils. Also included are soils that have soft bedrock within a depth of 10 inches and areas of rock outcrops. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest and is used for timber production, wildlife habitat, or recreation. Privately owned areas are used mainly for woodland. A few areas are used for pasture or building site development.

These Soco and Stecoah soils are poorly suited to timber production because of the slope. Upland hardwoods, such as white oak, hickory, scarlet oak, and chestnut oak, eastern white pine, and yellow pines are the common trees. The soils can be reforested by planting eastern white pine or by managing the natural regeneration of hardwoods. The main concerns in timber management are erosion, soil instability, and the slope. The use of wheeled and tracked equipment is dangerous on these soils. Cable yarding generally is safer to use, requires fewer roads, and causes less damage to the soils. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. Site preparation for pines, such as burning and herbicide application, helps to reduce immediate plant competition and improve seedling survival. Burning also helps to minimize debris and lower planting costs. Ripping landings when the soils are dry breaks up compacted layers, improves tilth, and increases seedling survival.

These soils are poorly suited to pasture because of the slope and the hazard of erosion. Adapted forage species include tall fescue and orchardgrass. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soils are dry help to control erosion. Operating farm equipment on slopes greater than 50 percent is unsafe. Hand application of lime, fertilizers, seeds, and herbicides is necessary because of the slope.

These soils are poorly suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The soils are subject to downslope movement in cutbanks and may settle unevenly when used for fill slopes. Permanent retaining walls may be needed to increase soil strength. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete. The soils are very susceptible to landslides because of the instability of the underlying rock, especially during periods of high rainfall or under heavy traffic. Construction can expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

These soils are poorly suited to septic tank absorption fields because of the moderate depth to soft bedrock in the Soco soil and the slope. Untreated effluent can move along the surface of the restrictive layer and seep downslope, thus creating a health hazard. Onsite investigation is needed to locate sites on the Stecoah soil for sewage disposal. Because the slope can cause effluent to seep to the surface, septic tank absorption fields should be installed on the contour.

These soils are poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. During rainy periods, roads in bare areas are slippery and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Because of the natural instability of the soils, cut and fill slopes are subject to sliding and slumping. Regular maintenance of cut and fill slopes, the road surface, and water-control structures is needed. Surface water should not be diverted across fill slopes. Road construction may expose seams of rocks that have a high content of sulfur. Runoff from exposed seams of high sulfur-bearing rocks can increase stream acidity so much that aquatic life is killed.

The capability subclass is VIIe. Based on eastern white pine as the indicator species, the woodland ordination symbol is 11R in areas of the Soco soil and 12R in areas of the Stecoah soil.

SsE—Spivey-Whiteoak complex, 30 to 50 percent slopes, extremely bouldery. This map unit consists of steep, very deep, well drained Spivey and Whiteoak soils. These soils are in drainageways and coves of low and intermediate mountains. Generally, the Spivey soil is in and along drainageways and the Whiteoak soil is in the higher areas between drainageways. Many boulders and stones are scattered on the surface. Typically, the unit is about 55 percent Spivey soil and 30 percent Whiteoak soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are oblong or long and narrow and range from 5 to 25 acres in size. Elevation ranges from 2,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Spivey soil are as follows—

Surface layer:

0 to 13 inches—very dark brown cobbly loam

Subsoil:

13 to 32 inches—dark yellowish brown very cobbly loam

32 to 60 inches—yellowish brown very cobbly loam

Typically, the sequence, depth, and composition of the layers of this Whiteoak soil are as follows—

Surface layer:

0 to 9 inches—very dark grayish brown cobbly loam

Subsoil:

9 to 12 inches—brown loam

12 to 23 inches—yellowish brown loam

23 to 34 inches—yellowish brown channery loam

34 to 62 inches—yellowish brown very flaggy loam

Air and water move through the Spivey soil at a moderately rapid rate and through the Whiteoak soil at a moderate rate. Surface runoff is medium in bare areas of the Spivey soil. The depth to bedrock is more than 60 inches in both soils. The content of organic matter in the surface layer is high or very high in the Spivey soil and ranges from moderate to very high in the Whiteoak soil. The rooting depth is greater than 60 inches in both soils. Stones and boulders cover 3 to 15 percent of the surface in areas of the Spivey soil and 2 and 10 percent of the surface in areas of the Whiteoak soil. The soils are subject to many seeps and springs below the surface and at the surface, and flowing water is common under the surface during wet periods. The potential for frost action is moderate in areas of the Whiteoak soil.

Included in this unit in mapping are small areas of Cheoah soils at the head of coves or drainageways. Cheoah soils have weathered bedrock at a depth of 40 to 60 inches. They have less clay in the subsoil than the Whiteoak soil and less rock fragments in the subsoil than the Spivey soil. Also included are some soils that have major soil properties similar to those of the Whiteoak soil and have similar use and management. These soils have a surface layer that is lighter colored and contains less organic matter than the surface layer of the Whiteoak soil. Contrasting inclusions make up about 15 percent of this map unit.

This map unit is used mainly as woodland.

These Spivey and Whiteoak soils are poorly suited to timber production because of the slope and the extremely bouldery surface. Productivity, however, is high. Cove hardwoods, such as yellow-poplar, black cherry, northern red oak, and red maple, are the common trees. Managing the natural regeneration of hardwoods is the best method of reforestation. Cutting all of the trees can increase the natural regeneration of hardwoods. The main concerns in timber management are stones and boulders on and below the surface, the slope, the hazard of erosion, seeps and springs, and plant competition. Cable yarding may be better to use than conventional harvesting methods because it causes less damage to timber and equipment. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams.

These soils are unsuited to cropland, hay, pasture, orchards, and ornamental crops because of the large stones and boulders and the slope.

These soils are poorly suited to building site development because of the large stones in areas of the Spivey soil and the slope. Seeps and springs are additional limitations. Large stones need to be removed, and the wetness caused by seeps and springs needs to be drained away from foundations. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

These soils are poorly suited to septic tank absorption fields because of the large stones in areas of the Spivey soil and the slope. Seeps and springs cause excess wetness, which interferes with the performance of septic systems. The large stones reduce the volume of soil material available to treat effluent and thus increase the risk of pollution of nearby streams.

These soils are poorly suited to access roads because of the large stones in areas of the Spivey soil and the slope. The moderate potential for frost action, runoff from adjacent higher areas, and seeps and springs are additional limitations affecting construction and maintenance. Using more water-control structures than normal helps to prevent the concentration of road drainage. Boulders and stones make building roads difficult and expensive. Falling rock makes access roads dangerous, especially during intense and prolonged periods of rainfall. During rainy periods, access roads in bare areas are slippery and can be impassable. Because of the natural instability of these soils, cut and fill slopes are subject to sliding and slumping. Surface water should not be diverted across fill slopes. The hazard of erosion can be reduced by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads.

The capability subclass is VIIs. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R in areas of the Spivey soil and 7R in areas of the Whiteoak soil.

SuA—Statler loam, 0 to 3 percent slopes, rarely flooded. This nearly level, very deep, well drained soil is on low stream terraces. Individual areas are irregular in shape and range from 2 to 50 acres in size. Elevation ranges from 2,000 to 3,000 feet.

Typically, the sequence, depth, and composition of the layers of this Statler soil are as follows—

Surface layer:
0 to 9 inches—dark brown loam

Subsoil:
9 to 23 inches—dark yellowish brown loam
23 to 40 inches—dark yellowish brown clay loam
40 to 53 inches—yellowish brown loam

Underlying material:
53 to 60 inches—yellowish brown fine sandy loam

Air and water move through this soil at a moderate rate. Surface runoff is slow in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is moderate or high. The rooting depth is greater than 60 inches. The depth to a seasonal high water table is greater than 6 feet. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Dillsboro soils in the higher landscape positions, Rosman soils on flood plains along the edge of the unit, and Hemphill soils in the lower landscape positions. Dillsboro and Hemphill soils have more than 35 percent clay in the subsoil. Hemphill soils are very poorly drained. Rosman soils have less clay in the subsoil than the Statler soil. Also included are areas of moderately well drained soils. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is used for cropland, hay, pasture, orchards, or ornamental crops. Some areas are used for building site development.

This Statler soil is well suited to woodland, but it is not used for timber production in the survey area.

This soil is well suited to cropland. Tilth can be maintained by the return of crop residue to the soil, crop rotations, cover crops, and applications of manure. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is well suited to hay and pasture. Adapted forage species include mixtures of tall fescue or orchardgrass and legumes for spring and fall production and sudangrass and alfalfa for summer production. Streambank erosion can be reduced by preventing grazing along streambanks and maintaining an adequate plant cover.

This soil is well suited to ornamental crops and moderately suited to orchards because of poor air drainage. Sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution. The soil is suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

This soil is poorly suited to building site development because of the flooding. Flooding is unlikely but possible, and structures are subject to damage or loss from flooding. Buildings should have the lowest floor higher than the 100-year flood level. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

This soil is moderately suited to septic tank absorption fields because of the flooding and the moderate permeability. Trench walls are susceptible to smearing if the soil is excavated when wet. Raking the trench walls removes smeared surfaces. Special design is needed for the absorption fields.

This soil is moderately suited to access roads because of the flooding. The moderate potential for frost action and low strength are additional limitations. The design of access roads should control surface runoff. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. Roads should be constructed above the level of potential flooding.

The capability subclass is I. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8A.

TaC—Tanasee-Balsam complex, 8 to 15 percent slopes, stony. This map unit consists of strongly sloping, very deep, well drained Tanasee and Balsam soils. These soils are on fans, on benches, on toe slopes, in narrow drainageways, and in coves of high mountains. Generally, the Tanasee soil is between drainageways and the Balsam soil is along drainageways. Stones and boulders are scattered on the surface. Typically, the unit is about 60 percent Tanasee soil and 25 percent Balsam soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are oblong or long and narrow and range from 5 to 50 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Tanasee soil are as follows—

Surface layer:
0 to 7 inches—black sandy loam
7 to 13 inches—very dark brown sandy loam

Subsoil:
13 to 31 inches—yellowish brown sandy loam

Underlying material:
31 to 51 inches—dark yellowish brown cobbly loamy coarse sand
51 to 60 inches—multicolored gravelly loamy sand

Typically, the sequence, depth, and composition of the layers of this Balsam soil are as follows—

Surface layer:
0 to 12 inches—black cobbly loam
12 to 17 inches—very dark grayish brown cobbly loam

Subsoil:
17 to 35 inches—yellowish brown very cobbly loam
35 to 60 inches—dark yellowish brown very cobbly sandy loam

Air and water move through these soils at a moderately rapid rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is very high. The rooting depth is greater than 60 inches. The climate is severe. It is cold and icy in winter and rainy, foggy, and cool during the rest of the year. The soils remain frozen for long periods in winter. They are subject to seeps and springs below the surface and at the surface. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Burton and Craggey soils near rock outcrops and Wayah soils on ridges. Burton soils are moderately deep, and Craggey soils are shallow to hard bedrock. Also included are some soils that have a seasonal high water table at a depth of 3 to 6 feet, small areas of moderately well drained to poorly drained soils in depressions or along drainageways, and soils that have major soil properties similar to those of the Tanasee and Balsam soils and have similar use and management. The similar soils have a dark surface layer that is less than 10 inches thick or more than 20 inches thick. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest. It is used for woodland, wildlife habitat, or recreation or is in a federally designated wilderness area. Privately owned areas are used mainly for woodland and the production of Christmas trees.

These Tanasee and Balsam soils are moderately suited to timber production because of the cold climate, which can reduce production. Northern hardwoods, such as northern red oak, black cherry, American beech, sugar maple, yellow birch, and black birch, are the common trees. Red spruce, Fraser fir, and eastern hemlock also grow on these soils. Areas below an elevation of 5,300 feet should be managed for hardwoods, and areas above an elevation of 5,300 feet should be managed for red spruce. Fraser fir is not used for timber production because infestations of balsam woolly adelgids kill most large trees. Thinning red spruce can increase the quality of the stand. Red spruce is shallow rooted, and thinning should be done under the supervision of a professional forester. The reforestation of hardwoods occurs dominantly by sprouts in cutover stands. Cutting all of the trees and large shrubs increases the amount and quality of sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple should be favored.

These soils have no major management limitations affecting woodland management. Good management, however, can help to avoid potential problems. Care is needed to prevent soil compaction. The use of heavy equipment should be restricted to the drier periods. When the soils are wet, skid trails are highly erodible and very slick because of the high content of organic matter in the surface layer.

These soils are poorly suited to cropland, hay, pasture, and orchards because of the harsh climate and the short growing season. The large stones and a hazard of erosion are additional limitations.

These soils are well suited to the production of Fraser fir for Christmas trees. Sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

These soils are poorly suited to building site development because of the large stones, especially in areas of the Balsam soil. Extreme freezing, seeps and springs, and the slope are additional limitations. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

These soils are poorly suited to septic tank absorption fields because of the large stones. The slope is an additional limitation. Seeps and springs cause excess wetness, which interferes with the performance of septic systems. The large stones reduce the volume of soil material available to treat effluent and increase the risk of pollution of nearby streams. Septic tank absorption fields should be installed on the contour.

These soils are moderately suited to access roads because of the slope, the moderate potential for frost action, and the large stones. During rainy periods, access roads in bare areas are slippery and can be impassable. The design of access roads should control surface runoff and help to stabilize cut and fill slopes. In some areas the deep cuts made when leveling a surface for an access road can expose cobbles and stones. The road should be permanently surfaced to withstand winter conditions if it is used year-round.

The capability subclass is IVe in areas of the Tanasee soil and VIIs in areas of the Balsam soil. Based on red spruce as the indicator species, the woodland ordination symbol is 10A in areas of both soils.

TcD—Tanasee-Balsam complex, 15 to 30 percent slopes, very stony. This map unit consists of moderately steep, very deep, well drained Tanasee and Balsam soils. These soils are on fans, on benches, on toe slopes, in narrow drainageways, and in coves of high mountains. Many stones and boulders are scattered on the surface. Typically, the unit is about 60 percent Tanasee soil and 25 percent Balsam soil. Generally, the Tanasee soil is between drainageways and the Balsam soil is along drainageways. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are oblong or long and narrow and range from 5 to 50 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Tanasee soil are as follows—

Surface layer:

0 to 7 inches—black sandy loam

7 to 13 inches—very dark brown sandy loam

Subsoil:

13 to 31 inches—yellowish brown sandy loam

Underlying material:

31 to 51 inches—dark yellowish brown cobbly loamy coarse sand

51 to 60 inches—multicolored gravelly loamy sand

Typically, the sequence, depth, and composition of the layers of this Balsam soil are as follows—

Surface layer:

0 to 12 inches—black cobbly loam

12 to 17 inches—very dark grayish brown cobbly loam

Subsoil:

17 to 35 inches—yellowish brown very cobbly loam

35 to 60 inches—dark yellowish brown very cobbly sandy loam

Air and water move through these soils at a moderately rapid rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is very high. The rooting depth is greater than 60 inches. The climate is severe. It is cold and icy in winter and rainy, foggy, and cool during the rest of the year. The soils remain frozen for long periods in winter. They are subject to seeps and springs below the surface and at the surface. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Burton and Craggey soils near rock outcrops and Wayah soils on ridges. Also included are some soils that have a seasonal high water table at a depth of 3 to 6 feet. Burton soils are moderately deep, and Craggey soils are shallow to hard bedrock. Also included are small areas of moderately well drained to poorly drained soils in depressions or along drainageways and areas of soils that have major soil properties similar to those of the Tanasee and Balsam soils and have similar use and management. The similar soils have a dark surface layer that is less than 10 inches thick or more than 20 inches thick. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest. It is used for woodland, wildlife habitat, or recreation or is in a federally designated wilderness area. Privately owned areas are used mainly for woodland and the production of Christmas trees.

These Tanasee and Balsam soils are moderately suited to timber production because of the cold climate and the slope. Northern hardwoods, such as northern red oak, black cherry, American beech, sugar maple, yellow birch, and black birch, are the common trees. Red spruce, Fraser fir, and eastern hemlock also grow on these soils. Areas below an elevation of 5,300 feet should be managed for hardwoods, and areas above an elevation of 5,300 feet should be managed for red spruce. Fraser fir is not used for timber production because infestations of balsam woolly adelgids kill most large trees. Thinning red spruce can increase the quality of the stand. Red spruce is shallow rooted, and thinning should be done under supervision of a professional forester. The reforestation of hardwoods occurs dominantly by sprouts in cutover stands. The main concerns in timber management are a hazard of erosion and the slope. Care is needed to prevent soil compaction. Wheeled and tracked equipment can be used on these soils. The use of heavy equipment should be restricted to the drier periods. When the soils are wet, skid trails are highly erodible and very slick because of the content of organic matter in the surface layer.

These soils are poorly suited to cropland, hay, pasture, and orchards because of the harsh climate, the slope, the short growing season, and the large stones.

These soils are moderately suited to the production of Fraser fir for Christmas trees because of the hazard of erosion, the slope, and the many stones on the surface. Sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

These soils are poorly suited to building site development because of the large stones and the slope. Extreme freezing and seeps and springs are additional limitations. Special designs are needed to overcome these limitations. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

These soils are poorly suited to septic tank absorption fields because of the large stones and the slope. Seeps and springs cause excess wetness, which interferes with the performance of septic systems. The large stones reduce the volume of soil material available to treat effluent and thus increase the risk of pollution of nearby streams. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

These soils are poorly suited to access roads because of the slope, the hazard of erosion, and the large stones. The moderate potential for frost action is an additional limitation. During rainy periods, access roads in bare areas are slippery and can be impassable. The design of access roads should control surface runoff and help to stabilize cut and fill slopes. In some areas the deep cuts made when leveling a surface for an access road can expose cobbles and stones. The road should be permanently surfaced to withstand winter conditions if it is used year-round.

The capability subclass is VIe in areas of the Tanasee soil and VIIs in areas of the Balsam soil. Based on red spruce as the indicator species, the woodland ordination symbol is 10R in areas of both soils.

TcE—Tanasee-Balsam complex, 30 to 50 percent slopes, very stony. This map unit consist of steep, very deep, well drained Tanasee and Balsam soils. These soils are in narrow drainageways and coves of high mountains. Many stones and boulders are scattered on the surface. Typically, the unit is about 55 percent Tanasee soil and 30 percent Balsam soil. Generally, the Tanasee soil is between drainageways and the Balsam soil is along drainageways. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are oblong or long and narrow and range from 5 to 50 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Tanasee soil are as follows—

Surface layer:
0 to 7 inches—black sandy loam
7 to 13 inches—very dark brown sandy loam

Subsoil:
13 to 31 inches—yellowish brown sandy loam

Underlying material:
31 to 51 inches—dark yellowish brown cobbly loamy coarse sand
51 to 60 inches—multicolored gravelly loamy sand

Typically, the sequence, depth, and composition of the layers of this Balsam soil are as follows—

Surface layer:
0 to 12 inches—black cobbly loam
12 to 17 inches—very dark grayish brown cobbly loam

Subsoil:
17 to 35 inches—yellowish brown very cobbly loam
35 to 60 inches—dark yellowish brown very cobbly sandy loam

Air and water move through these soils at a moderately rapid rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is very high. The rooting depth is greater than 60 inches. The climate is severe. It is cold and icy in winter and rainy, foggy, and cool during the rest of the year. The soils remain frozen for long periods in winter. They are subject to seeps and springs below the surface and at the surface. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Burton and Craggey soils near rock outcrops and Wayah soils on ridges. Burton soils are moderately deep, and Craggey soils are shallow to hard bedrock. Also included are some soils that have a seasonal high water table at a depth of 3 to 6 feet, small areas of moderately well drained to poorly drained soils in depressions or along drainageways, and soils that have major soil properties similar to those of the Tanasee and Balsam soils and have similar use and management. The similar soils have a dark surface layer that is less than 10 inches thick or more than 20 inches thick. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is in the Pisgah National Forest. It is used for woodland, wildlife habitat, or recreation or is in a federally designated wilderness area. Privately owned areas are used mainly for woodland and the production of Christmas trees.

These Tanasee and Balsam soils are poorly suited to timber production because of the slope and the cold climate. Northern hardwoods, such as northern red oak, black cherry, American beech, sugar maple, yellow birch, and black birch, are the common trees. Red spruce, Fraser fir, and eastern hemlock also grow on these soils. Areas below an elevation of 5,300 feet should be managed for hardwoods, and areas above an elevation of 5,300 feet should be managed for red spruce. Fraser fir is not used for timber production because infestations of balsam woolly adelgids kill most large trees. Thinning red spruce can increase the quality of the stand. Red spruce is shallow rooted, and thinning should be done under the supervision of a professional forester. The reforestation of hardwoods occurs dominantly by sprouts in cutover stands. The main concerns in timber management are a hazard of erosion and the slope. Care is needed to prevent soil compaction. Wheeled and tracked equipment can be used on these soils. The use of heavy equipment should be restricted to the drier periods. When the soils are wet, skid trails are highly erodible and very slick because of the content of organic matter in the surface layer.

These soils are poorly suited to cropland, hay, pasture, and orchards because of the harsh climate, the slope, the short growing season, and the large stones.

These soils are poorly suited to the production of Fraser fir for Christmas trees because of the hazard of erosion, the slope, and the many stones on the surface. Sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

These soils are poorly suited to building site development because of the large stones and the slope. Extreme freezing and seeps and springs are additional limitations. Special designs are needed to overcome these limitations. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

These soils are poorly suited to septic tank absorption fields because of the large stones and the slope. Seeps and springs cause excess wetness, which interferes with the performance of septic systems. The large stones reduce the volume of soil material available to treat effluent and thus increase the risk of pollution of nearby streams. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

These soils are poorly suited to access roads because of the slope, the hazard of erosion, and the large stones. The moderate potential for frost action is an additional limitation. During rainy periods, access roads in bare areas are slippery and can be impassable. The design of access roads should control surface runoff and help to stabilize cut and fill slopes. In some areas the deep cuts made when leveling a surface for an access road can expose cobbles and stones. The road should be permanently surfaced to withstand winter conditions if it is used year-round.

The capability subclass is VIIe in areas of the Tanasee soil and VIIs in areas of the Balsam soil. Based on red spruce as the indicator species, the woodland ordination symbol is 10R in areas of both soils.

TeC2—Tanasee-Balsam complex, 8 to 15 percent slopes, eroded, stony. This map unit consists of strongly sloping, very deep, well drained Tanasee and Balsam soils. These soils are on fans, on benches, on toe slopes, in drainageways, and in coves of high mountains. Stones and boulders are scattered on the surface. Typically, the unit is about 55 percent Tanasee soil and 30 percent Balsam soil. Generally, the Tanasee soil is between drainageways and the Balsam soil is along drainageways. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 5 to 50 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Tanasee soil are as follows—

Surface layer:
0 to 5 inches—very dark grayish brown sandy loam

Subsoil:
5 to 18 inches—yellowish brown fine sandy loam
18 to 60 inches—brown gravelly fine sandy loam

Typically, the sequence, depth, and composition of the layers of this Balsam soil are as follows—

Surface layer:
0 to 3 inches—very dark gray cobbly loam
3 to 6 inches—dark yellowish brown cobbly loam

Subsoil:
6 to 26 inches—dark yellowish brown very cobbly loam
26 to 60 inches—dark yellowish brown very cobbly sandy loam

Air and water move through these soils at a moderately rapid rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is very high. The rooting depth is greater than 60 inches. The climate is severe. It is cold and icy in winter and rainy, foggy, and cool during the rest of the year. The soils remain frozen for long periods in winter. They are subject to seeps and springs below the surface and at the surface.

Included in this unit in mapping are small areas of Burton and Craggey soils near rock outcrops and Wayah soils on ridges. Burton soils are moderately deep, and Craggey soils are shallow to hard bedrock. Also included are gullies, small areas of moderately well drained to poorly drained soils in depressions or along drainageways, some soils that have a seasonal high water table at a depth of 3 to 6 feet, and soils that have major soil properties similar to those of the Tanasee and Balsam soils and have similar use and management. The similar soils have a dark surface layer that is less than 10 inches thick or more than 20 inches thick. Contrasting inclusions make up about 15 percent of this map unit.

All of the acreage in this map unit is in the Pisgah National Forest near Sam Knob, Graveyard Fields, and the Shining Rock Wilderness Area in the southeastern part of Haywood County. This entire area was severely burned twice. The vegetation was destroyed, and the soils were exposed to erosion. The unit is used for wildlife habitat or recreation or is in a federally designated wilderness area.

This map unit is not used for commercial timber production, cropland, pasture, orchards, ornamental crops, or building site development because it is owned by the U.S. Forest Service and is in a federally designated wilderness area.

These Tanasee and Balsam soils are moderately suited to access roads because of the slope, the moderate potential for frost action, and the large stones. During rainy periods, access roads in bare areas are slippery and can be impassable. The design of access roads should control surface runoff and help to stabilize cut and fill slopes. In some areas the deep cuts made when leveling a surface for an access road can expose cobbles and stones. The road should be permanently surfaced to withstand winter conditions if it is used year-round.

The capability subclass is IVe in areas of the Tanasee soil and VIIs in areas of the Balsam soil. Based on red spruce as the indicator species, the woodland ordination symbol is 10A in areas of both soils.

TeD2—Tanasee-Balsam complex, 15 to 30 percent slopes, eroded, stony. This map unit consists of moderately steep, very deep, well drained Tanasee and Balsam soils. These soils are on fans, on benches, on toe slopes, in drainageways, and in coves of high mountains. Stones and boulders are scattered on the surface. Typically, the unit is about 55 percent Tanasee soil and 30 percent Balsam soil. Generally, the Tanasee soil is between drainageways and the Balsam soil is along drainageways. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are irregular in shape and range from 5 to 50 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Tanasee soil are as follows—

Surface layer:
0 to 5 inches—very dark grayish brown sandy loam

Subsoil:
5 to 18 inches—yellowish brown fine sandy loam
18 to 60 inches—brown gravelly fine sandy loam

Typically, the sequence, depth, and composition of the layers of this Balsam soil are as follows—

Surface layer:
0 to 3 inches—very dark gray cobbly loam
3 to 6 inches—dark yellowish brown cobbly loam

Subsoil:
6 to 26 inches—dark yellowish brown very cobbly loam
26 to 60 inches—dark yellowish brown very cobbly sandy loam

Air and water move through these soils at a moderately rapid rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is very high. The rooting depth is greater than 60 inches. The climate is severe. It is cold and icy in winter and rainy, foggy, and cool during the rest of the year. The soils remain frozen for long periods in winter. They are subject to seeps and springs below the surface and at the surface. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Burton and Craggey soils near rock outcrops and Wayah soils on ridges. Burton soils are moderately deep, and Craggey soils are shallow to hard bedrock.

Also included are gullies, some soils that have a seasonal high water table at a depth of 3 to 6 feet, small areas of moderately well drained to poorly drained soils in depressions or along drainageways, and soils that have major soil properties similar to those of the Tanasee and Balsam soils and have similar use and management. The similar soils have a dark surface layer that is less than 10 inches thick or more than 20 inches thick. Contrasting inclusions make up about 15 percent of this map unit.

All the acreage of this map unit is in the Pisgah National Forest near Sam Knob, Graveyard Fields, and the Shining Rock Wilderness Area in the southeastern part of Haywood County. This entire area was severely burned twice. The vegetation was destroyed, and the soils were exposed to erosion. The unit is used for wildlife habitat or recreation or is in a federally designated wilderness area.

This map unit is not used for commercial timber production, cropland, pasture, hay, orchards, ornamental crops, or building site development because it is owned by the U.S. Forest Service and it is in a federally designated wilderness area.

These Tanasee and Balsam soils are poorly suited to access roads because of the slope, a hazard of erosion, and the large stones. The moderate potential for frost action is an additional limitation. During rainy periods, access roads in bare areas are slippery and can be impassable. The design of access roads should control surface runoff and help to stabilize cut and fill slopes. In some areas the deep cuts made when leveling a surface for an access road can expose cobbles and stones. The road should be permanently surfaced to withstand winter conditions if it is used year-round.

The capability subclass is VIe in areas of the Tanasee soil and VIIs in areas of the Balsam soil. Based on red spruce as the indicator species, the woodland ordination symbol is 10R in areas of both soils.

TrE—Trimont gravelly loam, 30 to 50 percent slopes, stony. This steep, very deep, well drained soil is on north- to east-facing side slopes of low mountains and on south- to west-facing side slopes shaded by the adjacent taller mountains. Stones are scattered on the surface. Individual areas are irregular in shape and range from 10 to 150 acres in size. Elevation ranges from 2,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Trimont soil are as follows—

Surface layer:
0 to 7 inches—dark brown gravelly loam

Subsoil:
7 to 38 inches—strong brown loam

Underlying material:
38 to 60 inches—multicolored saprolite of gravelly sandy loam

Air and water move through this soil at a moderate rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is moderate to very high. The rooting depth is greater than 60 inches. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Cowee soils on the shoulders of ridges and knolls, Evard and Fannin soils intermingled with the Trimont soil on side slopes, and Saunook soils along drainageways. Cowee, Evard, and Fannin soils have a surface layer that is thinner or lighter colored than that of the Trimont soil. Cowee soils have soft bedrock within a depth of 20 to 40 inches. Fannin soils have a high content of mica. Saunook soils have a subsoil that is browner than that of the Trimont soil. Also included are areas that have soft bedrock at a depth of 40 to 60 inches and areas of rock outcrops. Contrasting inclusions make up about 15 percent of this map unit.

This map unit is used for woodland, pasture, orchards, ornamental crop production, or building site development.

This Trimont soil is poorly suited to timber production because of the slope. Productivity, however, is high. Northern hardwoods, such as northern red oak, yellow-poplar, sweet birch, and black cherry, are the common trees. Managing the natural regeneration of hardwoods is the best method of reforestation. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. The main concerns in timber management are the slope and a hazard of erosion. Wheeled and tracked equipment can be used in the less steep areas, but cable yarding generally is safer to use and does not disturb the soil as much in the steeper areas.

This soil is poorly suited to pasture and unsuited to hay because of the slope. Poor accessibility is an additional limitation. Adapted forage species include native bluegrass, clovers, tall fescue, and orchardgrass. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. Operating farm machinery on slopes greater than 30 percent may be unsafe. Hand application of lime, fertilizer, and chemicals may be necessary. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is poorly suited to orchards and ornamental crops because of the slope. The hazard of erosion is severe in unvegetated areas. To reduce this hazard, sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution. The soil is suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

This soil is poorly suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete may be damaged by the high corrosivity of the soil. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is poorly suited to septic tank absorption fields because of the slope. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action and low strength are additional limitations. During rainy periods, access roads in bare areas are slippery and can be impassable. The design of access roads should control surface runoff and help to stabilize cut and fill slopes. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. The hazard of erosion can be reduced by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads.

The capability subclass is VIIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

TrF—Trimont gravelly loam, 50 to 95 percent slopes, stony. This very steep, very deep, well drained soil is on north- to east-facing side slopes of low mountains and on south- to west-facing side slopes shaded by the adjacent taller mountains. Stones are scattered on the surface. Individual areas are irregular in shape and range from 10 to 150 acres in size. Elevation ranges from 2,500 to 3,500 feet.

Typically, the sequence, depth, and composition of the layers of this Trimont soil are as follows—

Surface layer:
0 to 7 inches—dark brown gravelly loam

Subsoil:
7 to 38 inches—strong brown loam

Underlying material:
38 to 60 inches—multicolored saprolite of gravelly sandy loam

Air and water move through this soil at a moderate rate. Surface runoff is very rapid in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is moderate to very high. The rooting depth is greater than 60 inches. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Cowee soils on shoulders of ridges and knolls, Evard and Fannin soils intermingled with the Trimont soil on side slopes, and Saunook soils along drainageways. Cowee, Evard, and Fannin soils have a surface layer that is thinner or lighter colored than that of the Trimont soil. Cowee soils have soft bedrock at a depth of 20 to 40 inches. Fannin soils have a high content of mica. Saunook soils have a subsoil that is browner than that of the Trimont soil. Also included are areas that have soft bedrock at a depth of 40 to 60 inches and areas of rock outcrops. Contrasting inclusions make up about 15 percent of this map unit.

This map unit is used as woodland or pasture. A few areas are used for building sites.

This Trimont soil is poorly suited to timber production because of the slope. Productivity, however, is high. Northern hardwoods, such as northern red oak, yellow-poplar, sweet birch, and black cherry, are the common trees. Managing the natural regeneration of hardwoods is the best method of reforestation. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. The main concerns in timber management are a hazard of erosion and the slope. The use of wheeled and tracked equipment is dangerous on this soil. Cable yarding generally is safer to use, requires fewer roads, and causes less damage to the soil.

This soil is poorly suited to pasture because of the slope. Poor accessibility is an additional limitation. Adapted forage species include native bluegrass, clovers, tall fescue, and orchardgrass. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. Operating farm machinery on slopes greater 50 percent is unsafe. Hand application of lime, fertilizer, and chemicals is necessary. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is poorly suited to building site development because of the slope. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete may be damaged by the high corrosivity of the soil. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is poorly suited to septic tank absorption fields because of the slope. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action and low strength are additional limitations. During rainy periods, access roads in bare areas are slippery and can be impassable. The design of access roads should control surface runoff and help to stabilize cut and fill slopes. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. The hazard of erosion can be reduced by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads.

The capability subclass is VIIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

TuD—Tuckasegee-Cullasaja complex, 15 to 30 percent slopes, very stony. This map unit consists of moderately steep, very deep, well drained Tuckasegee and Cullasaja soils. These soils are in narrow drainageways and coves of intermediate mountains. Many stones and boulders are scattered on the surface. Typically, the unit is about 60 percent Tuckasegee soil and 25 percent Cullasaja soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are oblong or long and narrow and range from 2 to 25 acres in size. Elevation ranges from 3,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Tuckasegee soil are as follows—

Surface layer:
- 0 to 10 inches—very dark grayish brown gravelly loam
- 10 to 14 inches—dark yellowish brown gravelly loam

Subsoil:
- 14 to 39 inches—dark yellowish brown gravelly sandy loam
- 39 to 60 inches—yellowish brown gravelly sandy loam

Typically, the sequence, depth, and composition of the layers of this Cullasaja soil are as follows—

Surface layer:
- 0 to 14 inches—black very cobbly loam
- 14 to 20 inches—dark brown very cobbly loam

Subsoil:
- 20 to 60 inches—dark yellowish brown very cobbly loam

Air and water move through these soils at a moderately rapid rate. Surface runoff is rapid in bare areas of the Tuckasegee soil and medium in bare areas of the Cullasaja soil. The depth to bedrock is more than 60 inches in areas of both soils. The content of organic matter in the surface layer is high or very high. The rooting depth is greater than 60 inches. The soils are subject to many seeps and springs below the surface and at the surface, and flowing water is common under the surface during wet periods. The potential for frost action is moderate in areas of the Cullasaja soil.

Included in this unit in mapping are small areas of Chestnut, Edneyville, and Plott soils on side slopes along the edge of the unit. Edneyville and Chestnut soils have a surface layer that is thinner or lighter colored than that of the Tuckasegee and Cullasaja soils. They are underlain by saprolite. Chestnut soils have soft bedrock at a depth of 20 to 40 inches. Plott soils are on side slopes with cooler aspects and are underlain by saprolite. Also included are some soils that have major soil properties similar to those of the Tuckasegee and Cullasaja soils and have similar use and management. These similar soils have a surface layer that is more than 20 inches thick. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is used as woodland.

These Tuckasegee and Cullasaja soils are moderately suited to timber production because of the slope and a hazard of erosion. Productivity, however, is high. Cove hardwoods, such as yellow-poplar, northern red oak, black cherry, and sweet birch, are the common trees. Managing the natural regeneration of hardwoods is the best method of reforestation. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. The main concerns in timber management are stones and boulders on and below the surface, the slope, and the hazard of erosion. When the soils are wet, skid trails are highly erodible and very slick because of the content of organic matter in the surface layer. Cable yarding may be better to use than conventional harvesting methods because it causes less damage to timber and equipment.

These soils are poorly suited to cropland, hay, pasture, orchards, and ornamental crops because of the large stones and boulders and the slope.

These soils are poorly suited to building site development because of the large stones and the slope. Seeps and springs are additional limitations. Special designs are needed to overcome these limitations. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

These soils are poorly suited to septic tank absorption fields because of the large stones and the slope. Seeps and springs cause excess wetness, which interferes with the performance of septic systems. The large stones reduce the volume of soil material available to treat effluent and thus increase the risk of pollution of nearby streams. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

These soils are poorly suited to access roads because of the slope, the hazard of erosion, and the large stones. The moderate potential for frost action is an additional limitation. During rainy periods, access roads in bare areas are slippery and can be impassable. The design of access roads should control surface runoff and help to stabilize cut and fill slopes. In some areas the deep cuts made when leveling a surface for an access road can expose cobbles and stones. The road should be permanently surfaced if it is used year-round.

The capability subclass is VIe in areas of the Tuckasegee soil and VIIs in areas of the Cullasaja soil. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R in areas of both soils.

TvE—Tuckasegee-Cullasaja complex, 30 to 50 percent slopes, extremely stony. This map unit consists of steep, very deep, well drained Tuckasegee and Cullasaja soils. These soils are in narrow drainageways in coves of intermediate mountains. Many stones and boulders are scattered on the surface. Typically, the unit is about 50 percent Tuckasegee soil and 35 percent Cullasaja soil. The two soils occur as areas too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are oblong or long and narrow and range from 2 to 25 acres in size. Elevation ranges from 3,500 to 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Tuckasegee soil are as follows—

Surface layer:
- 0 to 10 inches—very dark grayish brown gravelly loam
- 10 to 14 inches—dark yellowish brown gravelly loam

Subsoil:
- 14 to 39 inches—dark yellowish brown gravelly sandy loam
- 39 to 60 inches—yellowish brown gravelly sandy loam

Typically, the sequence, depth, and composition of the layers of this Cullasaja soil are as follows—

Surface layer:
- 0 to 14 inches—black very cobbly loam
- 14 to 20 inches—dark brown very cobbly loam

Subsoil:
- 20 to 60 inches—dark yellowish brown very cobbly loam

Air and water move through these soils at a moderately rapid rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer is high or very high. The rooting depth is greater than 60 inches. The soils are subject to many seeps and springs below the surface and at the surface, and flowing water is common under the surface during wet periods. The potential for frost action is moderate in areas of the Cullasaja soil.

Included in this unit in mapping are small areas of Chestnut, Edneyville, and Plott soils on side slopes along the edge of the unit. Edneyville and Chestnut soils have a surface layer that is thinner or lighter colored than that of the Tuckasegee and Cullasaja soils. They are underlain by saprolite. Chestnut soils have soft bedrock at a depth of 20 to 40 inches. Plott soils are on side slopes with cooler aspects and are underlain by saprolite. Also included are some soils that have major soil properties similar to those of the Tuckasegee and Cullasaja soils and have similar use and management. These similar soils have a surface layer that is more than 20 inches thick. Contrasting inclusions make up about 15 percent of this map unit.

Most of this map unit is use for woodland.

These Tuckasegee and Cullasaja soils are poorly suited to timber production because of the slope and a hazard of erosion. Productivity, however, is high. Cove hardwoods, such as yellow-poplar, northern red oak, black cherry, and sweet birch, are the common trees. Managing the natural regeneration of hardwoods is the best method of reforestation. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. The main concerns in timber management are the stones and boulders on and below the surface, the slope, and the hazard of erosion. When these soils are wet, skid trails are highly erodible and very slick because of the content of organic matter in the surface. Cable yarding is better to use than conventional harvesting methods because it causes less damage to timber and equipment.

These soils are poorly suited to cropland, pasture, orchards, and ornamental crops and unsuited to hay because of the large stones and boulders and the slope.

These soils are poorly suited to building site development because of the large stones and the slope. Seeps and springs are additional limitations. Special designs are needed to overcome these limitations. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to steel and concrete.

These soils are poorly suited to septic tank absorption fields because of the large stones and the slope. Seeps and springs cause excess wetness, which interferes with the performance of septic systems. The large stones reduce the volume of soil material available to treat effluent and thus increase the risk of pollution of nearby streams. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

These soils are poorly suited to access roads because of the slope, the hazard of erosion, and the large stones. The moderate potential for frost action is an additional limitation. During rainy periods, access roads in bare areas are slippery and can be impassable. The design of access roads should control surface runoff and help to stabilize cut and fill slopes. In some areas the deep cuts made when leveling a surface for an access road can expose cobbles and stones. The road should be permanently surfaced if it is used year-round.

The capability subclass is VIIe in areas of the Tuckasegee soil and VIIs in areas of the Cullasaja soil. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R in areas of both soils.

Ud—Udorthents, loamy. This map unit consists of areas where the natural soil layers have been destroyed by earthmoving activities. Because operations, such as scraping, backfilling, trenching, and excavating, have completely altered soil characteristics, the original series can no longer be identified. The unit includes cut and fill areas, landfills, and highway roadbeds and interchanges. Individual areas are long and narrow or irregular in shape and range from 2 to 45 acres in size. They occur on any slope and in any landscape position.

Air and water move through the Udorthents at a variable rate, depending on compaction, the content of clay, and the content of stone. Surface runoff in bare areas is variable but generally is rapid. The depth to bedrock and the rooting depth are variable. Flooding may be a hazard in low fill areas. Udorthents in cut-and-fill areas that contain micaceous saprolite or are underlain by low-grade metasedimentary rocks are subject to downslope movement on cut faces and to uneven settling in fill slopes. The potential for frost action is moderate.

Included in this unit in mapping are areas of undisturbed or partially disturbed soils around the edge of the unit and areas of urban land. Contrasting inclusions and urban land make up about 15 percent of this map unit.

Cut areas occur where the natural soil has been removed. Cuts are generally made through ridges or side slopes. The cut areas range from 2 to more than 80 feet in depth but average 10 to 30 feet in depth. Fill areas are commonly made in valleys and low areas. Fill material may cover relatively undisturbed natural soil or a previous excavation. The fill areas generally range from 2 to 20 feet in thickness but may range to more than 50 feet in thickness. The soil material in the fill has variable texture. It may consist of clay loam, sandy clay loam, sandy loam, and loam and include gravel, cobbles, and stones. It is used for building site development.

Landfills consist of excavated or nonexcavated areas that have become filled areas. The filled areas consist of layers of solid waste, such as household refuse and industrial waste, alternating with layers of soil material. Some landfills near Canton contain industrial waste from the Champion Paper Mill. This industrial waste is a sludge that has a high content of lime. The final surface of a landfill is covered with 2 to 3 feet of soil material.

Highway interchanges and roadbeds are in areas where the natural soil has been altered by road construction. Excavated cuts that are 10 to 100 feet or more in depth through mountains and filled areas and 10 to 100 feet or more in depth in valleys or around highway interchanges are common. About 30 percent of the cuts are covered with impervious road-building materials or are exposed bedrock. The impervious material greatly influences the hydrology of the surrounding areas.

Most areas are seeded, but maintenance is expensive, especially on south- to west-facing cuts that are subject to freezing and thawing in spring and fall. Some areas, especially in low-grade metasedimentary rock formations, are susceptible to landslides during periods of intense and prolonged rainfall. Low-grade metasedimentary rock formations also may have high levels of sulfur, which can increase stream acidity if exposed by road-building activities.

The characteristics of the soil material within this unit are so variable that accurate interpretive statements and ratings cannot be made. A careful onsite investigation is needed to determine the suitability and limitations of any area of this unit for any land use.

The capability subclass is VIIs. No woodland ordination symbol has been assigned to this map unit.

UfA—Udorthents-Urban land complex, 0 to 3 percent slopes, rarely flooded. This map unit occurs as areas of nearly level Udorthents that have variable drainage and texture and areas of Urban land. This unit is on manmade landscapes, mainly in and around Canton in areas along the Pigeon River. Typically, it is about 50 percent Udorthents and 35 percent Urban land. The Udorthents and the Urban land are too intricately mixed and too small in size to map them separately at the selected scale. Individual areas are long and narrow or irregular in shape and range from 5 to 25 acres in size. Elevation ranges from 2,000 to 3,000 feet.

The Udorthents consist of areas where fill material has been placed on part of the flood plain to prevent flooding. Fill areas are used as construction sites, mainly for commercial buildings and industries. They consist mainly of soil material that is sandy loam or loam and may include clay, clay loam, and sandy clay loam and rock fragments. They commonly range from 2 to 20 feet in thickness but can range to more than 50 feet in thickness. Fill material covers relatively undisturbed natural soil or a previous excavation.

Urban land consists of areas covered by streets, buildings, parking lots, railroad facilities, and other urban structures. The natural soil was covered, removed, or greatly altered by filling, grading, and shaping during the process of urban development. The original landscape, topography, and, commonly, the drainage pattern have been changed.

Included in this unit in mapping are areas of undisturbed or partially disturbed soils around the edge of the unit. These soils make up about 15 percent of this map unit.

Air and water move through the Udorthents at a variable rate depending on compaction, the content of clay, and the content of stone. Surface runoff in bare areas is variable but generally is rapid. The depth to bedrock is variable. Rare flooding is a hazard. Udorthents in fill areas that contain micaceous saprolite or low-grade metasedimentary rocks are subject to downslope movement on cut faces and to uneven settling in fill slopes. Runoff from the areas of Urban land is excessive. If graded areas are not stabilized and are subject to erosion, the pollution of streams by sediments is a hazard. The potential for frost action is moderate.

The Udorthents vary in suitability for pasture, gardens, lawns, and landscape plants. Onsite investigation and soil testing are necessary to determine the suitability and the best management measures for these uses.

This map unit is poorly suited to building site development because of the flooding. Fill areas that contain micaceous saprolite or low-grade metasedimentary rocks may be unstable because of the instability of these materials.

Careful onsite investigation is needed to determine the suitability and limitations of any area of this map unit for any land use.

The capability subclass is VIIs in areas of the Udorthents and VIIIs in areas of the Urban land. No woodland ordination symbol has been assigned to this map unit.

Ur—Urban land. This map unit consists of areas where more than 85 percent of the surface is covered by streets, buildings, parking lots, railroad facilities, and other impervious material. The natural soils were covered, removed, or greatly altered by cutting, filling, grading, and shaping during the process of urban development. The original landscape, topography, and, commonly, the drainage pattern have been changed. This unit is irregular in shape and ranges from 2 to 20 acres in size.

Included in this unit in mapping are small areas of soils consisting mainly of Udorthents. These areas are used for gardens, lawns, parks, cemeteries, and drainageways. They make up about 15 percent of this map unit.

Because runoff is very rapid in this map unit, the hazard of flooding is increased in low areas.

The capability subclass is VIIIs. No woodland ordination symbol has been assigned to this map unit.

WaD—Wayah sandy loam, 15 to 30 percent slopes, stony. This moderately steep, very deep, well drained soil is on ridges of high mountains. Stones and boulders are scattered on the surface. Individual areas are long and narrow and range from 5 to 75 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Wayah soil are as follows—

Surface layer:

0 to 8 inches—very dark brown sandy loam
8 to 13 inches—dark brown sandy loam

Subsoil:

13 to 28 inches—yellowish brown sandy loam
28 to 33 inches—dark yellowish brown gravelly sandy loam

Underlying material:

33 to 60 inches—yellowish brown saprolite of gravelly sandy loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is very high. The climate is severe. It is cold and icy in winter and rainy, foggy, and cool during the rest of the year. The soil remains frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are Burton and Craggey soils near rock outcrops and Tanasee and Balsam soils in drainageways. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Tanasee soils are not underlain by saprolite. Balsam soils have more than 35 percent rock fragments in the subsoil. Also included are soils that have soft bedrock or hard bedrock at a depth of 40 to 60 inches and areas of rock outcrop. Contrasting inclusions make up about 15 percent of this map unit.

Most of the acreage in this map unit is in the Pisgah National Forest. It is used for timber production, wildlife habitat, or recreation or is in a federally designated wilderness area. Small privately owned areas are used for woodland, the production of Christmas trees, or building site development.

This Wayah soil is moderately suited to timber production because of the slope. Production is also reduced because of the harsh climate. Northern hardwoods, such as northern red oak, black cherry, American beech, sugar maple, yellow birch, and black birch, are the common trees. Red spruce and Fraser fir also grow on this soil. Areas below an elevation of 5,300 feet should be managed for hardwoods, and areas above an elevation of 5,300 feet should be managed for red spruce. Fraser fir is not used for timber production because infestations of balsam woolly adelgids kill most large trees. Thinning red spruce can increase the quality of the stand. The soil can be reforested by managing the natural regeneration of hardwoods. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration. The main concerns in timber management are the cold climate, the slope, and a hazard of erosion. Wheeled and tracked equipment can be used on this soil.

This soil is moderately suited to the production of Christmas trees because of the hazard of erosion and the slope. Sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is poorly suited to building site development because of the slope. An additional limitation is soil freezing. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete may be damaged by the high corrosivity of the soil. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is poorly suited to septic tank absorption fields because of the slope. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Frost action may damage unprotected road surfaces.

The capability subclass is VIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

WaE—Wayah sandy loam, 30 to 50 percent slopes, stony. This steep, very deep, well drained soil is on side slopes of high mountains. Stones and boulders are scattered on the surface. Individual areas are irregular in shape and range from 5 to 100 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Wayah soil are as follows—

Surface layer:
- 0 to 8 inches—very dark brown sandy loam
- 8 to 13 inches—dark brown sandy loam

Subsoil:
- 13 to 28 inches—yellowish brown sandy loam
- 28 to 33 inches—dark yellowish brown gravelly sandy loam

Underlying material:
- 33 to 60 inches—yellowish brown saprolite of gravelly sandy loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is very high. The climate is severe. It is cold and icy in winter and rainy, foggy, and cool during the rest of the year. The soil remains frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are Burton and Craggey soils near rock outcrops and Tanasee and Balsam soils in drainageways. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Tanasee soils are not underlain by saprolite. Balsam soils have more than 35 percent rock fragments in the subsoil. Also included are areas that have soft bedrock or hard bedrock at a depth of 40 to 60 inches and areas of rock outcrop. Contrasting inclusions make up about 15 percent of this map unit.

Most of the acreage in this map unit is in the Pisgah National Forest. It is used for timber production, wildlife habitat, or recreation or is in a federally designated wilderness area. Small privately owned areas are used for woodland, the production of Christmas trees, or building site development.

This Wayah soil is poorly suited to timber production because of the slope. Production is also reduced because of the harsh climate. Northern hardwoods, such as northern red oak, black cherry, American beech, sugar maple, yellow birch, and black birch, are the common trees. Red spruce and Fraser fir also grow on this soil. Areas below an elevation of 5,300 feet should be managed for hardwoods, and areas above an elevation of 5,300 feet should be managed for red spruce. Fraser fir is not used for timber production because infestations of balsam woolly adelgids kill most large trees. Thinning red spruce can increase the quality of the stand. The soil can be reforested by managing the natural regeneration of hardwoods. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration. The main concerns in timber management are the cold climate, the slope, and a hazard of erosion. Wheeled and tracked equipment can be used in the less steep areas, but cable yarding generally is safer to use and does not disturb the soil as much in the steeper areas. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams.

This soil is poorly suited to the production of Christmas trees because of the hazard of erosion and the slope. Sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is poorly suited to building site development because of the slope. An additional limitation is soil freezing. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete may be damaged by the high corrosivity of the soil. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is poorly suited to septic tank absorption fields because of the slope. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Frost action may damage unprotected road surfaces.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

WaF—Wayah sandy loam, 50 to 95 percent slopes, stony. This very steep, very deep, well drained soil is on side slopes of high mountains. Stones and boulders are scattered on the surface. Individual areas are irregular in shape and range from 5 to 250 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Wayah soil are as follows—

Surface layer:
0 to 8 inches—very dark brown sandy loam
8 to 13 inches—dark brown sandy loam

Subsoil:
13 to 28 inches—yellowish brown sandy loam
28 to 33 inches—dark yellowish brown gravelly sandy loam

Underlying material:
33 to 60 inches—yellowish brown saprolite of gravelly sandy loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is very rapid in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is very high. The climate is severe. It is cold and icy in winter and rainy, foggy, and cool during the rest of the year. The soil remains frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are Burton and Craggey soils near rock outcrops and Tanasee and Balsam soils in drainageways. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Tanasee soils are not underlain by saprolite. Balsam soils have more than 35 percent rock fragments in the subsoil. Also included are areas that have soft bedrock or hard bedrock at a depth of 40 to 60 inches and areas of rock outcrop. Contrasting inclusions make up about 15 percent of this map unit.

Most of the acreage in this map unit is in the Pisgah National Forest. It is used for timber production, wildlife habitat, or recreation or is in a federally designated wilderness area. Small privately owned areas are used for woodland.

This Wayah soil is poorly suited to timber production because of the slope. Production is also reduced because of the harsh climate. Northern hardwoods, such as northern red oak, black cherry, American beech, sugar maple, yellow birch, and black birch are the common trees. Red spruce and Fraser fir also grow on this soil. Areas below an elevation of 5,300 feet should be managed for hardwoods, and areas above an elevation of 5,300 feet should be managed for red spruce. Fraser fir is not used for timber production because infestations of balsam woolly adelgids kill most large trees. Thinning red spruce can increase the quality of the stand. The soil can be reforested by managing the natural regeneration of hardwoods. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration. The main concerns in timber management are the cold climate, the slope, and a hazard of erosion. The use of wheeled and tracked equipment is dangerous on this soil. Cable yarding generally is safer to use, requires fewer roads, and causes less damage to the soil. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams.

This soil is poorly suited to building site development because of the slope. An additional limitation is soil freezing. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete may be damaged by the high corrosivity of the soil. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is poorly suited to septic tank absorption fields because of the slope. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Frost action may damage unprotected road surfaces.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

WeC—Wayah sandy loam, windswept, 8 to 15 percent slopes, stony. This strongly sloping, very deep, well drained soil is on ridges of high mountains. Stones and boulders are scattered on the surface. Individual areas are long and narrow and range from 3 to 50 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Wayah soil are as follows—

Surface layer:
0 to 8 inches—very dark brown sandy loam
8 to 13 inches—dark brown sandy loam

Subsoil:
13 to 28 inches—yellowish brown sandy loam
28 to 33 inches—dark yellowish brown gravelly sandy loam

Underlying material:
33 to 60 inches—yellowish brown saprolite of gravelly sandy loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is very high. The climate is severe. It is cold, icy, and very windy in winter and rainy, foggy, and cool during the rest of the year. The soil remains frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are Burton and Craggey soils near rock outcrops and Tanasee and Balsam soils in drainageways. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Tanasee soils are not underlain by saprolite. Balsam soils have more than 35 percent rock fragments in the subsoil. Also included are areas that have soft bedrock or hard bedrock at a depth of 40 to 60 inches and areas of rock outcrop. Contrasting inclusions make up about 15 percent of this map unit.

Most of the acreage in this map unit is in the Pisgah National Forest. It is used for wildlife habitat or recreation or is in a federally designated wilderness area.

This Wayah soil is not used for commercial timber production. The trees have been stunted by high winds and ice damage. Northern red oak is the most common tree. Fraser fir, red spruce, black birch, yellow birch, black cherry, and sugar maple also grow on this soil.

This soil is moderately suited to building site development because of the slope, the harsh climate, and soil freezing. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is moderately suited to septic tank absorption fields because of the slope. Septic tank absorption fields should be installed on the contour.

This soil is moderately suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes.

The capability subclass is IVe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2A.

WeD—Wayah sandy loam, windswept, 15 to 30 percent slopes, stony. This moderately steep, very deep, well drained soil is on ridges of high mountains. Stones and boulders are scattered on the surface. Individual areas are long and narrow and range from 5 to 50 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Wayah soil are as follows—

Surface layer:
0 to 8 inches—very dark brown sandy loam
8 to 13 inches—dark brown sandy loam

Subsoil:
13 to 28 inches—yellowish brown sandy loam
28 to 33 inches—dark yellowish brown gravelly sandy loam

Underlying material:
33 to 60 inches—yellowish brown saprolite of gravelly sandy loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is very high. The climate is severe. It is cold, icy, and very windy in winter and rainy, foggy, and cool during the rest of the year. The soil remains frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are Burton and Craggey soils near rock outcrops and Tanasee and Balsam soils in drainageways. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Tanasee soils are not underlain by saprolite. Balsam soils have more than 35 percent rock fragments in the subsoil. Also included are areas that have soft bedrock or hard bedrock at a depth of 40 to 60 inches and areas of rock outcrop. Contrasting inclusions make up about 15 percent of this map unit.

Most of the acreage in this map unit is in the Pisgah National Forest. It is used for wildlife habitat or recreation or is in a federally designated wilderness area.

This Wayah soil is not used for commercial timber production. The trees have been stunted by high winds and ice damage. Northern red oak is the most common tree. Fraser fir, red spruce, black birch, yellow birch, black cherry, and sugar maple also grow on this soil.

This soil is poorly suited to building site development because of the slope. An additional limitation is soil freezing. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete may be damaged by the high corrosivity of the soil. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is poorly suited to septic tank absorption fields because of the slope. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Frost action may damage unprotected road surfaces.

The capability subclass is VIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R.

WeE—Wayah sandy loam, windswept, 30 to 50 percent slopes, stony. This steep, very deep, well drained soil is on side slopes of high mountains. Stones and boulders are scattered on the surface. Individual areas are irregular in shape and range from 5 to 100 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Wayah soil are as follows—

Surface layer:
0 to 8 inches—very dark brown sandy loam
8 to 13 inches—dark brown sandy loam

Subsoil:
13 to 28 inches—yellowish brown sandy loam
28 to 33 inches—dark yellowish brown gravelly sandy loam

Underlying material:
33 to 60 inches—yellowish brown saprolite of gravelly sandy loam

Air and water move through this soil at a moderately rapid rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is very high. The climate is severe. It is cold, icy, and very windy in winter and rainy, foggy, and cool during the rest of the year. The soil remains frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are Burton and Craggey soils near rock outcrops and Tanasee and Balsam soils in drainageways. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Tanasee soils are not underlain by saprolite. Balsam soils have more than 35 percent rock fragments in the subsoil. Also included are areas that have soft bedrock or hard bedrock at a depth of 40 to 60 inches and areas of rock outcrops. Contrasting inclusions make up about 15 percent of this map unit.

Most of the acreage in this map unit is in the Pisgah National Forest. It is used for wildlife habitat or recreation or is in a federally designated wilderness area.

This Wayah soil is not used for commercial timber production. The trees have been stunted by high winds and ice damage. Northern red oak is the most common tree. Fraser fir, red spruce, black birch, yellow birch, black cherry, and sugar maple also grow on this soil.

This soil is poorly suited to building site development because of the slope. An additional limitation is soil freezing. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete may be damaged by the high corrosivity of the soil. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is poorly suited to septic tank absorption fields because of the slope. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Frost action may damage unprotected road surfaces.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R.

WhB2—Wayah loam, windswept, 2 to 8 percent slopes, eroded, stony. This gently sloping, very deep, well drained soil is on ridges of high mountains. Stones and boulders are scattered on the surface. Individual areas are long and narrow and range from 3 to 45 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Wayah soil are as follows—

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

Subsoil:
6 to 44 inches—yellowish brown loam

Underlying material:
44 to 60 inches—yellowish brown loamy fine sand

Air and water move through this soil at a moderately rapid rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is very high. The climate is severe. It is cold, icy, and very windy in winter and rainy, foggy, and cool during the rest of the year. The soil remains frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are Burton and Craggey soils near rock outcrops and Tanasee and Balsam soils in drainageways. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Tanasee soils are not underlain by saprolite. Balsam soils have more than 35 percent rock fragments in the subsoil. Also included are areas that have soft bedrock or hard bedrock at a depth of 40 to 60 inches, rock outcrops, and gullies. Contrasting inclusions make up about 15 percent of this map unit.

All of the acreage in this map unit is in the Pisgah National Forest near Sam Knob, Graveyard Fields, and the Shining Rock Wilderness Area in the southeastern part of Haywood County. This entire area was severely burned twice. The plant cover was destroyed, and the soil was exposed to erosion. The unit is used for wildlife habitat or recreation or is in a federally designated wilderness area.

This Wayah soil is not used for commercial timber production. The few scattered trees have been stunted by high winds and ice damage. Northern red oak is the most common tree. Fraser fir, red spruce, black birch, yellow birch, black cherry, and sugar maple also grow on this soil.

This soil is moderately suited to building site development because of the harsh climate and soil freezing. All excavated areas are susceptible to moderate erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is well suited to septic tank absorption fields.

This soil is moderately suited to access roads because of the moderate potential for frost action. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes.

The capability subclass is IIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2A.

WhC2—Wayah loam, windswept, 8 to 15 percent slopes, eroded, stony. This strongly sloping, very deep, well drained soil is on ridges of high mountains. Stones and boulders are scattered on the surface. Individual areas are long and narrow and range from 3 to 45 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Wayah soil are as follows—

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

Subsoil:
6 to 44 inches—yellowish brown loam

Underlying material:
44 to 60 inches—yellowish brown loamy fine sand

Air and water move through this soil at a moderately rapid rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is very high. The climate is severe. It is cold, icy, and very windy in winter and rainy, foggy, and cool during the rest of the year. The soil remains frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are Burton and Craggey soils near rock outcrops and Tanasee and Balsam soils in drainageways. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Tanasee soils are not underlain by saprolite. Balsam soils have more than 35 percent rock fragments in the subsoil. Also included are rock outcrops, gullies, and areas that have soft bedrock or hard bedrock at a depth of 40 to 60 inches.

Contrasting inclusions make up about 15 percent of this map unit.

All of the acreage in this map unit is in the Pisgah National Forest near Sam Knob, Graveyard Fields, and the Shining Rock Wilderness Area in the southeastern part of Haywood County. This entire area was severely burned twice. The plant cover was destroyed, and the soil was exposed to erosion. The unit is used for wildlife habitat or general recreation or is in a federally designated wilderness area.

This Wayah soil is not used for commercial timber production. The few scattered trees have been stunted by high winds and ice damage. Northern red oak is the most common tree. Fraser fir, red spruce, black birch, yellow birch, black cherry, and sugar maple also grow on this soil.

This soil is moderately suited to building site development because of the slope, the harsh climate, and soil freezing. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is moderately suited to septic tank absorption fields because of the slope. Septic tank absorption fields should be installed on the contour.

This soil is moderately suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes.

The capability subclass is IVe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2A.

WhD2—Wayah loam, windswept, 15 to 30 percent slopes, eroded, stony. This moderately steep, very deep, well drained soil is on ridges and side slopes of high mountains. Stones and boulders are scattered on the surface. Individual areas are irregular in shape and range from 5 to 50 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Wayah soil are as follows—

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

Subsoil:
6 to 44 inches—yellowish brown loam

Underlying material:
44 to 60 inches—yellowish brown loamy fine sand

Air and water move through this soil at a moderately rapid rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is very high. The climate is severe. It is cold, icy, and very windy in winter and rainy, foggy, and cool during the rest of the year. The soil remains frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are Burton and Craggey soils near rock outcrops and Tanasee and Balsam soils in drainageways. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Tanasee soils are not underlain by saprolite. Balsam soils have more than 35 percent rock fragments in the subsoil. Also included are rock outcrops, gullies, and areas that have soft bedrock or hard bedrock at a depth of 40 to 60 inches. Contrasting inclusions make up about 15 percent of this map unit.

All of the acreage of this unit is in the Pisgah National Forest near Sam Knob, Graveyard Fields, and the Shining Rock Wilderness Area in the southeastern part of Haywood County. This entire area was severely burned twice. The plant cover was destroyed, and the soil was exposed to erosion. The unit is used for wildlife habitat or recreation or is in a federally designated wilderness area.

This Wayah soil is not used for commercial timber production. The few scattered trees have been stunted by high winds and ice damage. Northern red oak is the most common tree. Fraser fir, red spruce, black birch, yellow birch, black cherry, and sugar maple also grow on this soil.

This soil is poorly suited to building site development because of the slope. An additional limitation is soil freezing. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete may be damaged by the high corrosivity of the soil. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is poorly suited to septic tank absorption fields because of the slope. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Frost action may damage unprotected road surfaces.

The capability subclass is VIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R.

WhE2—Wayah loam, windswept, 30 to 50 percent slopes, eroded, stony. This steep, very deep, well drained soil is on side slopes of high mountains. Stones and boulders are scattered on the surface. Individual areas are irregular in shape and range from 5 to 150 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Wayah soil are as follows—

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

Subsoil:
6 to 44 inches—yellowish brown loam

Underlying material:
44 to 60 inches—yellowish brown loamy fine sand

Air and water move through this soil at a moderately rapid rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is very high. The climate is severe. It is cold, icy, and very windy in winter and rainy, foggy, and cool during the rest of the year. The soil remains frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are Burton and Craggey soils near rock outcrops and Tanasee and Balsam soils in drainageways. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Tanasee soils are not underlain by saprolite. Balsam soils have more than 35 percent rock fragments in the subsoil. Also included are rock outcrops, gullies, and areas that have soft bedrock or hard bedrock at a depth of 40 to 60 inches. Contrasting inclusions make up about 15 percent of this map unit.

All of the acreage in this map unit is in the Pisgah National Forest near Sam Knob, Graveyard Fields, and the Shining Rock Wilderness Area in the southeastern part of Haywood County. This entire area was severely burned twice. The plant cover was destroyed, and the soil was exposed to erosion. The unit is used for wildlife habitat or recreation or is in a federally designated wilderness area.

This Wayah soil is not used for commercial timber production. The few scattered trees have been stunted by high winds and ice damage. Northern red oak is the most common tree. Fraser fir, red spruce, black birch, yellow birch, black cherry, and sugar maple also grow on this soil.

This soil is poorly suited to building site development because of the slope. An additional limitation is soil freezing. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete may be damaged by the high corrosivity of the soil. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is poorly suited to septic tank absorption fields because of the slope. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Frost action may damage unprotected road surfaces.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R.

WhF2—Wayah loam, windswept, 50 to 95 percent slopes, eroded, stony. This very steep, very deep, well drained soil is on side slopes of high mountains. Stones and boulders are scattered on the surface. Individual areas are irregular in shape and range from 5 to 50 acres in size. Elevation is above 4,800 feet.

Typically, the sequence, depth, and composition of the layers of this Wayah soil are as follows—

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

Subsoil:
6 to 44 inches—yellowish brown loam

Underlying material:
44 to 60 inches—yellowish brown loamy fine sand

Air and water move through this soil at a moderately rapid rate. Surface runoff is very rapid in bare areas. The depth to bedrock is more than 60 inches. The rooting depth is greater than 60 inches. The content of organic matter in the surface layer is very high. The climate is severe. It is cold, icy, and very windy in winter and rainy, foggy, and cool during the rest of the year. The soil remains frozen for long periods in winter. The potential for frost action is moderate.

Included in this unit in mapping are Burton and Craggey soils near rock outcrops and Tanasee and Balsam soils in drainageways. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Tanasee soils are not underlain by saprolite. Balsam soils have more than 35 percent rock fragments in the subsoil. Also included are rock outcrops, gullies, and areas that have soft bedrock or hard bedrock at a depth of 40 to 60 inches. Contrasting inclusions make up about 15 percent of this map unit.

All of the acreage in this map unit is in the Pisgah National Forest near Sam Knob, Graveyard Fields, and the Shining Rock Wilderness Area in the southeastern part of Haywood County. This entire area was severely burned twice. The plant cover was destroyed, and the soil was exposed to erosion. The unit is used for wildlife habitat or recreation or is in a federally designated wilderness area.

This Wayah soil is not used for commercial timber production. The few scattered trees have been stunted by high winds and ice damage. Northern red oak is the most common tree. Fraser fir, red spruce, black birch, yellow birch, black cherry, and sugar maple also grow on this soil.

This soil is poorly suited to building site development because of the slope. An additional limitation is soil freezing. All excavated areas are susceptible to severe erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Concrete may be damaged by the high corrosivity of the soil. Using corrosion-resistant material for foundations, basements, and underground utilities helps to offset the risk of corrosion to concrete.

This soil is poorly suited to septic tank absorption fields because of the slope. Effluent may seep to the surface in areas downslope. Septic tank absorption fields should be installed on the contour.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action is an additional limitation. Roads in bare areas are slippery when wet and can be impassable. Access roads should be designed to remove runoff safely. Runoff can be controlled by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Surface water should not be diverted across fill slopes. Frost action may damage unprotected road surfaces.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R.

WoC—Whiteoak cobbly loam, 8 to 15 percent slopes, stony. This strongly sloping, very deep, well drained soil is in coves, on toe slopes, and on benches of intermountain hills and low and intermediate mountains. Stones and boulders are scattered on the surface. Individual areas are irregular in shape and range from 2 to 50 acres in size. Elevation ranges from 1,400 to 4,000 feet.

Typically, the sequence, depth, and composition of the layers of this Whiteoak soil are as follows—

Surface layer:

0 to 9 inches—very dark grayish brown cobbly loam

Subsoil:

9 to 12 inches—brown loam
12 to 23 inches—yellowish brown loam
23 to 34 inches—yellowish brown channery loam
34 to 62 inches—yellowish brown very flaggy loam

Air and water move through this soil at a moderate rate. Surface runoff is medium in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer ranges from moderate to very high. The rooting depth is greater than 60 inches. This soil is subject to seeps and springs below the surface and at the surface. It is subject to downslope movement when lateral support is removed and may settle unevenly when used for fill slopes. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Spivey soils along drainageways. Spivey soils have more than 35 percent rock fragments in the subsoil. Also included are soils on knolls that have more clay in the subsoil than the Whiteoak soil, soils along streams that have more sand in the subsoil than the Whiteoak soil, and moderately well drained to poorly drained soils in depressions. Contrasting inclusions make up about 15 percent of this map unit.

About half of this map unit is in the Pisgah National Forest and is used for timber production, wildlife habitat, or recreation. The rest is privately owned and used for cropland, hay, pasture, orchards, ornamental crops, woodland, or building site development.

This Whiteoak soil is well suited to timber production. Cove hardwoods, such as yellow-poplar, black cherry, northern red oak, and red maple, are the common trees. Eastern white pine and eastern hemlock also grow on this unit. The soil can be reforested by natural regeneration of hardwoods or by planting eastern white pine. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration.

This soil has no major limitations affecting timber management. Wheeled and tracked equipment can be used, although this equipment can cause rutting and compaction when the soil is wet. Soil compaction can be reduced by using low-pressure ground equipment, laying out skid trails in advance, and harvesting timber when the soil is dry. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. Site preparation for pines, such as burning and herbicide application, helps to reduce immediate plant competition and improve seedling survival. Burning also helps to minimize debris and lower planting costs. Ripping skid trails and landings when this soil is dry breaks up compacted layers, improves tilth, and increases seedling survival.

This soil is moderately suited to cropland because of the slope. Erosion is the main limitation. It can be controlled by minimum tillage, stripcropping, grassed waterways, close-growing cover crops, applications of fertilizer, rotations that include legumes and grasses, and other erosion-control measures. Tilth can be maintained by the proper erosion-control measures and by additions of organic material. An artificial drainage system or diversions may be required to remove excess water from seeps and springs. Stones on the surface should be removed to prevent damage to farm equipment. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is well suited to hay and pasture. Adapted forage species include mixtures of tall fescue or orchardgrass and legumes for spring and fall production and sudangrass and alfalfa for summer production. The hazard of erosion is moderate in unvegetated areas. Erosion is also a hazard in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. Eroded sites can crust or become sealed and thus cause poor infiltration of water. Seeps and springs can be developed as water sources for livestock. The stones on the surface should be removed to prevent damage to farm equipment.

This soil is well suited to orchards and ornamental crops. The hazard of erosion is severe in unvegetated areas. To reduce this hazard, sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution. The soil is suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

This soil is moderately suited to building site development because of the slope. All excavated areas are susceptible to moderate erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. Excavation is hindered by underground springs and cobbles and stones. Building sites should be graded so that surface runoff is directed away from the structure. Using corrosion-resistant material for foundations and basements helps to offset the risk of corrosion to concrete. Installing perforated drainage tile around the foundations helps to reduce the wetness caused by underground springs. The soil is subject to downslope movement in cutbanks and may settle unevenly when used for fill slopes. Permanent retaining walls may be needed to increase soil strength.

This soil is moderately suited to septic tank absorption fields because of the slope and the moderate permeability. Filter fields should be installed on the contour. Areas containing seeps or springs should not be selected as sites. Trench walls are susceptible to smearing if the soil is excavated when too wet. Raking the trench walls removes smeared surfaces.

This soil is moderately suited to access roads because of low strength and the slope. The moderate potential for frost action is an additional limitation. During rainy periods, access roads in bare areas are slippery and can be impassable. The design of access roads should control surface runoff and help to stabilize cut and fill slopes. This soil is subject to downslope movement on cut slopes and to differential settling in fill slopes. Permanent retaining walls may be needed to increase soil strength. In some areas the deep cuts made when leveling a surface for an access road can expose cobbles and stones. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. Unless it is removed, water from seeps and springs can saturate the roadbed. The roads may need more culverts than normal. The hazard of erosion can be reduced by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads. Because of the natural instability of this soil, cut and fill slopes are subject to sliding and slumping. Regular maintenance of cut and fill slopes, the road surface, and water-control structures is needed.

The capability subclass is IVs. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7A.

WoD—Whiteoak cobbly loam, 15 to 30 percent slopes, stony. This moderately steep, very deep, well drained soil is in coves, on toe slopes, and on benches of intermountain hills and low and intermediate mountains. Stones and boulders are scattered on the surface. Individual areas are long and narrow or irregular in shape and range from 5 to 100 acres in size. Elevation ranges from 1,400 to 4,000 feet.

Typically, the sequence, depth, and composition of the layers of this Whiteoak soil are as follows—

Surface layer:

0 to 9 inches—very dark grayish brown cobbly loam

Subsoil:

9 to 12 inches—brown loam

12 to 23 inches—yellowish brown loam

23 to 34 inches—yellowish brown channery loam

34 to 62 inches—yellowish brown very flaggy loam

Air and water move through this soil at a moderate rate. Surface runoff is rapid in bare areas. The depth to bedrock is more than 60 inches. The content of organic matter in the surface layer ranges from moderate to very high. The rooting depth is greater than 60 inches. This soil is subject to seeps and springs below the surface and at the surface. It is subject to downslope movement when lateral support is removed and may settle unevenly when used for fill slopes. The potential for frost action is moderate.

Included in this unit in mapping are small areas of Spivey soils along drainageways. Spivey soils have more than 35 percent rock fragments in the subsoil. Also included are soils on knolls that have more clay in the subsoil than the Whiteoak soil, soils along streams that have more sand in the subsoil than the Whiteoak soil, and moderately well drained to poorly drained soils in depressions. Contrasting inclusions make up about 15 percent of this map unit.

About half of this map unit is in the Pisgah National Forest and is used for timber production, wildlife habitat, or recreation. The rest is privately owned and is used for pasture, hay, orchards, ornamental crops, woodland, cropland, or building site development.

This Whiteoak soil is moderately suited to timber production because of the slope. Productivity, however, is high. Cove hardwoods, such as yellow-poplar, black cherry, northern red oak, and red maple, are the common trees. Eastern white pine and eastern hemlock also grow on this soil. The soil can be reforested by managing the natural regeneration of hardwoods or by planting eastern white pine. Site preparation for hardwoods that includes cutting all of the trees can increase natural regeneration. The main concerns in timber management are the slope and a hazard of erosion. Wheeled and tracked equipment can be used, although this equipment can cause rutting and compaction when the soil is wet. Soil compaction can be reduced by using low-pressure ground equipment, laying out skid trails in advance, and harvesting timber when the soil is dry. A buffer zone of trees and shrubs should be left adjacent to perennial streams to prevent siltation and warming of streams. Site preparation for pines, such as burning and herbicide application, helps to reduce immediate plant competition and improve seedling survival. Burning also helps to minimize debris and lower planting costs. Ripping skid trails and landings when this soil is dry breaks up compacted layers, improves tilth, and increases seedling survival.

This soil is poorly suited to cropland because of the slope and a severe hazard of erosion. Erosion-control measures are difficult and expensive to establish and maintain on this soil. The stones on the surface should be removed to prevent damage to farm equipment. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution.

This soil is moderately suited to hay and pasture because of the slope. Adapted forage species include mixtures of tall fescue or orchardgrass and legumes for spring and fall production and sudangrass and alfalfa for summer production. The hazard of erosion is severe in unvegetated areas. It also is severe in areas along waterways where livestock destroy plant cover. Preventing overgrazing, preventing grazing along waterways, and grazing only when the soil is dry help to control erosion. Eroded sites can crust or become sealed, and the result is poor infiltration of water. Seeps and springs can be developed as water sources for livestock. The stones on the surface should be removed to prevent damage to farm equipment.

This soil is moderately suited to orchards and ornamental crops because of the slope. Sod should be established and maintained between rows and on farm paths. Soil-applied herbicides may be ineffective if used at normal rates because of the high content of organic matter in the surface layer. Higher rates are not recommended because of increased costs and potential environmental pollution. The soil is suitable for ball and burlap harvesting because of an acceptable amount of clay in the subsoil.

This soil is poorly suited to building site development because of the slope. All excavated areas are susceptible to moderate erosion if they are left unprotected. Revegetating disturbed areas and using erosion-control structures, such as sediment fences and catch basins, help to keep sediments onsite. The soil is susceptible to downslope movement in cutbanks and may settle unevenly when used for fill slopes. Permanent retaining walls may be needed to increase soil strength. Excavation is hindered by underground springs and cobbles and stones. Building sites should be graded so that surface runoff is directed away from the structure. Using corrosion-resistant material for foundations and basements helps to offset the risk of corrosion to concrete. Installing perforated drainage tile around the foundations helps to reduce the wetness caused by underground springs.

This soil is poorly suited to septic tank absorption fields because of the slope. Filter fields should be installed on the contour. Areas containing seeps or springs should not be selected as sites. Trench walls are susceptible to smearing if the soil is excavated when too wet. Raking the trench walls removes smeared surfaces.

This soil is poorly suited to access roads because of the slope. The moderate potential for frost action and low strength are additional limitations. During rainy periods, access roads in bare areas are slippery and can be impassable. The design of access roads should control surface runoff and help to stabilize cut and fill slopes. Because of the natural instability of the soil, cut and fill slopes are subject to sliding and slumping. In some areas the deep cuts made when leveling a surface for an access road can expose cobbles and stones. The design of roads for year-round use should include a well compacted roadbed or geotextile under a gravel surface. This design is needed for road support and to reduce maintenance. Unless it is removed, water from seeps and springs can saturate the roadbed. The roads may need more culverts than normal. The hazard of erosion can be reduced by vegetating all disturbed areas and installing water-control structures, such as culverts, broad-based dips, water bars, and outsloped roads.

The capability subclass is VIs. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7R.

Prime Farmland

In this section, prime farmland is defined. The soils in the survey area that are considered prime farmland are listed in table 5.

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

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

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They 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 8 percent.

The location of each map unit listed in table 5 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.

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