United States Department of Agriculture

Natural Resources Conservation Service

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

Soil Survey of Jackson County, North Carolina

How To Use This Soil Survey

General Soil Map

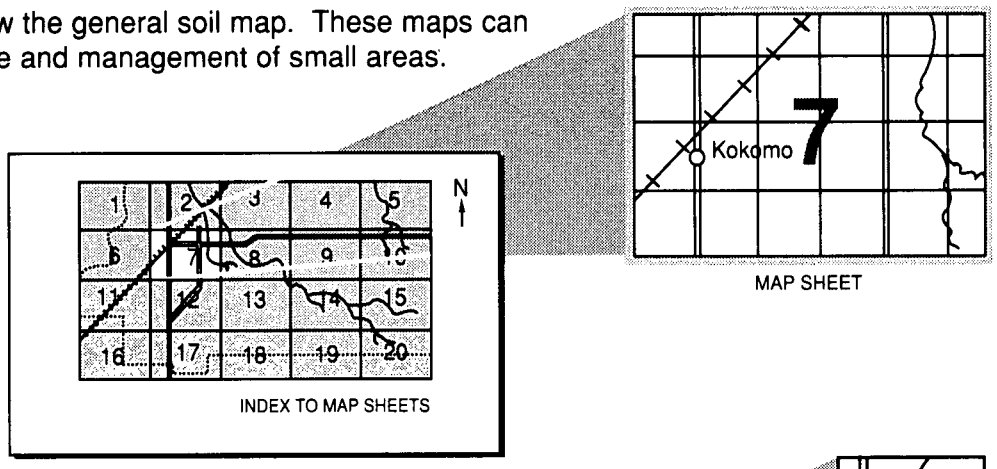
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

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.

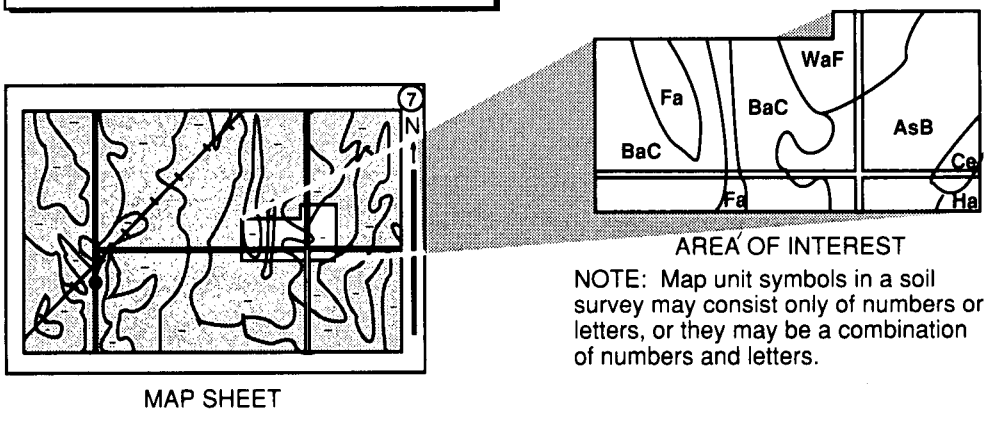
Detailed Soil Maps

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

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



Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **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.



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 (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1989. Soil names and descriptions were approved in 1991. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1991. This soil survey was made cooperatively by the Natural Resources Conservation Service; the United States Department of Agriculture, Forest Service; the United States Department of the Interior, Bureau of Indian Affairs; the North Carolina Department of Environment, Health, and Natural Resources; the North Carolina Agricultural Research Service; the North Carolina Cooperative Extension Service; the Jackson Soil and Water Conservation District; and the Jackson County Board of Commissioners. The survey is part of the technical assistance furnished to the Jackson Soil and Water Conservation District. The Jackson 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 first soil survey of Jackson County was published in 1948 by the U.S. Department of Agriculture. This survey updates the first survey, provides more detailed maps on aerial photographs, and contains more interpretive information *(15)*.

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

Cover: Christmas trees on Chandler gravelly fine sandy loam, 8 to 15 percent slopes, and Chandler gravelly fine sandy loam, 15 to 30 percent slopes, in Zacharys Gap in Jackson County.

Contents

Issued June 1997

Index to Map Units

Summary of Tables

Foreword

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

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

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

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

Richard A. Gallo
State Conservationist
Natural Resources Conservation Service

Soil Survey of Jackson County, North Carolina

By Michael L. Sherrill, Natural Resources Conservation Service

Soils surveyed by Michael L. Sherrill, Mark S. Hudson, L. Lee Mallard, III, Brian A. Wood, Steven T. Evans, and Phyllis D. Hockett, Natural Resources Conservation Service; Scott C. Keenan and Thomas N. Schmitt, North Carolina Department of Environment, Health, and Natural Resources; Sara A. Browning, U.S. Forest Service; and John M. King, private contractor

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

JACKSON COUNTY is in the southwestern part of North Carolina, about 235 miles west of Raleigh, the State capital (fig. 1). The total area of the county is 495 square miles, or 316,877 acres. According to the 1980 census, the population of the county was 25,811. Sylva, the county seat, had a population of 1,700.

This county is in the Blue Ridge Mountain physiographic region. It is bordered on the north by Swain County, on the west by Swain and Macon Counties, on the east by Haywood and Transylvania Counties, and on the south by Oconee County, South Carolina. The elevation ranges from 1,850 feet above sea level near Whittier to 6,450 feet at the summit of Richland Balsam.

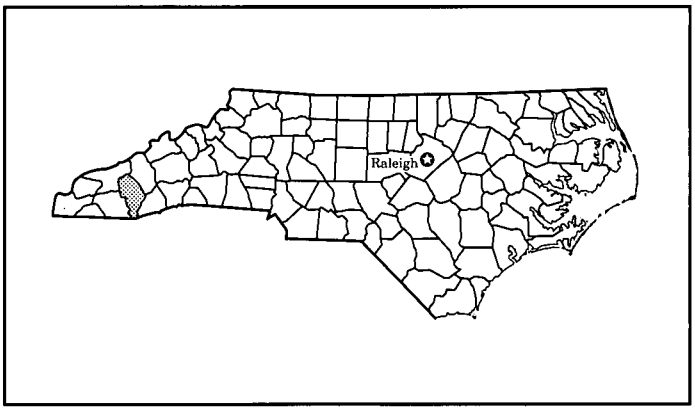


Figure 1.—Location of Jackson County in North Carolina.

General Nature of the County

George E. Frizzell, local historian, helped prepare this section.

This section provides general information about Jackson County. It describes the history and development; population trends; industrial and agricultural trends; water resources; physiography, relief, and drainage; and climate.

Jackson County is essentially rural and wooded. Its terrain varies from relatively flat basins to narrow valleys and from rolling hills to very steep mountains. Geography has had a tremendous impact on the county's development. Historically, the mountains were a barrier to the development of natural and human

resources. Recently, the construction of highways and promotion of the county have made new economic, educational, and cultural opportunities available *(13)*.

History and Development

The Cherokees are the only Indian Nation to have occupied the area that is now western North Carolina in historic times, and Cherokee place names are still common. Several Cherokee towns were in the Tuckasegee River valley, but the centers of Cherokee population shifted to the northern part of what is now Jackson County as settlers began to arrive. Part of the county was opened to settlers by 1800, and the Cherokee Nation ceded all of the remaining lands in the county in 1819 *(4)*. According to the 1980 Federal Census, however, more than 2,400 Native Americans still live in the county.

The Eastern Band of the Cherokee Nation is one of the two Indian tribes in North Carolina recognized by the Federal Government. They are descendants of those Indians who remained in the area despite land cessions and efforts to remove them to Indian Territory with the main body of the Cherokee Nation. Today, the Eastern Band of the Cherokee Nation owns 19,347 acres in the northern part of the county, which represents about one-third of their total reservation holdings *(5)*.

Settlers entering the area after 1800 included those of Scottish, Scotch-Irish, English, German, French, and African origin *(5)*. By 1850, a new county needed to be formed because of the requirements of civil government and the constraints imposed by the terrain on transportation and community interaction. Jackson County was formed in 1851 from parts of Haywood and Macon Counties. It was named in honor of former President Andrew Jackson. Webster was the first county seat. The county seat was moved to Sylva in 1913 by popular vote, however, after Webster's economic fortunes declined and a railroad line brought increasing prosperity to Sylva *(9)*.

Population Trends

After two decades of decline, the population of Jackson County has grown since 1960. By 1988, the county had a population of 27,000 *(7)*. Several factors contributed to this growth. Better economic opportunities have reduced out-migration of the county's young people and also created jobs for newcomers. Also, senior citizens have chosen the mountains as a suitable place to permanently retire. The average density of 53 inhabitants per square mile in the county is misleading because most of the people are concentrated along the Tuckasegee River valley and its tributaries or in coves in the mountains. Sylva, the largest incorporated town, had a population of more than 2,000 in 1988 *(7)*.

Industrial and Agricultural Trends

Initial isolation and a steady improvement in transportation facilities have determined the industrial and agricultural development of Jackson County. When transportation was crude and inadequate, the early settlers were largely self-sufficient both agriculturally and economically. The construction of a railroad line into the county in 1884 opened opportunities for large-scale mining and forestry operations *(4)*.

Commercial mining of kaolin and mica, the two most intensively exploited minerals, began in the late 1800's. The county was a major producer of kaolin, which is used for pottery, before production was halted in 1925. Other minerals mined on a smaller scale were corundum, olivine, gold, copper, nickel, and chromium. Production and marketing problems and competition from other sources have hindered the continuous and extensive exploitation of the county's mineral resources *(4)*.

Several commercial attempts at large-scale timber operations began in 1890. Blight destroyed the prominent chestnut trees in the 1930's, but the timber and wood product industries continued to thrive into the 1970's *(11)*.

The industrial base in the county still includes wood product operations and mining. Also, plants producing apparel and textile products began operations in 1953 and are now vital parts of the economy *(11)*. About 11 percent of the county's work force is in manufacturing. In contrast, agriculture accounts for only 1.5 percent of the work force. The 234 farms total 18,069 acres, although many families maintain private gardens *(22)*. The major agricultural products are hay, tobacco, cabbage, Christmas trees, native ornamentals, and corn. The production of Christmas trees and native ornamentals has grown rapidly in recent years as pasture and hayland are converted to growing these ornamental crops *(11)*.

Water Resources

Jackson County has an abundant supply of water from rivers, streams, and ground-water sources. High-quality water that flows from watersheds that are dominantly wooded is important to tourism in the county. Streams that flow from watersheds that have many roads, homes, or farms generally have lower quality of water. Sediment is the main problem. The quality of streams can be improved by soil and water conservation practices. Drilled wells are the most

common source of domestic water. Some springs also are used for water supplies. The water for the town of Sylva is from a reservoir on Fisher Creek.

Physiography, Relief, and Drainage

The terrain in Jackson County varies from nearly level flood plains to almost vertical rock cliffs. The physiography of the county consists of high, intermediate, and low mountains; flood plains; and stream terraces.

The high mountain landscape is above 4,800 feet in elevation. These areas are mainly in the eastern part of the county along the Blue Ridge Parkway. This landscape is exposed to cold temperatures and high winds. It has very deep to shallow, well drained soils that are high in organic matter content.

The intermediate mountain landscape ranges from 3,500 to 4,800 feet in elevation. It is the most extensive landscape in the county. The intermediate mountains have very deep to shallow, well drained to excessively drained soils on side slopes and ridges. Very deep, well drained and moderately well drained soils are in coves and drainageways. The soils on cool aspects and in coves and drainageways have a topsoil that is high in organic matter content. The soils on warm aspects have a topsoil that is medium in organic matter content.

The low mountain landscape ranges from 1,850 to 3,500 feet in elevation. It has very deep and moderately deep, well drained soils on side slopes and ridges. Very deep, well drained soils are in coves and drainageways. The soils in coves and drainageways and on cool aspects have a topsoil that is high in organic matter content. The soils on warm aspects have a topsoil that is medium in organic matter content.

The flood plains and stream terraces range from 1,850 to 3,000 feet in elevation. They are along streams, such as the Tuckasegee River, Scott Creek, and Caney Fork Creek. They have very deep, well drained to very poorly drained soils. The soils on flood plains and on the lower stream terraces have a topsoil that is high in organic matter content. The soils on high stream terraces have a topsoil that is medium in organic matter content.

Relief varies greatly from one landscape to another. The mountain landscapes have strong relief and dominantly steep and very steep slopes. Mountain ridgetops and coves are mainly gently sloping to moderately steep. The stream terraces and flood plains have low relief and are nearly level to moderately steep.

The county is largely in the Tuckasegee River Watershed and drains to the north. Major tributaries include Caney Fork Creek, Scott Creek, Savannah Creek, and Greens Creek. A small part of the county drains to the south. The southwestern corner of the county is drained by the Chattooga River, and the southeastern corner is drained by the Whitewater River.

Climate

The climate in Jackson County varies greatly from the high mountains to the flood plains along creeks and rivers. The climate at any particular place in the county is influenced by elevation, aspect, and location to the moisture laden winds from the Gulf of Mexico, which enter the county from the south. Annual precipitation varies significantly in the county. It averages about 50 inches in Cullowhee and as much as 100 inches south of Cashiers. The amount of rainfall and snowfall generally increases as the elevation increases and the temperature and growing season decrease. Similar variations occur in temperature, snowfall, freeze dates, and length of the growing season. The data in tables 1, 2, and 3 reflect the climate of the valleys in the central part of the county and do not necessarily apply to other parts of the county.

The higher elevations in the county receive significant amounts of unmeasured precipitation, which occurs as fog in the warmer months and rime ice in the colder months. Precipitation is heavy and evenly distributed throughout the year. Precipitation in summer falls mainly during thunderstorms. Precipitation in winter is mainly rain and occasional snow in the valleys. It is mainly snow in the higher mountains, although rainfall is frequent in those areas. Snow cover does not persist, except at the highest elevations.

In winter, the valleys are very cool and have occasional cold and warm spells. The upper slopes and mountaintops generally are cold and windy, especially on prominent north-south trending mountains. In summer, the valleys are very warm and frequently hot during the day but become cool at night as the air cools and drains down the mountains and collects in the valleys.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Cullowhee, North Carolina, in the period 1951 to 1981. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 39 degrees F and the average daily minimum temperature is 27 degrees. The lowest temperature on record, which occurred at Cullowhee on February 18, 1958, is -14 degrees. In summer, the average temperature is 72 degrees and the average daily maximum temperature is 84 degrees. The highest recorded temperature, which occurred at Cullowhee on July 28, 1952, is 99 degrees.

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

The total annual precipitation is 50 inches. Of this, 24 inches, or 49 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 21 inches. The heaviest 1-day rainfall during the period of record was 4.02 inches at Cullowhee on May 28, 1973. Thunderstorms occur on about 46 days each year.

The average seasonal snowfall is 12 inches. The greatest snow depth at any one time during the period of record was 13 inches. On an average of 2 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 90 percent. The sun shines 60 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the north. Average windspeed is highest, 10 miles per hour, in winter.

How This Survey Was Made

This survey was made to provide information about the soils in Jackson County. 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 unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

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 scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

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

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify 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 major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the 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. 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 small areas.

General Soil Map Units

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

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

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

The general soil map of Jackson County does not join those of Oconee County, South Carolina, and Transylvania County, North Carolina, because of differences in detail and the large number of new soil series that were correlated in Jackson County. Major landform boundaries, however, are joined with those of Transylvania County.

Areas of Soils That Have a Loamy Surface Layer and Subsoil and Formed in Material Weathered from High-Grade Metamorphic Rocks, Colluvium, or Alluvium and Areas of Rock Outcrop

1. Evard-Cowee-Saunook-Trimont

Gently sloping to very steep, very deep to moderately deep, well drained soils; on uplands and in coves in the low mountains

The landscape of this map unit consists of moderately rugged, dissected low mountains that have long side slopes and narrow, winding ridgetops and drainageways (fig. 2). Slopes range from 2 to 95 percent. Numerous drainageways join and become creeks, which join the rivers. Streams flow in winding courses through bowl- and finger-shaped coves and flood plains.

This map unit makes up about 25 percent of the county. It is about 40 percent Evard soils, 19 percent Cowee soils, 11 percent Saunook soils, 10 percent Trimont soils, and 20 percent minor soils. The minor soils include Plott, Edneyville, and Chestnut soils on intermediate mountains; Dellwood, Nikwasi, Cullowhee, and Reddies soils along flood plains; Braddock soils on high stream terraces; Cullasaja and Tuckasegee soils in coves; and Fannin soils on mountains. Fannin soils have more mica than the major soils. Small areas of rock outcrop are common in the steeper areas of this map unit.

Evard soils are very deep and are strongly sloping to very steep. They commonly are on ridgetops and south- to west-facing side slopes. Typically, the surface layer is dark brown and strong brown gravelly loam. The subsoil is red clay loam in the upper part and mottled red, yellowish red, and strong brown loam in the lower part. The underlying material is multicolored sandy loam.

Cowee soils are moderately deep and are strongly sloping to very steep. They are on ridgetops and south- to west-facing side slopes. The surface layer is reddish brown gravelly sandy loam. The subsoil is red gravelly sandy loam and gravelly sandy clay loam. Weathered bedrock is at a depth of 27 inches.

Saunook soils are very deep and are gently sloping to moderately steep. They are on benches and toe slopes in coves. Typically, the surface layer is dark brown gravelly loam. The subsoil is strong brown gravelly clay loam, gravelly sandy clay loam, gravelly sandy loam, and sandy loam. The underlying material is yellowish brown cobbly fine sandy loam.

Trimont soils are very deep and are steep and very steep. They are on north- to east-facing side slopes. The surface layer is dark brown gravelly loam. The subsoil is reddish brown and yellowish red loam and clay loam.

Most areas of this map unit are used for commercial timber. Recreational uses and homesites are also

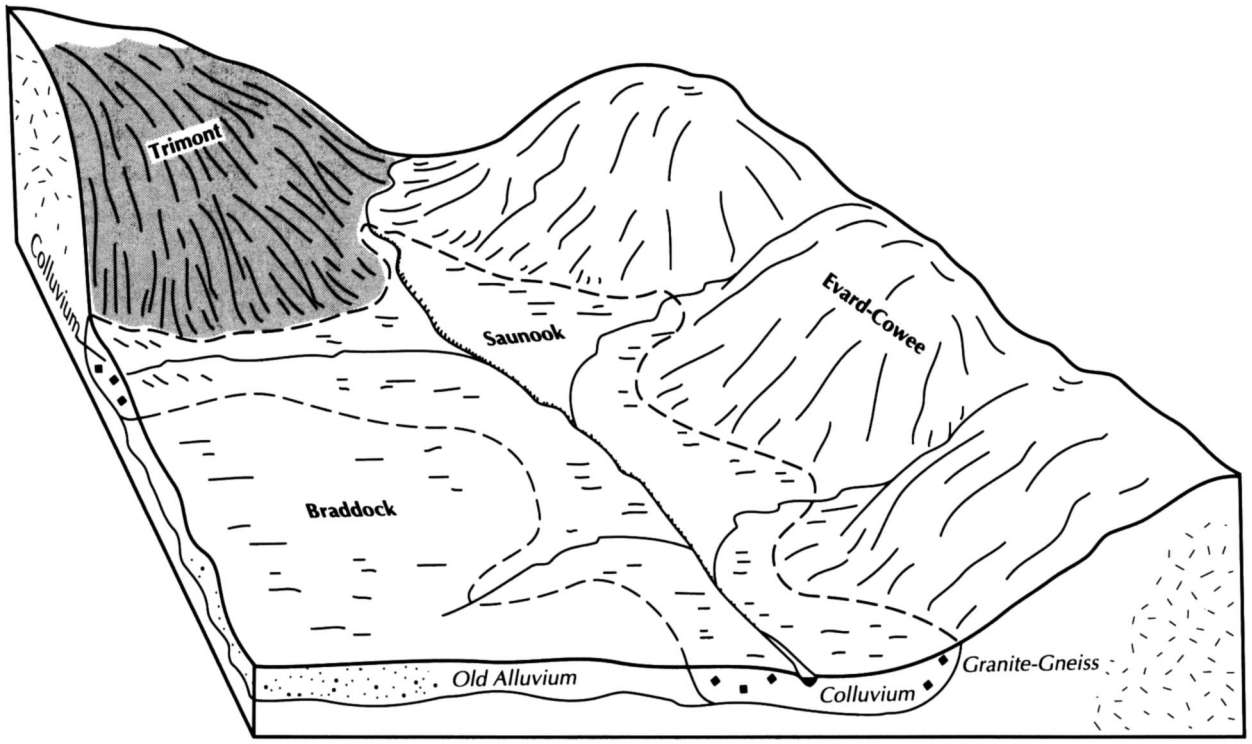


Figure 2.—Relationship of soils, aspect, parent material, and landscape position in the Evard-Cowee-Saunook-Trimont general soil map unit.

important. Pasture and crops are grown in some of the less sloping areas.

The mountain ridgetops and the south- to west-facing slopes are dominated by scarlet oak, chestnut oak, hickory, pitch pine, and white oak. The north- to east-facing slopes are dominated by yellow-poplar, northern red oak, black cherry, sweet birch, and white oak. The coves, toe slopes, and areas along drainageways are dominated by yellow-poplar. Productivity is affected by variation in rainfall in this unit. The soils in coves, on toe slopes, along drainageways, and on the north- to east-facing side slopes are preferred for timber production. Logging is difficult in the steep and very steep areas. Building and maintaining access roads are costly in this map unit. The slope and the hazard of erosion are the main management concerns on the major soils. The depth to bedrock also is a limitation in the Cowee soils.

The less sloping areas that are not federally owned commonly are cleared of trees. The Evard and Cowee soils are used as pasture and hayland. The Saunook soils are commonly used for the production of hay, Christmas trees, landscaping plants, strawberries, and tomatoes.

Some areas of the well drained minor soils on flood plains, in coves, and on toe slopes are used for the production of high-value crops, such as Christmas trees, landscaping plants, burley tobacco, tomatoes, and strawberries.

A few of the less sloping areas of the major soils and some areas of the minor soils are used intensively for pasture, hay, and crops. The Evard and Cowee soils are commonly used as pasture and hayland. The Saunook soils and many areas of the minor soils in coves, along toe slopes, and on flood plains are used for the production of high-value crops, such as burley tobacco, tomatoes, strawberries, landscaping plants, and Christmas trees. The slope and the hazard of erosion are the main management concerns on the major soils. The flooding and the wetness are the main management concerns on the minor soils on flood plains.

Large areas of this map unit are used for hiking, camping, fishing, hunting, and sightseeing. The slope is the main limitation.

This unit is increasingly being used for homesites. The slope is the main limitation on the major soils. The depth to bedrock also is a limitation in the Cowee soils.

2. Plott-Edneyville-Chestnut-Cullasaja

Strongly sloping to very steep, very deep to moderately deep, well drained soils; on uplands and in coves in the intermediate mountains

The landscape of this map unit consists of rugged, dissected intermediate mountains that have long side slopes and narrow, winding ridgetops and drainageways (fig. 3). Slopes range from 8 to 95 percent. The numerous drainageways join and become creeks and rivers. Streams flow in winding courses through bowl- and finger-shaped coves, along toe slopes, and through narrow flood plains and gorges that have small areas of rock outcrop.

This map unit makes up about 40 percent of the county. It is about 24 percent Plott soils, 19 percent Edneyville soils, 15 percent Chestnut soils, 15 percent Cullasaja soils, and 27 percent minor soils. The minor soils include Cleveland soils near areas of rock outcrop; Chandler, Fannin, and Cashiers soils in areas on low and intermediate mountains; Evard, Cowee, and Trimont soils on low mountains; Tuckasegee, Whiteside, and Sylva soils in coves; and Cullowhee, Dellwood, Nikwasi, and Reddies soils along narrow flood plains. Chandler, Fannin, and Cashiers soils have more mica than the major soils.

Plott soils are very deep and are moderately steep to very steep. They are on north- to east-facing mountain side slopes and on moderately steep ridgetops on the shaded or the higher parts of the intermediate mountains. Typically, the surface layer is very dark grayish brown and dark brown fine sandy loam and gravelly fine sandy loam. The subsoil is dark yellowish brown or yellowish brown gravelly loam and cobbly fine sandy loam. The underlying material is light yellowish brown and multicolored cobbly sandy loam.

Edneyville soils are very deep and are strongly sloping to very steep. They commonly are on south- to west-facing mountain ridgetops and side slopes. Typically, the surface layer is dark brown gravelly fine sandy loam. The subsoil is strong brown fine sandy loam and yellowish brown sandy loam. The underlying material is multicolored sandy loam.

Chestnut soils are moderately deep and are strongly sloping to very steep. They commonly are on south- to west-facing mountain ridgetops and side slopes.

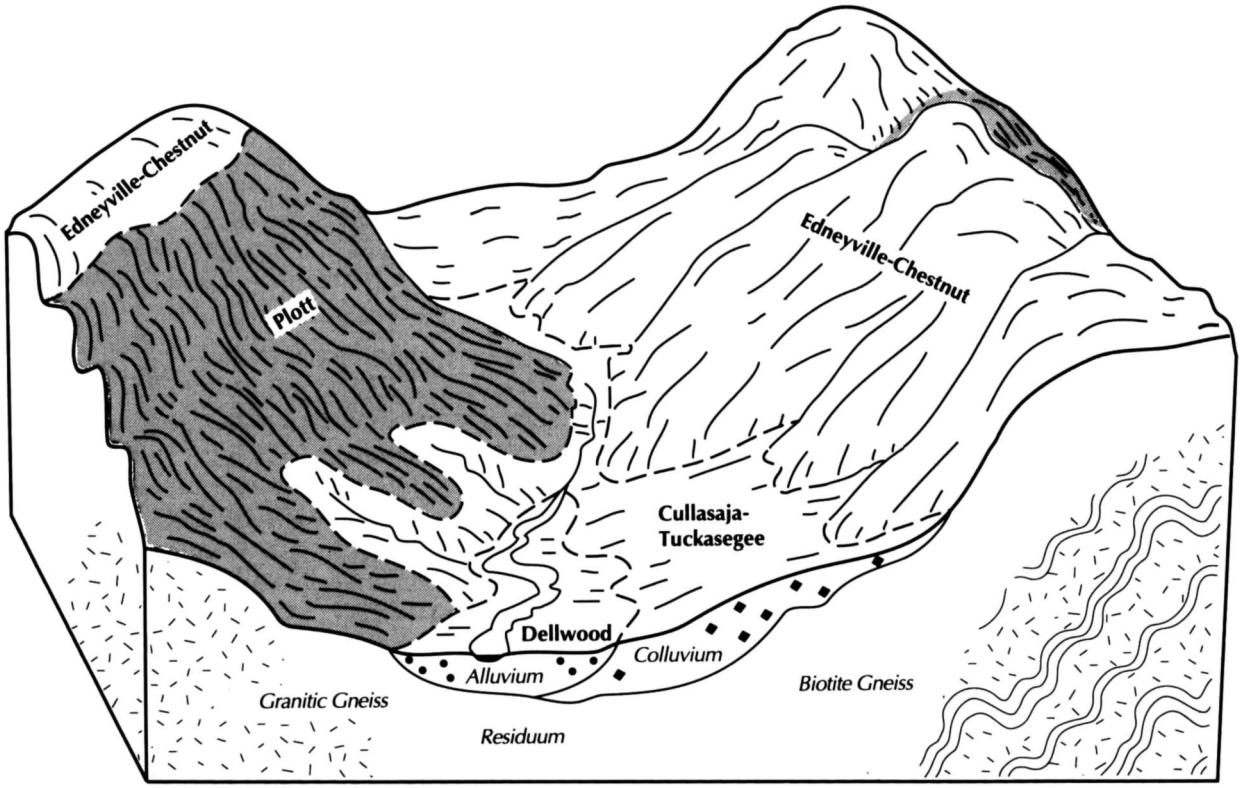


Figure 3.—Relationship of soils, aspect, parent material, and landscape position in the Plott-Edneyville-Chestnut-Cullasaja general soil map unit.

Typically, the surface layer is dark yellowish brown gravelly fine sandy loam. The subsoil is strong brown fine sandy loam. The underlying material is strong brown gravelly sandy loam. Weathered bedrock is at a depth of 28 inches.

Cullasaja soils are very deep and are strongly sloping to very steep. They are on toe slopes and benches and along drainageways in coves. Typically, the surface layer is black and very dark brown very cobbly fine sandy loam. The subsoil is dark yellowish brown very cobbly fine sandy loam, yellowish brown very cobbly sandy loam, and dark yellowish brown extremely cobbly sandy loam.

Most areas of this map unit are used for commercial timber. The production of Christmas trees and other ornamental plants and outdoor recreational uses are also important.

The natural vegetation is mainly hardwoods, but eastern white pine is dominant in some areas. The mountain ridgetops and the south- to west-facing slopes are dominated by scarlet oak, chestnut oak, hickory, pitch pine, and eastern white pine. The north- to east-facing slopes are dominated by northern red oak, black cherry, sweet birch, sugar maple, and yellow-poplar. The coves, toe slopes, and areas along drainageways are dominated by yellow-poplar. Productivity is generally better in the areas that have higher rainfall. Logging is difficult in the very steep areas. Building and maintaining access roads are difficult and costly in the steep and very steep areas. The soil material and saprolite in areas of this map unit, however, can be easily compacted. This map unit is better suited to year-round logging than the other map units in the county.

The less sloping areas of the major soils and most areas of the minor soils are intensively used for Christmas trees, native ornamentals, ginseng, cabbage, broccoli, pasture, or hay. Many areas are used for outdoor recreational purposes.

The slope and the hazard of erosion are the main management concerns. Also, the moderate depth to weathered bedrock in the Chestnut soils and large stones in the Cullasaja soils are severe limitations affecting many uses.

3. Cleveland-Rock Outcrop-Chestnut

Moderately steep to very steep, moderately deep or shallow, well drained and somewhat excessively drained soils; on uplands in the intermediate mountains

The landscape of this map unit is characterized by prominent mountain peaks and rock cliffs (fig. 4). Ridgetops are rounded, moderately steep or steep stringers that connect distinct mountain peaks. Slopes range from 15 to 95 percent.

This map unit makes up about 7 percent of the county. It is about 39 percent Cleveland soils, 27 percent areas of Rock outcrop, 20 percent Chestnut soils, and 14 percent minor soils. The minor soils are Cullasaja and Tuckasegee soils in local depressions and Edneyville soils on the smoother parts of ridgetops.

Cleveland soils are somewhat excessively drained, shallow, and moderately steep to very steep. They are on ridgetops and side slopes. Typically, the surface layer is black sandy loam. The subsoil is yellowish brown loam. Hard bedrock is at a depth of 17 inches.

The areas of Rock outcrop generally are nearly vertical but range to moderately steep.

Chestnut soils are well drained, moderately deep, and moderately steep to very steep. They are on ridgetops and side slopes. Typically, the surface layer is dark yellowish brown gravelly fine sandy loam. The subsoil is strong brown fine sandy loam. The underlying material is strong brown gravelly sandy loam. Weathered bedrock is at a depth of 28 inches.

Nearly all of the acreage in this map unit is wooded. This unit is not managed for commercial timber, however, because the trees are severely stunted by the frequent winds and ice. Because of its scenic views, this unit is used for outdoor recreational purposes and vacation homes.

The slope, the shallow to moderate depth to bedrock, stones, numerous areas of Rock outcrop, the hazard of erosion in bare areas, and the severe climate are the main management concerns.

4. Whiteside-Tuckasegee-Nikwasi

Nearly level to strongly sloping, well drained to very poorly drained soils that are very deep to moderately deep to strata of sand, gravel, and cobbles; in coves and on flood plains along small streams

The landscape of this map unit consists of large colluvial flats at the head of drainageways and on toe slopes in coves and on narrow flood plains in the intermediate mountains (fig. 5). Slopes range from 0 to 15 percent. The drainageways join and become small branches, which join the creeks and rivers.

This map unit makes up about 1 percent of the county. It is about 25 percent Whiteside soils, 22 percent Tuckasegee soils, 16 percent Nikwasi soils, and 37 percent minor soils. The minor soils are Cullasaja soils on toe slopes in coves; Cullowhee soils on flood plains; Edneyville, Chestnut, and Cleveland soils on uplands along the edge of the map unit; Sylva soils on colluvial flats at the head of drainageways; and Udorthents in disturbed areas around Cashiers.

Whiteside soils are very deep, nearly level to strongly sloping, and moderately well drained. They are on

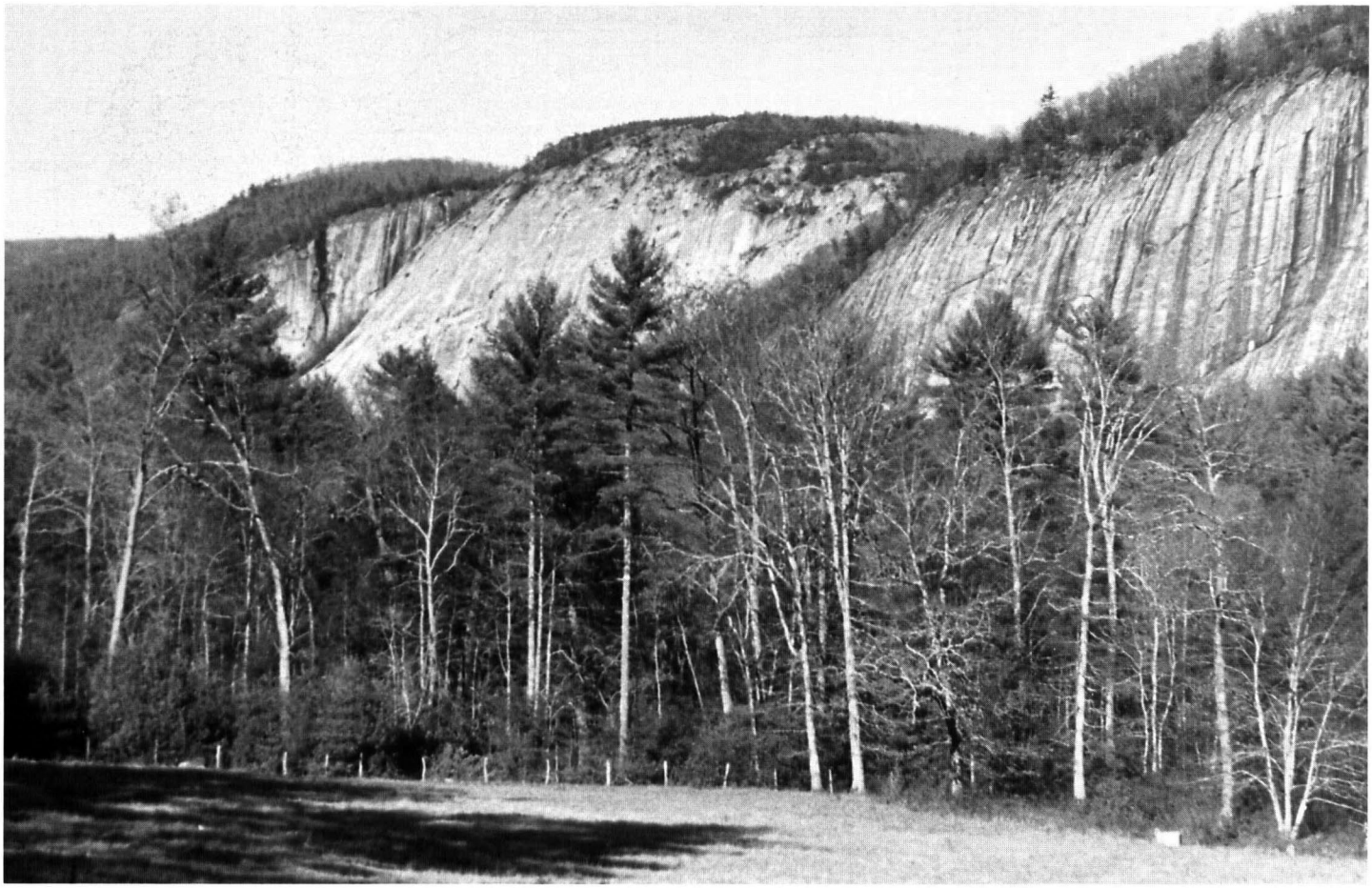


Figure 4.—Outcrops of high-grade metamorphic bedrock in the Cleveland-Rock outcrop-Chestnut general soil map unit.

colluvial flats and toe slopes in coves. Typically, the surface layer is very dark grayish brown fine sandy loam. The upper part of the subsoil is yellowish brown sandy clay loam. The next part is yellowish brown sandy clay loam that has strong brown and gray mottles. The lower part is gray fine sandy loam that has yellowish brown mottles. The underlying material is light brownish gray sandy loam in the upper part and gray sandy clay loam in the lower part.

Tuckasegee soils are very deep, gently sloping and strongly sloping, and well drained. They are on toe slopes and benches in coves. Typically, the surface layer is very dark brown gravelly loam. The subsoil is dark yellowish brown loam and gravelly loam in the upper part and yellowish brown gravelly fine sandy loam and gravelly sandy clay loam in the lower part.

Nikwasi soils are nearly level, poorly drained and very poorly drained, and moderately deep to strata of sand, gravel, and cobbles. They are on flood plains. Typically, the surface layer is very dark grayish brown and very dark gray fine sandy loam. The underlying material is dark grayish brown and multicolored extremely gravelly coarse sand.

Land use patterns are complex in areas of this map unit and include such uses as woodland, cropland, residential development, recreational development, and wilderness preservation. The areas west of Thorpe Lake are used mainly for cabbage, broccoli, pasture, or hay. Pasture, urban development, and recreational development are the major land uses along the Horse Pasture River. Woodland is the major use along Norton Creek and Grassy Camp Creek. Urban development and recreational development are the major uses around and south of Cashiers. Wilderness preservation and outdoor recreation are major uses in the Panthertown Creek area.

The wetness and the slope are the main limitations in areas of the Whiteside soils. The flooding and wetness

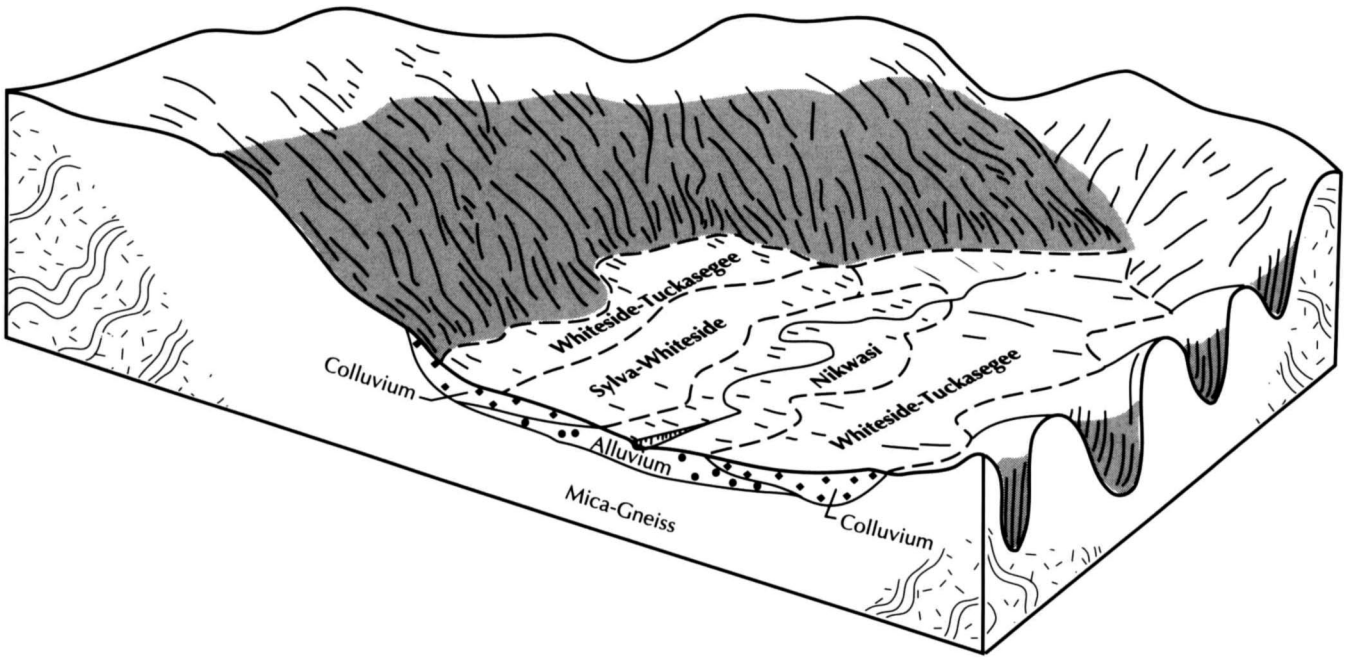


Figure 5.—Relationship of soils and landscape position in the Whiteside-Tuckasegee-Nikwasi general soil map unit.

are the main management concerns in areas of the Nikwasi soils. The slope is the main limitation in areas of the Tuckasegee soils.

5. Wayah

Strongly sloping to very steep, very deep, well drained soils; on uplands in the high mountains

The landscape of this map unit consists of rugged, dissected mountain peaks and side slopes. The peaks of these high mountains are rounded and moderately broad. Slopes range from 8 to 95 percent.

This map unit makes up about 5 percent of the county. It is about 79 percent Wayah soils and 21 percent soils of minor extent. The minor soils include Tanasee and Balsam soils in coves and along drainageways and Burton and Craggey soils near areas of rock outcrop. Small areas of rock outcrop are also included in this map unit.

Wayah soils are very deep and are strongly sloping to very steep. They are on moderately broad, rounded ridgetops and side slopes. Typically, the surface layer is black and very dark grayish brown sandy loam. The subsoil is dark yellowish brown gravelly sandy loam. The underlying material varies in color and has a texture of gravelly sandy loam.

Almost all of the acreage in this map unit is wooded. The dominant trees are northern red oak, black cherry, and sugar maple at elevations below 5,300 feet and red spruce and Fraser fir at elevations above 5,300 feet. A few areas are in natural grass or heath balds. Most of this map unit is owned and managed by the U.S. Forest Service or the National Park Service. The U.S. Forest Service manages timber in areas that are protected from the prevailing wind. Researchers are intensively studying a decrease in the acreage of red spruce and Fraser fir on this map unit. The unit is noted for its great natural beauty and is frequently used for outdoor recreational purposes. The slope and the harsh climate are the main limitations.

A few of the least windy, privately owned areas have been cleared of trees and are used for Christmas trees or as summer pasture. The slope, the hazard of erosion, and the harsh climate are the main management concerns affecting crops and pasture.

Most areas of this map unit are not used for commercial timber because of the harsh climate, which is characterized by high winds and frequent ice storms that severely deform hardwood timber. A few areas that are protected from the wind are used for commercial timber. The slope, the hazard of erosion, and the harsh climate are the main management concerns.

Most of this map unit is federally owned and is used for camping, hiking, fishing, hunting, and sightseeing.

Privately owned areas are being increasingly used for vacation homes and outdoor recreational purposes. The slope and the harsh climate are the main limitations.

Soils That Have a Loamy Surface Layer and Subsoil and Formed in Material Weathered from Metasedimentary Rocks

6. Junaluska-Brasstown-Tsali

Moderately steep to very steep, deep to shallow, well drained soils; on uplands in the low mountains

The landscape of this map unit consists of moderately rugged, dissected low mountains that have long side slopes and very narrow, winding ridgetops and drainageways. Slopes range from 15 to 95 percent. The numerous drainageways join and become creeks, which join the rivers. Streams flow in winding courses through bowl- and finger-shaped coves and narrow drainageways.

This map unit makes up about 2 percent of the county. It is about 55 percent Junaluska soils, 16 percent Brasstown soils, 15 percent Tsali soils, and 14 percent minor soils. The minor soils include Spivey and Santeetlah soils in coves and along drainageways; Dellwood, Cullowhee, and Nikwasi soils along narrow flood plains; and Soco and Stecoah soils along the edge of this map unit at the higher elevations.

Junaluska soils are moderately deep and are moderately steep to very steep. They commonly are on south- to west-facing mountain ridgetops and side slopes. Typically, the surface layer is dark brown channery fine sandy loam. The subsoil is strong brown channery loam and yellowish red channery clay loam. Weathered bedrock is at a depth of 28 inches.

Brasstown soils are deep and are moderately steep and steep. They commonly are on south- to west-facing mountain ridgetops and side slopes. Typically, the surface layer is dark brown channery fine sandy loam. The subsoil is yellowish red and red channery sandy clay loam and channery fine sandy loam. Weathered bedrock is at a depth of 50 inches.

Tsali soils are shallow and are moderately steep to very steep. They commonly are on south- to west-facing, very narrow mountain ridgetops and side slopes. Typically, the surface layer is dark brown channery fine sandy loam. The subsoil is brown and yellowish red channery fine sandy loam or channery loam. Weathered bedrock is at a depth of 16 inches.

Nearly all of the acreage in this map unit is used for commercial timber. A few areas of the minor soils in coves, along drainageways, and on narrow flood plains are cleared of trees and used for pasture or hay. This map unit is also used for outdoor recreational purposes and homesites.

The natural vegetation is mainly hardwoods, such as scarlet oak, chestnut oak, and hickory. Eastern white pine, Virginia pine, and pitch pine are dominant in old fields or pasture that has reverted to woodland. Coves, toe slopes, and drainageways are dominated by yellow-poplar. Logging is difficult in the steep and very steep areas. Building and maintaining access roads are difficult and costly in this map unit. Areas where seams of unstable rocks bearing a large amount of sulfur are unearthed require special treatment. The slope, the depth to weathered bedrock, the hazard of erosion, and the instability of the underlying bedrock are the main limitations affecting woodland management.

Areas of mainly minor soils, such as Santeetlah and Spivey soils in coves and along drainageways and Cullowhee and Dellwood soils along small streams, have been cleared of trees. Most of these areas are used for pasture or hay. The slope and stoniness are the main limitations affecting pasture and hay on Santeetlah and Spivey soils. The flooding and stoniness are the main management concerns affecting pasture and hay on Dellwood soils. The wetness and flooding are the main management concerns affecting pasture and hay on Cullowhee soils.

This map unit is being increasingly used for vacation homes. The slope, the depth to bedrock, the hazard of erosion, and the instability of the underlying bedrock are the main management concerns.

7. Soco-Stecoah-Cheoah

Moderately steep to very steep, moderately deep and deep, well drained soils; on uplands in the intermediate mountains

The landscape of this map unit consists of rugged, dissected mountains that have long side slopes and very narrow, winding ridgetops and drainageways. Slopes range from 15 to 95 percent. The numerous drainageways join and become creeks, which join the rivers. Streams flow in winding courses through bowl- and finger-shaped coves, through narrow flood plains, and through gorges that have small areas of rock outcrop.

This unit makes up about 4 percent of the county. It is about 32 percent Soco soils, 25 percent Stecoah soils, 22 percent Cheoah soils, and 21 percent minor soils. The minor soils include Spivey and Santeetlah soils in coves and along toe slopes and Cullowhee, Nikwasi, and Reddies soils along narrow flood plains. Small areas of rock outcrop are also included in this map unit.

Soco soils are moderately deep and are moderately steep to very steep. They commonly are on south- to west-facing mountain ridgetops and side slopes. Typically, the surface layer is very dark grayish brown channery loam. The subsoil is strong brown, dark yellowish brown, and yellowish brown fine sandy loam and channery fine sandy loam. The underlying material is multicolored channery fine sandy loam. Weathered bedrock is at a depth of 35 inches.

Stecoah soils are deep and are moderately steep to very steep. They commonly are on south- to west-facing ridgetops and side slopes. Typically, the surface layer is very dark grayish brown channery fine sandy loam. The subsoil is dark brown and strong brown fine sandy loam, channery fine sandy loam, and channery sandy loam. Weathered bedrock is at a depth of 45 inches.

Cheoah soils are deep and are steep and very steep. They commonly are on north- to east-facing, shaded or higher ridgetops and side slopes. Typically, the surface layer is very dark grayish brown and dark yellowish brown channery loam. The subsoil is yellowish brown and strong brown channery loam and channery fine sandy loam. The underlying material is multicolored channery fine sandy loam. Weathered bedrock is at a depth of 56 inches.

Most areas of this map unit are used for commercial timber. Recreational uses and homesites are also important. Some of the less sloping areas are cleared of trees and are used as pasture.

The ridgetops and the south- to west-facing slopes are dominated by scarlet oak, chestnut oak, black oak, hickory, and pitch pine. The north- to east-facing slopes are dominated by northern red oak, black cherry, sweet birch, and sugar maple. The coves, toe slopes, and areas along drainageways are dominated by yellow-poplar. Productivity is generally better in the areas that have higher rainfall. The north- to east-facing slopes, coves, toe slopes, and areas along drainageways are preferred for commercial timber production. Logging is difficult in the steep and very steep areas. Building and maintaining access roads are difficult and costly in the steep and very steep areas. Road building also unearths seams of rocks bearing a large amount of sulfur, which are costly to treat and maintain, and the underlying bedrock is unstable. The slope and the hazard of erosion are the major management concerns.

A few of the less sloping areas of the major soils and some areas of the minor soils in this map unit are used for pasture and hay. The slope is the main limitation in the Soco, Stecoah, and Cheoah soils. In the minor soils, stoniness and the slope are the main limitations in areas of Spivey and Santeetlah soils. The flooding and the wetness are the main management concerns in areas of Nikwasi, Cullowhee, and Reddies soils.

Some areas of this map unit that are both federally and privately owned are used for camping, hiking, fishing, hunting, and sightseeing. Privately owned areas are also used for vacation homes. The slope, the depth to weathered bedrock, and the instability of the underlying bedrock are major limitations in most areas.

8. Oconaluftee

Moderately steep to very steep, very deep, well drained soils; on uplands in the high mountains

The landscape of this map unit consists of rugged, dissected mountain peaks and side slopes. The peaks of these high mountains are sharp and narrow. Slopes range from 15 to 95 percent.

This map unit makes up about 1 percent of the county. It is about 80 percent Oconaluftee soils and 20 percent minor soils. The minor soils include Wayah soils along the geologic boundary between metasedimentary rocks and high-grade metamorphic rocks and Cheoah soils at the lower elevations. Small areas of rock outcrop are common in some areas.

Oconaluftee soils are very deep and are moderately steep to very steep. They are on ridgetops 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 underlying material is multicolored channery fine sandy loam.

Almost all of the acreage in this map unit is wooded. The dominant trees are northern red oak, black cherry, and sugar maple at elevations below 5,300 feet and red spruce and Fraser fir at elevations above 5,300 feet. A few areas are in natural grassy balds or heath balds. Most of this map unit is owned and managed by the National Park Service and the Bureau of Indian Affairs. The Bureau of Indian Affairs manages timber in areas that are protected from the prevailing wind. Researchers are intensively studying a decrease in the acreage of red spruce and Fraser fir on this map unit. The unit is noted for its great natural beauty and is frequently used for outdoor recreational purposes. The slope, the harsh climate, the hazard of erosion, the instability of the underlying rock layers along planes of weakness, and the potential for a high content of sulfur in the underlying bedrock are the main management concerns.

A few of the privately owned areas have been cleared of trees and are used for Christmas trees or as summer pasture. The slope, the hazard of erosion, and the harsh climate are the main management concerns affecting crops and pasture.

Most areas of this map unit are not used for

commercial timber because of the harsh climate, which is characterized by high winds and frequent ice storms that severely deform hardwood timber. A few areas that are protected from the wind are used for commercial timber. The slope restricts the use of logging equipment in many areas. Building and maintaining access roads are difficult and costly because of the climate and the slope. Road building also unearths seams of rocks bearing a large amount of sulfur, which are difficult to treat and maintain. Erosion is a major hazard along logging roads and skid trails.

The federally owned land in this map unit is used for sightseeing, hiking, camping, fishing, and hunting. Privately owned areas are increasingly being used for vacation homes and outdoor recreational purposes. The slope is the major limitation in most areas.

Soils That Have a Loamy Surface Layer and a Clayey Subsoil and Formed in Material Weathered from Ultramafic Rocks

9. Ellijay

Gently sloping to moderately steep, very deep, well drained clayey soils; on uplands in the low mountains

The landscape of this map unit is characterized by moderately broad ridges and short side slopes. Slope ranges from 2 to 30 percent.

This map unit makes up less than 1 percent of the county. It is about 80 percent Ellijay soils and 20 percent minor soils. The minor soils are Braddock soils on high stream terraces and Evard and Cowee soils along the edge of this map unit on the more dissected terrain.

Ellijay soils are very deep and are gently sloping to moderately steep. They are on ridgetops and side slopes. Typically, the surface layer is dusky red silty clay loam. The upper part of the subsoil is dark red clay. The lower part is dark red loam. The underlying material is mottled clay loam and loam.

Most of the gently sloping areas on ridgetops have been cleared of trees and are moderately suited to white pine for use as Christmas trees or as pasture and hayland. The Ellijay soils have a severe calcium-magnesium imbalance in most areas. Calcitic lime needs to be applied to help establish a better nutrient balance. The slope and the hazard of erosion are also management concerns affecting cropland, pasture, or hayland.

Most of the steeper parts of this map unit are wooded or are reverting to woodland, but these areas are poorly suited to commercial timber. The natural vegetation is mainly pine, but hardwoods are dominant in the steeper areas. The vegetation is distinctive and is characterized by stunted Virginia pine, pitch pine, eastern redcedar, and scarlet oak. Trees grow slowly because of the calcium-magnesium imbalance in the major soils and past woodland management practices.

This map unit is increasingly being used for residential homesites. The clayey subsoil may affect septic tank absorption fields. Establishing and maintaining grasses and landscaping plants may be difficult and costly because of the calcium-magnesium imbalance and compaction.

Soils That Have a Very High Content of Mica and a Loamy Surface Layer and Subsoil and Formed in Material Weathered from High-Grade Metamorphic Rocks

10. Chandler-Fannin-Cashiers

Strongly sloping to very steep, very deep, well drained and somewhat excessively drained soils that are very high in content of mica; on uplands in the low and intermediate mountains

The landscape of this map unit consists of moderately broad ridgetops, wide side slopes, and narrow coves (fig. 6). Slopes range from 8 to 95 percent. Numerous drainageways join and become creeks, which join the rivers. Streams flow through bowl- and finger-shaped coves and through narrow flood plains and steep gorges.

This map unit makes up about 12 percent of the county. It is about 42 percent Chandler soils, 21 percent Fannin soils, 17 percent Cashiers soils, and 20 percent minor soils. The minor soils include Dellwood, Nikwasi, and Reddies soils on flood plains; Cullasaja, Tuckasegee, Whiteside, and Sylva soils in coves; and Plott, Edneyville, Chestnut, Evard, Cowee, and Trimont soils in areas that have less mica than the major soils. Small areas of rock outcrop are common.

Chandler soils are somewhat excessively drained, very deep, and strongly sloping to very steep. They commonly are on south- to west-facing ridgetops and side slopes. Typically, the surface layer is very dark grayish brown and dark yellowish brown gravelly fine sandy loam. The subsoil is yellowish brown fine sandy loam. The underlying material is multicolored fine sandy loam.

Fannin soils are well drained, very deep, and strongly sloping to very steep. They commonly are on south- to west-facing ridgetops and side slopes. Typically, the surface layer is very dark grayish brown fine sandy loam. The upper part of the subsoil is strong brown loam. The next part is yellowish red sandy clay loam.

The lower part is yellowish red sandy loam. The underlying material is yellowish red sandy loam.

Cashiers soils are well drained, very deep, and strongly sloping to very steep. They commonly are on higher or shaded, north- to east-facing ridgetops and side slopes. Typically, the surface layer is very dark brown gravelly fine sandy loam. The subsoil is yellowish brown and dark yellowish brown sandy loam or gravelly sandy loam.

Most areas of this map unit are used for commercial timber. Recreational uses are also important. Privately owned areas are used for homesites. The less sloping areas are commonly cleared of trees and are used for hay, pasture, Christmas trees, landscaping plants, cabbage, or broccoli.

Scarlet oak, chestnut oak, eastern white pine, and pitch pine are the dominant trees on the Chandler and Fannin soils. Northern red oak, yellow-poplar, and eastern white pine are the dominant trees on the Cashiers soils. Productivity is generally higher on the Cashiers soils and in the areas that have high rainfall in the southern part of the county. The slope restricts the use of logging equipment in many areas. The hazard of erosion is severe along many logging roads and skid trails. Because of the very high content of mica, logging roads and skid trails are also unstable and very slick during wet periods.

Most areas of this unit that are cleared of trees are in coves, on toe slopes, or on flood plains. The minor Tuckasegee, Cullasaja, and Whiteside soils are the

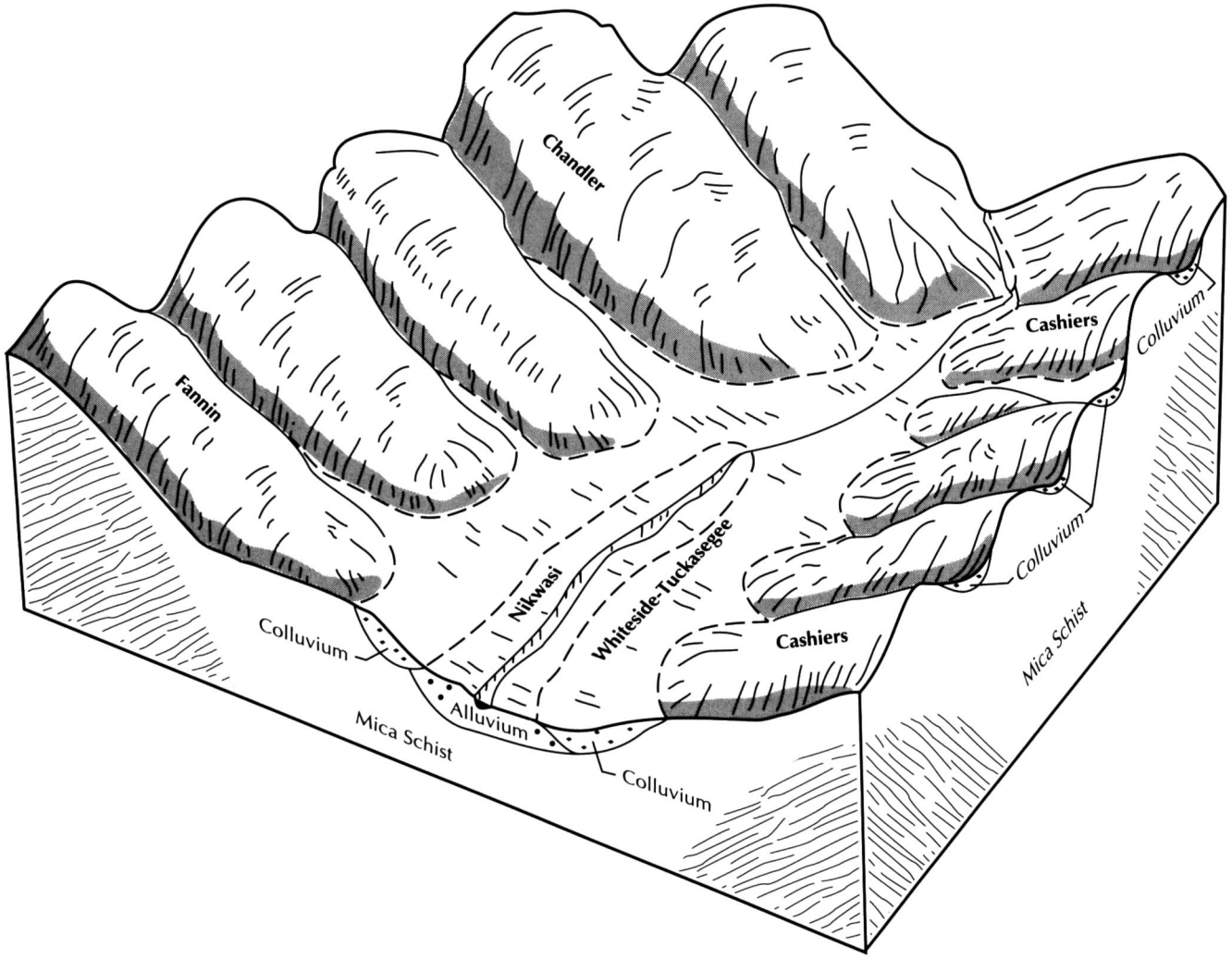


Figure 6.—Relationship of soils, aspect, and parent material in the Chandler-Fannin-Cashiers general soil map unit.

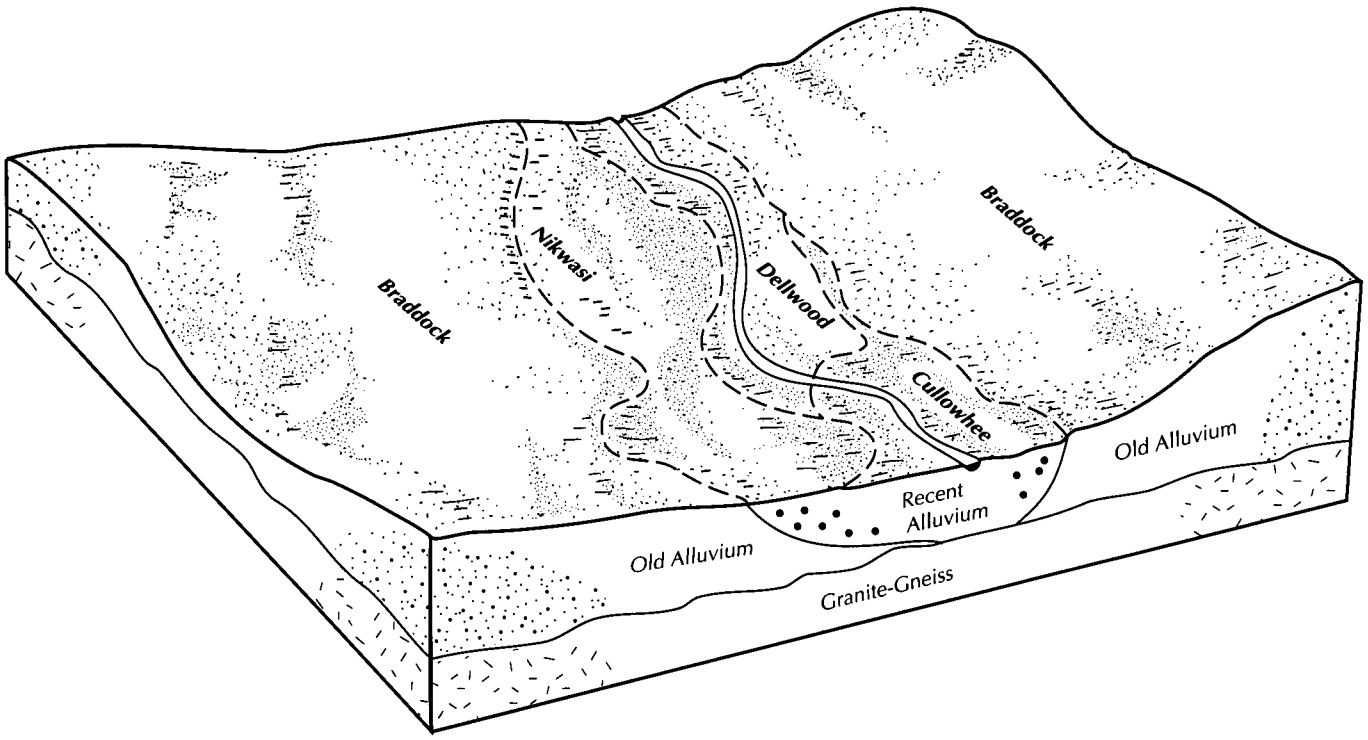


Figure 7.—Relationship of soils and landscape position in the Braddock-Nikwasi-Dellwood-Cullowhee general soil map unit.

main soils used as cropland. They are intensively used for Christmas trees, native ornamentals, ginseng, cabbage, broccoli, pasture, or hay. The slope and the hazard of erosion are the main management concerns affecting crops on Tuckasegee and Whiteside soils. Stoniness is the main limitation affecting crops on Cullasaja soils. Small areas of other minor soils are also used for growing crops. Stoniness and flooding are the main limitations affecting crops on Dellwood soils. Wetness and flooding are the main limitations affecting crops on Nikwasi soils. Wetness is also a limitation affecting crops on Sylva soils. Flooding is the main hazard affecting crops on Reddies soils.

The smoother areas of the major soils in the uplands are also intensively used for Christmas trees, native ornamentals, hay, or pasture. The slope and the severe hazard of erosion are the main management concerns affecting crops and pasture in these areas.

Large areas of this map unit are federally owned and are used for wilderness preservation and camping, hiking, fishing, hunting, and sightseeing. Privately owned areas are being increasingly used for vacation homes and outdoor recreational purposes. The slope, the unstable micaceous parent material, and the severe hazard of erosion are the major management concerns.

Soils That Have a Loamy Surface Layer and a Clayey, Loamy, or Sandy Subsoil and Formed in Old and Recent Alluvium or Colluvium Along the Major Streams

11. Braddock-Nikwasi-Dellwood-Cullowhee

Nearly level to moderately steep, shallow to very deep to strata of sand, gravel, and cobbles, well drained to very poorly drained soils; on high stream terraces, colluvial fans, and flood plains

The landscape of this map unit consists of rolling high stream terraces, colluvial fans, and narrow flood plains along the Tuckasegee River and its major tributaries (fig. 7). Most of these streams are swift and picturesque. Most major roads are parallel to these streams, and most of the year-round population, businesses, and farming operations are in this map unit. Most of this map unit is cleared of trees and is intensively used. Slope ranges from 0 to 30 percent.

This map unit makes up about 3 percent of the county. It is about 32 percent Braddock soils, 11 percent Nikwasi soils, 10 percent Dellwood soils, 10 percent Cullowhee soils, and 37 percent minor soils. The minor soils are Biltmore, Reddies, and Rosman

soils on flood plains; Statler, Dillard, and Hemphill soils on low stream terraces; and Dillsboro soils on high stream terraces.

Braddock soils are well drained, very deep, and gently sloping to moderately steep. These soils are on ridgetops and side slopes on high stream terraces and colluvial fans. Typically, the surface layer is reddish brown clay loam. The upper part of the subsoil is red clay. The lower part is mottled red, yellowish red, and strong brown clay loam.

Nikwasi soils are nearly level, poorly drained and very poorly drained, and moderately deep to strata of sand, gravel, and cobbles. They are on flood plains. Typically, the surface layer is very dark grayish brown and very dark gray fine sandy loam. The underlying material is dark grayish brown and multicolored extremely gravelly coarse sand.

Dellwood soils are nearly level, moderately well drained, and shallow to strata of sand, gravel, and cobbles. They are on flood plains. Typically, the surface layer is dark brown gravelly fine sandy loam and cobbly fine sandy loam. The underlying material is strong brown very cobbly loamy sand.

Cullowhee soils are nearly level, somewhat poorly drained, and moderately deep to strata of sand, gravel, and cobbles. They are on flood plains. Typically, the surface layer is very dark grayish brown, dark brown, and dark yellowish brown fine sandy loam and loamy sand. The underlying material is dark yellowish brown loamy sand, black loamy fine sand, and multicolored extremely gravelly sand.

This map unit is used for variety of crops, such as Fraser fir seedlings, landscaping plants, burley tobacco, strawberries, tomatoes, corn, Christmas trees, hay, and pasture. The flooding and the wetness are the main management concerns affecting crops on the Nikwasi, Dellwood, and Cullowhee soils. The slope and the hazard of erosion are the main management concerns affecting crops on the Braddock soils.

These soils are intensively used for residential and commercial building sites. The flooding and the wetness are the main management concerns on the Nikwasi, Dellwood, and Cullowhee soils. The slope and the hazard of erosion are the main management concerns on the Braddock soils.

The minor soils in this map unit are also intensively used as cropland and as commercial or residential building sites. The flooding and the wetness are the main management concerns affecting these uses on Biltmore, Reddies, Rosman, Dillard, and Hemphill soils. The flooding is the main hazard affecting these uses on Statler soils. The slope and the hazard of erosion are the main management concerns affecting these uses on Dillsboro soils.

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 soil 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 that affects use or management. For example, Cashiers gravelly fine sandy loam, 50 to 95 percent slopes, is a phase of the Cashiers 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 land 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. Cullasaja-Tuckasegee complex, 8 to 15 percent slopes, stony, 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 are identified by a special symbol on the soil maps.

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

BaA—Biltmore sand, 0 to 3 percent slopes, frequently flooded. This map unit consists mainly of nearly level, very deep, well drained or moderately well drained Biltmore and similar soils on flood plains. Individual areas are on the natural levees along the inside of the curve at the bends of major streams. They range from 2 to 20 acres in size.

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

Surface layer:
0 to 10 inches, dark brown sand

Underlying material:
10 to 27 inches, dark yellowish brown sand
27 to 36 inches, yellowish brown loamy sand
36 to 60 inches, dark yellowish brown sand

Permeability is rapid. Surface runoff is slow. The soil is frequently flooded for brief periods. The seasonal high water table is 3.5 to 6.0 feet below the surface. The depth to hard bedrock is more than 60 inches.

Included in mapping are small areas of Reddies and

Rosman soils. These soils have a loamy surface layer and subsoil. Also, Reddies soils are moderately deep to strata of gravel, cobbles, and sand. They are in areas scoured by floodwater along large stream channels or in areas where the smaller streams cross the unit. Rosman soils are behind Biltmore soils on the inside of the curve of the bends of large streams. Included soils make up about 15 percent of this map unit.

Also included in mapping are some soils that are similar to the Biltmore soil but have a darker surface layer.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for specialty crops, row crops, woodland, or recreational development.

This map unit is moderately suited to pasture and hay. The flooding is the main hazard. Also, the Biltmore soil is droughty because the surface layer and subsoil are sandy. Properly locating watering facilities and stream crossings can help to minimize damage to streambanks and improve water quality downstream.

This map unit is moderately suited to specialty crops. The flooding and droughtiness are the main management concerns. This soil is too sandy for specialty crops that are to be balled and burlapped during harvesting. This soil is preferred for bare-rooted seedling production, however, because seedlings are easily pulled out of the soil without damage to the roots because of the sandy texture. This soil is desirable for specialty crops because it has good access, is near a source of irrigation water, is nearly level, and has good productivity if properly managed. Fraser fir seedlings are grown in most areas (fig. 8). A few areas are used for growing eastern hemlock, rhododendron, and dog hobble. Irrigation is needed to supply additional water, to cool the crop on hot days, and to saturate the soil before harvest. Land shaping helps to smooth the surface and improve the efficiency of irrigation. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is only moderately suited to row crops because of the flooding. Droughtiness and poor air drainage are additional problems. Frost damage to sensitive crops can be significant because of poor air drainage. This soil is commonly used for row crops, however, because it is productive if properly managed. The most common crops are sweet corn, tomatoes, burley tobacco, and strawberries. Nutrients are easily leached from this soil. Split applications of fertilizer are needed for more efficient use by the crop and to control the hazard of ground-water contamination. Irrigation is needed to protect high-value crops. Land shaping helps to smooth the surface and improves the efficiency of irrigation. Vegetative filter strips can improve water quality and provide wildlife habitat. Soil-applied herbicides may be ineffective at normal rates because of the high content of organic matter in the surface layer.

This map unit is well suited to commercial timber. It is seldom used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from crops, pasture, and hayland. The most common trees are yellow-poplar, black cherry, black walnut, American sycamore, pitch pine, shortleaf pine, white oak, eastern white pine, white ash, and Virginia pine.

This map unit is poorly suited to most recreational uses because of the flooding. Because this soil is nearly level and is near streams, however, many areas are used for campsites, parks, picnic areas, ball fields, and tennis courts.

This map unit is poorly suited to building site development because of the flooding. It is rarely used for this purpose.

This map unit is poorly suited to access roads. The flooding is the main hazard. Elevating the roads during construction minimizes the damage caused by flooding.

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

BkB2—Braddock clay loam, 2 to 8 percent slopes, eroded. This map unit consists mainly of gently sloping, very deep, well drained Braddock and similar soils on high stream terraces. Individual areas are irregular in shape and range from 3 to 20 acres in size.

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

Surface layer:
0 to 8 inches, reddish brown clay loam

Subsoil:
8 to 52 inches, red clay
52 to 60 inches, mottled red, yellowish red, and strong brown clay loam

Further erosion is a severe hazard if the surface is bare and unprotected. In these areas, surface runoff is medium. Permeability is moderate. Because of the high content of clay in the surface layer, maintaining good tilth is difficult. A crust may form on the surface layer after rainfall, and clods form if the soil is worked during wet periods. The crust and clods interfere with seed germination.

The seasonal high water table is more than 6 feet below the surface. The depth to bedrock is more than 60 inches. The shrink-swell potential is moderate.

Included in mapping are small areas of Saunook and

Figure 8.—Fraser fir seedlings on Biltmore sand, 0 to 3 percent slopes, frequently flooded.

Dillsboro soils. These soils are not eroded and have a dark surface layer. Saunook soils have a loamy subsoil and are in drainageways. Dillsboro soils are in slight depressions on high stream terraces. Included soils make up about 15 percent of this map unit.

Also included in mapping are small areas of Braddock soils that have a gravelly surface layer.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for row crops, specialty crops, building site development, recreational development, or woodland.

This soil is well suited to pasture and hay, especially alfalfa. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Grazing during wet periods causes severe compaction, increases the runoff rate, and reduces the rate of water infiltration. Keeping the pasture in good condition helps to control erosion and conserves water.

This map unit is moderately suited to crops. The slope, poor tilth, and the severe hazard of erosion are the main management concerns. The most common crops are silage corn, small grain, sweet corn, and strawberries. Irrigation is needed for frost-sensitive crops, such as strawberries. Conservation tillage and crop residue management help to control runoff and

erosion. Grassed field borders, grassed waterways, diversions, contour farming, and crop rotations that include close-growing crops also help to conserve soil and water. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is well suited to specialty crops, such as apples and eastern white pine grown for use as Christmas trees. The slope and the hazard of erosion are management concerns. Establishing and maintaining sod on access roads and in other appropriate areas help to conserve water, minimize erosion, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is moderately suited to building site development. A high content of clay, the moderate shrink-swell potential, and the severe hazard of erosion during construction are management concerns. Permeability is moderate because of a high content of clay in the subsoil. Because of the moderate permeability, enlargement of the absorption area in the septic tank absorption fields may be necessary. The moderate shrink-swell potential can affect foundations in some areas. In many areas around building sites, severe compaction of the soil increases the costs of landscaping.

This map unit is moderately suited to commercial timber. It is seldom used for commercial timber, however, because of the small size of most of the mapped areas and the potentially higher profits from crops, building sites, pasture, or hayland. It also produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Dillsboro soils. The eroded surface layer is the main management concern. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, yellow-poplar, northern red oak, pitch pine, Virginia pine, and hickory.

This map unit is well suited to outdoor recreational uses, such as campsites and picnic areas. Because this map unit is not near streams and does not have adequate shade, however, it is seldom used for this purpose. The slope and the hazard of erosion are management concerns.

This map unit is poorly suited to access roads because of the high content of clay in the subsoil. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the clay subsoil. Frequent smoothing of the road surface is needed because ruts form as a result of the high content of clay.

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 map unit consists mainly of strongly sloping, very deep, well drained Braddock and similar soils on high stream terraces. Individual areas are irregular in shape and range from 3 to 30 acres in size.

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

Surface layer:
0 to 8 inches, reddish brown clay loam

Subsoil:
8 to 52 inches, red clay
52 to 60 inches, mottled red, yellowish red, and strong brown clay loam

Further erosion is a severe hazard if the surface is bare and unprotected. In these areas, surface runoff is rapid. Permeability is moderate. Because of the high content of clay in the surface layer, maintaining good tilth is difficult. A crust may form on the surface layer after rainfall, and clods form if the soil is worked during wet periods. The crust and the clods interfere with seed germination.

The seasonal high water table is more than 6 feet below the surface. The depth to bedrock is more than 60 inches. The shrink-swell potential is moderate.

Included in mapping are small areas of Saunook and Dillsboro soils. These soils are not eroded and have a dark surface layer. Saunook soils have a loamy subsoil and are in drainageways. Dillsboro soils are in slight depressions on high stream terraces. Included soils make up about 15 percent of this map unit.

Also included in mapping are small areas of soils that are similar to the Braddock soil but have more gravel in the surface layer.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for row crops, specialty crops, building site development, recreational development, or woodland.

This soil is well suited to pasture and hay, especially alfalfa. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Grazing during wet periods causes compaction, increases the runoff rate, and reduces the rate of water infiltration. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is moderately suited to crops. The slope, the severe hazard of erosion, and poor tilth are the main management concerns. The most common crops are silage corn, small grain, sweet corn, and strawberries. Irrigation is needed for some high-value

crops, such as strawberries. Conservation tillage and crop residue management help to control runoff and erosion. Grassed field borders, grassed waterways, diversions, contour farming, and crop rotations that include close-growing crops also help to conserve soil and water. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is moderately suited to specialty crops, such as eastern white pine grown for use as Christmas trees. The slope and the severe hazard of erosion are management concerns. Establishing and maintaining sod on access roads and in other appropriate areas help to conserve water, minimize erosion, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is moderately suited to building site development. The slope, a high content of clay, and the severe hazard of erosion during construction are management concerns. Permeability is moderate because of a high content of clay in the subsoil. Because of the moderate permeability, enlargement of the absorption area in the septic tank absorption fields may be necessary. The moderate shrink-swell potential can affect foundations in some areas. In many areas around building sites, severe compaction increases the costs of landscaping.

This map unit is moderately suited to commercial timber. It is seldom used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from crops, building sites, pasture, or hayland. It also produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Dillsboro soils. The eroded surface layer is the main management concern. The most common trees include scarlet oak, chestnut oak, black oak, white oak, eastern white pine, yellow-poplar, northern red oak, pitch pine, Virginia pine, and hickory.

This map unit is moderately suited to outdoor recreational uses, such as campsites, picnic areas, and hiking trails. Because this map unit is not near streams and does not have adequate shade, however, it is seldom used for campsites or picnic areas. The slope and the severe hazard of erosion are also management concerns.

This map unit is poorly suited to access roads. The slope and the high content of clay in the subsoil are management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the clay subsoil. Frequent smoothing of the road surface is needed because ruts form as a result of the high content of clay.

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

BkD2—Braddock clay loam, 15 to 30 percent slopes, eroded. This map unit consists mainly of moderately steep, very deep, well drained Braddock and similar soils on high stream terraces or colluvial fans. Individual areas are irregular in shape and range from 5 to 30 acres in size.

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

Surface layer:
0 to 8 inches, reddish brown clay loam

Subsoil:
8 to 52 inches, red clay
52 to 60 inches, mottled red, yellowish red, and strong brown clay loam

Further erosion is a severe hazard if the surface is bare and unprotected. In these areas, surface runoff is rapid. Permeability is moderate. Because of the high clay content in the surface layer, maintaining good tilth is difficult. A crust may form on the surface layer after rainfall, and clods form if the soil is worked during wet periods. The crust and the clods interfere with seed germination. Operating farm equipment on this soil is difficult.

The seasonal high water table is more than 6 feet below the surface. The depth to bedrock is more than 60 inches. The shrink-swell potential is moderate.

Included in mapping are small areas of Cowee, Evard, and Saunook soils. These soils are not eroded and have a loamy subsoil. Saunook soils have a dark surface layer and are in drainageways. Cowee and Evard soils formed in saprolite on the adjacent uplands. Also, Cowee soils are moderately deep to weathered bedrock. Included soils make up about 15 percent of this map unit.

Also included in mapping are small areas of soils that are similar to the Braddock soil but have more gravel in the surface layer.

Much of the acreage in this map unit is used as pasture and hayland. Some areas are used for specialty crops, building site development, recreational development, or woodland.

This soil is moderately suited to pasture and hay, especially alfalfa. The slope, soil compaction, and the severe hazard of erosion are the main management concerns. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Grazing during wet periods causes

compaction, increases the runoff rate, and reduces the rate of water infiltration.

This map unit is poorly suited to row crops. The slope, the severe hazard of erosion, and poor tilth are the main management concerns.

This map unit is poorly suited to specialty crops, such as eastern white pine grown for use as Christmas trees. The slope and the severe hazard of erosion are management concerns. Establishing and maintaining sod on access roads and in other appropriate areas help to conserve water, minimize erosion, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development. In many areas, however, it is commonly used for this purpose. The slope, a high content of clay, the moderate shrink-swell potential, and the severe hazard of erosion during construction are management concerns. Permeability is moderate because of a high content of clay in the subsoil. Because of the moderate permeability, enlargement of the absorption area in the septic tank absorption fields may be necessary. The moderate shrink-swell potential can affect foundations in some areas. In many areas around building sites, severe compaction increases the costs of landscaping.

This map unit is moderately suited to commercial timber. It is seldom used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from pasture, hayland, building sites, or specialty crops. It also produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Dillsboro soils. The slope and the eroded surface layer are the main management concerns. The most common trees include scarlet oak, chestnut oak, black oak, white oak, eastern white pine, yellow-poplar, northern red oak, pitch pine, Virginia pine, and hickory.

This map unit is poorly suited to outdoor recreational uses, such as campsites, picnic areas, and hiking trails. The slope and the severe hazard of erosion are management concerns. The hiking trails are very slick and soft during wet periods.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion during construction, and the high content of clay in the subsoil are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the clay subsoil. Frequent smoothing of the road surface is needed because ruts form as a result of the high content of clay.

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 consists mainly of very deep, gently sloping and strongly sloping, well drained Braddock and similar soils and areas of Urban land. The unit is on high stream terraces. Most of the unit is near the Tuckasegee River, especially near the towns of Whittier, Sylva, and Dillsboro and in the Cullowhee community. The unit is about 50 percent Braddock and similar soils, 35 percent Urban land, and 15 percent included soils. The Braddock soil and Urban land occur as areas too intricately mixed to be mapped separately. Most areas are irregular in shape and range from about 5 to 50 acres in size.

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

Surface layer:

0 to 8 inches, reddish brown clay loam
8 to 52 inches, red clay

Subsoil:

52 to 60 inches, mottled red, yellowish red, and strong brown clay loam

Urban land consists of areas where the original soils have been cut, filled, graded, or paved. Soil properties have been so altered that a soil series is not recognized. These areas are used for buildings, streets, parking lots, or other uses where buildings are closely spaced or the soils are covered with pavement. The extent of site modification varies greatly.

Included in mapping are small areas of Dillsboro and Saunook soils. These soils are not eroded and have a dark surface layer. Saunook soils have a loamy subsoil. They are in drainageways. Dillsboro soils are in slight depressions. Included soils make up about 15 percent of this unit.

The rate of surface runoff in areas of this map unit is higher than that on other Braddock soils because most areas are covered by buildings, streets, parking lots, and other impermeable materials. During periods of heavy rainfall, the runoff is difficult to control and is concentrated in concave areas. The hazard of erosion can be severe during and immediately after construction if the surface is bare and unprotected. Permeability is moderate because of a high content of clay in the subsoil. Because of the moderate permeability, enlargement of the absorption area in septic tank absorption fields may be necessary.

Landscaping problems are common on the Braddock soil. This soil generally was eroded before urbanization, and the surface layer has a high content of clay and poor physical properties. In many areas compaction of the soil further adds to the problems of landscaping. Crusting and clodding commonly interfere with seed

germination and increase the costs of landscaping.

The capability subclass is IVe in areas of the Braddock soil and VIIIs in areas of Urban land. This unit has not been assigned a woodland ordination symbol.

BuD—Burton-Craggey-Rock outcrop complex, windswept, 8 to 30 percent slopes, stony. This map unit occurs mainly as areas of a moderately deep, well drained Burton soil; a shallow, somewhat excessively drained Craggey soil; and areas of Rock outcrop. The unit is on sloping to moderately steep ridgetops in the high mountains. Individual areas are long and narrow and range from 5 to 40 acres in size. Typically, they are 35 to 45 percent Burton soil, 25 to 35 percent Craggey soil, and 10 to 20 percent Rock outcrop. The two soils and the Rock outcrop occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 12 inches, very dark gray and very dark grayish brown cobbly sandy loam

Subsoil:
12 to 22 inches, brownish yellow cobbly sandy loam

Weathered bedrock:
22 to 36 inches, weathered, high-grade metamorphic bedrock

Hard bedrock:
36 inches, hard, high-grade metamorphic bedrock

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

Surface layer:
0 to 16 inches, black, very dark gray, and dark brown cobbly sandy loam

Hard bedrock:
16 inches, hard, high-grade metamorphic bedrock

Permeability is moderately rapid in the Burton and Craggey soils. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The hazard of erosion is severe when the soils are unvegetated. The climate is severe. Winter is cold, icy, and very windy, and the rest of the year is rainy, foggy, and cool. The Burton and Craggey soils are frozen for long periods in the winter.

Included in mapping are small areas of Wayah soils. These soils are very deep to hard bedrock. Also included are small areas of seeps around the areas of Rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Burton and Craggey soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or on shoulder slopes on the ridges. Where the surface layer is more than 20 inches thick, the soils are in saddles.

Most of the acreage in this map unit is wooded and is on U.S. Forest Service lands, on National Park Service lands along the Blue Ridge Parkway, or on the Cherokee Indian Reservation. A few areas are in grassy balds or heath balds. Most areas of federally owned land are used for recreational purposes. Some of the privately owned lands are used for building site development.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The depth to hard bedrock, limited access, and a severe hazard of erosion also are management concerns. Northern red oak is the most common tree. Other trees include sweet birch and yellow birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is poorly suited to recreational facilities that require onsite sewage disposal. The depth to bedrock, limited access, and the severe hazard of erosion are the main management concerns. Many areas have scenic vistas, especially along the Blue Ridge Parkway, and commonly are used for overlooks and hiking trails. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is poorly suited to building site development. Limited access, the depth to bedrock, the severe hazard of erosion, and the cold, windy winters are management concerns. The building sites are used mainly for summer homes. The depth to which the soil freezes and the depth to bedrock limit the use of this unit for septic tank absorption fields. The hazard of ground-water contamination or stream pollution is severe. Access is very difficult in winter. Revegetating disturbed areas is difficult because of the slope, the scarcity of soil material, and freezing and thawing in spring and fall. Excavation for dwellings with basements is hampered by the depth to bedrock.

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 the costs of maintaining the roads. Drilling and blasting of the hard bedrock are commonly needed. Because unsurfaced roads are slick when wet, they should be surfaced for year-round use. Revegetating areas that have been cut and filled is difficult because of the slope, the scarcity of soil material, and freezing and thawing in spring and fall. Building the roadbed on the natural soil, where possible, minimizes slumping.

This map unit is unsuited to crops, pasture, or hayland. The slope, the depth to bedrock, difficult access across the steep terrain, the cold climate, stoniness, and the severe hazard of erosion are management concerns.

The capability subclass is VIs 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 2R in areas of the Burton soil and 2D in areas of the Craggey soil. The Rock outcrop has not been assigned a woodland ordination symbol.

BuF—Burton-Craggey-Rock outcrop complex, windswept, 30 to 95 percent slopes, stony. This map unit occurs mainly as areas of a moderately deep, well drained Burton soil; a shallow, somewhat excessively drained Craggey soil; and areas of Rock outcrop. The unit is on steep and very steep head slopes and side slopes in the high mountains. In most areas crossing the landscape is dangerous. Individual areas are irregular in shape and range from 10 to 80 acres in size. Typically, they are 35 to 45 percent Burton soil, 25 to 35 percent Craggey soil, and 10 to 20 percent Rock outcrop. The two soils and the Rock outcrop occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 12 inches, very dark gray and very dark grayish brown cobbly sandy loam

Subsoil:
12 to 22 inches, brownish yellow cobbly sandy loam

Weathered bedrock:
22 to 36 inches, weathered, high-grade metamorphic bedrock

Hard bedrock:
36 inches, hard, high-grade metamorphic bedrock

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

Surface layer:
0 to 16 inches, black, very dark gray, and dark brown cobbly sandy loam

Hard bedrock:
16 inches, hard, high-grade metamorphic bedrock

Permeability is moderately rapid in the Burton and Craggey soils. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The hazard of erosion is severe when the soils are unvegetated. The climate is severe. Winter is cold, icy, and very windy, and the rest of the year is rainy, foggy, and cool. The Burton and Craggey soils are frozen for long periods in the winter. Landslides are common during prolonged periods of heavy rainfall.

Included in mapping are small areas of Balsam, Tanasee, and Wayah soils. These soils are very deep to bedrock. Balsam and Tanasee soils are intermingled with areas of the Burton and Craggey soils in coves and gaps, and Wayah soils are in saddles. Balsam soils have more than 35 percent rock fragments in the subsoil. Also included are small areas of seeps around the areas of Rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Burton and Craggey soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are in saddles or on the lower side slopes.

Most of the acreage of this map unit is wooded and is on U.S. Forest Service lands, on National Park Service lands along the Blue Ridge Parkway, or on the Cherokee Indian Reservation. A few areas are in grassy balds or heath balds. Most areas of federally owned land are used for recreational purposes.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, the depth to hard bedrock, limited access, and a severe hazard of erosion are also management concerns. Northern red oak is the most common tree. Other trees include sweet birch and yellow birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is poorly suited to recreational facilities that require onsite sewage disposal. The slope, the

depth to bedrock, and the severe hazard of erosion are management concerns. Many areas have scenic vistas, especially along the Blue Ridge Parkway, and commonly are used for overlooks and hiking trails. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is unsuited to building site development, crops, and pasture. The slope, the depth to bedrock, the cold climate, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope and the depth to hard bedrock are the main limitations. Freezing and thawing in spring and fall and frequent ice storms in winter increase the costs of maintaining the roads. Drilling and blasting of the hard bedrock are commonly needed. Because unsurfaced roads are slick when wet, they should be surfaced for year-round use. Revegetating large areas that have been cut and filled is difficult because of the slope, the scarcity of soil material, and freezing and thawing in spring and fall. Building the roadbed on the natural soil, where possible, minimizes slumping.

The capability subclass is VIIs in areas of the Burton and Craggey soils and VIIIs in areas of Rock outcrop. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R. The Rock outcrop has not been assigned a woodland ordination symbol.

CaC—Cashiers gravelly fine sandy loam, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, well drained Cashiers and similar soils on north-trending ridgetops or ridgetops shaded by the higher mountains, predominantly in the intermediate mountains. Individual areas are long and narrow and range from 5 to 40 acres in size.

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

Surface layer:

0 to 9 inches, very dark brown gravelly fine sandy loam

Subsoil:

9 to 48 inches, yellowish brown and dark yellowish brown sandy loam

48 to 65 inches, dark yellowish brown gravelly sandy loam

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible.

Included in mapping are small areas of Chandler and Fannin soils. These soils are generally on south- to west-facing ridgetops. They have a surface layer that is thinner or lighter colored than that of the Cashiers soil. Also, Fannin soils have more clay in the subsoil. Included soils make up about 15 percent of this unit.

Also included in mapping are soils that are similar to the Cashiers soil but have a dark surface layer that is more than 10 inches thick or have a redder subsoil.

Much of the acreage in this map unit is wooded. Some areas are used for specialty crops, pasture, hayland, building site development, or recreational development.

This map unit is well suited to commercial timber. The productivity of commercial species is high. The high productivity helps to compensate for management concerns, such as the slope and plant competition. The most common trees are eastern white pine, yellow-poplar, northern red oak, black cherry, sweet birch, yellow buckeye, American beech, white ash, red maple, and eastern hemlock.

Hardwoods should be preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry and northern red oak generally are left standing.

Eastern white pine commonly is planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris, and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the content of organic matter in the surface layer and the very high content of mica.

This map unit is well suited to specialty crops, such as landscaping plants and Christmas trees. The slope and the severe hazard of erosion are management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir is grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to

control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is well suited to pasture and hayland. Cool-season grasses, such as tall fescue and orchardgrass, grow well. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is only moderately suited to building site development because of the slope, the severe hazard of erosion, and the instability of the underlying saprolite. Cold temperatures in winter also reduce the potential for year-round homes. Caving of cutbanks is a hazard in excavated areas because of the high content of mica in the underlying saprolite. Revegetating disturbed areas is difficult because of the slope and the instability of the underlying saprolite.

This map unit is only moderately suited to recreational uses, such as hiking trails and campsites, because of the slope and the severe hazard of erosion. The trails are very slick during wet periods. Because this soil commonly is on ridgetops, campsites that have a convenient source of water are scarce.

This map unit is poorly suited to cropland because of the slope and the severe hazard of erosion.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, the instability of the underlying saprolite, and difficulty in compacting the soil are the main management concerns. Revegetating the areas that have been cut and filled is difficult. Because of the very high content of mica, compacting fill material is difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

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

CaD—Cashiers gravelly fine sandy loam, 15 to 30 percent slopes. This map unit consists mainly of moderately steep, very deep, well drained Cashiers and similar soils on north- to east-facing side slopes and north-trending ridgetops, predominantly in the intermediate mountains. Individual areas are long and narrow and range from 5 to 60 acres in size.

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

Surface layer:

0 to 9 inches, very dark brown gravelly fine sandy loam

Subsoil:

9 to 48 inches, yellowish brown and dark yellowish brown sandy loam

48 to 65 inches, dark yellowish brown gravelly sandy loam

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. Because of the slope, operating farm equipment on this soil is difficult.

Included in mapping are small areas of Chandler and Fannin soils. These soils are generally on south- to west-facing side slopes and ridgetops. They have a surface layer that is thinner or lighter colored than that of the Cashiers soil. Also, Fannin soils have more clay in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cashiers soil but have a dark surface layer that is more than 10 inches thick or have a redder subsoil.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or for specialty crops, building site development, or recreational development.

This map unit is moderately suited to commercial timber. The productivity of commercial species is high. The high productivity helps to compensate for management concerns, such as the slope, plant competition, and a moderate hazard of erosion. The most common trees are eastern white pine, yellow-poplar, northern red oak, black cherry, sweet birch, yellow buckeye, American beech, white ash, red maple, and eastern hemlock.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry and northern red oak generally are left standing.

Eastern white pine commonly is planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide

increases the seedling survival rate, controls plant competition, minimizes the amount of debris, and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope, a high organic matter content, and the very high content of mica.

This map unit is only moderately suited to pasture and hay because of the slope and the severe hazard of erosion. Cool-season grasses, such as tall fescue and orchardgrass, grow well. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is only moderately suited to specialty crops, such as landscaping plants and Christmas trees, because of the slope and the severe hazard of erosion. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir is grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development because of the slope, the severe hazard of erosion, and the instability of the underlying saprolite. Cold temperatures in winter also reduce the potential for year-round homes. Caving of cutbanks is a hazard in excavated areas because of the very high content of mica in the underlying saprolite. Revegetating disturbed areas is difficult because of the slope and the severe hazard of erosion.

The map unit is only moderately suited to outdoor recreational uses, such as hiking trails, because of the slope and the severe hazard of erosion. The trails are very slick during wet periods.

This map unit is poorly suited to crops because of the slope and the severe hazard of erosion.

This map unit is poorly suited to access roads because of the slope, the severe hazard of erosion, the instability of the underlying saprolite, and difficulty in compacting the soil. Revegetating the areas that have been cut and filled is difficult. Because of the very high content of mica, compacting fill material is difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. This soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

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

CaE—Cashiers gravelly fine sandy loam, 30 to 50 percent slopes. This map unit consists mainly of steep, very deep, well drained Cashiers and similar soils on north- to east-facing head slopes, side slopes, and ridgetops in the low and intermediate mountains. Individual areas are irregular in shape and range from 5 to 75 acres in size.

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

Surface layer:

0 to 9 inches, very dark brown gravelly fine sandy loam

Subsoil:

9 to 48 inches, yellowish brown and dark yellowish brown sandy loam

48 to 65 inches, dark yellowish brown gravelly sandy loam

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible.

Included in mapping are small areas of Chandler and Fannin soils. These soils are generally on south- to west-facing side slopes. They have a surface layer that is thinner or lighter colored than that of the Cashiers soil. Also, Fannin soils have more clay in the subsoil. Included soils make up about 15 percent of this unit.

Also included in mapping are soils that are similar to the Cashiers soil but have a dark surface layer that is more than 10 inches thick or have a redder subsoil.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or for specialty crops, building site development, or recreational development.

This map unit is poorly suited to commercial timber. The slope and the severe hazard of erosion are the main management concerns. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for the management concerns. The most common trees are eastern white pine, yellow-poplar, northern red oak, black cherry, sweet birch, yellow

buckeye, American beech, white ash, red maple, and eastern hemlock.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry and northern red oak generally are left standing.

Eastern white pine commonly is planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris, and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope, the content of organic matter in the surface layer, and the very high content of mica.

This map unit is poorly suited to pasture because of the slope and the very severe hazard of erosion. Operating farm equipment is dangerous on this soil. Most farming operations are done by hand. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition helps to control erosion and conserves water.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees, because of the slope and the very severe hazard of erosion. Operating farm equipment is dangerous on this soil. Most farming operations are done by hand. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir is grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is unsuited to hayland or row crops because of the slope and the very severe hazard of erosion.

This map unit is poorly suited to building site development because of the slope, the very severe hazard of erosion, and the instability of the underlying saprolite. Cold temperatures in winter increase the costs of utilities and maintenance and reduce the potential for year-round homes. Because the slopes are too steep to operate equipment safely, septic tank absorption fields generally should be dug by hand. Caving of cutbanks is a hazard in excavated areas because of the very high content of mica in the underlying saprolite. Revegetating disturbed areas is difficult because of the slope and the very severe hazard of erosion. Establishing vegetation is needed to help control erosion. Hydroseeding is an excellent way to establish vegetation in steep, bare areas.

This soil is poorly suited to recreational uses, such as hiking trails. The slope and the very severe hazard of erosion are management concerns. The trails are very slick during wet periods.

This soil is poorly suited to access roads. The slope, the very severe hazard of erosion, the instability of the underlying saprolite, and difficulty in compacting the soil are the main management concerns. Revegetating large areas that have been cut and filled is very difficult. Hydroseeding is a good way to revegetate steep, bare areas. Because of the very high content of mica, compacting fill material is difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. This soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

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

CaF—Cashiers gravelly fine sandy loam, 50 to 95 percent slopes. This map unit consists mainly of very steep, very deep, well drained Cashiers and similar soils on north- to east-facing head slopes and side slopes, predominantly in the intermediate mountains. Individual areas are irregular in shape and range from 10 to 80 acres in size.

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

Surface layer:

0 to 9 inches, very dark brown gravelly fine sandy loam

Subsoil:

9 to 48 inches, yellowish brown and dark yellowish brown sandy loam

48 to 65 inches, dark yellowish brown gravelly sandy loam

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible.

Included in mapping are small areas of Chandler and Fannin soils. These soils are generally on south- to west-facing side slopes. They have a surface layer that is thinner and lighter colored than that of the Cashiers soil. Also, Fannin soils have more clay in the subsoil. Included soils make up about 15 percent of this unit.

Also included in mapping are soils that are similar to the Cashiers soil but have a dark surface layer that is more than 10 inches thick or have a redder subsoil.

Nearly all of the acreage in this map unit is used for commercial timber. A few areas are used for outdoor recreational purposes, such as hiking trails.

This map unit is poorly suited to commercial timber. The slope and the severe hazard of erosion are the main management concerns. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for the management concerns. The most common trees are eastern white pine, yellow-poplar, northern red oak, black cherry, sweet birch, yellow buckeye, American beech, white ash, red maple, and eastern hemlock.

Hardwoods commonly are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry and northern red oak generally are left standing.

Eastern white pine commonly is planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris, and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the kind of equipment that can be used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this soil. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to recreational uses because of the slope and the severe hazard of erosion. A few areas are used for hiking trails. The trails are very slick during wet periods.

This map unit is poorly suited to pasture, building site development, and crops. The slope, the severe hazard of erosion, and the cold winter weather are management concerns.

This map unit is poorly suited to access roads because of the slope, the severe hazard of erosion, the instability of the underlying saprolite, and difficulty in compacting the soil. Revegetating large areas that have been cut and filled is very difficult. Because of the very high content of mica, compacting fill material is very difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

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

CdC—Chandler gravelly fine sandy loam, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, somewhat excessively drained Chandler and similar soils on ridgetops in the low and intermediate mountains. Individual areas are long and narrow and range from 5 to 40 acres in size.

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

Surface layer:
0 to 7 inches, very dark grayish brown and dark yellowish brown gravelly fine sandy loam

Subsoil:
7 to 25 inches, yellowish brown fine sandy loam

Underlying material:
25 to 99 inches, multicolored fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall compensates for the droughtiness of the soil and increases productivity.

Included in mapping are small areas of Cashiers and

Fannin soils. Cashiers soils are on north- to east-facing ridgetops and have a dark surface layer that is thicker than that of the Chandler soil. Fannin soils are redder than the Chandler soil. They have more clay in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chandler soil but have a redder subsoil or more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or hayland or for specialty crops, building site development, or recreational development.

This map unit is well suited to commercial timber. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are management concerns. This soil produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cashiers soils. The most common trees are scarlet oak, chestnut oak, northern red oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, Virginia pine, hickory, shortleaf pine, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, eastern white pine, Virginia pine, and black locust. Genetically improved white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are very slick because of the very high content of mica.

This map unit is well suited to pasture and hay. The slope, the severe hazard of erosion, and difficult access across the steep terrain are management concerns. Cool-season grasses grow well because they are dormant in the droughty summer months. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas.

This map unit is only moderately suited to specialty crops, such as landscaping plants and Christmas trees, because of the slope, the severe hazard of erosion, and difficult access across the steep terrain. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. In the areas of high rainfall, Fraser fir is grown for use as Christmas trees. Eastern white pine is grown in other areas. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is moderately suited to building site development. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are management concerns. Caving of cutbanks is a hazard in excavated areas because of the very high content of mica in the saprolite. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness. Hydroseeding is a good way to seed steep, bare areas.

This map unit is moderately suited to some recreational uses, such as hiking trails and campsites. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods. Freezing and thawing increase the need for trails to be properly maintained. Because this map unit is on ridgetops, campsites that have a convenient source of water are scarce.

This map unit is poorly suited to row crops because of the slope, the severe hazard of erosion, and droughtiness.

This map unit is poorly suited to access roads because of the slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep areas that have been cut and filled. Because of the very high content of mica, compacting fill material is difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are very slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is IVe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 4A.

CdD—Chandler gravelly fine sandy loam, 15 to 30 percent slopes. This map unit consists mainly of moderately steep, very deep, somewhat excessively drained Chandler and similar soils on south- to west-facing side slopes and narrow ridgetops in the low and intermediate mountains. Individual areas are long and narrow and range from 5 to 40 acres in size.

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

Surface layer:
0 to 7 inches, very dark grayish brown and dark yellowish brown gravelly fine sandy loam

Subsoil:
7 to 25 inches, yellowish brown fine sandy loam

Underlying material:
25 to 99 inches, multicolored fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall compensates for the droughtiness of the soil and increases productivity.

Included in mapping are small areas of Cashiers and Fannin soils. Cashiers soils are on north- to east-facing side slopes or ridgetops and have a dark surface layer that is thicker than that of the Chandler soil. Fannin soils are redder than the Chandler soil. They have more clay in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chandler soil but have a redder subsoil or more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or hayland or for specialty crops, building site development, or recreational development.

This map unit is moderately suited to commercial timber. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are management concerns. This soil produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cashiers soils. The most common trees are scarlet oak, chestnut oak, northern red oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, Virginia pine, hickory, shortleaf pine, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, eastern white pine, Virginia pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are very slick because of the very high content of mica.

This map unit is moderately suited to pasture and hay. The slope, difficult access across the steep terrain, and the severe hazard of erosion are management concerns. Operating farm equipment is difficult because of the slope. Cool-season grasses grow well because they are dormant during the droughty summer months. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas.

This map unit is only moderately suited to specialty crops, such as landscaping plants and Christmas trees, because of the slope, the severe hazard of erosion, and difficult access across the steep terrain. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. In the areas of high rainfall, Fraser fir is grown for use as Christmas trees. Eastern white pine is grown in other areas. Operating farm equipment is difficult because of the slope. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are management concerns. Caving of cutbanks is a hazard in excavated areas because of the very high content of mica in the saprolite. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness.

This map unit is moderately suited to some recreational uses, such as hiking trails. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods.

The slope and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to row crops because of the slope, droughtiness, and the severe hazard of erosion.

This map unit is poorly suited to access roads because of the slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep areas that have been cut and filled. Because of the very high content of mica, compacting fill material is very difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are very slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

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

CdE—Chandler gravelly fine sandy loam, 30 to 50 percent slopes. The map unit consists mainly of steep, very deep, somewhat excessively drained Chandler and similar soils on south- to west-facing side slopes and ridgetops in the low and intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 75 acres in size.

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

Surface layer:
0 to 7 inches, very dark grayish brown and dark yellowish brown gravelly fine sandy loam

Subsoil:
7 to 25 inches, yellowish brown fine sandy loam

Underlying material:
25 to 99 inches, multicolored fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall compensates for the droughtiness of the soil and increases productivity. Operating farm equipment is dangerous on this soil. All farming operations are done by hand.

Included in mapping are small areas of Cashiers and Fannin soils. Cashiers soils are on north- to east-facing side slopes or ridgetops and have a dark surface layer that is thicker than that of the Chandler soil. Fannin soils are redder than the Chandler soil. They have more clay in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chandler soil but have a redder subsoil or more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or for specialty crops, building site development, or recreational development.

This map unit is poorly suited to commercial timber. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are the main management concerns. This soil produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cashiers soils. The most common trees are scarlet oak, chestnut oak, northern red oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, Virginia pine, hickory, shortleaf pine, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, eastern white pine, Virginia pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are very slick because of the slope and the very high content of mica.

This map unit is poorly suited to pasture and hay. The slope and the severe hazard of erosion are the main management concerns. Cool-season grasses grow well because they are dormant in the droughty summer

months. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition conserves soil and water.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees, because of the slope and the severe hazard of erosion. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. In the areas of high rainfall, Fraser fir is grown for use as Christmas trees. Eastern white pine is grown in other areas. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are management concerns. Septic tank absorption fields commonly are dug by hand because of the slope. Caving of cutbanks is a hazard in excavated areas because of the very high content of mica in the saprolite. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness. Hydroseeding is a good way to revegetate steep areas that have been cut and filled.

This map unit is poorly suited to most recreational uses. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods. The slope and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to row crops. The slope and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads because of the slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil. Revegetating and maintaining large areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep areas that have been cut and filled. Because of the very high content of mica, compacting fill material is very difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

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

CdF—Chandler gravelly fine sandy loam, 50 to 95 percent slopes. This map unit consists mainly of very steep, very deep, somewhat excessively drained Chandler and similar soils on south- to west-facing side slopes in the low and intermediate mountains. Individual areas are irregular in shape and range from 10 to 80 acres in size.

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

Surface layer:
0 to 7 inches, very dark grayish brown and dark yellowish brown gravelly fine sandy loam

Subsoil:
7 to 25 inches, yellowish brown fine sandy loam

Underlying material:
25 to 99 inches, multicolored fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall compensates for the droughtiness of the soil and increases productivity.

Included in mapping are small areas of Cashiers and Fannin soils. Cashiers soils have a dark surface layer that is thicker than that of the Chandler soil. They are on north- to east-facing side slopes. Fannin soils are redder in color than the Chandler soil. They have more clay in the subsoil. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chandler soil but have a redder subsoil or more rocks on the surface.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for outdoor recreational development.

This map unit is poorly suited to commercial timber. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are management concerns. This soil produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cashiers soils. The most common trees are scarlet oak, chestnut oak, northern red oak, black oak, white oak, yellow-poplar, eastern white pine, pitch

pine, Virginia pine, hickory, shortleaf pine, and black locust.

Hardwoods should be preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, eastern white pine, Virginia pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to nearly all recreational uses. A few areas are used for hiking trails. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to pasture, hayland, building site development, and cropland. The slope and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the very severe hazard of erosion, the instability of the underlying saprolite, and difficulty in compacting the soil are management concerns. Revegetating and maintaining large areas that have been cut and filled are very difficult. Hydroseeding is a good way to revegetate steep areas that have been cut and filled. Because of the very high content of mica, compacting fill material is very difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

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

CeC—Chandler gravelly fine sandy loam, 8 to 15 percent slopes, windswept. This map unit consists mainly of strongly sloping, very deep, somewhat excessively drained Chandler and similar soils on south- to west-facing ridgetops in the low and intermediate mountains. Individual areas are long and narrow and range from 5 to 25 acres in size.

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

Surface layer:
0 to 7 inches, very dark grayish brown and dark yellowish brown gravelly fine sandy loam

Subsoil:
7 to 25 inches, yellowish brown fine sandy loam

Underlying material:
25 to 99 inches, multicolored fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall compensates for the droughtiness of the soil and increases productivity.

Included in mapping are small areas of Cashiers and Fannin soils. Cashiers soils are on north- to east-facing ridgetops and have a dark surface layer that is thicker than that of the Chandler soil. Fannin soils are redder than the Chandler soil. They have more clay in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chandler soil but have a redder subsoil or more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or hayland or for specialty crops, recreational development, or building site development.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, the instability of the underlying saprolite, and the severe hazard of erosion also are management concerns. The most common trees are

scarlet oak, chestnut oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, Virginia pine, hickory, and black locust.

This map unit is well suited to pasture and hay. The severe hazard of erosion and difficult access across the steep terrain are management concerns. Cool-season grasses grow well because they are dormant in the droughty summer months. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Livestock shelters are needed during the winter. Keeping the pasture in good condition conserves soil and water.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees, mainly because of the harsh climate. Specialty crops need protection from strong winds in the winter. The slope, the severe hazard of erosion, and difficult access across the steep terrain also are management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development because of the slope, the instability of the underlying saprolite, and the severe hazard of erosion. Caving of cutbanks is a hazard in excavated areas because of the very high content of mica in the saprolite. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness. Hydroseeding is a good way to revegetate steep, bare areas.

This map unit is moderately suited to recreational uses, such as hiking trails and campsites. The slope, the harsh climate, and the severe hazard of erosion are management concerns. The trails are very slick during wet periods. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained. Because this map unit is on ridges, campsites that have a convenient source of water are scarce.

This map unit is poorly suited to row crops because of the slope, the severe hazard of erosion, difficult access across the steep terrain, and droughtiness.

This map unit is poorly suited to access roads because of the slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep, bare areas. Because of the very high content of mica, compacting fill material is very difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are very slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is IVe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 2A.

CeD—Chandler gravelly fine sandy loam, 15 to 30 percent slopes, windswept. This map unit consists mainly of moderately steep, very deep, somewhat excessively drained Chandler and similar soils on south- to west-facing side slopes and ridgetops in the low and intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 30 acres in size.

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

Surface layer:
0 to 7 inches, very dark grayish brown and dark yellowish brown gravelly fine sandy loam

Subsoil:
7 to 25 inches, yellowish brown fine sandy loam

Underlying material:
25 to 99 inches, multicolored fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall compensates for the droughtiness of the soil and increases productivity. Operating farm equipment is difficult on this soil.

Included in mapping are small areas of Cashiers and Fannin soils. Cashiers soils are on north- to east-facing side slopes or ridgetops and have a dark surface layer that is thicker than that of the Chandler soil. Fannin soils are redder than the Chandler soil. They have more clay in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chandler soil but have a redder subsoil or more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or hayland or for specialty crops, building site development, or recreational development.

This soil is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, the instability of the underlying saprolite, and the severe hazard of erosion also are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, Virginia pine, hickory, and black locust.

This map unit is only moderately suited to pasture and hay because of the slope, difficult access across the steep terrain, and the severe hazard of erosion. Cool-season grasses grow well because they are dormant during the droughty summer months. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees. The slope, difficult access across the steep terrain, the severe hazard of erosion, and the harsh climate are management concerns. Specialty crops need protection from strong winds in the winter. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development because of the slope, difficult access across the steep terrain, the instability of the underlying saprolite, and the severe hazard of erosion. Caving of cutbanks is a hazard in excavated areas because of the very high content of mica in the saprolite. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness.

This map unit is moderately suited to recreational uses, such as hiking trails. The slope, the harsh climate, and the severe hazard of erosion are management concerns. The trails are very slick during wet periods. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is poorly suited to row crops because of the slope, difficult access across the steep terrain, and the severe hazard of erosion.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil are management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Because of the very high content of mica, compacting fill material is very difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are very slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

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

CeE—Chandler gravelly fine sandy loam, 30 to 50 percent slopes, windswept. This map unit consists mainly of steep, very deep, somewhat excessively drained Chandler and similar soils on south- to west-facing side slopes and ridgetops in the low and intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 75 acres in size.

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

Surface layer:
0 to 7 inches, very dark grayish brown and dark yellowish brown gravelly fine sandy loam

Subsoil:
7 to 25 inches, yellowish brown fine sandy loam

Underlying material:
25 to 99 inches, multicolored fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall compensates for the droughtiness of the soils and increases productivity. Operating farm equipment is dangerous on this soil.

Included in mapping are small areas of Cashiers and Fannin soils. Cashiers soils are on north- to east-facing side slopes or ridgetops and have a dark surface layer that is thicker than that of the Chandler soil. Fannin soils are redder than the Chandler soil. They have more

clay in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chandler soil but have a redder subsoil or more stones on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or for specialty crops, building site development, or recreational development.

This soil is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, the instability of the underlying saprolite, and the severe hazard of erosion also are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, pitch pine, Virginia pine, hickory, and black locust.

This map unit is poorly suited to pasture and hayland because of the slope and the severe hazard of erosion. Cool-season grasses grow well because they are dormant in the droughty summer months. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition conserves soil and water.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees. The slope, the harsh climate, and the severe hazard of erosion are the main management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir is grown for use as Christmas trees. Landscaping plants and Christmas trees need protection from strong winds in winter. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development because of the slope, the instability of the underlying saprolite, the severe hazard of erosion, and the harsh climate. Septic tank absorption fields commonly are dug by hand because of the slope. Caving of cutbanks is a hazard in excavated areas because of the very high content of mica in the saprolite. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness.

This map unit is poorly suited to recreational uses. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is unsuited to row crops because of the severe hazard of erosion, the slope, and the harsh climate.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil are management concerns. Revegetating and maintaining large areas that have been cut and filled are difficult. Because of the very high content of mica, compacting fill material is very difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

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

CeF—Chandler gravelly fine sandy loam, 50 to 95 percent slopes, windswept. This map unit consists mainly of very steep, very deep, somewhat excessively drained Chandler and similar soils on south- to west-facing side slopes in the low and intermediate mountains. Individual areas are irregular in shape and range from 10 to 80 acres in size.

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

Surface layer:

0 to 7 inches, very dark grayish brown and dark yellowish brown gravelly fine sandy loam

Subsoil:

7 to 25 inches, yellowish brown fine sandy loam

Underlying material:

25 to 99 inches, multicolored fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall compensates for the droughtiness of the soil and increases productivity.

Included in mapping are small areas of Cashiers and Fannin soils. Cashiers soils have a dark surface layer that is thicker than that of the Chandler soil. They are

on north- to east-facing side slopes. Fannin soils are redder in color than the Chandler soil. They have more clay in the subsoil. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chandler soil but have a redder subsoil or more rocks on the surface.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for outdoor recreational purposes.

This soil is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, the instability of the underlying saprolite, and the severe hazard of erosion also are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, Virginia pine, hickory, and black locust.

This map unit is poorly suited to outdoor recreational uses because of the slope, the harsh climate, and the severe hazard of erosion. A few areas are used for hiking trails. The trails are very slick during wet periods. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is unsuited to pasture, hayland, building site development, and crops. The slope, the harsh climate, and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads because of the slope, the severe hazard of erosion, the instability of the underlying saprolite, and difficulty in compacting the soil. Revegetating and maintaining large areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep areas that have been cut and filled. Because of the very high content of mica, compacting fill material is very difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

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

ChE—Cheoah channery loam, 30 to 50 percent slopes. This map unit consists mainly of steep, deep, well drained Cheoah and similar soils on side slopes and ridgetops in the intermediate mountains. They are on north- to east-facing side slopes or on slopes shaded by the higher mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 10 to 80 acres in size.

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

Surface layer:

0 to 15 inches, very dark grayish brown and dark yellowish brown channery loam

Subsoil:

15 to 32 inches, yellowish brown and strong brown channery loam

32 to 39 inches, strong brown channery fine sandy loam

Underlying material:

39 to 56 inches, multicolored channery fine sandy loam saprolite

Weathered bedrock:

56 to 60 inches, multicolored, weathered metasedimentary bedrock

Permeability is moderately rapid. The depth to weathered bedrock is 40 to 60 inches, and the depth to hard bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The soil is frozen for long periods in the winter and warms up later in the spring than other soils at the same elevation.

Included in mapping are small areas of Santeetlah, Soco, Spivey, and Stecoah soils. Soco and Stecoah soils are on south- to west-facing slopes and have a surface layer that is thinner or lighter colored than that of the Cheoah soil. Also, Soco soils are moderately deep to weathered bedrock. Santeetlah and Spivey soils are very deep and are in drainageways. Also, Spivey soils have more than 35 percent rock fragments in the subsoil. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included are soils that are similar to the Cheoah soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are in saddles or on the lower side slopes.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for outdoor recreational purposes, such as hiking trails.

This soil is poorly suited to commercial timber. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for the management concerns. The slope and the severe hazard of erosion are the main management concerns. The most common trees are northern red oak, black cherry, sweet birch, and sugar maple. Yellow-poplar is common on previously cleared sites or at elevations below 4,000 feet. Yellow birch, American beech, and eastern hemlock are common at elevations above 4,000 feet. Scarlet oak, white oak, black oak, and hickory are common in severely high-graded areas.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Eastern white pine generally is planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris and the hazard of wildfires, and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope and the organic matter content in the surface layer.

This map unit is poorly suited to building site development, pasture, hay, and crops because of the slope, the severe hazard of erosion, difficult access across the steep terrain, and the cold winters.

This map unit is poorly suited to outdoor recreational uses. Some areas, however, are used for scenic overlooks and hiking trails. The slope and the severe hazard of erosion are the main management concerns. The trails are very slick during wet periods.

This map unit is poorly suited to access roads because of the slope, the instability of the underlying bedrock, and the severe hazard of erosion. Revegetating large areas that have been cut and filled is difficult because of the slope and slumping. Hydroseeding is a good way to revegetate steep areas that have been cut and filled. Building roadbeds on the natural soil, where possible, minimizes slumping. Outsloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks may increase the acidity of streams and kill aquatic life.

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 map unit consists mainly of very steep, deep, well drained Cheoah and similar soils on side slopes in the intermediate mountains. They are on north- to east-facing side slopes or on slopes shaded by the higher mountains. Individual areas are irregular in shape and range from 10 to 80 acres in size.

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

Surface layer:
0 to 15 inches, very dark grayish brown and dark yellowish brown channery loam

Subsoil:
15 to 32 inches, yellowish brown and strong brown channery loam
32 to 39 inches, strong brown channery fine sandy loam

Underlying material:
39 to 56 inches, multicolored channery fine sandy loam saprolite

Weathered bedrock:
56 to 60 inches, multicolored, weathered metasedimentary bedrock

Permeability is moderately rapid. The depth to weathered bedrock is 40 to 60 inches, and the depth to hard bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The soil is frozen for long periods in the winter and warms up later in the spring than other soils at the same elevation.

Included in mapping are small areas of Santeetlah,

Soco, Spivey, and Stecoah soils. Soco and Stecoah soils are on south- to west-facing slopes and have a surface layer that is thinner or lighter colored than that of the Cheoah soil. Also, Soco soils are moderately deep to weathered bedrock. Santeetlah and Spivey soils are very deep and are in drainageways. Also, Spivey soils have more than 35 percent rock fragments in the subsoil. Also included are small areas of rock outcrop near the ridges. Inclusions make up about 15 percent of this map unit.

Also included are soils that are similar to the Cheoah soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for outdoor recreational purposes, such as hiking trails and scenic overlooks.

This soil is poorly suited to commercial timber. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for the management concerns. The slope, plant competition, and the severe hazard of erosion are the main management concerns. The most common trees are northern red oak, black cherry, sweet birch, and sugar maple. Yellow-poplar is common on previously cleared sites or at elevations below 4,000 feet. Yellow birch, American beech, and eastern hemlock are common at elevations above 4,000 feet. Scarlet oak, white oak, black oak, and hickory are common in severely high-graded areas.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Eastern white pine generally is planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris and the hazard of wildfires, and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is unsuited to building site development, pasture, hay, and crops because of the slope, the severe hazard of erosion, difficult access across the steep terrain, and the cold winters.

This map unit is poorly suited to outdoor recreational uses. A few areas are used for hiking trails and scenic overlooks. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods.

This map unit is poorly suited to access roads because of the slope, the instability of the underlying bedrock, and the severe hazard of erosion. Revegetating large areas that have been cut and filled is difficult because of the slope and slumping. Hydroseeding is a good way to revegetate steep areas that have been cut and filled. Building roadbeds on the natural soil, where possible, minimizes slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

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

CnC—Chestnut-Edneyville complex, windswept, 8 to 15 percent slopes, stony. This map unit occurs mainly as areas of a moderately deep Chestnut soil and a very deep Edneyville soil. Both soils are well drained. The unit is on strongly sloping, south- to west-facing ridgetops in the intermediate mountains. Individual areas are long and narrow and range from 5 to 40 acres in size. Typically, they are 50 to 60 percent Edneyville soil and 20 to 30 percent Chestnut soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:

0 to 3 inches, dark yellowish brown gravelly fine sandy loam

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

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

Surface layer:
0 to 5 inches, dark brown gravelly fine sandy loam

Subsoil:
5 to 28 inches, strong brown fine sandy loam
28 to 37 inches, yellowish brown sandy loam that has strong brown and yellow mottles

Underlying material:
37 to 60 inches, multicolored sandy loam saprolite

Permeability is moderately rapid in both soils. The depth to weathered bedrock is 20 to 40 inches in the Chestnut soil and more than 60 inches in the Edneyville soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Chandler, Cowee, Evard, and Plott soils. Chandler soils have more mica than the Chestnut and Edneyville soils. Cowee and Evard soils are redder than the Chestnut and Edneyville soils and have more clay in the subsoil. They are in the low mountains. Plott soils are on north- to east-facing slopes and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chestnut and Edneyville soils but have a redder subsoil or have fewer rocks on the surface.

Most of the acreage in this map unit is used as woodland. Some areas are used as building sites for summer homes or for recreational development, pasture, or hayland.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope and the severe hazard of erosion also are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, northern red oak, and black locust.

This map unit is only moderately suited to building site development because of the slope, difficult access across the steep terrain, the harsh climate, and the severe hazard of erosion. Excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Chestnut soil. The harsh climate in winter increases the costs of utilities and maintenance. Revegetating and maintaining bare areas are difficult because of the slope and freezing and thawing. Hydroseeding is a good way to revegetate bare areas.

This map unit is moderately suited to outdoor recreational uses, such as campsites, overlooks, and hiking trails. Because this map unit is on ridgetops, campsites that have a convenient source of water are scarce. The slope, stones, and the severe hazard of erosion also are management concerns. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is well suited to pasture and hay. The harsh climate, difficult access across the steep terrain, and the severe hazard of erosion are the main management concerns. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Livestock shelters are needed during the winter. Keeping the pasture and hayland in good condition conserves soil and water.

This map unit is moderately suited to access roads. The slope and freezing and thawing are the main management concerns. Freezing and thawing in spring and fall and frequent ice storms in winter increase the costs of maintaining the roads.

The capability subclass is IVe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2D in areas of the Chestnut soil and 2A in areas of the Edneyville soil.

CnD—Chestnut-Edneyville complex, windswept, 15 to 30 percent slopes, stony. This map unit occurs mainly as areas of a moderately deep Chestnut soil and a very deep Edneyville soil. Both soils are well drained. The unit is on moderately steep, south- to west-facing ridgetops in the intermediate mountains. Areas on ridgetops are long and narrow. They range from 5 to 40 acres in size. Typically, they are 50 to 60 percent Edneyville soil and 20 to 30 percent Chestnut soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

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

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly fine sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

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

Surface layer:
0 to 5 inches, dark brown gravelly fine sandy loam

Subsoil:
5 to 28 inches, strong brown fine sandy loam
28 to 37 inches, yellowish brown sandy loam that has strong brown and yellow mottles

Underlying material:
37 to 60 inches, multicolored sandy loam saprolite

Permeability is moderately rapid in both soils. The depth to weathered bedrock is 20 to 40 inches in the Chestnut soil and more than 60 inches in the Edneyville soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. Operating farm equipment is difficult on this map unit.

Included in mapping are small areas of Chandler, Cowee, Evard, and Plott soils. Chandler soils have more mica than the Chestnut and Edneyville soils. Cowee and Evard soils are redder than the Chestnut and Edneyville soils and have more clay in the subsoil. They are in the low mountains. Plott soils are on north- to east-facing slopes and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chestnut and Edneyville soils but have a redder subsoil or have fewer rocks on the surface.

Most of the acreage in this map unit is used as woodland. Some areas are used as building sites for summer homes or for recreational development, pasture, or hayland.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope and the severe hazard of erosion also are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, northern red oak, and black locust.

This map unit is poorly suited to building site development because of the slope, difficult access across the steep terrain, the harsh climate, and the severe hazard of erosion. Excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Chestnut soil. The harsh climate in winter increases the costs of utilities and maintenance. Revegetating and maintaining bare areas are difficult because of the slope and freezing and thawing. Hydroseeding is a good way to revegetate bare areas.

This map unit is moderately suited to recreational uses, such as campsites, overlooks, and hiking trails. Some areas have scenic vistas and are used as overlooks. Because this map unit is on ridgetops, campsites that have a convenient source of water are scarce. The slope, stones, the severe hazard of erosion, and the harsh climate are the main management concerns. The trails are slick during wet periods. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is moderately suited to pasture and hay. The slope, the harsh climate, difficult access across the steep terrain, and the severe hazard of erosion are the main management concerns. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Livestock shelters are needed during the winter. Keeping the pasture and hayland in good condition conserves soil and water.

This map unit is poorly suited to specialty crops because of the slope, the severe hazard of erosion, difficult access across the steep terrain, and the harsh climate.

This map unit is poorly suited to access roads. The slope and freezing and thawing are the main management concerns. Freezing and thawing in spring and fall and frequent ice storms in winter increase the costs of maintaining the roads.

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

CnE—Chestnut-Edneyville complex, windswept, 30 to 50 percent slopes, stony. This map unit occurs mainly as areas of a moderately deep Chestnut soil and a very deep Edneyville soil. Both soils are well drained. The unit is on steep, south- to west-facing ridgetops and side slopes in the intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 40 acres in size. Typically, they are 50 to 60 percent Edneyville soil and 20 to 30 percent Chestnut soil. The

two soils occur as areas too intricately mixed and too small to be mapped separately.

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

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

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly fine sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

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

Surface layer:
0 to 5 inches, dark brown gravelly fine sandy loam

Subsoil:
5 to 28 inches, strong brown fine sandy loam
28 to 37 inches, yellowish brown sandy loam that has strong brown and yellow mottles

Underlying material:
37 to 60 inches, multicolored sandy loam saprolite

Permeability is moderately rapid in both soils. The depth to weathered bedrock is 20 to 40 inches in the Chestnut soil and more than 60 inches in the Edneyville soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. Operating farm equipment is dangerous on this map unit, and nearly all farming operations are done by hand.

Included in mapping are small areas of Chandler, Cowee, Evard, and Plott soils. Chandler soils have more mica than the Chestnut and Edneyville soils. Cowee and Evard soils are redder than the Chestnut and Edneyville soils and have more clay in the subsoil. They are in the low mountains. Plott soils are on north- to east-facing slopes and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chestnut and Edneyville soils but have a redder subsoil or have fewer rocks on the surface.

Most of the acreage in this map unit is used as woodland. A few areas are used as building sites for summer homes or for recreational development or pasture.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope and the severe hazard of erosion are also management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, northern red oak, and black locust.

This map unit is poorly suited to building site development. The slope, difficult access across the steep terrain, the harsh climate, and the severe hazard of erosion are the main management concerns. Excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Chestnut soil. The harsh climate in winter increases the costs of utilities and maintenance. Revegetating and maintaining bare areas are difficult because of the slope and freezing and thawing. Hydroseeding is a good way to revegetate steep, bare areas.

This map unit is poorly suited to most recreational uses, such as campsites and hiking trails. Some areas have scenic vistas and are used as overlooks. The slope, stones, the severe hazard of erosion, and the harsh climate are the main management concerns. The trails are slick during wet periods. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is poorly suited to pasture and is unsuited to hay. The slope, the harsh climate, difficult access across the steep terrain, and the severe hazard of erosion are the main management concerns. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Livestock shelters are needed during the winter. Keeping the pasture in good condition conserves soil and water.

This map unit is unsuited to specialty crops, such as landscaping plants and Christmas trees. The slope, the severe hazard of erosion, difficult access across the steep terrain, and the harsh climate are the main management concerns.

This map unit is poorly suited to access roads. The slope is the main limitation. Freezing and thawing in spring and fall and frequent ice storms in winter increase the costs of maintaining the roads.

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

CpD—Cleveland-Chestnut-Rock outcrop complex, windswept, 15 to 30 percent slopes. This map unit occurs mainly as areas of a shallow, somewhat excessively drained Cleveland soil and a moderately deep, well drained Chestnut soil and areas of Rock outcrop. The unit is on moderately steep ridgetops in the intermediate mountains. Individual areas are oblong in shape and range from 10 to 60 acres in size. Typically, they are 30 to 40 percent Cleveland soil, 30 to 40 percent Chestnut soil, and 10 to 20 percent Rock outcrop. The two soils and the Rock outcrop occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 5 inches, black sandy loam

Subsoil:
5 to 17 inches, yellowish brown loam

Hard bedrock:
17 inches, hard, high-grade metamorphic bedrock

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

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

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly fine sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderately rapid in the Cleveland and Chestnut soils. The depth to hard bedrock is 10 to 20 inches in the Cleveland soil, and the depth to weathered bedrock is 20 to 40 inches in the Chestnut soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. Establishing and maintaining vegetation are very difficult in bare areas.

Included in mapping are small areas of Chandler and Edneyville soils. These soils are very deep and are in concave areas or on the lower part of the slopes. Also, Chandler soils have more mica than the Cleveland and Chestnut soils. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cleveland and Chestnut soils but have a redder subsoil or have fewer rocks on the surface.

Much of the acreage in this map unit is used as woodland. Some areas are used for building site development, pasture, or recreational development.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion also are management concerns. The most common trees are scarlet oak, chestnut oak, eastern white pine, pitch pine, Virginia pine, hickory, and northern red oak.

This map unit is poorly suited to building site development. The limited depth to bedrock, numerous areas of Rock outcrop, the slope, and the severe hazard of erosion are management concerns. Some areas have many scenic vistas and are commonly used as sites for summer homes. Establishing and maintaining vegetation are difficult and costly in bare areas. Excavation for dwellings with basements is hampered by the limited depth to bedrock. Suitable sites for septic tank absorption fields are scarce because of the limited depth to bedrock. The hazard of ground-water contamination or stream pollution is severe.

This map unit is poorly suited to pasture. The depth to bedrock, numerous areas of Rock outcrop, difficult access across the steep terrain, the slope, and the severe hazard of erosion are management concerns. Operating farm equipment is difficult on the Cleveland and Chestnut soils. Erosion is a major hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas.

This map unit is poorly suited to most recreational uses. Many areas have scenic vistas, however, and are used for overlooks. The slope, the depth to bedrock, and the harsh climate are the main management concerns.

This map unit is unsuited to crops. The slope, the depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The depth to bedrock, numerous areas of Rock outcrop, the slope, and the severe hazard of erosion are management concerns. Building and maintaining the roads are difficult and costly. Drilling and blasting of the hard bedrock commonly are needed. Building the roadbed on the natural soil, where possible, minimizes slumping. Hydroseeding is a good way to vegetate steep, bare areas.

The capability subclass is VIIe in areas of the Cleveland soil, VIe in areas of the Chestnut soil, and VIIIs in areas of the Rock outcrop. Based on chestnut oak as the indicator species, the woodland ordination symbol is 2D in areas of the Cleveland soil. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R in areas of the Chestnut soil. The Rock outcrop has not been assigned a woodland ordination symbol.

CpE—Cleveland-Chestnut-Rock outcrop complex, windswept, 30 to 50 percent slopes. This map unit occurs mainly as areas of a shallow, somewhat excessively drained Cleveland soil and a moderately deep, well drained Chestnut soil and areas of Rock outcrop. The unit is on steep head slopes and ridgetops in the intermediate mountains. In most areas crossing the landscape is difficult and dangerous. Individual areas are irregular in shape and range from 10 to 80 acres in size. Typically, they are 35 to 45 percent Cleveland soil, 25 to 35 percent Chestnut soil, and 10 to 20 percent Rock outcrop. The two soils and the Rock outcrop occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 5 inches, black sandy loam

Subsoil:
5 to 17 inches, yellowish brown loam

Hard bedrock:
17 inches, hard, high-grade metamorphic bedrock

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

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

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly fine sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderately rapid in the Cleveland and Chestnut soils. The depth to hard bedrock is 10 to 20 inches in the Cleveland soil. The depth to weathered bedrock is 20 to 40 inches in the Chestnut soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. Establishing and maintaining vegetation are very difficult in bare areas. Landslides are common during prolonged periods of heavy rainfall.

Included in mapping are small areas of the very deep Chandler, Edneyville, Plott, and Cullasaja soils. Chandler soils have more mica than the Cleveland and Chestnut soils. Edneyville soils are very deep and occur in concave areas. Plott and Cullasaja soils have a dark surface layer that is thicker than that of the Cleveland and Chestnut soils. Cullasaja soils formed in colluvium and have more than 35 percent rock fragments in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cleveland and Chestnut soils but have a redder subsoil or have fewer rocks on the surface.

Much of the acreage in this map unit is used as woodland. Some areas are used as pasture or for building site development or recreational development.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, the depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion are also management concerns. The most common trees on south- to west-facing slopes are scarlet oak, chestnut oak, eastern white pine, pitch pine, Virginia pine, and hickory. The most common trees on north- to east-facing slopes are northern red oak, sweet birch, and eastern hemlock.

This map unit is poorly suited to pasture. The slope, the depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion are management concerns. Operating farm equipment is dangerous on the Cleveland and Chestnut soils. Generally, weeds are controlled and fertilizer and lime are applied by hand. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas.

This map unit is poorly suited to building site development. The slope, the depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion are management concerns. Some areas have scenic vistas and are commonly used as sites for summer homes. Establishing and maintaining vegetation in bare areas is difficult. Excavation for dwellings with basements is hampered by the limited depth to bedrock. Suitable sites for septic tank absorption fields are scarce because of the slope and the depth to bedrock. The absorption fields commonly are dug by hand because of the slope. The hazard of

ground-water contamination or stream pollution is severe.

This map unit is poorly suited to recreational uses. Many areas have scenic vistas, however, and are used for scenic overlooks. The slope, the depth to hard bedrock, and numerous areas of Rock outcrop are the main limitations.

This map unit is unsuited to crops because of the slope, the depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion.

This map unit is poorly suited to access roads. The slope, the depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion are management concerns. Building and maintaining the roads are difficult and costly. Drilling and blasting of the hard bedrock commonly are needed. Building the roadbed on the natural soil, where possible, minimizes slumping. Hydroseeding is a good way to revegetate steep, bare areas.

The capability subclass is VIIe in areas of the Cleveland and Chestnut soils and VIIIs in areas of the Rock outcrop. Based on chestnut oak as the indicator species in areas of the Cleveland soil and northern red oak as the indicator species in areas of the Chestnut soil, the woodland ordination symbol is 2R. The Rock outcrop has not been assigned a woodland ordination symbol.

CpF—Cleveland-Chestnut-Rock outcrop complex, windswept, 50 to 95 percent slopes. This map unit occurs mainly as areas of a shallow, somewhat excessively drained Cleveland soil and a moderately deep, well drained Chestnut soil and areas of Rock outcrop. The unit is on very steep head slopes in the intermediate mountains. In most areas crossing the landscape is difficult and dangerous. Individual areas are irregular in shape and range from 20 to 150 acres in size. Typically, they are 40 to 50 percent Cleveland soil, 20 to 30 percent Chestnut soil, and 10 to 20 percent Rock outcrop. The two soils and the Rock outcrop occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 5 inches, black sandy loam

Subsoil:
5 to 17 inches, yellowish brown loam

Hard bedrock:
17 inches, hard, high-grade metamorphic bedrock

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

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

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly fine sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderately rapid in the Cleveland and Chestnut soils. The depth to hard bedrock is 10 to 20 inches in the Cleveland soil, and the depth to weathered bedrock is 20 to 40 inches in the Chestnut soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. Establishing and maintaining vegetation are very difficult in bare areas. Landslides are common during prolonged periods of heavy rainfall.

Included in mapping are small areas of the very deep Chandler, Edneyville, Plott, and Cullasaja soils. Chandler soils have more mica than the Cleveland and Chestnut soils. Edneyville soils are very deep and occur in concave areas. Plott and Cullasaja soils have a dark surface layer that is thicker than that of the Cleveland and Chestnut soils. Cullasaja soils formed in colluvium and have more than 35 percent rock fragments in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cleveland and Chestnut soils but have a redder subsoil or have fewer rocks on the surface.

Much of the acreage in this map unit is used as woodland. A few areas are used as pasture or for building site development or recreational development.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, stones, the depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion also are management concerns. The most common trees on south- to west-facing slopes are scarlet oak, chestnut oak, eastern white pine, pitch pine, Virginia pine, and hickory. The most common trees on north- to east-facing slopes are northern red oak, sweet birch, and eastern hemlock.

This map unit is poorly suited to pasture. The slope, stones, the depth to bedrock, numerous areas of Rock outcrop, and the very severe hazard of erosion are the main management concerns. Operating farm equipment

is very dangerous on the Cleveland and Chestnut soils. Generally, weeds are controlled and fertilizer and lime are applied by hand. Erosion is a major hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas.

This map unit is poorly suited to building site development. Some areas have many scenic vistas and are commonly used as sites for summer homes. The slope, stones, the depth to bedrock, numerous areas of Rock outcrop, and the very severe hazard of erosion are management concerns. Establishing and maintaining vegetation are difficult in bare areas. Excavation for dwellings with basements is hampered by the limited depth to bedrock. Suitable sites for septic tank absorption fields are scarce because of the slope and the depth to bedrock. The absorption fields commonly are dug by hand because of the slope. The hazard of ground-water contamination or stream pollution is severe.

This map unit is poorly suited to most recreational uses. Many areas have scenic vistas, however, and are used for scenic overlooks. The slope, the depth to bedrock, and numerous areas of Rock outcrop are the main limitations.

The map unit is unsuited to crops. The slope, the depth to bedrock, numerous areas of Rock outcrop, the severe climate, and the very severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope, the depth to bedrock, numerous areas of Rock outcrop, and the very severe hazard of erosion are management concerns. Building and maintaining the roads are difficult and costly. Drilling and blasting of the hard bedrock commonly are needed. Building the roadbed on the natural soil, where possible, minimizes slumping. Hydroseeding is a good way to vegetate steep, bare areas.

The capability subclass is VIIe in areas of the Cleveland and Chestnut soils and VIIIs in areas of the Rock outcrop. Based on chestnut oak as the indicator species in areas of the Cleveland soil and northern red oak in areas of the Chestnut soil, the woodland ordination symbol is 2R. The Rock outcrop has not been assigned a woodland ordination symbol.

CrD—Cowee-Evard-Urban land complex, 15 to 30 percent slopes. This map unit consists mainly of a moderately deep Cowee soil, a very deep Evard soil, and areas of Urban land. Both soils are well drained. They are on moderately steep ridgetops and side slopes in the low mountains. Individual areas are irregular in shape and range from 5 to 40 acres in size. Typically, they are 35 to 45 percent Cowee soil, 15 to 25 percent Evard soil, and 15 to 25 percent Urban land. The Cowee and Evard soils and Urban land occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 5 inches, reddish brown gravelly sandy loam

Subsoil:
5 to 13 inches, red gravelly sandy loam
13 to 27 inches, red gravelly sandy clay loam

Weathered bedrock:
27 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

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

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

Subsoil:
6 to 27 inches, red clay loam
27 to 35 inches, mottled red, yellowish red, and strong brown loam

Underlying material:
35 to 60 inches, multicolored sandy loam saprolite

Urban land consists of areas where the original soils have been cut, filled, graded, or paved. Soil properties have been so altered that a soil series is not recognized. These areas are used for buildings, streets, parking lots, or other uses where buildings are closely spaced or the soils are covered with pavement. The extent of site modification varies greatly.

Permeability is moderate in the Cowee and Evard soils. The depth to bedrock is more than 60 inches in the Evard soil. The depth to weathered bedrock is 20 to 40 inches in the Cowee soil. Surface runoff is rapid.

Included in mapping are small areas of Braddock and Saunook soils. Braddock soils are on high stream terraces and have more clay in the subsoil than the Cowee and Evard soils. Saunook soils are along drainageways and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cowee and Evard soils but have a browner subsoil or have more rocks on the surface.

Because areas of this unit are covered by impermeable material, such as buildings, streets, and parking lots, the rate of surface runoff is higher than that on other Cowee and Evard soils. During periods of heavy rainfall, the runoff is difficult to control and is concentrated in concave areas. The hazard of erosion

is severe during and immediately after construction if the surface is left bare and unprotected. Hydroseeding is a good way to revegetate bare areas.

The Cowee and Evard soils in open areas of this map unit commonly are used for lawns, gardens, and open areas. In many areas, the soil material has been compacted during construction. Compaction of the soil increases crusting and clodding, which interfere with the germination of seeds and increase the costs of landscaping. Also, the moderate depth to weathered bedrock in the Cowee soil lowers the survival and growth rate of some landscaping plants.

The capability subclass is VIe in areas of the Cowee and Evard soils and VIIIs in areas of Urban land. This unit has not been assigned a woodland ordination symbol.

CsD—Cullasaja very cobbly fine sandy loam, 15 to 30 percent slopes, extremely bouldery. This map unit consists mainly of moderately steep, very deep, well drained Cullasaja and similar soils in coves below areas of rock outcrop or on toe slopes at the base of nearly vertical rock cliffs. Most areas of this map unit are in the intermediate mountains in the southern part of the county. Areas in coves are bowl shaped in the lower part and finger up the drainageways. Areas on toe slopes are long and narrow. Individual areas range from 3 to 30 acres in size.

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

Surface layer:

0 to 13 inches, black and very dark brown very cobbly fine sandy loam

Subsoil:

13 to 26 inches, dark yellowish brown very cobbly fine sandy loam

26 to 38 inches, yellowish brown very cobbly sandy loam

38 to 60 inches, dark yellowish brown extremely cobbly sandy loam

Permeability is moderately rapid. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. The seasonal high water table is more than 6 feet below the surface. Because of the boulders and stones on the surface, tillage is impossible. In some areas the boulders are 30 feet long and 15 feet high. The hazard of erosion is severe in areas where the forest litter has been removed.

Included in mapping are small areas of Tuckasegee soils. These soils have less than 35 percent rock fragments in the subsoil. They are in convex areas between drainageways. Also included are small areas of rubble land and moderately well drained or somewhat poorly drained soils around springs and seeps. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cullasaja soil but have a dark surface layer that is less than 10 or more than 20 inches thick or are near drainageways and have a seasonal high water table 3 to 6 feet below the surface. Where the surface layer is less than 10 inches thick, the soils generally are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils generally are on the north- to east-facing slopes.

Nearly all of the acreage in this map unit is wooded.

This soil is poorly suited to commercial timber because of the numerous boulders on the surface. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for the management concerns. Yellow-poplar is the most common tree at elevations below 4,000 feet. Other trees include black cherry, American beech, yellow buckeye, eastern hemlock, and eastern white pine at the lower elevations. Black cherry, sweet birch, yellow birch, northern red oak, and sugar maple are the most common trees at elevations above 4,000 feet.

Reforestation of hardwoods occurs dominantly through sprouting. Cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Because of the boulders and stones, operating equipment, building access roads, and managing and harvesting timber are difficult and costly. In some areas, the boulders are so large that removing them requires drilling and blasting (fig. 9). Large boulders are so numerous in most areas that the use of wheeled equipment is impractical. When falling trees strike the large boulders, timber is seriously damaged during harvesting. Cable logging is limited in many areas because nearly vertical rock cliffs are on the upslope side of the area.

This map unit is poorly suited to access roads. Boulders, the slope, and runoff from the adjacent higher areas are the main limitations. Because of the boulders and stones, road building is difficult and expensive. Access roads are dangerous because of falling rocks, especially during prolonged periods of heavy rainfall. Cutbanks are unstable, and the roads should be designed so that runoff from the adjacent higher areas and water from springs and seeps are properly diverted.

This map unit is unsuited to pasture, hayland, specialty crops, row crops, recreation, and building site

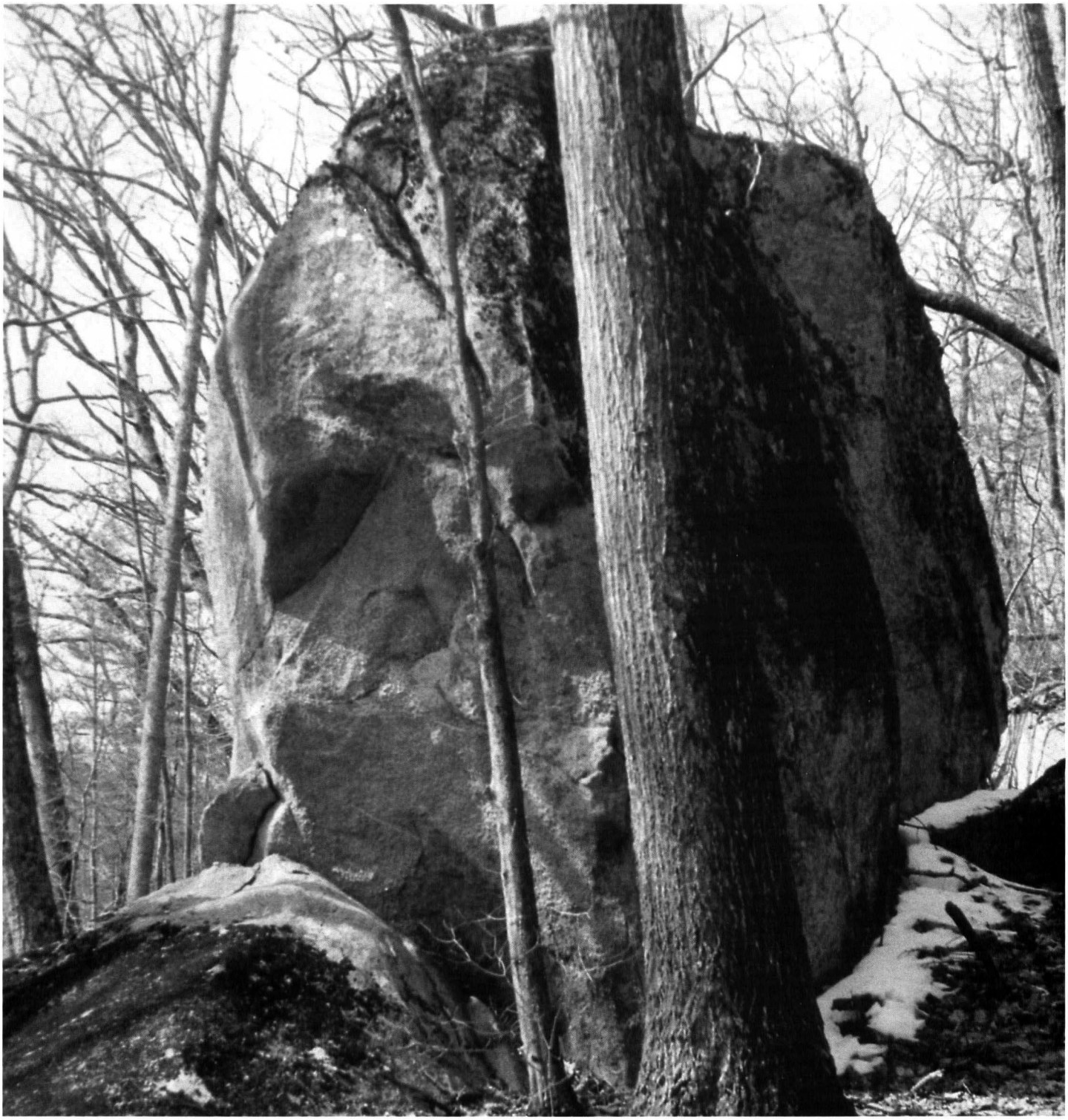


Figure 9.—Large boulders hinder timber management on Cullasaja very cobbly fine sandy loam, 15 to 30 percent slopes, extremely bouldery.

development because of the boulders on the surface and the slope.

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

CsE—Cullasaja very cobbly fine sandy loam, 30 to 50 percent slopes, extremely bouldery. This map unit consists mainly of steep, very deep, well drained Cullasaja and similar soils in coves below areas of rock outcrop or on toe slopes at the base of nearly vertical rock cliffs. Most areas of this map unit are in the intermediate mountains in the southern part of the county. Areas in coves are bowl shaped in the lower part and finger up the drainageways. Areas on toe slopes are long and narrow. Individual areas range from 3 to 30 acres in size.

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

Surface layer:

0 to 13 inches, black and very dark brown very cobbly fine sandy loam

Subsoil:

13 to 26 inches, dark yellowish brown very cobbly fine sandy loam

26 to 38 inches, yellowish brown very cobbly sandy loam

38 to 60 inches, dark yellowish brown extremely cobbly sandy loam

Permeability is moderately rapid. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. The seasonal high water table is more than 6 feet below the surface. Because of the boulders and stones on the surface, tillage is impossible. In some areas the boulders are 30 feet long and 15 feet high. The hazard of erosion is severe in areas where the forest litter has been removed.

Included in mapping are small areas of Tuckasegee soils. These soils have less than 35 percent rock fragments in the subsoil. They are in convex areas between drainageways. Also included are small areas of rubble land and moderately well drained or somewhat poorly drained soils around springs and seeps. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cullasaja soil but have a dark surface layer that is less than 10 or more than 20 inches thick or are near drainageways and have a seasonal high water table 3 to 6 feet below the surface. Where the surface layer is less than 10 inches thick, the soils generally are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils generally are on the north- to east-facing slopes.

Nearly all of the acreage in this map unit is wooded.

This soil is poorly suited to commercial timber. The numerous boulders on the surface, the severe hazard of erosion, and the slope are the main management concerns. The unit is desirable for timber production, however, because of the high productivity of the commercial species, which helps to compensate for the management concerns. Yellow-poplar is the most common tree at elevations below 4,000 feet. Other trees include black cherry, American beech, yellow buckeye, eastern hemlock, and eastern white pine at the lower elevations. Black cherry, sweet birch, northern red oak, and sugar maple are the most common trees at elevations above 4,000 feet.

Reforestation of hardwoods occurs dominantly through sprouting. Cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Because of the boulders and stones, operating equipment, building access roads, and managing and harvesting timber are difficult and costly. In some areas, the boulders are so large that removing them requires drilling and blasting. Large boulders are so numerous in most areas that the use of wheeled equipment is impractical. When falling trees strike the large boulders, timber is seriously damaged during harvesting. Cable logging is limited in many areas because the nearly vertical rock cliffs are on the upslope side of the area.

This map unit is poorly suited to access roads. Boulders, the slope, and runoff from the higher adjacent areas are the main limitations. Because of the boulders and stones, road building is difficult and expensive. Access roads are dangerous because of falling rocks, especially during prolonged periods of heavy rainfall. Cutbanks are unstable, and the roads should be designed so that runoff from the adjacent higher areas and water from springs and seeps are properly diverted.

This map unit is unsuited to pasture, hayland, specialty crops, row crops, recreation, and building site development because of the boulders on the surface and the slope.

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

CuC—Cullasaja-Tuckasegee complex, 8 to 15 percent slopes, stony. This map unit occurs mainly as areas of strongly sloping, very deep, well drained Cullasaja and Tuckasegee soils on benches and toe slopes in coves in the intermediate mountains. Typically, the Tuckasegee soil is between

drainageways and the Cullasaja soil is along the drainageways. Individual areas are bowl shaped in the lower part and long and narrow as they extend up the drainageways. They range from 4 to 30 acres in size. Typically, they are 45 to 55 percent Cullasaja soil and 25 to 35 percent Tuckasegee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 13 inches, black and very dark brown very cobbly fine sandy loam

Subsoil:
13 to 26 inches, dark yellowish brown very cobbly fine sandy loam
26 to 38 inches, yellowish brown very cobbly sandy loam
38 to 60 inches, dark yellowish brown extremely cobbly sandy loam

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

Surface layer:
0 to 11 inches, very dark brown gravelly loam

Subsoil:
11 to 24 inches, dark yellowish brown loam and gravelly loam
24 to 60 inches, yellowish brown gravelly fine sandy loam and gravelly sandy clay loam

Permeability is moderately rapid in both soils. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface. Tillage is difficult, especially in areas of the Cullasaja soil, because of the stones on the surface. The Tuckasegee soil is friable and can be tilled throughout a wide range in moisture content.

Included in mapping are small areas of Dellwood and Whiteside soils. Dellwood soils are occasionally flooded and are moderately well drained. Whiteside soils are moderately well drained. They are in depressions. Springs and seeps are also common in some map units. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cullasaja and Tuckasegee soils but have a dark surface layer that is less than 10 or more than 20 inches thick or have a seasonal high water table 3 to 6 feet below the surface. Where the surface layer is less than 10 inches thick, the soils commonly are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils commonly are on the north- to east-facing slopes.

Most of the acreage in this map unit is used as woodland. Some areas are used as pasture or hayland or for specialty crops, building site development, or recreational development.

This map unit is well suited to commercial timber. Plant competition, the slope, the severe hazard of erosion, and runoff from the higher adjacent areas are the main management concerns. Yellow-poplar is the most common tree at elevations below 4,000 feet. Other trees include black cherry, American beech, sweet birch, northern red oak, sugar maple, white oak, black locust, yellow buckeye, eastern hemlock, and eastern white pine. Black cherry, yellow birch, sweet birch, northern red oak, and sugar maple are the most common trees at elevations above 4,000 feet.

Reforestation of hardwoods occurs dominantly through sprouting. Cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are slick during wet periods because of the slope, the organic matter content in the surface layer, and the content of clay, especially in areas of the Tuckasegee soil.

This map unit is moderately suited to pasture and hay. Stones, the slope, the severe hazard of erosion, and runoff from the higher adjacent areas are management concerns. The stones damage farm equipment used for establishing and maintaining pasture and mowing and baling hay, especially in areas of the Cullasaja soil. The Tuckasegee soil has fewer stones on the surface and is better suited to pasture and hay. Erosion is a hazard in areas where plants are

becoming established and in sparsely vegetated or overgrazed areas. Properly locating watering facilities and stream crossings helps to prevent damage to streambanks. Keeping pasture and hayland in good condition conserves soil and water.

The Cullasaja soil is poorly suited to row crops or specialty crops. The Tuckasegee soil is moderately suited to row crops or specialty crops, such as ginseng, landscaping plants, and Christmas trees. Stones, the slope, the severe hazard of erosion, and runoff from the higher adjacent areas are management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees. Preparing a seedbed and harvesting plants are difficult, especially in areas of the Cullasaja soil. The Cullasaja soil is better suited to Fraser fir and eastern white pine harvested as cut trees. The Tuckasegee soil has fewer stones and is preferred for crops that must be dug during harvesting.

The Cullasaja soil in this map unit is poorly suited to building site development, and the Tuckasegee soil is moderately suited. The slope, stones, runoff from the higher adjacent areas, and the severe hazard of erosion are management concerns. The Tuckasegee soil is better suited to building site development than the Cullasaja soil because it has fewer stones on the surface and seeps and springs are less common. Excavation for dwellings with basements is hampered by stones and underground water from seeps and springs. A drainage system is needed in these areas. Building sites should be designed so that runoff from the higher adjacent areas is diverted. Sites that are wet because of seeps, springs, and runoff and, where practical, areas of the Cullasaja soil should not be used for septic tank absorption fields.

This map unit is moderately suited to some recreational uses, such as campsites and trailer parks. Because this map unit has adequate shade and springs that provide drinking water and is near streams, it commonly is used for campsites and trailer parks. The slope, stones, and the severe hazard of erosion are management concerns.

The Cullasaja soil in this map unit is poorly suited to access roads, and the Tuckasegee soil is moderately suited. Stones, runoff from the higher adjacent areas, springs, seeps, and the severe hazard of erosion are management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced and properly maintained for year-round use. Gravel continuously sinks into the subsoil. Building the roads near the area of contact with the uplands, where possible, helps to avoid the springs, the seeps, and the large stones. The roads should be designed so that runoff from the higher adjacent areas and water from seeps and springs are properly diverted.

The capability subclass is VIIs in areas of the Cullasaja soil and IIIe in areas of the Tuckasegee soil. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8X in areas of the Cullasaja soil and 8A in areas of the Tuckasegee soil.

CuD—Cullasaja-Tuckasegee complex, 15 to 30 percent slopes, stony. This map unit occurs mainly as areas of moderately steep, very deep, well drained Cullasaja and Tuckasegee soils on benches and toe slopes in coves in the intermediate mountains. Typically, the Tuckasegee soil is between drainageways and the Cullasaja soil is along the drainageways. Individual areas are bowl shaped in the lower part and long and narrow as they extend up the drainageways. They range from 4 to 80 acres in size. Typically, they are 45 to 55 percent Cullasaja soil and 25 to 35 percent Tuckasegee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 13 inches, black and very dark brown very cobbly fine sandy loam

Subsoil:
13 to 26 inches, dark yellowish brown very cobbly fine sandy loam
26 to 38 inches, yellowish brown very cobbly sandy loam
38 to 60 inches, dark yellowish brown extremely cobbly sandy loam

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

Surface layer:
0 to 11 inches, very dark brown gravelly loam

Subsoil:
11 to 24 inches, dark yellowish brown loam and gravelly loam
24 to 60 inches, yellowish brown gravelly fine sandy loam and gravelly sandy clay loam

Permeability is moderately rapid in both soils. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface. Tillage is difficult, especially in areas of the

Cullasaja soil, because of the stones on the surface. The Tuckasegee soil is friable and can be tilled throughout a wide range in moisture content.

Included in mapping are small areas of Chandler, Chestnut, Edneyville, and Plott soils. Chandler, Chestnut, and Edneyville soils formed in saprolite on south- to west-facing slopes. They have a surface layer that is thinner or lighter colored than that of the Cullasaja and Tuckasegee soils. Also, Chestnut soils are moderately deep to weathered bedrock and Chandler soils have more mica than the Cullasaja and Tuckasegee soils. Plott soils formed in saprolite on north- to east-facing side slopes. Also included are small areas of moderately well drained or somewhat poorly drained soils around seeps and springs. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cullasaja and Tuckasegee soils but have a dark surface layer that is less than 10 or more than 20 inches thick or have a seasonal high water table 3 to 6 feet below the surface. Where the surface layer is less than 10 inches thick, the soils commonly are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils commonly are on the north- to east-facing slopes.

Most of the acreage in this map unit is used as woodland. Some areas are used as pasture or hayland or for specialty crops, building site development, or recreational development.

This map unit is moderately suited to commercial timber. Plant competition, the slope, stones, the severe hazard of erosion, and runoff from the higher adjacent areas are the main management concerns. Yellow-poplar is the most common tree at elevations below 4,000 feet (fig. 10). Other trees include black cherry, American beech, sweet birch, northern red oak, sugar maple, yellow buckeye, white oak, black locust, eastern hemlock, and eastern white pine. Black cherry, sweet birch, yellow birch, northern red oak, and sugar maple are the most common trees at elevations above 4,000 feet.

Reforestation of hardwoods occurs dominantly through sprouting. Cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are slick during wet periods because of the slope and the organic matter content in the surface layer.

This map unit is moderately suited to pasture and hay. Stones, the slope, the severe hazard of erosion, and runoff from the higher adjacent areas are management concerns. The stones damage farm equipment used for establishing and maintaining pasture and mowing and baling hay, especially in areas of the Cullasaja soil. The Tuckasegee soil has fewer stones on the surface and is better suited to pasture and hay. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Properly locating watering facilities and stream crossings helps to prevent damage to streambanks. Keeping the pasture and hayland in good condition conserves soil and water.

This map unit is poorly suited to specialty crops, such as ginseng, landscaping plants, and Christmas trees. Stones, the slope, the severe hazard of erosion, and runoff from the higher adjacent areas are management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees. Preparing a seedbed and harvesting plants are difficult in areas of the Cullasaja soil. The Cullasaja soil is better suited to Fraser fir and eastern white pine harvested as cut trees. The Tuckasegee soil has fewer stones and is preferred for crops that must be dug during harvesting.

This map unit is poorly suited to building site development. The slope, stones, runoff from the higher adjacent areas, and the severe hazard of erosion are management concerns. The Tuckasegee soil is better suited to building site development than the Cullasaja soil because it has fewer stones and seeps or springs are less common. Excavation for dwellings with basements is hampered by stones and underground water from seeps and springs. A drainage system is needed in these areas. Building sites should be designed so that runoff from the higher adjacent areas is diverted. Sites that are wet because of seeps, springs, and runoff, and, where practical, areas of the Cullasaja soil should not be used for septic tank absorption fields.

This map unit is poorly suited to most recreational uses, such as campsites and trailer parks. Some areas

Figure 10.—A stand of yellow-poplar in coves on Cullasaja-Tuckasegee complex, 15 to 30 percent slopes, stony.

are used for hiking trails. The slope, stones, and the severe hazard of erosion are management concerns. The hiking trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer.

This map unit is poorly suited to access roads

because of the slope, stones, runoff from the higher adjacent areas, springs, seeps, and the severe hazard of erosion. Because unsurfaced roads are soft and slick when wet, they should be surfaced and properly maintained for year-round use. Gravel continuously sinks into the subsoil. Building the roads near the area of contact with the uplands, where possible, helps to avoid the springs, the seeps, and the large stones. The roads should be designed so that runoff from the higher adjacent areas and water from seeps and springs are properly diverted.

The capability subclass is VIIs in areas of the Cullasaja soil and VIe in areas of the Tuckasegee soil. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

CuE—Cullasaja-Tuckasegee complex, 30 to 50 percent slopes, stony. This map unit occurs mainly as areas of steep, very deep, well drained Cullasaja and Tuckasegee soils on toe slopes in coves near the headwaters of streams in the intermediate mountains. Typically, the Cullasaja soil is along the drainageways and the Tuckasegee soil is between drainageways. Individual areas are bowl shaped in the lower part and long and narrow as they extend up the drainageways. They range from 10 to 80 acres in size. Typically, they are 45 to 55 percent Cullasaja soil and 25 to 35 percent Tuckasegee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:

0 to 13 inches, black and very dark brown very cobbly fine sandy loam

Subsoil:

13 to 26 inches, dark yellowish brown very cobbly fine sandy loam

26 to 38 inches, yellowish brown very cobbly sandy loam

38 to 60 inches, dark yellowish brown extremely cobbly sandy loam

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

Surface layer:

0 to 11 inches, very dark brown gravelly loam

Subsoil:

11 to 24 inches, dark yellowish brown loam and gravelly loam

24 to 60 inches, yellowish brown gravelly fine sandy loam and gravelly sandy clay loam

Permeability is moderately rapid in both soils. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface. Operating farm equipment is dangerous on this map unit. Most farming operations are done by hand.

Included in mapping are small areas of Chandler, Chestnut, Edneyville, and Plott soils. Chandler, Chestnut, and Edneyville soils formed in saprolite on south- to west-facing slopes. They have a surface layer that is thinner or lighter colored than that of the Cullasaja and Tuckasegee soils. Also, Chestnut soils are moderately deep to weathered bedrock and Chandler soils have more mica than the Cullasaja and Tuckasegee soils. Plott soils formed in saprolite on north- to east-facing side slopes. Also included are small areas of rubble land and areas of moderately well drained or somewhat poorly drained soils around seeps and springs. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cullasaja and Tuckasegee soils but have a dark surface layer that is less than 10 or more than 20 inches thick or have a seasonal high water table 3 to 6 feet below the surface. Where the surface layer is less than 10 inches thick, the soils commonly are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils commonly are on the north- to east-facing slopes.

Most of the acreage in this map unit is used as woodland. A few areas are used for recreational development, pasture, or specialty crops.

This map unit is poorly suited to commercial timber. The slope, the severe hazard of erosion, runoff from the higher adjacent areas, stones, and plant competition are the main management concerns. This unit is desirable for timber production, however, because of the high productivity of the commercial species, which helps to compensate for the management concerns. Yellow-poplar is the most common tree at elevations below 4,000 feet. Other trees include black cherry, American beech, yellow buckeye, eastern hemlock, white oak, black locust, and eastern white pine. Black cherry, sweet birch, yellow birch, northern red oak, and sugar maple are the most common trees at elevations above 4,000 feet.

Reforestation of hardwoods occurs dominantly through sprouting. Cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Old fields and other idle areas naturally reseed to

yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

When the soil is wet, unsurfaced roads are slick, soft, and dangerous because of the slope and the content of clay, especially in areas of the Tuckasegee soil. The roads should be designed so that runoff from the higher adjacent areas is properly diverted.

The map unit is poorly suited to recreational development because of the slope, stones, the severe hazard of erosion, and runoff from the higher adjacent areas. Some areas are used for hiking trails. The trails are very slick during wet periods.

This map unit is poorly suited to pasture and unsuited to hay. The slope, stones, the severe hazard of erosion, and runoff from the higher adjacent areas are management concerns. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition conserves soil and water.

This map unit is poorly suited to specialty crops. In some areas, however, Fraser fir and eastern white pine are grown for use as Christmas trees. The slope, stones, the severe hazard of erosion, and runoff from the higher adjacent areas are the main management concerns. Balling and burlapping Christmas trees is impractical in areas of the Cullasaja soil because of the numerous rock fragments. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to access roads. The slope, stones, runoff from the higher adjacent areas, springs and seeps, and the severe hazard of erosion are management concerns. Building and maintaining the roads are difficult and costly. Building the roads near the area of contact with the uplands, where practical, helps to avoid the springs, the seeps, and the large stones. Revegetating large areas that have been cut and filled is difficult because of the slope. Hydroseeding is a good way to revegetate steep areas that have been cut and filled. Building roadbeds on the natural soil, where possible, minimizes slumping. The roads should be designed so that runoff from the higher adjacent areas is properly diverted. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The water from seeps and springs should be properly diverted from the roadbeds. Road failures are common.

The capability subclass is VIIs in areas of the Cullasaja soil and VIIe in areas of the Tuckasegee soil. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

CuF—Cullasaja-Tuckasegee complex, 50 to 90 percent slopes, stony. This map unit occurs mainly as areas of very steep, very deep, well drained Cullasaja and Tuckasegee soils on toe slopes in coves at the headwaters of streams in the intermediate mountains. Typically, the Cullasaja soil is along the drainageways and the Tuckasegee soil is between the drainageways. Individual areas are bowl shaped in the lower part and long and narrow as they extend up the drainageways. They range from 5 to 30 acres in size. Typically, they are 45 to 55 percent Cullasaja soil and 25 to 35 percent Tuckasegee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:

0 to 13 inches, black and very dark brown very cobbly fine sandy loam

Subsoil:

13 to 26 inches, dark yellowish brown very cobbly fine sandy loam

26 to 38 inches, yellowish brown very cobbly sandy loam

38 to 60 inches, dark yellowish brown extremely cobbly sandy loam

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

Surface layer:

0 to 11 inches, very dark brown gravelly loam

Subsoil:

11 to 24 inches, dark yellowish brown loam and gravelly loam

24 to 60 inches, yellowish brown gravelly fine sandy loam and gravelly sandy clay loam

Permeability is moderately rapid in both soils. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Chestnut, Edneyville, and Plott soils. Chestnut and Edneyville soils formed in saprolite on south- to west-facing slopes. They have a surface layer that is thinner or lighter colored than that of the Cullasaja and Tuckasegee soils. Also, Chestnut soils are moderately deep to weathered bedrock. Plott soils formed in saprolite on north- to east-facing side slopes. Also included are small areas of rubble land and areas of moderately well drained or somewhat poorly drained soils around seeps and springs. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cullasaja and Tuckasegee soils but have a dark surface layer that is less than 10 or more than 20 inches thick or have a seasonal high water table 3 to 6 feet below the surface. Where the surface layer is less than 10 inches thick, the soils commonly are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils commonly are on the north- to east-facing slopes.

Nearly all of the acreage in this map unit is wooded. A few areas are used for recreational development.

This map unit is poorly suited to commercial timber. The slope, the severe hazard of erosion, runoff from the higher adjacent areas, stones, and plant competition are the main management concerns. This unit is desirable for timber production, however, because of the high productivity of the commercial species, which helps to compensate for the management concerns. Yellow-poplar is the most common tree at elevations below 4,000 feet. Other trees include black cherry, American beech, yellow buckeye, eastern hemlock, and eastern white pine. Black cherry, sweet birch, yellow birch, northern red oak, and sugar maple are the most common trees at elevations above 4,000 feet.

Reforestation of hardwoods occurs dominantly through sprouting. Cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

The slope restricts the kinds of equipment that can be used. Operating wheeled and tracked equipment is dangerous. A cable yarding system is safer, results in less damage to the soil, and helps to maintain productivity. When the surface is wet, unsurfaced roads are slick, soft, and dangerous because of the slope and the content of clay, especially in areas of the Tuckasegee soil.

This map unit is poorly suited to outdoor recreational uses. The slope, runoff from the higher adjacent areas, and stones are management concerns.

This map unit is poorly suited to pasture and unsuited to hay because of the slope.

This map unit is poorly suited to access roads. The slope, stones, runoff from the higher adjacent areas, springs and seeps, and the severe hazard of erosion are management concerns. Building and maintaining the roads are difficult and costly. Building the roads near the area of contact with uplands helps to avoid the springs, the seeps, and the large stones. Revegetating large areas that have been cut and filled is difficult because of the slope. Hydroseeding is a good way to revegetate steep, bare areas. Building roadbeds on the natural soil, where possible, minimizes slumping. The roads should be designed so that runoff from the higher adjacent areas is properly diverted. Out-sloping road surfaces are needed because ditchbanks tend to slump. The water from seeps and springs should be properly diverted from the roadbeds. Road failures are common.

The capability subclass is VIIs in areas of the Cullasaja soil and VIIe in areas of the Tuckasegee soil. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

CwA—Cullowhee fine sandy loam, 0 to 2 percent slopes, occasionally flooded. This map unit consists mainly of nearly level, somewhat poorly drained Cullowhee and similar soils that are very deep to bedrock and moderately deep to strata of gravel, cobbles, and sand. The strata have more than 35 percent rock fragments. The unit commonly is in depressions on flood plains along the smaller streams. Individual areas are long bands parallel to the stream channels. They range from 2 to 25 acres in size.

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

Surface layer:

0 to 13 inches, very dark grayish brown and dark brown fine sandy loam

Underlying material:

13 to 23 inches, dark yellowish brown loamy sand that has strong brown and grayish brown mottles

23 to 35 inches, black loamy fine sand that has yellowish red and grayish brown mottles

35 to 65 inches, multicolored extremely gravelly sand

Permeability is moderately rapid in the upper layers and rapid or very rapid in the lower layers. Surface runoff is slow. Ponding occurs in depressions adjacent to the uplands. The soil is occasionally flooded for very brief periods. The seasonal high water table is 1.5 to 2.0 feet below the surface.

Included in mapping are small areas of Dellwood, Nikwasi, and Reddies soils. Dellwood soils are moderately well drained. They have more rock

fragments in the subsoil than the Cullowhee soil. They are along the upper reaches of small streams. Nikwasi soils are poorly drained or very poorly drained and are in depressions near the area of contact between the flood plains and the uplands. Reddies soils are moderately well drained and are on knolls. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cullowhee soil but have a lighter colored surface layer.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for row crops, specialty crops, or recreational development.

This map unit is moderately suited to pasture and hay. The flooding, the wetness, the ponding, soil compaction, and damage to streambanks are management concerns. Land shaping before seeding helps to open outlets and drain surface water from depressions. A tile drainage system may be needed in wet areas. Good drainage outlets, however, are rare. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Properly locating watering facilities and stream crossings can help to prevent damage to streambanks.

This map unit is moderately suited to crops. The flooding, the wetness, the ponding, and runoff from the higher adjacent areas are management concerns. The most common crops are silage corn, sweet corn, and strawberries. A tile drainage system commonly is needed to remove excess water. Good drainage outlets, however, are rare. Properly designed plowing patterns are needed to keep drainage outlets open and to prevent the formation of depressions. Land shaping helps to open outlets and drain surface water from depressions. Grassed field borders and grassed waterways can safely divert runoff. Irrigation commonly is used to protect high-value crops, such as strawberries, from frost and to supply additional water. Herbicides may be ineffective because of the organic matter content in the surface layer.

This map unit is moderately suited to specialty crops, such as landscaping plants and Christmas trees. The flooding, the wetness, runoff from the higher adjacent areas, and the ponding are management concerns. The most common landscaping plants are eastern hemlock, dog hobble, dogwood, white birch, and rhododendron. Also, eastern white pine is grown for use as Christmas trees. Grassed field borders and grassed waterways can safely divert runoff.

This map unit is poorly suited to building site development. The flooding and the wetness are the main management concerns.

This map unit is moderately suited to commercial timber. It is seldom used for commercial timber because of the small size of the mapped areas and the potentially higher profits from crops, pasture, or hayland. The most common trees are yellow-poplar, shortleaf pine, eastern white pine, American sycamore, red maple, yellow birch, and eastern hemlock.

This map unit is poorly suited to recreational uses. The flooding and the wetness are the main management concerns. Because this unit is nearly level and is near streams, some areas are used for campsites, parks, picnic areas, ball fields, or tennis courts.

This map unit is poorly suited to access roads. The flooding and the wetness are the main management concerns. Elevating the roads during construction minimizes the damage caused by flooding. The roads should be designed so that runoff is diverted. Wet areas should be drained.

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

DfA—Dellwood gravelly fine sandy loam, 0 to 3 percent slopes, occasionally flooded. This map unit consists mainly of nearly level, moderately well drained Dellwood and similar soils that are very deep to bedrock and shallow to strata of gravel, cobbles, and sand. The strata are more than 35 percent rock fragments. The unit is on narrow flood plains near stream origins (fig. 11). It is downstream from where a prominent decrease in stream gradient occurs. The surface is very uneven. It has numerous knolls and dips resulting from previous flood scouring, deposition, and channel movement. Individual areas are oblong in shape and range from 3 to 25 acres in size.

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

Surface layer:

0 to 16 inches, dark brown gravelly fine sandy loam and cobbly sandy loam

Underlying material:

16 to 60 inches, strong brown very cobbly loamy sand

Permeability is moderately rapid in the surface layer and rapid or very rapid in the lower layers. Surface runoff is slow. The soil is subject to occasional flash flooding for very brief periods. The seasonal high water table is 2 to 4 feet below the surface. Because of the stoniness, tillage is difficult. This map unit is a good source of gravel and is commonly used for this purpose.

Included in mapping are small areas of Cullowhee, Nikwasi, and Reddies soils. These soils are moderately

Figure 11.—An area of Dellwood gravelly fine sandy loam, 0 to 3 percent slopes, occasionally flooded, on initial flood plains, which are the first flood plains that form as water drains out of the mountains.

deep to strata of gravel, cobbles, and sand. The strata have more than 35 percent rock fragments. Also, Cullowhee and Nikwasi soils are in depressions. Cullowhee soils are somewhat poorly drained, and Nikwasi soils are poorly drained or very poorly drained. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Dellwood soil but have a surface layer that is lighter colored or thinner.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for row crops, specialty crops, building site development, recreational development, or woodland.

This map unit is moderately suited to pasture and hay. The flooding, stoniness, and droughtiness are the main management concerns. Removing large rocks minimizes the damage to farm equipment used to establish and maintain pasture and hayland. Also, rocks on the surface can damage equipment used for mowing and baling hay. Tall fescue and orchardgrass grow well because they are dormant in the droughty summer months. Properly locating watering facilities and stream crossings helps to minimize damage to streambanks.

This map unit is poorly suited to row crops because of the flooding, cobbles, droughtiness, the ponding in scoured depressions, runoff from the higher adjacent areas, and poor air drainage. The most common crops are silage corn, sweet corn, tomatoes, strawberries, and burley tobacco. Removing large rocks minimizes the damage to farm equipment used to plant, manage, or harvest crops. The harvesting of root crops and tilling the soil are hampered by the numerous small rock fragments that remain on the surface.

Split applications of fertilizer are needed because nutrients are easily leached. Also, split applications of fertilizer control the hazard of ground-water contamination and pollution in surrounding streams and lakes. Vegetative filter strips can improve water quality and provide wildlife habitat. Properly designed plowing patterns are needed to keep drainage outlets open and to prevent the formation of depressions that pond water. Land shaping helps to smooth the surface and open outlets to help drain surface water. A tile drainage system is needed for some crops, such as burley tobacco, during wet periods. Good drainage outlets, however, are rare. Irrigation is needed to protect crops, such as strawberries or tomatoes, from frost and to supply additional water during dry periods in the growing season. Diversions help to remove surface runoff from the higher areas. Installation of water management structures is difficult because of the stoniness and the scarcity of soil material.

Equipment can be used on this soil only hours after a heavy rain. This good access allows for timely planting, managing, and harvesting. The effectiveness of herbicides may be hampered by the content of organic matter in the surface layer.

This map unit is poorly suited to balled and burlapped specialty crops, such as landscaping plants and Christmas trees. Digging and preparing a ball for landscaping plants and Christmas trees are very difficult because of the stoniness, the limited soil depth, and the coarse texture of the soil. Fraser fir and eastern white pine commonly are grown for use as cut Christmas trees. Stoniness, the flooding, the low available water capacity, the ponding, and runoff from the higher adjacent areas are the main management concerns. Split applications of fertilizer are needed because nutrients are easily leached. Also, split applications of fertilizer control the hazard of contamination in ground water and surrounding streams and lakes. A tile drainage system may be needed for some crops, such as Fraser fir, during wet periods in the growing season. Irrigation may be needed for the same crops during dry periods in the growing season.

This map unit is poorly suited to building site development because of the hazard of occasional flash flooding.

This map unit is well suited to commercial timber. It is rarely used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from crops, pasture, or hayland. The flooding is the main hazard affecting woodland management. Yellow-poplar is the most common tree. Other trees include sweet birch, eastern hemlock, black cherry, red maple, river birch, American sycamore, and eastern white pine.

This map unit is poorly suited to recreational uses because of the hazard of occasional flash flooding and the stoniness. Many areas are used for recreational purposes, such as campsites, parks, picnic areas, ball fields, or tennis courts, however, because the unit is nearly level, has easy access, and is near streams.

This map unit is poorly suited to access roads. The occasional flash flooding and runoff from the higher adjacent areas are the main management concerns. Elevating the roads during construction minimizes the damage caused by flooding. The roads should be designed so that surface water is diverted.

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

DrB—Dillard loam, 1 to 5 percent slopes, rarely flooded. This map unit consists mainly of nearly level and gently sloping, very deep, moderately well drained Dillard and similar soils on low stream terraces.

Individual areas are long bands that parallel flood plains and range from 1 to 20 acres in size.

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

Surface layer:
0 to 9 inches, very dark grayish brown loam

Subsoil:
9 to 20 inches, yellowish brown sandy clay loam
20 to 37 inches, brownish yellow loam that has red and light gray mottles
37 to 70 inches, light gray clay loam that has yellowish brown, strong brown, and yellowish red mottles

Permeability is moderate. Surface runoff is slow or medium. The seasonal high water table is 2 to 3 feet below the surface.

Included in mapping are small areas of Hemphill, Reddies, Rosman, and Statler soils. Hemphill soils are very poorly drained and have slow permeability. They are in depressions near the area of contact between the low stream terrace and the uplands. Statler soils are well drained and have moderate permeability. They are on slightly elevated knolls. Reddies and Rosman soils have less clay in the subsoil than the Dillard soil. They are on flood plains. Also included are areas of somewhat poorly drained soils. Included soils make up about 15 percent of this map unit.

Also included in mapping are small areas of Dillard soils that have more rocks on the surface.

Much of the acreage in this map unit is used for row crops. Some areas are used as pasture or hayland or for specialty crops, building site development, or recreational development.

This soil is well suited to crops. The flooding, the ponding, runoff from the higher adjacent areas, the wetness, and poor air drainage are management concerns. The most common crops are silage corn, sweet corn, tomatoes, strawberries, and burley tobacco. Properly designed plowing patterns are needed to keep drainage outlets open and to prevent the formation of depressions. Land shaping helps to open outlets and drain surface water from depressions. Grassed field borders and diversions can safely remove runoff. Vegetative field borders can improve water quality and provide wildlife habitat. A tile drainage system is needed to drain surface water from depressions. Irrigation is used to protect high-value crops, such as strawberries and burley tobacco, from frost and to supply additional water. Herbicides may be affected because of the organic matter content in the surface layer.

This soil is well suited to specialty crops, such as landscaping plants and Christmas trees. The flooding, the ponding, the wetness, and runoff from the higher adjacent areas are the main management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, dog hobble, white birch, Bradford pear, and rhododendron. Eastern white pine commonly is grown for use as Christmas trees. The wetness is the main limitation affecting Fraser fir. This soil is well suited to trees and other plants that must be dug during harvesting. Water management practices similar to those used for row crops are appropriate.

This map unit is well suited to pasture and hay. The flooding, the ponding, compaction, the wetness, and damage to streambanks are management concerns. Land shaping before establishing pasture and hay helps to open outlets and drain surface water from depressions. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Properly locating watering facilities and stream crossings can help to prevent damage to streambanks. A tile drainage system is needed in wet spots.

This map unit is poorly suited to building site development because of the flooding, the wetness, the ponding, and runoff from the higher adjacent areas.

This map unit is well suited to commercial timber. It generally is not used for commercial timber because of the small size of the mapped areas and the potentially higher profits from crops, building site development, pasture, or hayland. The most common trees are yellow-poplar, eastern white pine, Virginia pine, and shortleaf pine.

This map unit is moderately suited to recreational uses, such as campsites, parks, picnic areas, and tennis courts. The flooding and the wetness are management concerns.

This map unit is poorly suited to access roads because of the runoff from the higher adjacent areas and the flooding. Elevating the roads during construction minimizes the damage caused by flooding. The roads should be designed so that runoff is diverted. Because unsurfaced roads are soft and slick when wet, surfacing is required for year-round use.

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

DsB—Dillsboro loam, 2 to 8 percent slopes. This map unit consists mainly of gently sloping, very deep, well drained Dillsboro and similar soils in slight depressions on high stream terraces. Individual areas are irregular in shape and range from 3 to 20 acres in size.

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

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

Subsoil:
10 to 43 inches, yellowish red clay loam and clay
43 to 59 inches, strong brown very cobbly clay that has yellowish red and strong brown mottles
59 to 75 inches, yellowish brown very cobbly clay loam that has red and light yellowish brown mottles

Permeability is moderate. The seasonal high water table is more than 6 feet below the surface. The shrink-swell potential is moderate.

Included in mapping are small areas of Saunook and Braddock soils. Saunook soils have a loamy subsoil and are in drainageways. Braddock soils are redder than the Dillsboro soil. They are in eroded, convex areas on high stream terraces. Included soils make up about 15 percent of this map unit.

Also included in mapping are small areas of Dillsboro soils that have more gravel in the surface layer.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for specialty crops, row crops, recreational development, or building site development.

This soil is well suited to pasture and hay, especially alfalfa. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Grazing during wet periods causes severe compaction, increases the runoff rate, and reduces the rate of water infiltration. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is well suited to specialty crops, such as apples, landscaping plants, and Christmas trees. Fraser fir and eastern white pine are grown for use as Christmas trees. The slope and the hazard of erosion are management concerns. Establishing and maintaining sod in appropriate areas helps to conserve water, minimizes erosion, and helps to control runoff. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is well suited to crops. The slope and the severe hazard of erosion are the main management concerns. The most common crops are silage corn, small grain, sweet corn, and strawberries. Irrigation is needed for frost-sensitive crops, such as strawberries. Conservation tillage and crop residue management help to control runoff and erosion. Grassed field borders, grassed waterways, diversions, contour farming, and crop rotations that include close-growing crops also help to conserve soil and water. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is moderately suited to building site development. A high content of clay in the subsoil, the moderate shrink-swell potential, and the severe hazard of erosion during construction are management concerns. A larger septic tank absorption field is needed in some areas because of the high content of clay in the subsoil. In many areas around building sites, severe compaction increases the costs of landscaping.

This map unit is well suited to commercial timber. It is rarely used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from crops, building sites, pasture, or hayland. The most common trees are yellow-poplar, eastern white pine, shortleaf pine, Virginia pine, white oak, scarlet oak, and northern red oak.

This map unit is well suited to recreational uses, such as campsites and picnic areas. It is seldom used for these purposes, however, because the unit is not near streams or does not have adequate shade. The slope and the hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The high content of clay in the subsoil is the main management concern. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the clay subsoil. Frequent smoothing of the road surface is needed because ruts form as a result of the high content of clay.

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 map unit consists mainly of strongly sloping, very deep, well drained Dillsboro and similar soils in slight depressions on high stream terraces. Individual areas are irregular in shape and range from 3 to 20 acres in size.

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

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

Subsoil:
10 to 43 inches, yellowish red clay loam and clay
43 to 59 inches, strong brown very cobbly clay that has yellowish red and strong brown mottles
59 to 75 inches, yellowish brown very cobbly clay

loam that has red and light yellowish brown mottles

Permeability is moderate. The seasonal high water table is more than 6 feet below the surface. The shrink-swell potential is moderate.

Included in mapping are small areas of Saunook and Braddock soils. Saunook soils have a loamy subsoil and are in drainageways. Braddock soils are redder than the Dillsboro soil. They are in eroded, convex areas on high stream terraces. Included soils make up about 15 percent of this map unit.

Also included in mapping are small areas of Dillsboro soils that have more rocks on the surface.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for specialty crops, row crops, or building site development.

This soil is well suited to pasture and hay, especially alfalfa. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Grazing during wet periods causes severe compaction, increases the runoff rate, and reduces the rate of water infiltration. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is moderately suited to specialty crops, such as apples, landscaping plants, and Christmas trees. Fraser fir and eastern white pine are grown for use as Christmas trees. The slope, the high content of clay in the subsoil, and the hazard of erosion are management concerns. Establishing and maintaining sod in appropriate areas helps to conserve water, minimizes erosion, and helps to control runoff. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is moderately suited to crops. The slope and the severe hazard of erosion are the main management concerns. The most common crops are silage corn, small grain, sweet corn, and strawberries. Irrigation is needed for frost-sensitive crops, such as strawberries. Conservation tillage and crop residue management help to control runoff and erosion. Grassed field borders, grassed waterways, diversions, contour farming, and crop rotations that include close-growing crops also help to conserve soil and water. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is only moderately suited to building site development because of the slope, the high content of clay, shrinking and swelling, and the severe hazard of erosion during construction. A larger septic tank absorption field is needed in some areas because of the high content of clay in the subsoil. In many areas around building sites, severe compaction increases the costs of landscaping.

This map unit is well suited to commercial timber. It is rarely used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from crops, building sites, pasture, or hayland. The most common trees are yellow-poplar, eastern white pine, shortleaf pine, Virginia pine, white oak, scarlet oak, and northern red oak.

This map unit is moderately suited to recreational uses, such as campsites and picnic areas. It is rarely used for these purposes, however, because the unit is not near streams and does not have adequate shade. The slope and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope, the high content of clay in the subsoil, and the moderate shrink-swell potential are management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the clay subsoil. Frequent smoothing of the road surface is needed because ruts form as a result of the high content of clay.

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

EdC—Edneyville-Chestnut complex, 8 to 15 percent slopes, stony. This map unit occurs mainly as areas of a very deep Edneyville soil and a moderately deep Chestnut soil. Both soils are well drained. The unit is on strongly sloping, south- to west-facing ridgetops in the intermediate mountains. Individual areas are long and narrow and range from 5 to 40 acres in size. Typically, they are 50 to 60 percent Edneyville soil and 20 to 30 percent Chestnut soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:

0 to 5 inches, dark brown gravelly fine sandy loam

Subsoil:

5 to 28 inches, strong brown fine sandy loam

28 to 37 inches, yellowish brown sandy loam that has strong brown and yellow mottles

Underlying material:

37 to 60 inches, multicolored sandy loam saprolite

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

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

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches in the Edneyville soil, and the depth to weathered bedrock is 20 to 40 inches in the Chestnut soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Chandler, Cowee, Evard, and Plott soils. Chandler soils have more mica than the Edneyville and Chestnut soils. Cowee and Evard soils are redder than the Edneyville and Chestnut soils and have more clay in the subsoil. They are in the low mountains. Plott soils are on north- to east-facing slopes and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Edneyville and Chestnut soils but have a redder subsoil or have fewer rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or hayland or for crops or building site development.

This map unit is moderately suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Plott soils. The slope and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, shortleaf pine, hickory, yellow-poplar, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting. This map unit is well suited to year-round logging.

This map unit is well suited to pasture and hay. Limited access, the slope, and the hazard of erosion are the main management concerns. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and runoff.

This map unit is moderately suited to crops. The slope, the severe hazard of erosion, and stones are management concerns. In some areas, cabbage and broccoli are grown. Because of the severe hazard of erosion, the high rainfall, and the limited ground cover during the growing season, the unit is highly susceptible to erosion. Contour rows and diversions minimize erosion, conserve water, and help to control runoff. Grassed field borders and grassed waterways can divert water safely around row crops. Vegetative filter strips can improve water quality and provide wildlife habitat. In most areas, stripcropping is not feasible because of the small size of the fields. No-till and minimum tillage can be used instead of conventional tillage in areas where cabbage and broccoli are grown.

This map unit is only moderately suited to specialty crops, such as landscaping plants and Christmas trees, because of the slope, stones, the severe hazard of erosion, and limited access. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir is grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is only moderately suited to building site development because of difficult access and the slope. Also, excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Chestnut soil.

This map unit is moderately suited to some recreational uses, such as campsites, overlooks, and hiking trails. Because the unit is on ridgetops, campsites that have a convenient source of water are scarce. The slope, stones, the severe hazard of erosion, and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is moderately suited to access roads. The slope and freezing and thawing are the main management concerns. Revegetating areas that have been cut and filled is difficult. Hydroseeding is a good way to revegetate bare areas.

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 occurs mainly as areas of a very deep Edneyville soil and a moderately deep Chestnut soil. Both soils are well drained. The unit is on moderately steep, south- to west-facing ridgetops and side slopes in the intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 40 acres in size.

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

Surface layer:
0 to 5 inches, dark brown gravelly fine sandy loam

Subsoil:
5 to 28 inches, strong brown fine sandy loam
28 to 37 inches, yellowish brown sandy loam that has strong brown and yellow mottles

Underlying material:
37 to 60 inches, multicolored sandy loam saprolite

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

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

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches in the Edneyville soil, and the depth to weathered bedrock is 20 to 40 inches in the Chestnut soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Chandler, Cowee, Evard, and Plott soils. Chandler soils have more mica than the Edneyville and Chestnut soils. Cowee and Evard soils are redder than the Edneyville and Chestnut soils and have more clay in the subsoil. They are in the low mountains. Plott soils are on north- to east-facing slopes and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Edneyville and Chestnut soils but have a redder subsoil or have fewer rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or hayland or for crops, building site development, or recreational development.

This map unit is moderately suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Plott soils. The slope and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, shortleaf pine, hickory, yellow-poplar, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting. This map unit is well suited to year-round logging.

This map unit is poorly suited to pasture and hay because of the slope, limited access, and the severe hazard of erosion. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and runoff. Operating farm equipment is difficult because of the slope.

This map unit is poorly suited to crops. The slope, difficult access across the steep terrain, the severe hazard of erosion, and stones are management

concerns. In some areas, cabbage and broccoli are grown. Because of the severe hazard of erosion, the high rainfall, and the limited ground cover during the growing season, the unit is highly susceptible to erosion. Contour rows and diversions minimize erosion, conserve water, and help to control runoff. Grassed field borders and grassed waterways can divert water safely around row crops. Vegetative filter strips can improve water quality and provide wildlife habitat. In most areas, stripcropping is not feasible because of the small size of the fields. No-till and minimum tillage can be used instead of conventional tillage in areas where cabbage and broccoli are grown.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees. The slope, stones, the severe hazard of erosion, and limited access are the main management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. In the areas of high rainfall, Fraser fir is grown for use as Christmas trees. Eastern white pine is grown in other areas. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development because of the slope, difficult access, and the severe hazard of erosion. Also, excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Chestnut soil.

This map unit is moderately suited to some recreational uses, such as campsites, overlooks, and hiking trails. Campsites that have a dependable source of water are scarce in areas on ridgetops. The slope, stones, the severe hazard of erosion, and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to access roads because of the severe hazard of erosion, freezing and thawing, and the slope. Building and maintaining the roads are difficult and costly. Hydroseeding is a good way to revegetate steep, bare areas.

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 occurs mainly as areas of a very deep Edneyville soil and a moderately deep Chestnut soil. Both soils are well drained. The unit is on steep, south- to west-facing ridgetops and side slopes in the intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 40 acres in size. Typically, they are 50 to 60 percent Edneyville soil and 20 to 30 percent Chestnut soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 5 inches, dark brown gravelly fine sandy loam

Subsoil:
5 to 28 inches, strong brown fine sandy loam
28 to 37 inches, yellowish brown sandy loam that has strong brown and yellow mottles

Underlying material:
37 to 60 inches, multicolored sandy loam saprolite

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

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

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches in the Edneyville soil, and the depth to weathered bedrock is 20 to 40 inches in the Chestnut soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Chandler, Cowee, Evard, and Plott soils. Chandler soils have more mica than the Edneyville and Chestnut soils. Cowee and Evard soils are redder than the Edneyville and Chestnut soils and have more clay in the subsoil. They are in the low mountains. Plott soils are on north- to east-facing slopes and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Edneyville and Chestnut soils but have a redder subsoil or have fewer stones on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or hayland or for

specialty crops, recreational development, or building site development.

This map unit is poorly suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Plott soils. The slope and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, shortleaf pine, hickory, yellow-poplar, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting. This map unit is well suited to year-round logging.

This map unit is poorly suited to pasture and is unsuited to hay because of the slope, limited access, and the severe hazard of erosion. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition helps to control erosion and conserve water. Operating farm equipment is dangerous.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees. The slope, difficult access across the steep terrain, stones, and the severe hazard of erosion are management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. In the areas of high rainfall, Fraser fir is grown for use as Christmas trees. Eastern white pine is grown in other areas. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to recreational uses, such as campsites and hiking trails. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns and increase the need for the trails to be properly maintained.

This map unit is poorly suited to building site development. The slope and the severe hazard of erosion are the main management concerns. Also, excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Chestnut soil.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns. Building and maintaining the roads are difficult and costly. Hydroseeding is a good way to revegetate steep, bare areas.

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 occurs mainly as areas of a very deep Edneyville soil and a moderately deep Chestnut soil. Both soils are well drained. The unit is on very steep, south- to west-facing side slopes in the intermediate mountains. Individual areas are irregular in shape and range from 5 to 40 acres in size. Typically, they are 50 to 60 percent Edneyville soil and 20 to 30 percent Chestnut soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 5 inches, dark brown gravelly fine sandy loam

Subsoil:
5 to 28 inches, strong brown fine sandy loam
28 to 37 inches, yellowish brown sandy loam that has strong brown and yellow mottles

Underlying material:
37 to 60 inches, multicolored sandy loam saprolite

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

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

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches in the Edneyville soil, and the depth to weathered bedrock is 20 to 40 inches in the Chestnut soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Chandler, Cowee, Evard, and Plott soils. Chandler soils have more mica than the Edneyville and Chestnut soils. Cowee and Evard soils are redder than the Edneyville and Chestnut soils and have more clay in the subsoil. They are in the low mountains. Plott soils are on north- to east-facing slopes and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Edneyville and Chestnut soils but have a redder subsoil or have fewer rocks on the surface.

Nearly all of the acreage of this map unit is used as woodland. A few areas are used for recreational development.

This map unit is poorly suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Plott soils. The slope and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, shortleaf pine, hickory, yellow-poplar, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting. This map unit is well suited to year-round logging.

The slope restricts the kind of equipment that can be used. Generally, operating wheeled and tracked equipment is dangerous. A cable yarding system is safer, results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to recreational uses. The slope and the severe hazard of erosion are the main management concerns. Some areas have scenic vistas and are used for overlooks, and some areas are used for hiking trails. The slope, the severe hazard of erosion, and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hay, and building site development. The slope and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep, bare areas.

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

EgB2—Ellijay silty clay loam, 2 to 8 percent slopes, eroded. This map unit consists mainly of gently sloping, very deep, well drained Ellijay and similar soils on ridgetops in the low mountains. Individual areas are long and narrow and range from 5 to 20 acres in size.

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

Surface layer:
0 to 4 inches, dusky red silty clay loam

Subsoil:
4 to 34 inches, dark red clay
34 to 52 inches, dark red loam

Underlying material:
52 to 70 inches, mottled yellowish red, reddish yellow, brownish yellow, strong brown, and very pale brown clay loam and loam saprolite

Permeability is moderate. Surface runoff is medium or rapid in areas that have been cleared of trees and slow in wooded areas. This soil has a calcium-magnesium imbalance. Additional calcium from such sources as calcitic limestone or gypsum needs to be applied for the production of most commercial crops. A crust may form on the surface after rainfall, and maintaining good tilth is difficult. Clods form if the soil is worked during wet periods. Crushing the clods is difficult. The crusting and clodding interfere with the germination of seeds.

Included in mapping are small areas of Braddock,

Cowee, and Evard soils. These soils do not have a calcium-magnesium imbalance. Cowee and Evard soils are on the steeper adjacent mountains. They have less clay in the subsoil than the Ellijay soil. Also, Cowee soils are moderately deep to weathered bedrock. Braddock soils are on high stream terraces. They are lighter in color than the Ellijay soil. Also included are small areas of old mines and mine spoil. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Ellijay soil but do not have a dark red subsoil.

Much of the acreage in this map unit is used for building site development. Some areas are used as pasture, hayland, or woodland.

This map unit is moderately suited to building site development. The high content of clay, the severe hazard of erosion, and a moderate shrink-swell potential are management concerns. Because of the calcium-magnesium imbalance, revegetating disturbed areas is difficult. In most areas, supplemental applications of calcium from such sources as calcitic limestone or gypsum are needed to establish and maintain plant cover. A larger septic tank absorption field is needed in some areas because of the high content of clay in the subsoil.

This map unit is only moderately suited to pasture and hay because of the calcium-magnesium imbalance, the slope, and the severe hazard of erosion. Supplemental applications of calcium from such sources as calcitic limestone or gypsum are needed in most areas where plants are becoming established and maintained. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Grazing during wet periods causes severe compaction, which increases the runoff rate and reduces the rate of water infiltration.

This map unit is poorly suited to commercial timber. It produces a lower volume of poorer quality timber and has fewer desirable species than other soils on similar landscapes. Tree growth is poor because of the calcium-magnesium imbalance and past management practices. The most common trees are scarlet oak, chestnut oak, black oak, white oak, pitch pine, Virginia pine, post oak, and hickory. Pitch pine and Virginia pine are dominant in areas that are reverting to woodland. This map unit is not managed for commercial timber because of the poor productivity and the potentially higher profits from building sites, pasture, or hayland.

This map unit is well suited to recreational uses, such as campsites, picnic areas, and hiking trails. It is rarely used for campsites or picnic areas, however, because the unit does not have adequate shade and is not near streams. The slope and the severe hazard of erosion are management concerns. The trails are slick during wet periods. Freezing and thawing increase the need for the trails on south- to west-facing slopes to be properly maintained.

This map unit is poorly suited to access roads. The high content of clay in the subsoil, the severe hazard of erosion, and the moderate shrink-swell potential are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the clay subsoil. Frequent smoothing of the road surface is needed because ruts form as a result of the high content of clay.

The capability subclass is IIIe. Based on Virginia pine as the indicator species, the woodland ordination symbol is 6T.

EgC2—Ellijay silty clay loam, 8 to 15 percent slopes, eroded. This map unit consists mainly of strongly sloping, very deep, well drained Ellijay and similar soils on ridgetops and side slopes in the low mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 20 acres in size.

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

Surface layer:
0 to 4 inches, dusky red silty clay loam

Subsoil:
4 to 34 inches, dark red clay
34 to 52 inches, dark red loam

Underlying material:
52 to 70 inches, mottled yellowish red, reddish yellow, brownish yellow, strong brown, and very pale brown clay loam and loam saprolite

Permeability is moderate. Surface runoff is medium or rapid in areas that have been cleared of trees and slow in wooded areas. This soil has a calcium-magnesium imbalance. Additional calcium from such sources as calcitic limestone or gypsum need to be applied for the production of most commercial crops. A crust may form on the surface after rainfall, and maintaining good tilth is difficult. Clods form if the soil is worked during wet periods. Crushing the clods is difficult. The crusting and clodding interfere with the germination of seeds.

Included in mapping are small areas of Braddock, Cowee, and Evard soils. These soils do not have a calcium-magnesium imbalance. Cowee and Evard soils are on the steeper adjacent mountains. They have less clay in the subsoil than the Ellijay soil. Also, Cowee soils are moderately deep to weathered bedrock. Braddock soils are on high stream terraces. They are

lighter in color than the Ellijay soil. Also included are small areas of old mines and mine spoil. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Ellijay soil but do not have a dark red subsoil.

Much of the acreage in this map unit is used for building site development. Some areas are used as pasture, hayland, or woodland.

This map unit is moderately suited to building site development. The slope, the high content of clay, the severe hazard of erosion, and a moderate shrink-swell potential are the main management concerns. Because of the calcium-magnesium imbalance, revegetating disturbed areas is difficult. In most areas, supplemental applications of calcium from such sources as calcitic limestone or gypsum are needed to establish and maintain plant cover. A larger septic tank absorption field is needed in some areas because of the high content of clay in the subsoil.

This map unit is only moderately suited to pasture and hay because of the calcium-magnesium imbalance, the slope, and the severe hazard of erosion. Supplemental applications of calcium from such sources as calcitic limestone or gypsum are needed in most areas where plants are becoming established and maintained. Erosion is a hazard in sparsely vegetated or overgrazed areas. Grazing during wet periods causes severe compaction, which increases the runoff rate and reduces the rate of water infiltration. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is poorly suited to commercial timber. It produces a lower volume of poorer quality timber and has fewer desirable species than other soils on similar landscapes. Tree growth is poor because of the calcium-magnesium imbalance and past management practices. The most common trees are scarlet oak, chestnut oak, black oak, white oak, pitch pine, Virginia pine, post oak, and hickory. Pitch pine and Virginia pine are dominant in areas that are reverting to woodland. This map unit is not managed for commercial timber because of the poor productivity and the potentially higher profits from building sites, pasture, or hayland.

This map unit is moderately suited to recreational uses, such as campsites, picnic areas, and hiking trails. It is rarely used for campsites or picnic areas, however, because the unit does not have adequate shade and is not near streams. The slope and the severe hazard of erosion are management concerns. The trails are slick during wet periods. Freezing and thawing increase the need for the trails on south- to west-facing slopes to be properly maintained.

This map unit is poorly suited to access roads. The high content of clay, the slope, the severe hazard of erosion, and the moderate shrink-swell potential are management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the clay subsoil. Frequent smoothing of the road surface is needed because ruts form as a result of the high content of clay.

The capability subclass is IVe. Based on Virginia pine as the indicator species, the woodland ordination symbol is 6T.

EgD2—Ellijay silty clay loam, 15 to 30 percent slopes, eroded. This map unit consists mainly of moderately steep, very deep, well drained Ellijay and similar soils on side slopes in the low mountains. Individual areas are irregular in shape and range from 5 to 20 acres in size.

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

Surface layer:
0 to 4 inches, dusky red silty clay loam

Subsoil:
4 to 34 inches, dark red clay
34 to 52 inches, dark red loam

Underlying material:
52 to 70 inches, mottled yellowish red, reddish yellow, brownish yellow, strong brown, and very pale brown clay loam and loam saprolite

Permeability is moderate. Surface runoff is medium or rapid in areas that have been cleared of trees and slow in wooded areas. This soil has a calcium-magnesium imbalance. Additional calcium from such sources as calcitic limestone or gypsum needs to be applied for the production of most commercial crops. A crust may form on the surface after rainfall, and maintaining good tilth is difficult. Clods form if the soil is worked during wet periods. Crushing the clods is difficult. The crusting and clodding interfere with the germination of seeds.

Included in mapping are small areas of Braddock, Cowee, and Evard soils. These soils do not have a calcium-magnesium imbalance. Cowee and Evard soils are on the steeper adjacent mountains. They have less clay in the subsoil than the Ellijay soil. Also, Cowee soils are moderately deep to weathered bedrock. Braddock soils are on high stream terraces. They are lighter in color than the Ellijay soil. Also included are small areas of old mines and mine spoil. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Ellijay soil but do not have a dark red subsoil.

Much of the acreage in this map unit is used as

pasture or hayland. Some areas are used as woodland or for building site development.

The slope, the calcium-magnesium imbalance, and a severe hazard of erosion are the main management concerns affecting pasture and hayland. Supplemental applications of calcium from such sources as calcitic limestone or gypsum are needed in most areas where plants are becoming established and maintained. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Grazing during wet periods causes severe compaction, which increases the runoff rate and reduces the rate of water infiltration. Operating farm equipment is difficult on this map unit.

This map unit is poorly suited to commercial timber. It produces a lower volume of poorer quality timber and has fewer desirable species than other soils on similar landscapes. Tree growth is poor because of the calcium-magnesium imbalance and past management practices. The most common trees are scarlet oak, chestnut oak, black oak, white oak, pitch pine, Virginia pine, post oak, and hickory. Pitch pine and Virginia pine are dominant in areas that are reverting to woodland. This map unit is not managed for commercial timber because of the poor productivity and the higher profits from building sites, pasture, or hayland.

This map unit is poorly suited to building site development because of the slope, the high content of clay, the severe hazard of erosion, and a moderate shrink-swell potential. Because of the calcium-magnesium imbalance, revegetating disturbed areas is a problem. In most areas, supplemental applications of calcitic limestone or gypsum are needed to establish and maintain plant cover. A larger septic tank absorption field is needed in some areas because of the high content of clay in the subsoil.

This map unit is poorly suited to recreational uses, such as campsites, picnic areas, and hiking trails. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, the high content of clay, and the moderate shrink-swell potential are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the clay subsoil. Frequent smoothing of the road surface is needed because ruts form as a result of the high content of clay.

The capability subclass is VIe. Based on Virginia pine as the indicator species, the woodland ordination symbol is 6R.

EvC—Evard-Cowee complex, 8 to 15 percent slopes. This map unit occurs mainly as areas of a very deep Evard soil and a moderately deep Cowee soil. Both soils are well drained. The unit is on strongly sloping, south- to west-facing ridgetops in the low mountains. Individual areas are long and narrow and range from 5 to 50 acres in size. Typically, they are 50 to 60 percent Evard soil and 20 to 30 percent Cowee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

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

Subsoil:
6 to 27 inches, red clay loam
27 to 35 inches, mottled red, yellowish red, and strong brown loam

Underlying material:
35 to 60 inches, multicolored sandy loam saprolite

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

Surface layer:
0 to 5 inches, reddish brown gravelly sandy loam

Subsoil:
5 to 27 inches, red gravelly sandy loam and gravelly sandy clay loam

Weathered bedrock:
27 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderate in both soils. The depth to bedrock is more than 60 inches in the Evard soil. The depth to weathered bedrock is 20 to 40 inches in the Cowee soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Fannin and Saunook soils. Fannin soils have more mica than the Evard and Cowee soils. Saunook soils are along drainageways and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Evard and Cowee soils but have more clay in the subsoil or are browner in color.

Much of the acreage in this map unit is used as woodland. Other areas are used as pasture or hayland or for specialty crops, recreational development, or building site development.

This map unit is well suited to commercial timber. It

produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Trimont soils. The slope, compaction, and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, yellow-poplar, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When this map unit is wet, skid trails and unsurfaced roads are soft and slick because of the slope and the content of clay in the subsoil.

This map unit is well suited to pasture and hay. The slope, difficult access across the steep terrain, and the severe hazard of erosion are management concerns. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is moderately suited to specialty crops, such as apples, landscaping plants, and Christmas trees. The slope, difficult access across the steep terrain, and the severe hazard of erosion are management concerns. The most common landscaping plants are Norway spruce, mountain laurel, and rhododendron. Eastern white pine is grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is moderately suited to building site development. Difficult access across the steep terrain, the slope, and the severe hazard of erosion are the main management concerns. Excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Cowee soil.

This map unit is moderately suited to some recreational uses, such as campsites and hiking trails. Because the unit is on ridgetops, campsites that have a convenient source of water are scarce. The severe hazard of erosion and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to row crops. The slope, difficult access across the steep terrain, and the severe hazard of erosion are management concerns.

This map unit is moderately suited to access roads. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Because unsurfaced roads are easily eroded and are soft and slick when wet, they should be surfaced and properly maintained for year-round use.

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

EvD—Evard-Cowee complex, 15 to 30 percent slopes. This map unit occurs mainly as areas of a very deep Evard soil and a moderately deep Cowee soil. Both soils are well drained. The unit is on moderately steep, south- to west-facing ridgetops and side slopes in the low mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 40 acres in size. Typically, they are 50 to 60 percent Evard soil and 20 to 30 percent Cowee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

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

Subsoil:
6 to 27 inches, red clay loam
27 to 35 inches, mottled red, yellowish red, and strong brown loam

Underlying material:
35 to 60 inches, multicolored sandy loam saprolite

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

Surface layer:
0 to 5 inches, reddish brown gravelly sandy loam

Subsoil:

5 to 27 inches, red gravelly sandy loam and gravelly sandy clay loam

Weathered bedrock:

27 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderate in both soils. The depth to bedrock is more than 60 inches in the Evard soil. The depth to weathered bedrock is 20 to 40 inches in the Cowee soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Fannin and Saunook soils. Fannin soils have more mica than the Evard and Cowee soils. Saunook soils are along drainageways and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Evard and Cowee soils but have more clay in the subsoil or are browner in color.

Much of the acreage in this map unit is used as woodland. Other areas are used as pasture or hayland or for specialty crops, recreational development, or building site development.

This map unit is moderately suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Trimont soils. The slope, compaction, and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, yellow-poplar, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When this map unit is wet, skid trails and unsurfaced roads are soft and slick because of the content of clay.

This map unit is moderately suited to pasture and hayland. The slope, difficult access across the steep terrain, and the severe hazard of erosion are the main management concerns. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and conserves water. Operating farm equipment is difficult on this map unit.

This map unit is moderately suited to specialty crops, such as apples, landscaping plants, and Christmas trees. The slope, difficult access across the steep terrain, and the severe hazard of erosion are the main management concerns. The most common landscaping plants are Norway spruce, mountain laurel, and rhododendron. Eastern white pine is grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development because of the slope, difficult access across the steep terrain, and the severe hazard of erosion. Excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Cowee soil.

This map unit is moderately suited to some recreational uses, such as campsites and hiking trails. Campsites that have a dependable source of water are scarce in areas on ridgetops. The slope, the severe hazard of erosion, and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to row crops. The slope, difficult access across the steep terrain, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate bare areas. Because unsurfaced roads are easily eroded and are soft and slick when wet, they should be surfaced and properly maintained for year-round use.

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 occurs mainly as areas of a very deep Evard soil and a moderately deep Cowee soil. Both soils are well drained. The unit is on steep, south- to west-facing ridgetops and side slopes in the low mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 10 to 75 acres in size. Typically, they are 50 to 60 percent Evard soil and 20 to 30 percent Cowee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

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

Subsoil:
6 to 27 inches, red clay loam
27 to 35 inches, mottled red, yellowish red, and strong brown loam

Underlying material:
35 to 60 inches, multicolored sandy loam saprolite

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

Surface layer:
0 to 5 inches, reddish brown gravelly sandy loam

Subsoil:
5 to 27 inches, red gravelly sandy loam and gravelly sandy clay loam

Weathered bedrock:
27 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderate in both soils. The depth to bedrock is more than 60 inches in the Evard soil. The depth to weathered bedrock is 20 to 40 inches in the Cowee soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of contrasting Fannin and Saunook soils. Fannin soils have more mica than the Evard and Cowee soils. Saunook soils are along drainageways and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Evard and Cowee soils but have a browner subsoil or have more rocks on the surface.

Much of the acreage in this map unit is used as woodland. Other areas are used as pasture or hayland or for specialty crops, recreational development, or building site development.

This map unit is poorly suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Trimont soils. The slope, compaction, and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, yellow-poplar, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the amount and quantity of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When this map unit is wet, skid trails and unsurfaced roads are soft and slick because of the slope and the content of clay.

This map unit is poorly suited to pasture and is unsuited to hay because of the slope, difficult access across the steep terrain, and the severe hazard of erosion. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition helps to control erosion and conserves water. Operating farm equipment is dangerous on this map unit.

This map unit is poorly suited to specialty crops. In some areas, however, specialty crops are grown, especially eastern white pine for use as Christmas trees. The slope and the severe hazard of erosion are management concerns. Operating farm equipment is dangerous on this map unit. Specialty crops generally are planted by hand. A few areas are used for growing Norway spruce, mountain laurel, and rhododendron. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development. The slope and the severe hazard of erosion are the main management concerns. Excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Cowee soil.

This map unit is poorly suited to recreational uses, such as campsites and hiking trails. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns and increase the need for the trails to be properly maintained.

This map unit is unsuited to row crops. The slope and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep, bare areas. Vegetative filter strips can improve water quality and provide wildlife habitat. Because unsurfaced roads are easily eroded and are soft and slick when wet, they should be surfaced and properly maintained for year-round use.

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.

EvF—Evard-Cowee complex, 50 to 95 percent slopes. This map unit occurs mainly as areas of a very deep Evard soil and a moderately deep Cowee soil. Both soils are well drained. The unit is on steep, south- to west-facing side slopes in the low mountains. Individual areas are irregular in shape and range from 10 to 100 acres in size. Typically, they are 50 to 60 percent Evard soil and 20 to 30 percent Cowee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

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

Subsoil:
6 to 27 inches, red clay loam
27 to 35 inches, mottled red, yellowish red, and strong brown loam

Underlying material:
35 to 60 inches, multicolored sandy loam saprolite

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

Surface layer:
0 to 5 inches, reddish brown gravelly sandy loam

Subsoil:
5 to 27 inches, red gravelly sandy loam and gravelly sandy clay loam

Weathered bedrock:
27 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderate in both soils. The depth to bedrock is more than 60 inches in the Evard soil. The depth to weathered bedrock is 20 to 40 inches in the Cowee soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of contrasting Fannin and Saunook soils. Fannin soils have more mica than the Evard and Cowee soils. Saunook soils are along drainageways and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Evard and Cowee soils but have a browner subsoil or have more rocks on the surface.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for recreational development.

This map unit is poorly suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Trimont soils. The slope, compaction, and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, yellow-poplar, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the amount and quantity of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of

wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to recreational uses. A few areas are used for hiking trails. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns and increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hay, or building site development. The slope and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep, bare areas. Because unsurfaced roads are easily eroded and are soft and slick when wet, they should be surfaced and properly maintained for year-round use.

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.

FaC—Fannin fine sandy loam, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, well drained Fannin and similar soils on south- to west-facing ridgetops in the low and intermediate mountains. Individual areas are long and narrow and range from 5 to 40 acres in size.

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

Surface layer:

0 to 3 inches, very dark grayish brown fine sandy loam

Subsoil:

3 to 6 inches, strong brown loam

6 to 42 inches, yellowish red sandy clay loam or sandy loam

Underlying material:

42 to 60 inches, yellowish red sandy loam saprolite

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall increases productivity.

Included in mapping are small areas of Cashiers and Chandler soils. These soils are browner than the Fannin soil and have less clay in the subsoil. Cashiers soils are on north- to east-facing ridgetops and have a dark surface layer that is thicker than that of the Fannin soil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Fannin soil but have a browner subsoil or have more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used for pasture, hay, specialty crops, or building site development.

This map unit is well suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cashiers soils. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, shortleaf pine, northern red oak, Virginia pine, hickory, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, eastern white pine, Virginia pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are very slick because of the slope, the content of clay in the subsoil, and the very high content of mica.

This map unit is well suited to pasture and hay. The severe hazard of erosion and difficult access across the steep terrain are management concerns. Cool-season grasses grow well because they are dormant in the droughty summer months. Erosion is a hazard in areas where plants are becoming established and in sparsely

vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is moderately suited to specialty crops, such as landscaping plants and Christmas trees. The severe hazard of erosion and difficult access across the steep terrain are management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. In the areas of high rainfall, Fraser fir is grown for use as Christmas trees. Eastern white pine is grown in other areas. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is only moderately suited to building site development because of the instability of the saprolite, the severe hazard of erosion, and the slope. Caving of cutbanks is a potential hazard in excavated areas because of the very high content of mica in the underlying material. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness. Hydroseeding is a good way to revegetate bare areas.

This map unit is moderately suited to recreational uses, such as hiking trails or campsites. Erosion is a severe hazard. The trails are very slick during rainy periods. Freezing and thawing increase the need for the trails to be properly maintained. Also, because this map unit is on ridgetops, campsites that have a convenient source of water are scarce.

This map unit is unsuited to row crops. The slope, the severe hazard of erosion, and difficult access across the steep terrain are management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep, bare areas. Because of the very high content of mica, compacting fill material is difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are very slick when wet, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. This soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than the soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

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

FaD—Fannin fine sandy loam, 15 to 30 percent slopes. This map unit consists mainly of moderately steep, very deep, well drained Fannin and similar soils on south- to west-facing ridgetops and side slopes in the low and intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 40 acres in size.

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

Surface layer:
0 to 3 inches, very dark grayish brown fine sandy loam

Subsoil:
3 to 6 inches, strong brown loam
6 to 42 inches, yellowish red sandy clay loam or sandy loam

Underlying material:
42 to 60 inches, yellowish red sandy loam saprolite

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall increases productivity.

Included in mapping are small areas of Cashiers and Chandler soils. These soils are browner than the Fannin soil and have less clay in the subsoil. Cashiers soils are on north- to east-facing ridgetops and side slopes and have a dark surface layer that is thicker than that of the Fannin soil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Fannin soil but have a browner subsoil or have more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used for pasture, hay, specialty crops, or building site development.

This map unit is moderately suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cashiers soils. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, Virginia pine, shortleaf pine, hickory, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, eastern white pine, Virginia pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are very slick because of the slope, the content of clay in the subsoil, and the very high content of mica.

This map unit is moderately suited to pasture and hay. The severe hazard of erosion and difficult access across the steep terrain are management concerns. Cool-season grasses grow well because they are dormant in the droughty summer months. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees. The slope, the severe hazard of erosion, and difficult access across the steep terrain are management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. In the areas of high rainfall, Fraser fir is grown for use as Christmas trees. Eastern white pine is grown in other areas. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development because of the slope, the instability of the underlying saprolite, and the severe hazard of erosion. Caving of cutbanks is a potential hazard in excavated areas because of the very high content of mica in the underlying material. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness. Hydroseeding is a good way to revegetate bare areas.

This map unit is poorly suited to recreational uses. A few areas are used for hiking trails or campsites. Erosion is a severe hazard. The trails are very slick during rainy periods. Freezing and thawing increase the need for the trails to be properly maintained. Also, because this map unit is on ridgetops, convenient sources of water are scarce.

This map unit is unsuited to row crops. The slope, the severe hazard of erosion, and difficult access across the steep terrain are management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate bare areas. Because of the very high content of mica, compacting fill material is difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are very slick when wet, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. This soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than the soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

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

FaE—Fannin fine sandy loam, 30 to 50 percent slopes. This map unit consists mainly of steep, very deep, well drained Fannin and similar soils on south- to west-facing ridgetops and side slopes in the low and intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 40 acres in size.

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

Surface layer:

0 to 3 inches, very dark grayish brown fine sandy loam

Subsoil:

3 to 6 inches, strong brown loam

6 to 42 inches, yellowish red sandy clay loam or sandy loam

Underlying material:

42 to 60 inches, yellowish red sandy loam saprolite

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas

where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall increases productivity.

Included in mapping are small areas of Cashiers and Chandler soils. These soils are browner than the Fannin soil and have less clay in the subsoil. Cashiers soils are on north- to east-facing ridgetops and side slopes and have a dark surface layer that is thicker than that of the Fannin soil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Fannin soil but have a browner subsoil or have more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used for pasture, hay, specialty crops, or building site development.

This map unit is poorly suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cashiers soils. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are the main management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, yellow-poplar, shortleaf pine, eastern white pine, pitch pine, Virginia pine, hickory, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, eastern white pine, Virginia pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are very slick because of the slope, the content of clay in the subsoil, and the very high content of mica.

This map unit is poorly suited to pasture and unsuited to hayland. The slope and the severe hazard of erosion are the main management concerns. Cool-season grasses grow well because they are dormant in the droughty summer months. Operating farm equipment is dangerous on this map unit. Generally, weeds are controlled and fertilizer and lime are applied by hand. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition helps to control erosion and conserves water.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees. The slope and the severe hazard of erosion are the main management concerns. Operating farm equipment is dangerous on this map unit. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. In the areas of high rainfall, Fraser fir is grown for use as Christmas trees. Eastern white pine is grown in other areas. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development because of the slope, the instability of the underlying saprolite, and the severe hazard of erosion. Caving of cutbanks also is a potential hazard in excavated areas because of the very high content of mica in the underlying material. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness. Hydroseeding is a good way to revegetate bare areas.

This map unit is poorly suited to most recreational uses. Some areas are used for hiking trails. The slope and the severe hazard of erosion are management concerns. The trails are very slick during rainy periods. The slope and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to row crops. The slope and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate bare areas. Because of the very high content of mica, compacting fill material is difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are very slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. This soil requires more culverts, broad-based dips, and

water bars to control runoff and erosion than the soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

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

FaF—Fannin fine sandy loam, 50 to 95 percent slopes. This map unit consists mainly of very steep, very deep, well drained Fannin and similar soils on south- to west-facing side slopes in the low and intermediate mountains. Individual areas are irregular in shape and range from 5 to 40 acres in size.

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

Surface layer:
0 to 3 inches, very dark grayish brown fine sandy loam

Subsoil:
3 to 6 inches, strong brown loam
6 to 42 inches, yellowish red sandy clay loam or sandy loam

Underlying material:
42 to 60 inches, yellowish red sandy loam saprolite

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall increases productivity.

Included in mapping are small areas of Cashiers and Chandler soils. These soils are browner than the Fannin soil and have less clay in the subsoil. Cashiers soils are on north- to east-facing ridgetops and side slopes and have a dark surface layer that is thicker than that of the Fannin soil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Fannin soil but have a browner subsoil or have more rocks on the surface.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for hiking trails and scenic overlooks.

This map unit is poorly suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cashiers soils. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are the main management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, Virginia pine, hickory, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, eastern white pine, Virginia pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is unsuited to nearly all recreational uses. A few areas are used for hiking trails and scenic overlooks. The slope and the severe hazard of erosion are the main management concerns. The trails are very slick during rainy periods. The slope and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to pasture, hayland, building site development, and crops. The slope and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate bare areas. Because of the very high content of mica, compacting fill material is difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are very slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. This soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than the soils that have a lower content of mica. These measures

allow water to be removed more often and in smaller amounts.

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

HpA—Hemphill clay loam, 0 to 3 percent slopes, rarely flooded. This map unit consists of nearly level, very deep, very poorly drained Hemphill and similar soils in depressions on low stream terraces. Individual areas are long bands near the area of contact between the flood plains and the uplands. They range from 2 to 25 acres in size.

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

Surface layer:
0 to 13 inches, very dark gray clay loam

Subsoil:
13 to 38 inches, dark grayish brown and grayish brown clay and clay loam having yellowish brown and strong brown mottles
38 to 64 inches, light brownish gray loam and fine sandy loam having strong brown and dark yellowish brown mottles

Underlying material:
64 to 80 inches, dark gray fine sandy loam

Permeability is slow. Surface runoff is slow. Crusting increases the hazard of ponding where outlets have been blocked. This soil is rarely flooded for brief periods. The seasonal high water table is at the surface to 1 foot below the surface. This soil has a narrow moisture range for tillage operations. Tillage is extremely difficult when the surface layer is too dry. Large clods form easily when this soil is tilled when it is too wet.

Included in mapping are small areas of Dillard and Nikwasi soils. Dillard soils are moderately well drained. They have less clay than the Hemphill soil and are on elevated knolls. Nikwasi soils are moderately deep to strata of gravel, cobbles, and sand. The strata have more than 35 percent rock fragments. Also, Nikwasi soils are along small streams on flood plains that are subject to frequent flooding. Also included are small areas of somewhat poorly drained soils. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Hemphill soil but have a thinner surface layer or a surface layer that has less clay.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for row crops or as woodland.

This map unit is only moderately suited to pasture and hay because of the wetness, the flooding, the ponding, and runoff from the higher adjacent areas. A drainage system is essential. Installing a tile drainage system is difficult and costly because of the high content of clay in the subsoil, the nearly level slope, and poor outlets. An open ditch drainage system is a better way to drain this soil. Land shaping helps to open outlets and drain surface water from depressions. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Properly locating watering facilities and stream crossings helps to prevent damage to streambanks.

This map unit is unsuited to crops in undrained areas and is moderately suited in drained areas. The ponding, the wetness, crusting, runoff from the higher adjacent areas, and the flooding are the main management concerns. Large clods form easily if this soil is tilled when it is wet. The most common crops are silage corn, sweet corn, and strawberries. Properly designed plowing patterns are needed to keep drainage outlets open and to prevent the formation of depressions. Water management measures similar to those used for pasture and hayland are used for row crops. Vegetative filter strips can improve water quality and provide wildlife habitat. Some herbicides may be ineffective because of the organic matter content in the surface layer.

This map unit is poorly suited to commercial timber. The wetness, the flooding, and the ponding are the main management concerns. Yellow-poplar is the most common tree. Alder and red maple are dominant in areas that are reverting to woodland. Also, yellow birch, eastern hemlock, and eastern white pine grow on this soil. This soil is rarely used for commercial timber because of the small size of the mapped areas and the potentially higher profits from crops, pasture, or hayland.

This map unit is poorly suited to building site development because of the flooding, the wetness, runoff from the higher adjacent areas, the ponding, and a high shrink-swell potential.

This map unit is poorly suited to recreational uses, such as parks, picnic areas, ball fields, and tennis courts. The wetness, the flooding, and the ponding are the main management concerns. Water management practices similar to those used in pasture and hayland are appropriate.

This map unit is poorly suited to access roads. The flooding, the wetness, runoff from the higher adjacent areas, the ponding, and a high shrink-swell potential are the main management concerns. Because unsurfaced roadbeds are soft and very slick when wet, the roads should be surfaced for year-round use. The roads

should be designed so that runoff from the higher adjacent areas is diverted away from the roadbed. Elevating the roadbeds during construction minimizes the damage caused by flooding.

The capability subclass is VIw in undrained areas and IVw in drained areas. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 6W.

JbD—Junaluska-Brasstown complex, 15 to 30 percent slopes. This map unit occurs mainly as areas of a moderately deep Junaluska soil and a deep Brasstown soil. Both soils are well drained. The unit is on moderately steep, south- to west-facing ridgetops in the low mountains. Individual areas are long and narrow and range from 5 to 50 acres in size. Typically, they are 35 to 45 percent Junaluska soil and 35 to 45 percent Brasstown soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 3 inches, dark brown channery fine sandy loam

Subsoil:
3 to 13 inches, strong brown channery loam
13 to 28 inches, yellowish red channery clay loam

Weathered bedrock:
28 to 60 inches, multicolored, weathered, fractured metasedimentary bedrock

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

Surface layer:
0 to 4 inches, dark brown channery fine sandy loam

Subsoil:
4 to 45 inches, yellowish red and red channery sandy clay loam and clay loam
45 to 50 inches, yellowish red channery fine sandy loam

Weathered bedrock:
50 to 60 inches, multicolored, weathered, fractured metasedimentary bedrock

Permeability is moderate in both soils. The depth to weathered bedrock is 20 to 40 inches in the Junaluska soil and 40 to 60 inches in the Brasstown soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Tsali soils in highly dissected areas. These soils are shallow to weathered bedrock. Included soils make up about 10 percent of this map unit.

Also included in mapping are soils that are similar to the Junaluska and Brasstown soils but have a browner subsoil or have more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or hayland or for recreational purposes or building site development.

This map unit is moderately suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cheoah soils. The slope, soil compaction, and the severe hazard of erosion are the main management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, northern red oak, shortleaf pine, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and hardwood seedlings are not available. In cutover areas, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soils are wet, skid trails and unsurfaced roads are soft and slick because of the slope and the content of clay in the subsoil.

This map unit is only moderately suited to pasture and hay because of the slope, difficult access across the steep terrain, and the severe hazard of erosion. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and conserves water. Operating farm equipment is difficult on this map unit.

This map unit is poorly suited to building site development because of difficult access across the steep terrain, the slope, and the severe hazard of erosion. Excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock.

This map unit is moderately suited to some

recreational uses, such as hiking trails or campsites. Campsites on ridgetops that have a dependable source of water are scarce. The slope, freezing and thawing, and the severe hazard of erosion are the main management concerns.

This map unit is unsuited to row crops. The slope, difficult access across the steep terrain, and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the depth to weathered bedrock, the instability of the underlying bedrock, and the severe hazard of erosion are the main management concerns. Revegetating areas that have been cut and filled is difficult because of the slope and slumping. Hydroseeding is a good way to revegetate bare areas. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may also expose seams of rocks bearing a large amount of sulfur. Water flowing from exposed seams of these rocks may increase the acidity of streams and kill aquatic life.

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

JbE—Junaluska-Brasstown complex, 30 to 50 percent slopes. This map unit occurs mainly as areas of a moderately deep Junaluska soil and a deep Brasstown soil. Both soils are well drained. The unit is on steep, south- to west-facing ridgetops and side slopes in the low mountains. Individual areas on ridgetops are long and narrow, and individual areas on side slopes are irregular in shape. They range from 5 to 50 acres in size. Typically, they are 35 to 45 percent Junaluska soil and 35 to 45 percent Brasstown soil. The two soils are too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 3 inches, dark brown channery fine sandy loam

Subsoil:
3 to 13 inches, strong brown channery loam
13 to 28 inches, yellowish red channery clay loam

Weathered bedrock:
28 to 60 inches, multicolored, weathered, fractured metasedimentary bedrock

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

Surface layer:
0 to 4 inches, dark brown channery fine sandy loam

Subsoil:
4 to 45 inches, yellowish red and red channery sandy clay loam and clay loam
45 to 50 inches, yellowish red channery fine sandy loam

Weathered bedrock:
50 to 60 inches, multicolored, weathered, fractured metasedimentary bedrock

Permeability is moderate in both soils. The depth to weathered bedrock is 20 to 40 inches in the Junaluska soil and 40 to 60 inches in the Brasstown soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Santeetlah, Spivey, and Tsali soils. Santeetlah and Spivey soils are along drainageways and have a dark surface layer. These soils are very deep to weathered bedrock. Also, Spivey soils have more than 35 percent rock fragments in the subsoil. Tsali soils are in highly dissected areas and are shallow to weathered bedrock. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Junaluska and Brasstown soils but have a browner subsoil or have more rocks on the surface.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for recreational purposes, such as hiking trails, and a few areas are used for building site development.

This map unit is poorly suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cheoah soils. The slope, soil compaction, and the severe hazard of erosion are the main management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, shortleaf pine, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black

locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and hardwood seedlings are not available. In cutover areas, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soils are wet, skid trails and unsurfaced roads are soft and slick because of the slope and the content of clay in the subsoil.

This map unit is poorly suited to building site development because of the slope, the severe hazard of erosion, and difficult access across the steep terrain. Excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Junaluska soil.

This map unit is unsuited to most recreational uses. A few areas are used for hiking trails. The slope, freezing and thawing, and the severe hazard of erosion are management concerns.

This map unit is unsuited to crops and hay and is poorly suited to pasture. The slope, difficult access across the steep terrain, and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the depth to weathered bedrock, the instability of the underlying bedrock, and the severe hazard of erosion are the main management concerns. Revegetating areas that have been cut and filled is difficult because of the slope and slumping. Hydroseeding is a good way to revegetate bare areas. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may also expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks may increase the acidity of streams and kill aquatic life.

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

JtD—Junaluska-Tsali complex, 15 to 30 percent slopes. This map unit occurs mainly as areas of a moderately deep, well drained Junaluska soil and a shallow, well drained Tsali soil. The unit is on moderately steep, south- to west-facing ridgetops in the low mountains. Individual areas are long and narrow and range from 10 to 25 acres in size. Typically, they are 60 to 70 percent Junaluska soil and 20 to 30 percent Tsali soil. The two soils are too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 3 inches, dark brown channery fine sandy loam

Subsoil:
3 to 13 inches, strong brown channery loam
13 to 28 inches, yellowish red channery clay loam

Weathered bedrock:
28 to 60 inches, multicolored, weathered, fractured metasedimentary bedrock

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

Surface layer:
0 to 3 inches, dark brown channery fine sandy loam

Subsoil:
3 to 6 inches, brown channery fine sandy loam
6 to 16 inches, yellowish red channery loam

Weathered bedrock:
16 to 40 inches, multicolored, weathered, fractured metasedimentary bedrock

Permeability is moderate in both soils. The depth to weathered bedrock is 20 to 40 inches in the Junaluska soil and 10 to 20 inches in the Tsali soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Brasstown soils. These soils are deep to weathered bedrock and are on the widest part of the ridgetops. Also included are areas of soils that have more than 35 percent rock fragments in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Junaluska and Tsali soils but have a browner subsoil or have more rocks on the surface.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for outdoor recreational purposes, such as hiking trails and campsites.

This map unit is poorly suited to commercial timber The slope, the depth to bedrock, and the severe hazard

of erosion are the main management concerns. The most common trees are scarlet oak, chestnut oak, eastern white pine, pitch pine, Virginia pine, white oak, shortleaf pine, black oak, northern red oak, and hickory.

Eastern white pine generally is preferred for commercial timber. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. During wet periods, skid trails and unsurfaced roads are soft, slick, and dangerous because of the content of clay in the subsoil and the slope.

This map unit is poorly suited to recreational uses, such as hiking trails and campsites. The slope, the depth to bedrock, and the severe hazard of erosion are the main management concerns. Because this map unit is on ridgetops, campsites that have a convenient source of water are rare. The trails are slick during wet periods. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to pasture, building site development, and crops. The slope, the depth to bedrock, and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the depth to bedrock, the instability of the underlying bedrock, and the severe hazard of erosion are the main management concerns. Revegetating areas that have been cut and filled is difficult because of the slope, freezing and thawing, and slumping. Hydroseeding is a good way to revegetate bare areas. Building the roadbeds on the natural soil, where possible, minimizes slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may also expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

The capability subclass is VIe. Based on scarlet oak as the indicator species, the woodland ordination symbol is 3R in areas of the Junaluska soil and 2D in areas of the Tsali soil.

JtE—Junaluska-Tsali complex, 30 to 50 percent slopes. This map unit occurs mainly as areas of a moderately deep, well drained Junaluska soil and a shallow, well drained Tsali soil. The unit is on steep, south- to west-facing ridgetops and side slopes in the low mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 10 to 25 acres in size. Typically, they are 60 to 70 percent Junaluska soil and 20 to 30 percent Tsali soil. The two soils are too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 3 inches, dark brown channery fine sandy loam

Subsoil:
3 to 13 inches, strong brown channery loam
13 to 28 inches, yellowish red channery clay loam

Weathered bedrock:
28 to 60 inches, multicolored, weathered, fractured metasedimentary bedrock

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

Surface layer:
0 to 3 inches, dark brown channery fine sandy loam

Subsoil:
3 to 6 inches, brown channery fine sandy loam
6 to 16 inches, yellowish red channery loam

Weathered bedrock:
16 to 40 inches, multicolored, weathered, fractured metasedimentary bedrock

Permeability is moderate in both soils. The depth to weathered bedrock is 20 to 40 inches in the Junaluska soil and 10 to 20 inches in the Tsali soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Brasstown soils. These soils are deep to weathered bedrock and are on the widest part of the ridgetops. Also included are areas of soils that have more than 35 percent rock fragments in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Junaluska and Tsali soils but have a browner subsoil or have more rocks on the surface.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for outdoor

recreational purposes, such as hiking trails.

This map unit is poorly suited to commercial timber. The slope, the depth to bedrock, and the severe hazard of erosion are the main management concerns. The most common trees are scarlet oak, chestnut oak, eastern white pine, pitch pine, Virginia pine, white oak, shortleaf pine, black oak, northern red oak, and hickory.

Eastern white pine generally is preferred for commercial timber. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. During wet periods, skid trails and unsurfaced roads are soft, slick, and dangerous because of the content of clay in the subsoil and the slope.

This map unit is poorly suited to recreational uses, such as hiking trails. The slope and the severe hazard of erosion are the main management concerns. The trails are slick during wet periods. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to pasture, building site development, and crops. The slope, the depth to bedrock, and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the instability of the underlying bedrock, and the severe hazard of erosion are the main management concerns. Revegetating areas that have been cut and filled is difficult because of the slope, freezing and thawing, and slumping. Hydroseeding is a good way to revegetate bare areas. Building the roadbeds on the natural soil, where possible, minimizes slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is thinly bedded and is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic (fig. 12). Road construction may also expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

The capability subclass is VIIe. Based on scarlet oak as the indicator species, the woodland ordination symbol is 3R in areas of the Junaluska soil and 2R in areas of the Tsali soil.

JtF—Junaluska-Tsali complex, 50 to 95 percent slopes. This map unit occurs mainly as areas of a moderately deep, well drained Junaluska soil and a shallow, well drained Tsali soil. The unit is on very steep, south- to west-facing side slopes in the low mountains. Individual areas are irregular in shape. They range from 10 to 75 acres in size. Typically, they are 60 to 70 percent Junaluska soil and 20 to 30 percent Tsali soil. The two soils are too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 3 inches, dark brown channery fine sandy loam

Subsoil:
3 to 13 inches, strong brown channery loam
13 to 28 inches, yellowish red channery clay loam

Weathered bedrock:
28 to 60 inches, multicolored, weathered, fractured metasedimentary bedrock

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

Surface layer:
0 to 3 inches, dark brown channery fine sandy loam

Subsoil:
3 to 6 inches, brown channery fine sandy loam
6 to 16 inches, yellowish red channery loam

Weathered bedrock:
16 to 40 inches, multicolored, weathered, fractured metasedimentary bedrock

Permeability is moderate in both soils. The depth to weathered bedrock is 20 to 40 inches in the Junaluska soil and 10 to 20 inches in the Tsali soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Brasstown soils. These soils are deep to weathered bedrock and are on the widest part of the ridgetops. Also included are areas of soils that have more than 35 percent rock fragments and weathered bedrock at a depth of less than 10 inches. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Junaluska and Tsali soils but have a browner subsoil or have more rocks on the surface.

Nearly all of the acreage in this map unit is used as

Figure 12.—An area of thinly bedded, unstable, low-grade metasedimentary bedrock underlying Junaluska-Tsali complex, 30 to 50 percent slopes, that is very susceptible to landslides.

woodland. A few areas are used for hiking trails.

This map unit is poorly suited to commercial timber. The slope, the depth to bedrock, and the severe hazard of erosion are the main management concerns. The most common trees are scarlet oak, chestnut oak, eastern white pine, pitch pine, Virginia pine, white oak, shortleaf pine, black oak, northern red oak, and hickory.

Eastern white pine generally is preferred for commercial timber. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to most recreational uses. A few areas are used for hiking trails. The slope, the depth to bedrock, and the severe hazard of erosion are management concerns. The trails are slick during wet periods. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to pasture, building site development, and crops. The slope, the depth to bedrock, and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the instability of the underlying bedrock, and the severe hazard of erosion are the main management concerns. Revegetating areas that have been cut and filled is difficult because of the slope and slumping and repeated freezing and thawing on south- to west-facing slopes. Building the roadbeds on the natural soil, where possible, minimizes slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may also expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

The capability subclass is VIIe. Based on scarlet oak as the indicator species, the woodland ordination symbol is 3R in areas of the Junaluska soil and 2R in areas of the Tsali soil.

NkA—Nikwasi fine sandy loam, 0 to 2 percent slopes, frequently flooded. This map unit consists mainly of nearly level, poorly drained and very poorly drained Nikwasi and similar soils that are very deep to bedrock and moderately deep to strata of gravel, cobbles, and sand. The strata have more than 35 percent rock fragments. The unit is in depressions on flood plains along small streams. Individual areas are long and narrow bands and range from 2 to 40 acres in size.

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

Surface layer:

0 to 26 inches, very dark grayish brown and very dark gray fine sandy loam

Underlying material:

26 to 60 inches, dark grayish brown and multicolored extremely gravelly coarse sand

Permeability is moderately rapid in the upper layers and rapid in the underlying material. Surface runoff is very slow or ponded. The soil is frequently flooded for very brief periods. The seasonal high water table is at the surface to 1 foot below the surface.

Included in mapping are small areas of Cullowhee, Dellwood, and Reddies soils. Cullowhee soils are somewhat poorly drained and are in slight depressions. Dellwood soils are moderately well drained and have more than 35 percent rock fragments in the subsoil. These soils are in areas scoured by floodwaters. Reddies soils are moderately well drained and are on small elevated knolls. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Nikwasi soil but have a thinner surface layer or have 4 to 10 inches of light colored, recent overwash near the area of contact between the flood plains and the uplands.

Most of the acreage in this map unit is used as pasture. Some areas are used as woodland or are abandoned cropland that is reverting to woodland.

This map unit is poorly suited to pasture in undrained areas and is moderately suited to pasture or hayland in drained areas. Where drained, it is commonly used for pasture in nearly level areas that have easy access. The flooding, the wetness, the ponding, soil compaction, runoff from the higher adjacent areas, and damage to streambanks are serious management concerns. A tile drainage system is difficult and costly to install because of the shallowness to extremely gravelly

Figure 13.—Operating equipment for harvesting timber is difficult during wet periods on Nikwasi fine sandy loam, 0 to 2 percent slopes, frequently flooded.

layers, the nearly level slope, and limited outlets. Land shaping helps to open outlets and drain surface water from depressions. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Properly locating watering facilities and stream crossings can minimize damage to streambanks.

This map unit is unsuited to crops because of the flooding, the wetness, and the ponding. Also, cultivating this soil is difficult when it is wet.

This map unit is poorly suited to commercial timber. The flooding, the wetness, and the ponding are the main management concerns (fig. 13). The most common trees in wooded areas are yellow-poplar, eastern white pine, sweet birch, yellow birch, American sycamore, and eastern hemlock. Alder and red maple are dominant in areas that are reverting to woodland. Plant competition is severe. In cutover stands the dense understory of rhododendron is very difficult to control.

This soil produces an excellent crop of hardwoods or eastern white pine if managed properly. Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. Reforestation of hardwoods

occurs dominantly through sprouting. Cutting all of the trees and large shrubs increases the number and quality of the sprouts.

In previously cleared areas eastern white pine can be successfully established. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs.

Care is needed to prevent soil compaction by heavy equipment during site preparation, management, and harvesting. The use of heavy equipment should be restricted to dry periods or to periods when the ground is frozen. When the soil is wet, skid trails and unsurfaced roads are very slick because of the wetness and the organic matter content in the surface layer.

This map unit is poorly suited to recreational uses because of the flooding, the wetness, and the ponding. Water management practices similar to those used in pasture management are appropriate.

This map unit is poorly suited to access roads. The flooding, the wetness, runoff from the higher adjacent areas, and the ponding are the main management concerns. Elevating the roads during construction provides a suitable roadbed and minimizes the damage caused by flooding. The roadbeds should be designed so that runoff is diverted.

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

OcD—Oconaluftee channery loam, 15 to 30 percent slopes. This map unit consists mainly of moderately steep, very deep, well drained Oconaluftee and similar soils on ridgetops in the high mountains. Individual areas are long and narrow and range from 10 to 50 acres in size.

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

Surface layer:
0 to 19 inches, black and dark brown channery loam

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

Underlying material:
35 to 67 inches, olive brown, white, gray, and black channery fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The climate is severe. It is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Wayah soils. These soils formed from high-grade metamorphic bedrock. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Wayah soils are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. These soils are similar to the Oconaluftee soil in appearance. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Oconaluftee soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Much of the acreage in this map unit is wooded. Some areas are used for outdoor recreational purposes, such as campsites, hiking trails, and scenic overlooks. A few areas are in grassy balds or heath balds. Nearly all of this map unit is in the Cherokee Indian Reservation or along the Blue Ridge Parkway.

This map unit is only moderately suited to commercial timber. The slope, the climate, and a severe hazard of erosion are the main management concerns. Productivity is reduced by the severe climate. The unit is commonly used for timber production, however, because of the desirable species, which help to compensate for some of the management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, sweet birch, eastern hemlock, yellow buckeye, American beech, and black oak at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black

cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and from various environmental factors. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester.

Restricting the use of heavy equipment to dry periods helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope and the content of organic matter in the surface layer.

This map unit is moderately suited to some recreational uses. Overlooks and hiking trails are the major uses. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hayland, and building site development. The slope, difficult access across the steep terrain, the cold climate, stones, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope and the instability of the underlying saprolite are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas. Building the roadbeds on the natural soil, where possible, minimizes slumping. Outsloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying saprolite is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

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

OcE—Oconaluftee channery loam, 30 to 50 percent slopes. This map unit consists mainly of steep, very deep, well drained Oconaluftee and similar soils on side slopes and ridgetops in the high mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. Individual areas range from 10 to 80 acres in size.

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

Surface layer:
0 to 19 inches, black and dark brown channery loam

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

Underlying material:
35 to 67 inches, olive brown, white, gray, and black channery fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The climate is severe. It is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Wayah soils. These soils formed from high-grade metamorphic bedrock. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Wayah soils are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. These soils are similar to the Oconaluftee soil in appearance. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Oconaluftee soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Much of the acreage in this map unit is wooded. Some areas are used for outdoor recreational purposes, such as hiking trails and scenic overlooks. A few areas are in grassy balds or heath balds. Nearly all of this map unit is in the Cherokee Indian Reservation or along the Blue Ridge Parkway.

This soil is poorly suited to commercial timber. The slope, the climate, and the severe hazard of erosion are the main management concerns. The productivity is reduced by the severe climate. The unit is commonly used for timber production, however, because of the desirable species, which help to compensate for some

of the management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, sweet birch, eastern hemlock, yellow buckeye, American beech, and black oak at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and various environmental factors. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester.

Restricting the use of heavy equipment to dry periods helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope and the content of organic matter in the surface layer.

This map unit is poorly suited to outdoor recreational uses. Some areas, however, are used for hiking trails and scenic overlooks. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hayland, or building site development. The slope, difficult access across the steep terrain, the cold climate, stones, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope and the instability of the underlying saprolite are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas. Building the roadbeds on the natural soil, where possible, minimizes slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying saprolite is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks may increase the acidity of streams and kill aquatic life.

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 map unit consists mainly of very steep, very deep, well drained Oconaluftee and similar soils on side slopes in the high mountains. Individual areas are irregular in shape and range from 10 to 50 acres in size.

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

Surface layer:
0 to 19 inches, black and dark brown channery loam

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

Underlying material:
35 to 67 inches, olive brown, white, gray, and black channery fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The climate is severe. It is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Wayah soils. These soils formed from high-grade metamorphic bedrock. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Wayah soils are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. These soils are similar to the Oconaluftee soil in appearance. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Oconaluftee soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface

layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Much of the acreage in this map unit is wooded. A few areas are used for outdoor recreational purposes, such as hiking trails and scenic overlooks. Nearly all of this map unit is in the Cherokee Indian Reservation or along the Blue Ridge Parkway.

This map unit is poorly suited to commercial timber. The slope, the climate, and a severe hazard of erosion are the main management concerns. The productivity is reduced by the severe climate. The unit is commonly used for timber production, however, because of the desirable species, which help to compensate for some of the management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, sweet birch, eastern hemlock, yellow buckeye, American beech, and black oak at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and from various environmental factors. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to most recreational uses. A few areas are used for overlooks and hiking trails. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is not suited to crops, pasture, hayland, and building site development because of the slope, difficult access across the steep terrain, the cold climate, stones, and the severe hazard of erosion.

This map unit is poorly suited to access roads. The slope and the instability of the underlying saprolite are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas. Building the roadbeds on the natural soil, where possible, minimizes slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying saprolite is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks may increase the acidity of streams and kill aquatic life.

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 map unit consists mainly of moderately steep, very deep, well drained Oconaluftee and similar soils on ridgetops in the high mountains. Individual areas are long and narrow and range from 10 to 50 acres in size.

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

Surface layer:
0 to 19 inches, black and dark brown channery loam

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

Underlying material:
35 to 67 inches, olive brown, white, gray, and black channery fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The climate is severe. It is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Wayah soils. These soils formed from high-grade metamorphic bedrock. Burton and Craggey

soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Wayah soils are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. These soils are similar to the Oconaluftee soil in appearance. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Oconaluftee soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Much of the acreage in this map unit is wooded. Some areas are used for outdoor recreational purposes, such as campsites, hiking trails, and scenic overlooks. A few areas are in grassy balds or heath balds. Nearly all of this map unit is in the Cherokee Indian Reservation or along the Blue Ridge Parkway.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. Limited access and a severe hazard of erosion also are management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is moderately suited to outdoor recreational uses, such as hiking trails, campsites, and scenic overlooks. The slope and the severe hazard of erosion are the main management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hayland, and building site development because of the slope, difficult access across the steep terrain, the cold climate, stones, and the severe hazard of erosion.

This map unit is poorly suited to access roads. The slope and the instability of the underlying saprolite are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas. Building the roadbeds on the natural soil, where possible, minimizes slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use. The cold temperatures and frequent ice storms in winter increase the costs of maintaining the roads.

The underlying saprolite is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

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 map unit consists mainly of steep, very deep, well drained Oconaluftee and similar soils on ridgetops and side slopes in the high mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 10 to 50 acres in size.

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

Surface layer:
0 to 19 inches, black and dark brown channery loam

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

Underlying material:
35 to 67 inches, olive brown, white, gray, and black channery fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The climate is severe. It is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Wayah soils. These soils formed from high-grade metamorphic bedrock. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Wayah soils are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. These soils are similar

to the Oconaluftee soil in appearance. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Oconaluftee soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Much of the acreage in this map unit is wooded. Some areas are used for outdoor recreational purposes, such as campsites, hiking trails, and scenic overlooks. A few areas are in grassy balds or heath balds. Nearly all of this map unit is in the Cherokee Indian Reservation or along the Blue Ridge Parkway.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, limited access, and a severe hazard of erosion are also management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is poorly suited to outdoor recreational uses. Some areas, however, are used for hiking trails or scenic overlooks. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hayland, and building site development. The slope, difficult access across the steep terrain, the cold climate, stones, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope and the instability of the underlying saprolite are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas. Building the roadbeds on the natural soil, where possible, minimizes slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use. The cold temperatures and frequent ice storms in winter increase the costs of maintaining the roads.

The underlying saprolite is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

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

OwF—Oconaluftee channery loam, windswept, 50 to 95 percent slopes. This map unit consists mainly of very steep, very deep, well drained Oconaluftee and similar soils on side slopes in the high mountains. Individual areas are irregular in shape and range from 10 to 50 acres in size.

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

Surface layer:
0 to 19 inches, black and dark brown channery loam

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

Underlying material:
35 to 67 inches, olive brown, white, gray, and black channery fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The climate is severe. It is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Wayah soils. These soils formed from high-grade metamorphic bedrock. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Wayah soils are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. These soils are similar to the Oconaluftee soil in appearance. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Oconaluftee soil but have a dark surface layer that

is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Much of the acreage in this map unit is wooded. Some areas are used for outdoor recreational purposes, such as hiking trails and scenic overlooks. Nearly all of this map unit is in the Cherokee Indian Reservation or along the Blue Ridge Parkway.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, limited access, and a severe hazard of erosion are also management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is poorly suited to recreational uses. Some areas, however, are used for hiking trails or scenic overlooks. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hayland, and building site development. The slope, difficult access across the steep terrain, the cold climate, stones, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope and the instability of the underlying saprolite are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas. Building the roadbeds on the natural soil, where possible, minimizes slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use. Freezing and thawing in spring and fall and frequent ice storms in winter increase the costs of maintaining the roads.

The underlying saprolite is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

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

Pt—Pits, quarries. This map unit consists of areas where the soil has been removed and the underlying bedrock has been mined and crushed for use as road base or olivine. Individual areas are 10 to 25 acres in size.

The pits are excavated areas that consist of vertical sidewalls and local mounding of rock rubble in their floors. The pit cuts range to as much as 175 feet deep. Some mounding of the rock rubble is adjacent to the excavated pits. In some places small areas of water are in the pits.

The exposed rock material cannot support significant plant growth.

Onsite investigation is needed before planning the reclamation and use of areas in this map unit.

The capability subclass is VIIIs. This unit has not been assigned a woodland ordination symbol.

PwD—Plott fine sandy loam, 15 to 30 percent slopes, stony. This map unit consists mainly of moderately steep, very deep, well drained Plott and similar soils. The unit generally is on north- to east-facing ridgetops and also on south- to west-facing ridgetops shaded by the higher mountains. Individual areas are long and narrow and range from 10 to 40 acres in size.

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

Surface layer:

0 to 12 inches, very dark grayish brown fine sandy loam and dark brown gravelly fine sandy loam

Subsoil:

12 to 26 inches, dark yellowish brown gravelly loam and cobbly fine sandy loam

26 to 36 inches, yellowish brown cobbly fine sandy loam

Underlying material:

36 to 45 inches, light yellowish brown cobbly sandy loam saprolite

45 to 60 inches, multicolored cobbly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow

in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The soil is frozen for long periods in the winter and warms up later in the spring than other soils at the same elevation.

Included in mapping are small areas of Chestnut and Edneyville soils. These soils are on south- to west-facing slopes. They have a surface layer that is thinner or lighter in color than that of the Plott soil. Also, Chestnut soils are moderately deep to weathered bedrock. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Plott soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are in saddles.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or for hay, specialty crops, recreational development, or building site development.

This map unit is moderately suited to commercial timber. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for management concerns, such as the slope, plant competition, and the hazard of erosion. The most common trees are northern red oak, black cherry, sweet birch, and sugar maple. Yellow-poplar is the most common tree on previously cleared sites at elevations below 4,000 feet. Yellow birch, American beech, and eastern hemlock are the most common trees at elevations above 4,000 feet. Scarlet oak, white oak, black oak, and hickory are the most common trees on severely high-graded sites.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry and northern red oak generally are left standing.

Eastern white pine is commonly planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris and the hazard of wildfires, and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope and the content of organic matter in the surface layer.

This map unit is moderately suited to pasture and hayland. The slope, stones on the surface, and a severe hazard of erosion are the main management concerns. Operating farm equipment is difficult on this map unit. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Cool-season grasses, such as tall fescue and orchardgrass, can provide good late-season pasture and hay when managed properly. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is moderately suited to specialty crops, such as landscaping plants and Christmas trees. The slope, limited access across the steep terrain, the severe hazard of erosion, and stones on the surface are management concerns. Operating farm equipment is difficult on this map unit. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir is grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development. The slope, the severe hazard of erosion, and limited access across the steep terrain are the main management concerns. The cold temperatures in winter increase the costs of utilities and maintenance and reduce the potential for year-round homes. Revegetating disturbed areas is difficult because of the slope and the severe hazard of erosion. Hydroseeding is an excellent way to establish vegetation in steep, bare areas.

This map unit is poorly suited to recreational uses. Some areas, however, are used for scenic overlooks and hiking trails. The slope, stones on the surface, and the severe hazard of erosion are management concerns.

This map unit is unsuited to row crops because of the slope and difficult access across the steep terrain.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, and stones on the surface are the main management concerns. Revegetating large areas that have been cut and filled is very difficult. Hydroseeding is a good way to

revegetate steep, bare areas. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. These measures allow water to be removed more often and in smaller amounts.

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 map unit consists mainly of steep, very deep, well drained Plott and similar soils. The unit is on north- to east-facing side slopes or ridgetops in the intermediate mountains and is also on south- to west-facing slopes shaded by the higher mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 10 to 80 acres in size.

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

Surface layer:

0 to 12 inches, very dark grayish brown fine sandy loam and dark brown gravelly fine sandy loam

Subsoil:

12 to 26 inches, dark yellowish brown gravelly loam and cobbly fine sandy loam

26 to 36 inches, yellowish brown cobbly fine sandy loam

Underlying material:

36 to 45 inches, light yellowish brown cobbly sandy loam saprolite

45 to 60 inches, multicolored cobbly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The soil is frozen for long periods in the winter and warms up later in the spring than other soils at the same elevation.

Included in mapping are small areas of Chestnut, Edneyville, Cullasaja, and Tuckasegee soils. Chestnut and Edneyville soils are on south- to west-facing slopes. They have a surface layer that is thinner or lighter in color than that of the Plott soil. Also, Chestnut soils are moderately deep to weathered bedrock. Cullasaja and Tuckasegee soils are in drainageways. Also, Cullasaja soils have more than 35 percent rock fragments in the subsoil. Also included are small areas of rock outcrop near the ridgetops. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Plott soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are in saddles or on the lower side slopes.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or for specialty crops, recreational development, or building site development.

This map unit is poorly suited to commercial timber. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for management concerns, such as the slope, plant competition, and a severe hazard of erosion. The most common trees are northern red oak, black cherry, sweet birch, and sugar maple. Yellow-poplar is the most common tree on previously cleared sites at elevations below 4,000 feet. Yellow birch, American beech, and eastern hemlock are the most common trees at elevations above 4,000 feet. Scarlet oak, white oak, black oak, and hickory are the most common trees on severely high-graded sites.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry and northern red oak generally are left standing.

Eastern white pine is commonly planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris and the hazard of wildfires, and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope and the content of organic matter in the surface layer.

This map unit is poorly suited to pasture. The slope, stones on the surface, and a severe hazard of erosion are the main management concerns. Operating farm

equipment is dangerous on this map unit. Most farming operations are done by hand. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Cool-season grasses, such as tall fescue and orchardgrass, can provide good late-season pasture when managed properly. Keeping the pasture in good condition helps to control erosion and conserves water.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees. In some areas, however, Fraser fir is grown for use as Christmas trees. The high productivity helps to compensate for management concerns, such as the slope, stones on the surface, and the severe hazard of erosion. Operating farm equipment is dangerous on this map unit. Most farming operations are done by hand. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development. The slope and the severe hazard of erosion are the main management concerns. The cold temperatures in winter increase the costs of utilities and maintenance and reduce the potential for year-round homes. Because the slopes are too steep to operate equipment safely, septic tank absorption fields generally are dug by hand. Revegetating disturbed areas is difficult because of the slope and the very severe hazard of erosion. Hydroseeding is an excellent way to establish vegetation in steep, bare areas.

This map unit is poorly suited to recreational uses. Some areas are used for scenic overlooks and hiking trails. The slope, stones on the surface, and the severe hazard of erosion are management concerns.

This map unit is unsuited to row crops and hay because of the slope.

This map unit is poorly suited to access roads. The slope, stones on the surface, and the severe hazard of erosion are the main management concerns. Revegetating large areas that have been cut and filled is very difficult. Hydroseeding is a good way to revegetate steep, bare areas. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. These measures allow water to be removed more often and in smaller amounts.

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 map unit consists mainly of very steep, very deep, well drained Plott and similar soils. The unit is on north- to east-facing side slopes in the intermediate mountains and is also on south- to west-facing slopes shaded by the higher mountains. Individual areas are irregular in shape and range from 10 to 80 acres in size.

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

Surface layer:

0 to 12 inches, very dark grayish brown fine sandy loam and dark brown gravelly fine sandy loam

Subsoil:

12 to 26 inches, dark yellowish brown gravelly loam and cobbly fine sandy loam

26 to 36 inches, yellowish brown cobbly fine sandy loam

Underlying material:

36 to 45 inches, light yellowish brown cobbly sandy loam saprolite

45 to 60 inches, multicolored cobbly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The soil is frozen for long periods in the winter and warms up later in the spring than other soils at the same elevation.

Included in mapping are small areas of Chestnut, Edneyville, Cullasaja, and Tuckasegee soils. Chestnut and Edneyville soils are on south- to west-facing slopes. They have a surface layer that is thinner or lighter in color than that of the Plott soil. Also, Chestnut soils are moderately deep to weathered bedrock. Cullasaja and Tuckasegee soils are in drainageways. Also, Cullasaja soils have more than 35 percent rock fragments in the subsoil. Also included are small areas of rock outcrop and seeps near the ridgetops. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Plott soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are in saddles or on the lower side slopes.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for scenic overlooks or hiking trails.

This map unit is poorly suited to commercial timber. The unit is desirable for timber production, however,

because of the high productivity of commercial species, which helps to compensate for management concerns, such as the slope, stones on the surface, plant competition, and a severe hazard of erosion. The most common trees are northern red oak, black cherry, sweet birch, and sugar maple. Yellow-poplar is the most common tree on previously cleared sites at elevations below 4,000 feet. Yellow birch, American beech, and eastern hemlock are the most common trees at elevations above 4,000 feet. Scarlet oak, white oak, black oak, and hickory are the most common trees on severely high-graded sites.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry and northern red oak generally are left standing.

Eastern white pine is commonly planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris and the hazard of wildfires, and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to recreational uses. A few areas are used for scenic overlooks and hiking trails. The slope, stones on the surface, and the severe hazard of erosion are management concerns.

This map unit is unsuited to pasture, hay, crops, and building site development. The slope, the severe hazard of erosion, and the cold weather in winter are the main management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, and stones on the surface are the main management concerns. Revegetating large areas that have been cut and filled is very difficult. Hydroseeding is a good way to revegetate steep, bare areas. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. These measures allow water to be removed more often and in smaller amounts.

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

RdA—Reddies fine sandy loam, 0 to 2 percent slopes, occasionally flooded. This map unit consists mainly of nearly level, moderately well drained Reddies and similar soils that are very deep to bedrock and moderately deep to strata of gravel, cobbles, and sand. The strata are more than 35 percent rock fragments. The unit is on slightly elevated knolls on flood plains along the smaller streams. Individual areas are long bands next to the stream channels. They range from 1 to 25 acres in size.

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

Surface layer:
0 to 14 inches, dark brown fine sandy loam

Subsoil:
14 to 26 inches, dark yellowish brown fine sandy loam

Underlying material:
26 to 41 inches, dark yellowish brown very gravelly sand
41 to 60 inches, multicolored very gravelly sand

Permeability is moderately rapid in the surface layer and subsoil and rapid and very rapid in the underlying material. Surface runoff is slow. The soil is occasionally flooded for very brief periods. The seasonal high water table is 2.0 to 3.5 feet below the surface.

Included in mapping are small areas of Cullowhee, Dellwood, Nikwasi, and Rosman soils. Cullowhee and Nikwasi soils are in depressions. Cullowhee soils are somewhat poorly drained, and Nikwasi soils are poorly drained or very poorly drained. Dellwood soils have more than 35 percent rock fragments in the subsoil. They are in areas that have a very uneven surface resulting from scouring by floodwaters. Rosman soils are more than 40 inches thick over strata of gravel, cobbles, and sand. They generally are along the larger streams. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Reddies soil but have a thinner or lighter colored surface layer or a redder subsoil.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for specialty crops or row crops or as woodland.

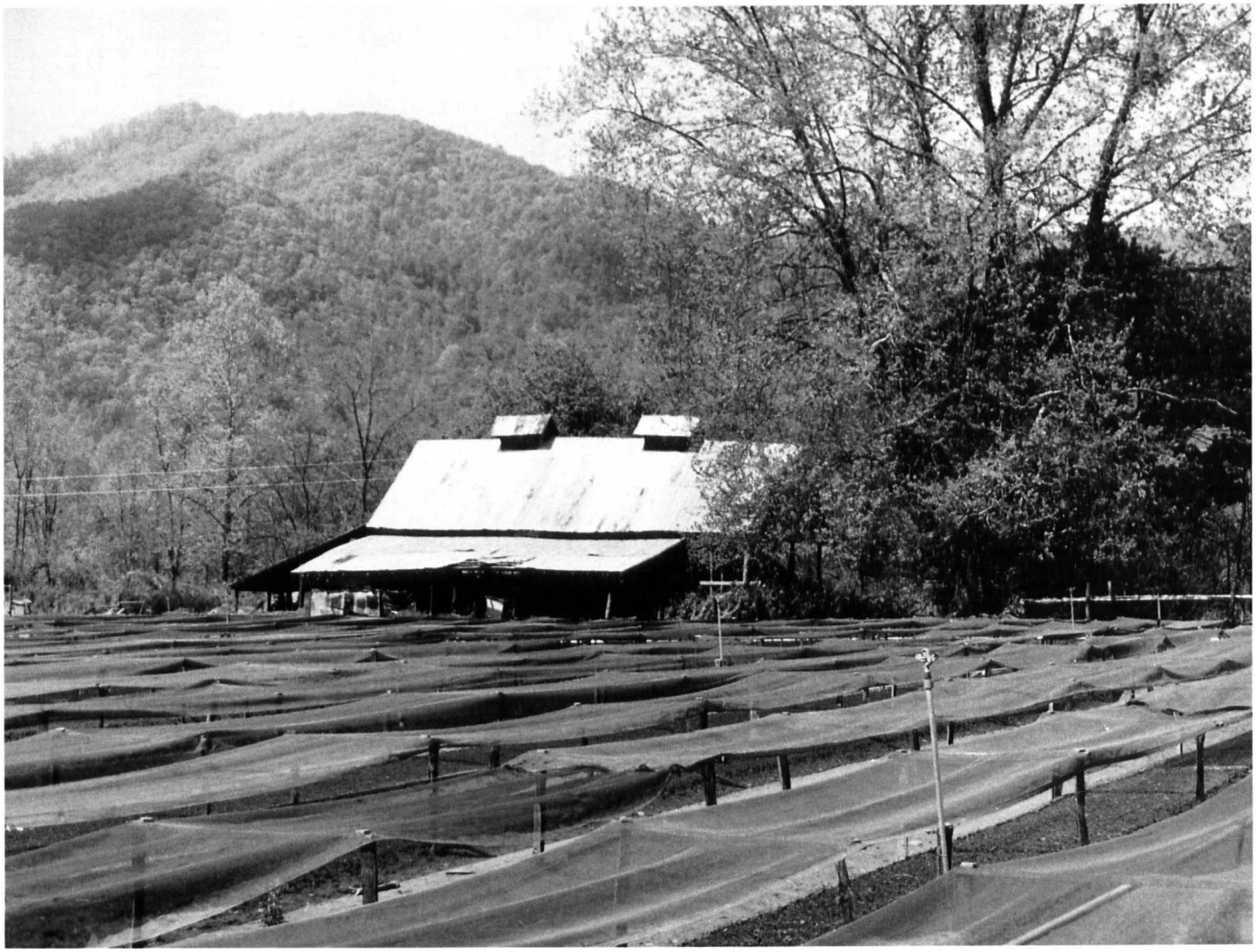


Figure 14.—Native ornamentals growing under shade cloth on Reddies fine sandy loam, 0 to 2 percent slopes, occasionally flooded.

This map unit is well suited to pasture and hay. The flooding, the wetness, and soil compaction are the main management concerns. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Properly locating watering facilities and stream crossings can help to minimize damage to streambanks.

This map unit is moderately suited to specialty crops, such as landscaping plants and Christmas trees. The flooding is the main hazard. The soil is desirable for growing and harvesting bare-rooted seedlings, such as Fraser fir and dog hobble, because it has a loamy surface layer, is nearly level, and is near streams that supply additional water for irrigation (fig. 14). Digging, balling, and burlapping landscaping plants and Christmas trees are easy during harvesting. Irrigation is necessary to overcome droughtiness, to cool the crop on hot days, and to saturate the soil before harvesting. Land shaping helps to smooth the surface and improves the efficiency of irrigation. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, dog hobble, white birch, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees. Diversions can be used to safely divert runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is moderately suited to cropland. The flooding and runoff from the higher adjacent areas are the main management concerns. Poor air drainage in

most areas of this soil is also a management concern affecting frost-sensitive crops. The most common crops are silage corn, sweet corn, tomatoes, strawberries, and burley tobacco. Split applications of fertilizer are needed because nutrients are easily leached. Land shaping helps to open outlets and drain surface water from depressions. Vegetative filter strips can improve water quality and provide wildlife habitat. Irrigation is needed during dry periods in the growing season and to protect sensitive crops, such as strawberries and tomatoes, from frost. Herbicides may be adversely affected by the organic matter content in the surface layer.

This map unit is poorly suited to building site development. The flooding and the wetness are the main management concerns.

This map unit is well suited to commercial timber. It is not used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from crops, pasture, or hayland. The most common trees are yellow-poplar, American sycamore, red maple, eastern white pine, and river birch. The flooding is the main hazard.

This map unit is poorly suited to recreational uses. The flooding and the wetness are the main management concerns. Because this soil is nearly level and is near streams, some areas are used for campsites, parks, picnic areas, and ball fields.

This map unit is poorly suited to access roads. The flooding, runoff from the higher adjacent areas, and the wetness are the main management concerns. Elevating the roads during construction minimizes the damage caused by flooding and wetness. The roads should be designed so that runoff is properly diverted.

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

RkF—Rock outcrop-Cleveland complex, windswept, 30 to 95 percent slopes. This map unit occurs mainly as areas of Rock outcrop and a steep and very steep, shallow, somewhat excessively drained Cleveland soil. The unit is on side slopes in the intermediate mountains. In most areas crossing the landscape is difficult and dangerous. Individual areas are irregular in shape and range from 20 to 100 acres in size. Typically, they are 50 to 60 percent Rock outcrop and 25 to 35 percent Cleveland soil. The Rock outcrop and the Cleveland soil occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 5 inches, black sandy loam

Subsoil:
5 to 17 inches, yellowish brown loam

Hard bedrock:
17 inches, hard granodiorite bedrock

Permeability is moderately rapid in the Cleveland soil. The depth to bedrock is 10 to 20 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. Available water capacity is low. Landslides are common during prolonged periods of heavy rainfall.

Included in mapping are small areas of Chandler, Chestnut, Plott, and Cullasaja soils. Chandler, Plott, and Cullasaja soils are very deep to weathered bedrock. Chestnut soils are moderately deep to weathered bedrock. Chandler soils have more mica than the Cleveland soil. Plott and Cullasaja soils have a dark surface layer that is thicker than that of the Cleveland soil. Cullasaja soils have more than 35 percent rock fragments in the subsoil. Also included are small areas of rubble land below rock cliffs. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cleveland soil but have a redder subsoil or more rocks on the surface.

Nearly all of the acreage in this map unit is wooded. Many areas are used for scenic overlooks.

This map unit is unsuited to commercial timber. The large areas of exposed bedrock, the severe windthrow hazard, and the slope are the main management concerns. Also, this map unit is subject to strong winds in the winter and severe ice storms that stunt, twist, or otherwise damage the trees. The most common trees on south- to west-facing slopes are scarlet oak, chestnut oak, eastern white pine, pitch pine, Virginia pine, and hickory. The most common trees on north- to east-facing slopes are northern red oak, sweet birch, and eastern hemlock.

This map unit is unsuited to recreational uses that require structures and onsite sewage disposal. The slope, numerous areas of Rock outcrop, and the depth to bedrock are the main management concerns. Because of its great natural beauty, this map unit is used mainly for hiking and camping. Many areas have scenic vistas and are used for overlooks.

This map unit is unsuited to pasture, hay, building site development, or crops. The slope, the depth to bedrock, and numerous areas of Rock outcrop are the main management concerns.

This map unit is poorly suited to access roads

because of the slope, the depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion. Building and maintaining roads are very difficult and costly. Drilling and blasting of the hard bedrock are needed. Building the roadbed on the natural soil, where possible, minimizes slumping. Hydroseeding is a good way to revegetate steep, bare areas.

The capability subclass is VIIIs in areas of Rock outcrop and VIIe in areas of the Cleveland soil. The Rock outcrop has not been assigned a woodland ordination symbol. Based on chestnut oak as the indicator species, the woodland ordination symbol is 2R in areas of the Cleveland soil.

RoA—Rosman fine sandy loam, 0 to 2 percent slopes, occasionally flooded. This map unit consists mainly of nearly level, very deep, well drained or moderately well drained Rosman and similar soils in slightly elevated areas on flood plains. The unit is commonly along major streams or in areas adjacent to the natural levees of Biltmore soils along the inside of the curve at the bends of streams. Individual areas are oblong and range from 1 to 30 acres in size.

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

Surface layer:
0 to 13 inches, dark brown fine sandy loam

Underlying material:
13 to 24 inches, reddish brown and dark brown fine sandy loam
24 to 65 inches, brown fine sandy loam
65 to 73 inches, very dark grayish brown very fine sandy loam

Permeability is moderately rapid. Surface runoff is slow. The soil is occasionally flooded for very brief periods. The seasonal high water table is 2.5 to 5.0 feet below the surface.

Included in mapping are small areas of Biltmore, Cullowhee, Reddies, Statler, and Nikwasi soils. Cullowhee soils are somewhat poorly drained, and Nikwasi soils are poorly drained or very poorly drained. They are in depressions where small streams cross the unit. Cullowhee, Nikwasi, and Reddies soils are moderately deep to strata of gravel, cobbles, or sand. Biltmore soils are sandy and are on slightly elevated natural stream levees. Statler soils are on low stream terraces and are rarely flooded. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Rosman soil but have a lighter colored surface layer.

Much of the acreage in this map unit is used for row crops. Some areas are used for specialty crops, pasture, hay, or recreational purposes.

This map unit is well suited to row crops. The flooding is the main hazard. Poor air drainage in this map unit is also a management concern affecting frost-sensitive row crops. The most common crops are silage corn, sweet corn, tomatoes, strawberries, cabbage, broccoli, and burley tobacco (fig. 15). Split applications of fertilizer are needed because nutrients are easily leached. Land shaping helps to open outlets and drain surface water from depressions. Vegetative filter strips can improve water quality and provide wildlife habitat. Irrigation is needed during dry periods in the growing season and to protect sensitive crops, such as strawberries and tomatoes, from frost. Herbicides may be adversely affected by the organic matter content in the surface layer.

This map unit is well suited to specialty crops, such as landscaping plants and Christmas trees. The flooding is the main hazard. The soil is desirable for growing and harvesting bare-rooted seedlings, such as Fraser fir, because it has a loamy surface layer, is nearly level, and is near streams that supply additional water for irrigation. Digging, balling, and burlapping landscaping plants and Christmas trees are easy during harvesting. Irrigation is needed to overcome droughtiness, to cool the crop on hot days, and to saturate the soil before harvest. Land shaping helps to smooth the surface and improves the efficiency of irrigation water. Vegetative filter strips can improve water quality and provide wildlife habitat. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, dog hobble, white birch, and rhododendron. Fraser fir is grown for use as Christmas trees. Water management practices similar to those used in row crops are appropriate.

This map unit is well suited to pasture and hay. The flooding is the main hazard. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Properly locating watering facilities and stream crossings can help to minimize damage to streambanks.

This map unit is poorly suited to building site development. The flooding is the main hazard.

This map unit is well suited to commercial timber. It is not used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from crops, pasture, or hayland. The most common trees are yellow-poplar, eastern white pine, northern red oak, white oak, scarlet oak, eastern hemlock, and red maple.

This map unit is poorly suited to recreational uses.

Figure 15.—Burley tobacco on Rosman fine sandy loam, 0 to 2 percent slopes, occasionally flooded.

The flooding is the main hazard. Because this soil is nearly level and is near streams, some areas are used for campsites, parks, picnic areas, and ball fields.

This map unit is poorly suited to access roads. The flooding is the main hazard. Elevating the roads during construction minimizes the damage caused by flooding.

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

SaB—Saunook gravelly loam, 2 to 8 percent slopes. This map unit consists mainly of gently sloping, very deep, well drained Saunook and similar soils on benches and on toe slopes in coves in the low mountains. Individual areas are bowl shaped in the lower part and are long and narrow further up the drainageways. They range from 1 to 40 acres in size.

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

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

Subsoil:
9 to 24 inches, strong brown gravelly clay loam and gravelly sandy clay loam
24 to 44 inches, strong brown gravelly sandy loam and sandy loam

Underlying material:
44 to 60 inches, yellowish brown cobbly fine sandy loam

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and is medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in the concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Cullowhee, Dellwood, Whiteside, Nikwasi, and Reddies soils. Cullowhee, Dellwood, Nikwasi, and Reddies soils are subject to flooding. Cullowhee soils are somewhat poorly drained. Dellwood, Reddies, and Whiteside soils are moderately well drained. Nikwasi soils are poorly drained or very poorly drained. Also, Dellwood soils have more than 35 percent rock fragments in the subsoil. Whiteside soils are in depressions. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Saunook soil but have a redder subsoil and some areas of soils that are near the area of contact with the uplands and have 3 to 10 inches of recent overwash.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for row crops, specialty crops, recreational development, or building site development.

This map unit is well suited to pasture and hayland. Soil compaction, a moderate hazard of erosion, and damage to streambanks are the main management concerns. Grazing during wet periods causes compaction, reduces the rate of water infiltration, and increases the runoff rate. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Properly locating watering facilities and stream crossings can help to control damage to streambanks. Maintaining sod in good condition helps to control erosion and improves water quality in nearby streams and lakes.

This map unit is well suited to crops. The slope, the moderate hazard of erosion, runoff from the higher adjacent areas, and poor air drainage are the main management concerns. The most common crops are silage corn, sweet corn, tomatoes, strawberries, and burley tobacco. Irrigation is used to protect high-value crops from frost or to supply additional water. Grassed field borders and grassed waterways help to control erosion and divert runoff. Vegetative filter strips can control erosion and improve water quality. The content of organic matter in the surface layer may affect some herbicides.

This map unit is well suited to specialty crops, such as landscaping plants, apples, Christmas trees, and ginseng. The slope, the moderate hazard of erosion, and runoff from the higher adjacent areas are the main management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, white birch, Bradford pear, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees.

This map unit is well suited to plants that are to be balled and burlapped during harvesting. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is well suited to building site development. Runoff from the higher adjacent areas and the moderate hazard of erosion are the main management concerns. Excavation for dwellings with basements is hampered by underground water from springs and seeps in some areas. A drainage system is needed in these areas. Building sites should be designed so that runoff is diverted. Sites that are wet because of seeps, springs, or runoff in concave areas should not be used for septic tank absorption fields. Establishing vegetation in bare areas helps to control erosion.

This map unit is well suited to commercial timber. Yellow-poplar is the most common tree. Other trees include black cherry, American beech, sweet birch, northern red oak, eastern white pine, white oak, scarlet oak, eastern hemlock, red maple, and yellow buckeye. Black walnut is also well suited to this soil. This soil is seldom managed for timber because of the small size of the mapped areas and the potentially higher profits from crops, building sites, pasture, or hayland.

This map unit is well suited to recreational uses. The slope and the moderate hazard of erosion are the main management concerns. Campsites, trailer parks, and hiking trails are common recreational uses. Springs and streams that provide drinking water are common in this map unit.

This map unit is well suited to access roads. Runoff from the higher adjacent areas and the moderate hazard of erosion are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Sites should be designed so that runoff from the higher adjacent areas and water from springs and seeps are diverted from the roadbed. Establishing and maintaining vegetation in bare areas helps to control erosion.

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

SaC—Saunook gravelly loam, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, well drained Saunook and similar soils on benches and on toe slopes in coves in the low

mountains. Individual areas are bowl shaped in the lower part and are long and narrow further up the drainageways. They range from 1 to 40 acres in size.

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

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

Subsoil:
9 to 24 inches, strong brown gravelly clay loam and gravelly sandy clay loam
24 to 44 inches, strong brown gravelly sandy loam and sandy loam

Underlying material:
44 to 60 inches, yellowish brown cobbly fine sandy loam

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Whiteside, Evard, and Cowee soils. Evard and Cowee soils are on the adjacent uplands. Also, Cowee soils are moderately deep to weathered bedrock. Whiteside soils are moderately well drained and are in depressions. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Saunook soil but have a redder subsoil and some areas of soils that are near the area of contact with the uplands and have 3 to 10 inches of recent overwash.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for row crops, specialty crops, recreational development, or building site development.

This map unit is well suited to pasture and hayland. Soil compaction, the slope, a severe hazard of erosion, and damage to streambanks are the main management concerns. Grazing during wet periods causes compaction, reduces the rate of water infiltration, and increases the runoff rate. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Properly locating watering facilities and stream crossings can help to control damage to streambanks. Maintaining sod in good condition helps to control erosion, conserves water, and improves water quality in nearby streams.

This map unit is moderately suited to crops. The slope, the severe hazard of erosion, and runoff from the higher adjacent areas are the main management concerns. The most common crops are silage corn, sweet corn, tomatoes, strawberries, and burley tobacco. Grassed field borders and grassed waterways can help to control erosion and divert runoff. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat. The content of organic matter in the surface layer may affect some herbicides.

This map unit is moderately suited to specialty crops, such as landscaping plants, Christmas trees, and ginseng. The slope, the severe hazard of erosion, and runoff from the higher adjacent areas are the main management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, white birch, Bradford pear, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees.

This map unit is well suited to plants that are to be balled and burlapped during harvesting. Establishing and maintaining sod in appropriate areas minimize erosion and help to control runoff. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is moderately suited to building site development. The slope, runoff from the higher adjacent areas, and the severe hazard of erosion are the main management concerns. Excavation for dwellings with basements is hampered by underground water from springs and seeps in some areas. A drainage system is needed in these areas. Building sites should be designed so that runoff is diverted safely. Sites that are wet because of seeps, springs, or runoff in concave areas should not be used for septic tank absorption fields. Establishing vegetation in bare areas helps to control erosion.

This map unit is well suited to commercial timber. Yellow-poplar is the most common tree. Other trees include black cherry, American beech, sweet birch, northern red oak, eastern white pine, white oak, scarlet oak, eastern hemlock, red maple, and yellow buckeye. Black walnut is also well suited to this soil. This soil is seldom managed for timber because of the small size of the mapped areas and the potentially higher profits from crops, building sites, pasture, or hayland.

This map unit is moderately suited to recreational uses. The slope and the severe hazard of erosion are the main management concerns. Campsites and hiking trails are common recreational uses. Springs and streams that provide drinking water are common on this map unit.

This map unit is moderately suited to access roads. Runoff from the higher adjacent areas, the slope, and the severe hazard of erosion are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use.

Sites should be designed so that runoff from the higher adjacent areas and water from springs and seeps are diverted from the roadbed. Establishing and maintaining vegetation in bare areas helps to control erosion.

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

SaD—Saunook gravelly loam, 15 to 30 percent slopes. This map unit consists mainly of moderately steep, very deep, well drained Saunook and similar soils on benches and on toe slopes in coves in the low mountains. Individual areas are bowl shaped in the lower part and are long and narrow further up the drainageways. They range from 5 to 40 acres in size.

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

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

Subsoil:
9 to 24 inches, strong brown gravelly clay loam and gravelly sandy clay loam
24 to 44 inches, strong brown gravelly sandy loam and sandy loam

Underlying material:
44 to 60 inches, yellowish brown cobbly fine sandy loam

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and is medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in the concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Whiteside, Evard, and Cowee soils. Evard and Cowee soils are on the adjacent uplands. Also, Cowee soils are moderately deep to weathered bedrock. Whiteside soils are moderately well drained and are in depressions. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Saunook soil but have a redder subsoil and some areas of soils that are near the area of contact with the uplands and have 3 to 10 inches of recent overwash.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used as woodland or for specialty crops, recreational development, or building site development.

This map unit is moderately suited to pasture and hayland. The slope, soil compaction, a severe hazard of erosion, and damage to streambanks are the main management concerns. Grazing during wet periods causes compaction, reduces the rate of water infiltration, and increases the runoff rate. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Properly locating watering facilities and stream crossings can help to control damage to streambanks. Operating farm equipment is difficult on this map unit.

This map unit is moderately suited to commercial timber. The slope is the main limitation. Yellow-poplar is the most common tree. Other trees include black cherry, American beech, sweet birch, northern red oak, eastern white pine, white oak, scarlet oak, eastern hemlock, red maple, and yellow buckeye. Black walnut is also well suited to this soil. This soil is seldom managed for timber because of the small size of the mapped areas and the potentially higher profits from crops, building sites, pasture, or hayland.

Reforestation of hardwoods occurs dominantly through sprouting. Cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are very slick and highly erodible during wet periods because of the slope, the content of clay in the subsoil, and the content of organic matter in the surface layer.

This map unit is moderately suited to specialty crops, such as landscaping plants, Christmas trees, and ginseng. The slope, the severe hazard of erosion, and runoff from the higher adjacent areas are the main management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, white birch, Bradford pear, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees.

This map unit is moderately suited to plants that are to be balled and burlapped during harvesting. Establishing and maintaining sod in appropriate areas

minimize erosion and help to control runoff. Vegetative filter strips can control erosion and improve water quality. Mulch and plastic are used for some crops to conserve water and control erosion.

This map unit is poorly suited to building site development. The slope, runoff from the higher adjacent areas, and the severe hazard of erosion are the main management concerns. Excavation for dwellings with basements is hampered by underground water from springs and seeps in some areas. A drainage system is needed in these areas. Building sites should be designed so that runoff is diverted. Sites that are wet because of seeps, springs, or runoff in concave areas should not be used for septic tank absorption fields. Establishing vegetation in bare areas helps to control erosion. Hydroseeding is a good way to revegetate bare areas.

This map unit is poorly suited to recreational uses. The slope and the severe hazard of erosion are the main management concerns. Campsites and hiking trails, however, are common recreational uses. Springs and streams that provide drinking water are common in this map unit.

This map unit is poorly suited to access roads. Runoff from the higher adjacent areas, the slope, and the severe hazard of erosion are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Sites should be designed so that runoff from the higher adjacent areas and water from springs and seeps are diverted from the roadbed. Establishing and maintaining vegetation in bare areas help to control erosion. Hydroseeding is a good way to revegetate bare areas.

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

SbD—Saunook gravelly loam, 15 to 30 percent slopes, stony. This map unit consists mainly of moderately steep, very deep, well drained Saunook and similar soils on benches and on toe slopes in coves in the low mountains, especially below areas of rock outcrop. Individual areas are bowl shaped in the lower part and long and narrow further up the drainageways. They range from 5 to 40 acres in size.

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

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

Subsoil:
9 to 24 inches, strong brown gravelly clay loam and gravelly sandy clay loam
24 to 44 inches, strong brown gravelly sandy loam and sandy loam

Underlying material:
44 to 60 inches, yellowish brown cobbly fine sandy loam

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and is medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in the concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Whiteside, Evard, and Cowee soils. Evard and Cowee soils are on the adjacent uplands. Also, Cowee soils are moderately deep to weathered bedrock. Whiteside soils are moderately well drained and are in depressions. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Saunook soil but have a redder subsoil and some areas of soils that are near the area of contact with the uplands and have 3 to 10 inches of recent overwash.

Much of the acreage in this map unit is used as pasture and hayland. Some areas are used as woodland or for specialty crops, recreational development, or building site development.

This map unit is moderately suited to pasture and hayland. The slope, stones on the surface, soil compaction, a severe hazard of erosion, and damage to streambanks are the main management concerns. Grazing during wet periods causes compaction, reduces the rate of water infiltration, and increases the runoff rate. The stones on the surface are also management concerns during establishing pasture and mowing hay. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Properly locating watering facilities and stream crossings can help to control damage to streambanks. Operating farm equipment is difficult on this map unit.

This map unit is moderately suited to commercial timber. The slope, stones on the surface, and the hazard of erosion are the main management concerns. Yellow-poplar is the most common tree. Other trees include black cherry, American beech, sweet birch, northern red oak, eastern white pine, white oak, scarlet oak, eastern hemlock, red maple, and yellow buckeye. Black walnut is also well suited to this soil. This soil is seldom managed for timber because of the small size of the mapped areas and the potentially higher profits from crops, building sites, pasture, or hayland.

Reforestation of hardwoods occurs dominantly through sprouting. Cutting all of the trees and large

shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is good and where hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are very slick and easily eroded during wet periods because of the content of clay in the subsoil and the content of organic matter in the surface layer.

This map unit is poorly suited to specialty crops, such as landscaping plants, apples, Christmas trees, and ginseng. The slope, stones on the surface, the severe hazard of erosion, and runoff from the higher adjacent areas are the main management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, white birch, Bradford pear, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees.

This map unit is moderately suited to plants that are to be balled and burlapped during harvesting. Stones on the surface are the main management concern affecting such harvesting. Establishing and maintaining sod in appropriate areas minimize erosion and help to control runoff. Vegetative filter strips can help to control erosion, improve water quality, and provide wildlife habitat.

This map unit is poorly suited to building site development. The slope, runoff from the higher adjacent areas, and the severe hazard of erosion are the main management concerns. Excavation for dwellings with basements is hampered by underground water from springs and seeps in some areas. A drainage system is needed in these areas. Building sites should be designed so that runoff is diverted. Sites that are wet because of seeps, springs, or runoff in concave areas should not be used for septic tank absorption fields. Establishing vegetation in bare areas helps to control erosion. Hydroseeding is a good way to revegetate bare areas.

This map unit is poorly suited to recreational uses. The slope, stones on the surface, and the severe hazard of erosion are the main management concerns. Campsites and hiking trails are common recreational uses. Springs and streams that provide drinking water are common in this map unit.

This map unit is poorly suited to access roads. The slope, runoff from the higher adjacent areas, and the content of clay in the subsoil are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Sites should be designed so that runoff from the higher adjacent areas and water from springs and seeps are diverted from the roadbed. Establishing and maintaining vegetation in bare areas help to control erosion. Hydroseeding is a good way to revegetate bare areas.

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

SoD—Soco-Stecoah complex, 15 to 30 percent slopes. This map unit occurs mainly as areas of a moderately deep Soco soil and a deep Stecoah soil. Both soils are well drained. The unit is on moderately steep, south- to west-facing ridgetops in the intermediate mountains. Individual areas are long and narrow and range from 5 to 50 acres in size. Typically, they are 45 to 55 percent Soco soil and 30 to 40 percent Stecoah soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

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

Subsoil:
4 to 24 inches, strong brown and dark yellowish brown fine sandy loam
24 to 32 inches, yellowish brown channery fine sandy loam

Underlying material:
32 to 35 inches, brown, gray, and black channery fine sandy loam saprolite

Weathered bedrock:
35 to 60 inches, multicolored, weathered phyllite

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

Surface layer:
0 to 5 inches, very dark grayish brown channery fine sandy loam

Subsoil:

5 to 22 inches, dark brown and strong brown fine sandy loam

22 to 45 inches, strong brown channery fine sandy loam

Weathered bedrock:

45 to 60 inches, multicolored, weathered, interbedded metasandstone and phyllite

Permeability is moderately rapid in both soils. The depth to weathered bedrock is 20 to 40 inches in the Soco soil and 40 to 60 inches in the Stecoah soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Cheoah soils. These soils have a thick, dark surface layer and are on north- to east-facing side slopes. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Soco and Stecoah soils but have more rocks on the surface or have a redder subsoil.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for pasture, hay, building site development, or recreational development.

This map unit is moderately suited to commercial timber. The main management concerns are the slope and a moderate hazard of erosion. The Soco soil also has a moderate windthrow hazard. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, yellow-poplar, shortleaf pine, hickory, black locust, and northern red oak.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Planting genetically improved eastern white pine results in better stands than the stands of naturally seeded eastern white pine. In cutover stands preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

This map unit is moderately suited to year-round logging. Proper erosion-control measures should be established to help control erosion during and after logging operations.

This map unit is poorly suited to building site development. The slope, the hazard of erosion, difficult access across the steep terrain, and the areas of the moderately deep Soco soil are management concerns. Revegetating disturbed areas is difficult because of the slope and freezing and thawing. Hydroseeding is a good way to revegetate bare areas. Excavation for dwellings with basements is hampered by the moderately deep Soco soil. Also, the Soco soil may be too shallow for septic tank absorption fields.

This map unit is moderately suited to recreational development. The slope and limited access are the main limitations. Some areas are used for hiking trails and scenic overlooks. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to row crops. The slope, the severe hazard of erosion, and limited access are the main management concerns.

This map unit is moderately suited to pasture and hayland. The slope and limited access are the main limitations. Keeping the pasture and hayland in good condition helps to control erosion, conserves water, and improves water quality in surrounding streams and lakes.

This map unit is poorly suited to access roads. The slope, the instability of the underlying bedrock, and the severe hazard of erosion are the main management concerns. Revegetating areas that have been cut and filled is difficult because of the slope, freezing and thawing, and slumping. Hydroseeding is a good way to revegetate areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may also expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

The capability subclass is VIe. 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.

SoE—Soco-Stecoah complex, 30 to 50 percent slopes. This map unit occurs mainly as areas of a moderately deep Soco soil and a deep Stecoah soil. Both soils are well drained. The unit is on steep, south- to west-facing ridgetops and side slopes in the

intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. Individual areas range from 5 to 50 acres in size. Typically, they are 40 to 50 percent Soco soil and 30 to 40 percent Stecoah soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

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

Subsoil:
4 to 24 inches, strong brown and dark yellowish brown fine sandy loam
24 to 32 inches, yellowish brown channery fine sandy loam

Underlying material:
32 to 35 inches, brown, gray, and black channery fine sandy loam saprolite

Weathered bedrock:
35 to 60 inches, multicolored, weathered phyllite

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

Surface layer:
0 to 5 inches, very dark grayish brown channery fine sandy loam

Subsoil:
5 to 22 inches, dark brown and strong brown fine sandy loam
22 to 45 inches, strong brown channery fine sandy loam

Weathered bedrock:
45 to 60 inches, multicolored, weathered, interbedded metasandstone and phyllite

Permeability is moderately rapid in both soils. The depth to weathered bedrock is 20 to 40 inches in the Soco soil and 40 to 60 inches in the Stecoah soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Cheoah, Santeetlah, and Spivey soils. These soils have a thick, dark surface layer. Cheoah soils are on north- to east-facing side slopes. The very deep Santeetlah and Spivey soils are in drainageways. Also, Spivey soils have more than 35 percent rock fragments in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Soco and Stecoah soils but have more rocks on the surface or have a redder subsoil.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for building site development or recreational development.

This map unit is poorly suited to commercial timber. The slope and a severe hazard of erosion are the main management concerns. The Soco soil also has a moderate windthrow hazard. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, black locust, and northern red oak.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Planting genetically improved eastern white pine results in better stands than the stands of naturally seeded eastern white pine. In cutover stands preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and lowers planting costs. Plant competition should be controlled again a few years after planting.

This map unit is poorly suited to building site development. The slope, the severe hazard of erosion, difficult access across the steep terrain, and the areas of the moderately deep Soco soil are management concerns. Revegetating disturbed areas is difficult because of the slope and freezing and thawing. Hydroseeding is a good way to revegetate bare areas. Excavation for dwellings with basements is hampered by the moderate depth to weathered bedrock in areas of the Soco soil. Also, the Soco soil may be too shallow for septic tank absorption fields.

This map unit is poorly suited to recreational development. The slope is the main limitation. Some areas are used for hiking trails and scenic overlooks. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to row crops, pasture, and hayland. The slope, the severe hazard of erosion, and limited access are the main management concerns.

This map unit is poorly suited to access roads. The slope, the instability of the underlying bedrock, and the severe hazard of erosion are the main management concerns. Revegetating areas that have been cut and filled is difficult because of the slope, freezing and

thawing, and slumping. Hydroseeding is a good way to revegetate areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may also expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks may increase the acidity of streams and kill aquatic life.

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 occurs mainly as areas of a moderately deep Soco soil and a deep Stecoah soil. Both soils are well drained. The unit is on very steep, south- to west-facing side slopes in the intermediate mountains. Individual areas are irregular in shape and range from 5 to 50 acres in size. Typically, they are 40 to 50 percent Soco soil and 30 to 40 percent Stecoah soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

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

Subsoil:
4 to 24 inches, strong brown and dark yellowish brown fine sandy loam
24 to 32 inches, yellowish brown channery fine sandy loam

Underlying material:
32 to 35 inches, brown, gray, and black channery fine sandy loam saprolite

Weathered bedrock:
35 to 60 inches, multicolored, weathered phyllite

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

Surface layer:
0 to 5 inches, very dark grayish brown channery fine sandy loam

Subsoil:
5 to 22 inches, dark brown and strong brown fine sandy loam
22 to 45 inches, strong brown channery fine sandy loam

Weathered bedrock:
45 to 60 inches, multicolored, weathered, interbedded metasandstone and phyllite

Permeability is moderately rapid in both soils. The depth to weathered bedrock is 20 to 40 inches in the Soco soil and 40 to 60 inches in the Stecoah soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Cheoah, Santeetlah, and Spivey soils. These soils have a thick, dark surface layer. Cheoah soils are on north- to east-facing side slopes. The very deep Santeetlah and Spivey soils are in drainageways. Also, Spivey soils have more than 35 percent rock fragments in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Soco and Stecoah soils but have more rocks on the surface or have a redder subsoil.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for recreational development.

This map unit is poorly suited to commercial timber. The main management concerns are the slope and a severe hazard of erosion. The Soco soil also has a moderate windthrow hazard. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, black locust, and northern red oak.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Planting genetically improved eastern white pine results in better stands than the stands of naturally seeded eastern white pine. In cutover stands preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the equipment used in management and harvesting. Generally, operating

wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to recreational uses. A few areas are used for hiking trails and scenic overlooks. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to row crops, pasture, hay, and building site development. The slope, the severe hazard of erosion, and limited access are the main management concerns.

This map unit is poorly suited to access roads. The slope, the instability of the underlying bedrock, and the severe hazard of erosion are the main management concerns. Revegetating areas that have been cut and filled is difficult because of the slope, freezing and thawing, and slumping. Hydroseeding is a good way to revegetate areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may also expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks may increase the acidity of streams and kill aquatic life.

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.

SrD—Spivey-Santeetlah complex, 15 to 30 percent slopes, stony. This map unit occurs mainly as areas of moderately steep, very deep, well drained Spivey and Santeetlah soils. The unit is on benches and on toe slopes and along drainageways in coves in the intermediate mountains. Typically, the Spivey soil is along the drainageways, and the Santeetlah soil is between the drainageways. Individual areas are bowl shaped in the lower part and long and narrow further up the drainageways. They range from 4 to 50 acres in size. Typically, they are 45 to 55 percent Spivey soil and 25 to 35 percent Santeetlah soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 13 inches, very dark brown and dark brown flaggy loam

Subsoil:
13 to 18 inches, dark yellowish brown very flaggy loam
18 to 60 inches, strong brown and yellowish brown very flaggy fine sandy loam

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

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

Subsoil:
12 to 28 inches, dark yellowish brown and strong brown loam
28 to 60 inches, dark yellowish brown channery fine sandy loam

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Soco, Stecoah, and Cheoah soils. Soco and Stecoah soils formed in saprolite on south- to west-facing slopes. These soils have a surface layer that is thinner or lighter colored than that of the Spivey and Santeetlah soils. Also, Soco soils are moderately deep to weathered bedrock. Cheoah soils formed in saprolite on north- to east-facing side slopes. Also included are small areas of moderately well drained or somewhat poorly drained soils around seeps and springs. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Spivey and Santeetlah soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are in convex, south- to west-facing areas. Where the surface layer is more than 20 inches thick, the soils are in north- to east-facing areas.

Most of the acreage in this map unit is wooded. Some areas are used for pasture, hay, building site development, or recreational development.

This map unit is only moderately suited to commercial timber. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for management concerns, such as plant competition, the slope, a moderate hazard of erosion, and runoff from

the higher adjacent areas. Yellow-poplar is the most common tree at elevations below 4,000 feet. Other common trees include black cherry, American beech, yellow birch, white oak, black oak, sweet birch, northern red oak, sugar maple, yellow buckeye, eastern hemlock, and eastern white pine. Black cherry, sweet birch, northern red oak, and sugar maple are the most common trees at elevations above 4,000 feet.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine results in better stands than the stands of naturally seeded eastern white pine. It commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and where hardwood seedlings are not available. In cutover stands preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are slick and highly erodible during wet periods because of the slope and the content of organic matter in the surface layer.

This map unit is moderately suited to pasture and hayland. The slope, stones on the surface, a severe hazard of erosion, and runoff from the higher adjacent areas are management concerns. The stones damage farm equipment used for establishing and maintaining pasture and mowing and baling hay, especially in areas of the Spivey soil. The Santeetlah soil has fewer stones on the surface and is better suited to pasture and hayland. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Properly locating watering facilities and stream crossings helps to prevent damage to streambanks.

This map unit is poorly suited to building site development. The slope, stones, runoff from the higher adjacent areas, and the severe hazard of erosion are management concerns. The Santeetlah soil is better suited to building site development than the Spivey soil because it has fewer rocks and seeps or springs are less common. Excavation for dwellings with basements is hampered by rocks and underground water from seeps and springs. A drainage system is needed in these areas. Building sites should be designed so that runoff from the higher adjacent areas is diverted safely. Sites that are wet because of seeps, springs, and runoff and, where practical, areas of the Spivey soil should not be used for septic tank absorption fields.

This map unit is poorly suited to most recreational uses. Some areas are used for hiking trails. The slope, stones, and the severe hazard of erosion are management concerns. The hiking trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer.

This map unit is poorly suited to access roads. The slope, stones, runoff from the higher adjacent areas, springs, seeps, and the severe hazard of erosion are management concerns. Because unsurfaced roads are soft and slick during wet periods, the roads should be surfaced and properly maintained for year-round use. Gravel continuously sinks into the subsoil. Building the roads near the area of contact with the uplands, where possible, helps to avoid the springs, the seeps, and the large rocks. The roads should be designed so that runoff from the higher adjacent areas and water from seeps and springs are properly diverted.

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

SrE—Spivey-Santeetlah complex, 30 to 50 percent slopes, stony. This map unit occurs mainly as areas of moderately steep, very deep, well drained Spivey and Santeetlah soils. The unit is on benches and on toe slopes and along drainageways in coves in the intermediate mountains. Typically, the Spivey soil is along the drainageways, and the Santeetlah soil is between the drainageways. Individual areas are bowl shaped in the lower part and long and narrow further up the drainageways. They range from 4 to 50 acres in size. Typically, they are 45 to 55 percent Spivey soil and 25 to 35 percent Santeetlah soil. The two soils occur as areas too intricately mixed and too small in size to be mapped separately.

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

Surface layer:

0 to 13 inches, very dark brown and dark brown flaggy loam

Subsoil:

13 to 18 inches, dark yellowish brown very flaggy loam

18 to 60 inches, strong brown and yellowish brown very flaggy fine sandy loam

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

Surface layer:

0 to 12 inches, very dark brown and dark brown flaggy loam

Subsoil:

12 to 28 inches, dark yellowish brown and strong brown loam

28 to 60 inches, dark yellowish brown channery fine sandy loam

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Soco, Stecoah, and Cheoah soils. Soco and Stecoah soils formed in saprolite on south- to west-facing slopes. These soils have a surface layer that is thinner or lighter colored than that of the Spivey and Santeetlah soils. Also, Soco soils are moderately deep to weathered bedrock. Cheoah soils formed in saprolite on north- to east-facing side slopes. Also included are small areas of moderately well drained or somewhat poorly drained soils around seeps and springs. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Spivey and Santeetlah soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are in convex, south- to west-facing areas. Where the surface layer is more than 20 inches thick, the soils are in north- to east-facing areas.

Most of the acreage in this map unit is wooded. Some areas are used as pasture or for recreational development.

This map unit is only moderately suited to commercial timber. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for management concerns, such as the slope, plant competition, a moderate hazard of erosion, and runoff from the higher adjacent areas. Yellow-poplar is the most common tree at elevations below 4,000 feet. Other common trees include black cherry, American beech, sweet birch, yellow birch, white oak, black oak, northern red oak, sugar maple, yellow buckeye, eastern hemlock, and eastern white pine. Black cherry, sweet birch, northern red oak, and sugar maple are the most common trees at elevations above 4,000 feet.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine results in better stands than the stands of naturally seeded eastern white pine. It commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and where hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are slick and highly erodible during wet periods because of the slope and the content of organic matter in the surface layer.

This map unit is poorly suited to pasture and is unsuited to hay. The slope, stones on the surface, a severe hazard of erosion, and runoff from the higher adjacent areas are management concerns. Operating equipment is dangerous on this map unit.

This map unit is poorly suited to building site development. The slope, stones, runoff from the higher adjacent areas, and the severe hazard of erosion are management concerns. The Santeetlah soil is better suited to building site development than the Spivey soil because it has fewer rocks and seeps or springs are less common. Excavation for dwellings with basements is hampered by large rocks and underground water from seeps and springs. A drainage system is needed in these areas. Building sites should be designed so that runoff from the higher adjacent areas is diverted safely. Sites that are wet because of seeps, springs, and runoff, and, where practical, areas of the Spivey soil should not be used for septic tank absorption fields.

This map unit is poorly suited to recreational uses. Some areas are used for hiking trails. The slope, stones, and the severe hazard of erosion are management concerns. The hiking trails are very slick during wet periods because of the slope and the

content of organic matter in the surface layer.

This map unit is poorly suited to access roads. The slope, stones, runoff from the higher adjacent areas, springs, seeps, and the severe hazard of erosion are management concerns. Because unsurfaced roads are soft and slick during wet periods, the roads should be surfaced and properly maintained for year-round use. Gravel continuously sinks into the subsoil. Building the roads near the area of contact with the uplands, where possible, helps to avoid the springs, the seeps, and the large stones. The roads should be designed so that runoff from the higher adjacent areas and water from seeps and springs are properly diverted.

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

SvB—Statler loam, 1 to 5 percent slopes, rarely flooded. This map unit consists mainly of nearly level and gently sloping, very deep, well drained Statler and similar soils on low stream terraces. Individual areas are long bands adjacent to flood plains. They range from 1 to 20 acres in size.

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

Surface layer:
0 to 9 inches, dark brown loam

Subsoil:
9 to 30 inches, yellowish brown clay loam
30 to 62 inches, yellowish brown sandy clay loam that has yellowish red and light yellowish brown mottles
62 to 70 inches, strong brown fine sandy loam that has yellowish red and yellowish brown mottles

Underlying material:
70 to 85 inches, multicolored alluvium that has a fine sandy loam texture

Permeability is moderate. Surface runoff is slow or medium. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Dillard, Hemphill, Reddies, and Rosman soils. Dillard soils are moderately well drained and have moderate permeability. Hemphill soils are very poorly drained and have slow permeability. Dillard and Hemphill soils are in depressions. Reddies soils are moderately deep to strata of gravel, cobbles, and sand. Reddies and Rosman soils have less clay in the subsoil than the Statler soil. They are on flood plains that are occasionally flooded. Included soils make up about 15 percent of this map unit.

Also included in mapping are small areas of soils that are similar to the Statler soil but have more rocks on the surface, soils that have a dark surface layer that is thicker than that of the Statler soil, or soils that have a seasonal high water table 3 to 6 feet below the surface.

Much of the acreage in this map unit is used for row crops. Some areas are used for specialty crops, pasture, hay, or building site development.

This map unit is well suited to cropland. The flooding, runoff from the higher adjacent areas, and poor air drainage are management concerns. The organic matter content in the surface layer may affect herbicides. The most common crops are silage corn, tomatoes, strawberries, cabbage, broccoli, and burley tobacco.

Land shaping helps to open outlets and drain surface water from depressions. Grassed field borders and diversions can be used to safely remove runoff. Vegetative filter strips can control erosion, improve water quality, and provide wildlife cover. Mulch is commonly used on some crops to hold moisture, control weeds, and help to control erosion. Irrigation is also used to protect high-value crops, such as strawberries, from frost and to supply additional water.

This map unit is well suited to specialty crops, such as landscaping plants and Christmas trees. The flooding and runoff from the higher adjacent areas are the main management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, dog hobble, white birch, Bradford pear, and rhododendron. Fraser fir and eastern white pine are commonly grown for use as Christmas trees. This soil is well suited to trees and other plants that must be dug during harvesting. Water management practices similar to those used in row crops are appropriate.

This map unit is well suited to pasture and hayland. The flooding, soil compaction, and damage to streambanks are the main management concerns. Land shaping before establishing pasture and hay helps to open outlets and drain surface water from depressions. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Properly locating watering facilities, fences, and stream crossings can help to prevent damage to streambanks.

This map unit is poorly suited to building site development. The flooding and runoff from adjacent land are management concerns.

This map unit is well suited to commercial timber. It is generally not used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from crops, building site development, pasture, or hayland. The most common trees are yellow-poplar, eastern white pine, white oak,

red maple, and eastern hemlock.

This map unit is moderately suited to recreational uses, such as parks, picnic areas, and tennis courts. The flooding is the main hazard.

This map unit is poorly suited to access roads. The flooding and runoff from the higher adjacent areas are the main management concerns. Elevating the roadbeds during construction minimizes the damage caused by flooding. The roads should be designed so that runoff from the higher adjacent areas is properly diverted. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use.

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

SyA—Sylva-Whiteside complex, 0 to 2 percent slopes. This nearly level map unit occurs mainly as areas of a very deep, poorly drained Sylva soil and a moderately well drained Whiteside soil. The unit is on colluvial flats in coves in the intermediate mountains, primarily in the southern part of the county. Generally, the Sylva soil is in depressions, and the Whiteside soil is in slightly elevated areas. Also, the thick growth of native plants in most areas limits observations of the soils. Individual areas are bowl shaped in the lower part and narrow further up the drainageways. They range from 5 to 40 acres in size. Typically, they are 50 to 60 percent Sylva soil and 20 to 30 percent Whiteside soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:

0 to 8 inches, black and very dark grayish brown loam

Subsoil:

8 to 37 inches, light gray loam and sandy loam

Underlying material:

37 to 65 inches, light brownish gray loam

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

Surface layer:

0 to 14 inches, very dark grayish brown fine sandy loam

Subsoil:

14 to 24 inches, yellowish brown sandy clay loam that has streaks of very dark grayish brown in old root channels

24 to 30 inches, yellowish brown sandy clay loam that has strong brown and gray mottles

30 to 47 inches, gray fine sandy loam that has yellowish brown and gray mottles

Underlying material:

47 to 53 inches, light brownish gray sandy loam that has brownish yellow mottles

53 to 70 inches, gray sandy clay loam that has yellowish brown mottles

Permeability is moderately rapid in the Sylva soil and moderate in the Whiteside soil. The depth to bedrock is more than 60 inches. Surface runoff is very slow in the Sylva soil and slow in the Whiteside soil. The seasonal high water table is from the surface to 1 foot below the surface in areas of the Sylva soil and from 1.5 to 3.0 feet below the surface in areas of the Whiteside soil.

Included in mapping are small areas of Dellwood, Nikwasi, and Tuckasegee soils. Dellwood and Nikwasi soils are subject to flooding. Also, Dellwood soils are moderately well drained and are shallow to strata of gravel, cobbles, and sand. Nikwasi soils are moderately deep to strata of gravel, cobbles, and sand. Tuckasegee soils are well drained. They are in the highest areas of this map unit. Also included in mapping are areas of soils that are somewhat poorly drained or have more rocks in the subsoil than is typical for the Sylva and Whiteside soils. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Sylva and Whiteside soils but have more rocks, mainly of gravel size, in the surface layer or have a dark surface layer that is less than 7 inches thick.

Nearly all of the acreage in this map unit is wooded. Small areas are used for pasture, hay, building site development, or recreational purposes.

The Sylva soil is poorly suited to commercial timber. The Whiteside soil is well suited. The unit is used for commercial timber, however, because the two soils occur as areas too intricately mixed to be managed separately. The wetness and severe plant competition are the main management concerns in areas of the Sylva soil.

Eastern white pine and yellow-poplar are the most common trees. Other trees include eastern hemlock, sweet birch, red maple, white oak, black cherry, yellow birch, black locust, sugar maple, and basswood. Alder and red maple dominate sites that have been cleared and are reverting to woodland.

Hardwoods should be preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands the dense understory of rhododendron is very difficult to control and may form a canopy. Cutting all of

the trees and large shrubs in cutover areas increases the number and quality of the sprouts. Eastern white pine is preferred where it has been successfully established in old fields. Planting genetically improved eastern white pine in old fields results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soils are wet, skid trails and unsurfaced roads are very slick because of the wetness and the content of organic matter in the surface layer.

This map unit is moderately suited to pasture and hayland in drained areas. The wetness, the ponding, soil compaction, runoff from the higher adjacent areas, and damage to streambanks are management concerns. A tile drainage system is difficult and costly to install because of the nearly level slope and poor outlets. Grazing during wet periods causes severe compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Properly locating watering facilities and stream crossings can help to prevent damage to streambanks.

This map unit is poorly suited to building site development. The wetness and the ponding are the main management concerns.

This map unit is poorly suited to recreational uses because of the wetness and the ponding.

This map unit is poorly suited to access roads. The wetness and the ponding are the main management concerns. Elevating the roads during construction minimizes the damage caused by wetness and ponding.

The capability subclass is IIIw in areas of the Sylva soil and IIw in areas of the Whiteside soil. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8W in areas of the Sylva soil and 7A in areas of the Whiteside soil.

TaC—Tanasee-Balsam complex, 8 to 15 percent slopes, stony. This map unit occurs mainly as areas of strongly sloping, very deep, well drained Tanasee and Balsam soils in coves and gaps in the high mountains. Typically, the Tanasee soil is between drainageways in coves and gaps and the Balsam soil is along the drainageways. Areas in coves are bowl shaped in the lower part and narrow further up the drainageways. Areas in gaps are irregular in shape. Individual areas range from 4 to 30 acres in size. Typically, they are 45 to 55 percent Tanasee soil and 25 to 35 percent Balsam soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 13 inches, black and 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 65 inches, multicolored gravelly loamy sand

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

Surface layer:
0 to 13 inches, black and very dark brown sandy loam

Subsoil:
13 to 48 inches, dark yellowish brown very cobbly loam and very cobbly sandy loam

Underlying material:
48 to 65 inches, dark yellowish brown, black, and white very cobbly sandy loam

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and is medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Burton, Craggey, and Wayah soils. These soils formed in saprolite on the adjacent uplands. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Also included are small areas of somewhat poorly drained or moderately well drained soils around seeps and springs. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Tanasee and Balsam soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils are on north- to east-facing slopes.

Nearly all of the acreage in this map unit is wooded. A few areas are used for recreational purposes.

This map unit is moderately suited to commercial timber. The main management concerns are the cold

climate, limited access, and runoff from the higher adjacent areas. The most common trees are northern red oak, black cherry, American beech, sweet birch, sugar maple, yellow buckeye, black oak, yellow birch, and eastern hemlock at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the amount and quality of the desirable sprouts and also helps to control plant competition on these stands. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and from various environmental factors.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are slick and highly erodible during wet periods because of the slope and the content of organic matter in the surface layer.

This map unit is moderately suited to recreational uses. Limited access, the slope, and rocks on the surface, especially in areas of the Balsam soil, are the main management concerns. Campsites and hiking trails, however, are common. Springs and streams that provide drinking water are convenient to most campsites. Freezing and thawing and the severe hazard of erosion increase the need for the trails to be properly maintained.

This map unit is poorly suited to access roads. Stoniness, runoff from the higher adjacent areas, the springs, the seeps, freezing and thawing, and the severe hazard of erosion are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced and continuously maintained for year-round use. Gravel continuously sinks into the subsoil. Building the roads near the area of contact with the uplands, where possible, helps to avoid the springs, the seeps, and the large stones. The roads should be designed so that runoff from the higher adjacent areas and water from seeps and springs are properly diverted.

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.

TaD—Tanasee-Balsam complex, 15 to 30 percent slopes, stony. This map unit occurs mainly as areas of moderately steep, very deep, well drained Tanasee and Balsam soils in coves and gaps in the high mountains. Typically, the Tanasee soil is between drainageways in coves and gaps and the Balsam soil is along the drainageways. Areas in coves are bowl shaped in the lower part and narrow further up the drainageways. Areas in gaps are irregular in shape. Individual areas range from 4 to 30 acres in size. Typically, they are 45 to 55 percent Tanasee soil and 25 to 35 percent Balsam soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 13 inches, black and 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 65 inches, multicolored gravelly loamy sand

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

Surface layer:
0 to 13 inches, black and very dark brown sandy loam

Subsoil:
13 to 48 inches, dark yellowish brown very cobbly loam and very cobbly sandy loam

Underlying material:
48 to 65 inches, dark yellowish brown, black, and white very cobbly sandy loam

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Burton,

Craggey, and Wayah soils. These soils formed in saprolite on the adjacent uplands. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Also included are small areas of somewhat poorly drained or moderately well drained soils around seeps and springs. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Tanasee and Balsam soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils are on north- to east-facing slopes.

Nearly all of the acreage in this map unit is wooded. A few areas are used for recreational purposes.

This map unit is moderately suited to commercial timber. The main management concerns are the cold climate, limited access, the slope, and runoff from the higher adjacent areas. The most common trees are northern red oak, black cherry, American beech, sweet birch, sugar maple, yellow buckeye, black oak, yellow birch, and eastern hemlock at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the amount and quality of the desirable sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and from various environmental factors.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are slick and highly erodible during wet periods because of the slope and the content of organic matter in the surface layer.

This map unit is poorly suited to recreational uses. The slope and limited access are the main management concerns. Campsites and hiking trails, however, are common. Springs and streams that provide drinking water are convenient to most campsites. The severe hazard of erosion and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to access roads. The slope, stones, runoff from the higher adjacent areas, the springs, the seeps, freezing and thawing, and the severe hazard of erosion are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced and continuously maintained for year-round use. Gravel continuously sinks into the subsoil. Building the roads near the area of contact with the uplands, where possible, helps to avoid the springs, the seeps, and the large stones. The roads should be designed so that runoff from the higher adjacent areas and water from seeps and springs are properly diverted.

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.

TaE—Tanasee-Balsam complex, 30 to 50 percent slopes, stony. This map unit occurs mainly as areas of steep, very deep, well drained Tanasee and Balsam soils in coves and gaps in the high mountains. Typically, the Tanasee soil is between drainageways in coves and gaps and the Balsam soil is along the drainageways. Areas in coves are bowl shaped in the lower part and narrow further up the drainageways. Areas in gaps are irregular in shape. Individual areas range from 4 to 30 acres in size. Typically, they are 45 to 55 percent Tanasee soil and 25 to 35 percent Balsam soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:

0 to 13 inches, black and 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 65 inches, multicolored gravelly loamy sand

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

Surface layer:

0 to 13 inches, black and very dark brown sandy loam

Subsoil:
13 to 48 inches, dark yellowish brown very cobbly loam and very cobbly sandy loam

Underlying material:
48 to 65 inches, dark yellowish brown, black, and white very cobbly sandy loam

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Burton, Craggey, and Wayah soils. These soils formed in saprolite on the adjacent uplands. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Also included are small areas of somewhat poorly drained or moderately well drained soils around seeps and springs. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Tanasee and Balsam soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils are on north- to east-facing slopes.

Nearly all of the acreage in this map unit is wooded. A few areas are used for recreational purposes.

This map unit is poorly suited to commercial timber. The main management concerns are the slope, the severe hazard of erosion, the cold climate, limited access, and runoff from the higher adjacent areas. The most common trees are northern red oak, black cherry, American beech, sweet birch, sugar maple, yellow buckeye, black oak, yellow birch, and eastern hemlock at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the amount and quality of the desirable sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and from various environmental factors.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are slick and highly erodible during wet periods because of the slope and the content of organic matter in the surface layer.

This map unit is poorly suited to recreational uses. The slope, stones, and limited access are the main management concerns. Hiking trails, however, are common. Springs and streams that provide drinking water are convenient to most of the trails. Freezing and thawing and the severe hazard of erosion increase the need for the trails to be properly maintained.

This map unit is poorly suited to access roads. The slope, stones, runoff from the higher adjacent areas, the springs, the seeps, freezing and thawing, and the severe hazard of erosion are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced and continuously maintained for year-round use. Gravel continuously sinks into the subsoil. Building the roads near the area of contact with the uplands, where possible, helps to avoid the springs, the seeps, and the large stones. The roads should be designed so that runoff from the higher adjacent areas and water from seeps and springs are properly diverted.

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.

TrE—Trimont gravelly loam, 30 to 50 percent slopes, stony. This map unit consists mainly of steep, very deep, well drained Trimont and similar soils in the low mountains on north- to east-facing head slopes or on south- to west-facing side slopes shaded by the higher mountains. Individual areas are irregular in shape and range from 10 to 50 acres in size.

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

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

Subsoil:
10 to 17 inches, reddish brown loam
17 to 40 inches, yellowish red clay loam
40 to 65 inches, yellowish red loam

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The soil is frozen for long periods in the winter and warms up later in the spring than other soils at the same elevation.

Included in mapping are small areas of Cowee, Evard, Plott, and Saunook soils. Cowee and Evard soils are on south- to west-facing slopes. They have a surface layer that is thinner or lighter in color than that of the Trimont soil. Also, Cowee soils are moderately deep to weathered bedrock. Plott soils are in the intermediate mountains and have less clay in the subsoil than the Trimont soil. They have a dark surface layer that is thicker than that of the Trimont soil. Saunook soils are along drainageways. Also included near the ridgetop in some areas are small areas of rock outcrop. Areas of seepage commonly are associated with the areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Trimont soil but have a dark surface layer that is more than 10 inches thick or have more rocks on the surface.

Nearly all of the acreage in this map unit is wooded. A few areas are used for building site development, pasture, or specialty crops.

This map unit is poorly suited to commercial timber. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for some of the main management concerns, such as the slope and a severe hazard of erosion. Yellow-poplar is the most common tree. Other common trees include black cherry, American beech, sweet birch, white oak, black oak, and northern red oak.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Eastern white pine is commonly planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris and the hazard of wildfires, and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope, the content of organic matter in the surface layer, and the content of clay in the subsoil.

This map unit is poorly suited to building site development. The slope, limited access in winter, and the severe hazard of erosion are the main management concerns. Revegetating disturbed areas is difficult because of the slope. Hydroseeding is a good way to revegetate steep, bare areas.

This map unit is poorly suited to pasture and is unsuited to hayland because of the slope and the severe hazard of erosion in bare areas. Operating farm equipment is dangerous on this map unit. Most farming operations are done by hand. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition helps to control erosion and conserves water.

This map unit is poorly suited to specialty crops. The slope and the severe hazard of erosion are the main management concerns. In some areas, however, the unit has high productivity and is used for Christmas trees. Operating farm equipment is dangerous on this map unit. Most farming operations are done by hand. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is unsuited to row crops, hay, and recreational uses. The slope and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope and the severe hazard of erosion are the main management concerns. Because unsurfaced roads are slick when wet, they should be surfaced for year-round use. Revegetating large areas that have been cut and filled is difficult because of the slope. Hydroseeding is a good way to revegetate steep, bare areas. Building roadbeds on the natural soil, where possible, minimizes slumping.

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 map unit consists mainly of very steep, very deep, well drained Trimont and similar soils in the low mountains on north- to east-facing head slopes or side slopes shaded by the higher mountains.

Individual areas are irregular in shape and range from 10 to 50 acres in size.

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

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

Subsoil:
10 to 17 inches, reddish brown loam
17 to 40 inches, yellowish red clay loam
40 to 65 inches, yellowish red loam

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The soil is frozen for long periods in the winter and warms up later in the spring than other soils at the same elevation.

Included in mapping are small areas of Cowee, Evard, Plott, and Saunook soils. Cowee and Evard soils are on south- to west-facing slopes. They have a surface layer that is thinner or lighter in color than that of the Trimont soil. Also, Cowee soils are moderately deep to weathered bedrock. Plott soils are in the intermediate mountains and have less clay in the subsoil than the Trimont soil. They have a dark surface layer that is thicker than that of the Trimont soil. Saunook soils are in drainageways. Also included in some areas are small areas of rock outcrop. Areas of seepage commonly are associated with the areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Trimont soil but have a dark surface layer that is more than 10 inches thick or have more rocks on the surface.

Nearly all of the acreage in this map unit is wooded. A few areas are used as pasture.

This map unit is poorly suited to commercial timber. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for some of the main management concerns, such as the slope and a severe hazard of erosion. Yellow-poplar is the most common tree. Other common trees include black cherry, American beech, sweet birch, white oak, black oak, and northern red oak.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Eastern white pine is commonly planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris and the hazard of wildfires, and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to pasture. The slope and the severe hazard of erosion are the main management concerns. Operating farm equipment is dangerous on this map unit. Most farming operations are done by hand. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition helps to control erosion and conserves water.

This map unit is unsuited to building site development, hay, crops, and recreational uses. The slope, the severe hazard of erosion, and limited access in the winter are the main management concerns.

This map unit is poorly suited to access roads. The slope and the severe hazard of erosion are the main management concerns. Because unsurfaced roads are slick when wet, they should be surfaced for year-round use. Revegetating large areas that have been cut and filled is difficult because of the slope. Hydroseeding is a good way to revegetate steep, bare areas. Building roadbeds on the natural soil, where possible, minimizes slumping.

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

TwC—Tuckasegee-Whiteside complex, 8 to 15 percent slopes. This map unit occurs mainly as areas of a strongly sloping, very deep, well drained Tuckasegee soil and a moderately well drained Whiteside soil. The unit is on toe slopes and on benches and along drainageways in coves in the intermediate mountains, primarily in the southern part of the county. Typically, the Tuckasegee soil is between drainageways and the Whiteside soil is along the drainageways. Individual areas are bowl shaped in the

lower part and narrow further up the drainageways. They range from 2 to 30 acres in size. Typically, they are 35 to 45 percent Tuckasegee soil and 35 to 45 percent Whiteside soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 11 inches, very dark brown gravelly loam

Subsoil:
11 to 24 inches, dark yellowish brown loam and gravelly loam
24 to 60 inches, yellowish brown gravelly fine sandy loam and gravelly sandy clay loam

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

Surface layer:
0 to 14 inches, very dark grayish brown fine sandy loam

Subsoil:
14 to 24 inches, yellowish brown sandy clay loam that has streaks of very dark grayish brown in old root channels
24 to 30 inches, yellowish brown sandy clay loam that has strong brown and gray mottles
30 to 47 inches, gray fine sandy loam that has yellowish brown and gray mottles

Underlying material:
47 to 53 inches, light brownish gray sandy loam that has brownish yellow mottles
53 to 70 inches, gray sandy clay loam that has yellowish brown mottles

Permeability is moderately rapid in the Tuckasegee soil and moderate in the Whiteside soil. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. Water may pond in concave areas during periods of intensive rainfall. The seasonal high water table is more than 6 feet below the surface in areas of the Tuckasegee soil and from 1.5 to 3.0 feet below the surface in areas of the Whiteside soil.

Included in mapping are areas of Dellwood, Nikwasi, and Sylva soils. Dellwood and Nikwasi soils are subject to flooding. Sylva soils are poorly drained. Nikwasi soils are poorly drained or very poorly drained. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Tuckasegee and Whiteside soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are in convex areas. Where the surface layer is more than 20 inches thick, the soils are in concave areas.

About half of the acreage in this map unit is cleared of trees and used for high-value row crops, pasture, hay, or specialty crops. Other areas are used as woodland or for building site development or recreational purposes.

This map unit is moderately suited to high-value row crops, such as cabbage and broccoli. The slope, the severe hazard of erosion, and runoff from the surrounding uplands are the main management concerns. Grassed waterways, diversions, and field borders are needed to control runoff and erosion. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is well suited to pasture and hayland. The slope, soil compaction, and runoff from the higher surrounding uplands are the main management concerns. Land shaping before establishing pasture and hay helps to open outlets and drain surface water from depressions. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is moderately suited to specialty crops, such as landscaping plants, Christmas trees, and ginseng. The slope and runoff from the higher surrounding uplands are the main management concerns. Also, a perched water table may interfere with the growth of Fraser fir in areas of the Whiteside soil. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, dog hobble, white birch, Bradford pear, and rhododendron. Fraser fir and eastern white pine are commonly grown for use as Christmas trees. This map unit is moderately suited to trees and other plants that must be dug during harvesting. Water management practices similar to those used in row crops are appropriate. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat. Establishing and maintaining sod in appropriate areas minimize erosion and help to control runoff.

This map unit is well suited to commercial timber. Plant competition, the slope, and runoff from the higher adjacent areas are the main management concerns. Yellow-poplar is the most common tree. Other common trees include black cherry, American beech, sweet birch, northern red oak, sugar maple, yellow buckeye,

yellow birch, white oak, red maple, black locust, eastern hemlock, and eastern white pine.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Eastern white pine commonly is planted in old fields and other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When these soils are wet, skid trails and unsurfaced roads are erodible and very slick because of the content of organic matter in the surface layer and runoff from the higher surrounding uplands.

The Tuckasegee soil is moderately suited to building site development. The slope and runoff from the surrounding uplands are the main management concerns. The Whiteside soil is poorly suited to building site development. The wetness, the slope, and runoff from the surrounding uplands are the main management concerns. If possible, areas of the Whiteside soil should not be used for septic tank absorption fields. Excavations for basements may be hampered by the depth to the seasonal high water table in areas of the Whiteside soil. Buildings should be designed so that runoff from the surrounding uplands is diverted.

This map unit is moderately suited to recreational uses. It commonly is used for campsites and hiking trails. Water sources, such as springs, are common in areas of this unit. The slope, the wetness, and runoff from the adjacent uplands are the main management concerns.

This map unit is moderately suited to access roads because of the slope, frost action, and the wetness. Runoff from the higher adjacent areas, springs and seeps, and controlling erosion are also management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the soil material. Frequent smoothing of the road surface is needed because ruts form easily. Building the roads near the area of contact with the uplands helps to avoid the springs and seeps. The roads should be designed so that runoff from the higher adjacent areas is diverted. The water from the seeps and springs should be intercepted and diverted away from the roadbeds. Seeding roadbanks and maintaining a good plant cover minimize sedimentation and improve water quality.

The capability subclass is IIIe in areas of the Tuckasegee soil and IVe in areas of the Whiteside soil. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8A in areas of the Tuckasegee soil and 7A in areas of the Whiteside soil.

Ud—Udorthents, loamy. This map unit consists of borrow areas, sanitary landfills, and highway interchanges and roadbeds. In these areas most of the natural soils have been altered by digging, grading, or filling.

Borrow areas consist of excavated areas where the soil material has been removed as a source of fill material. The cuts are 4 to more than 40 feet deep. The base slope in these cuts is level to steep. Most cuts have two or more nearly vertical side slopes. The exposed surface layer consists mainly of weathered bedrock or saprolite. Borrow areas commonly range from 3 to 10 acres in size.

Borrow areas commonly include small areas of intermittent ponds, loose fill material, and exposed bedrock.

Some borrow areas are temporarily seeded and vegetated. A few borrow areas are naturally seeded to wild grasses, weeds, and trees. Borrow areas commonly have poor physical properties for plant growth. The available water capacity, soil fertility, and organic matter content are low. Rooting depth generally is shallow. Areas that are reseeded have potential for use as wildlife habitat. Neglected areas are easily eroded and are a significant source of sediment in the surrounding streams and lakes.

Sanitary landfills consist of graded trenches that are backfilled with alternate layers of solid refuse and soil material. After a final cover of about 2 feet of soil is added, the areas range from nearly level to steep. Maintaining a plant cover is difficult and costly in most areas. Also, the potential for the production of methane gas and subsidence severely limits the use of these areas after landfill operations are completed.

Highway interchanges and roadbeds consist of areas where the natural soils have been altered by road building operations. Excavated areas that have been cut through mountains commonly range from 10 to 100 feet or more. The areas in valleys or around highway interchanges that have been filled commonly range from

10 to 100 feet or more deep. About 30 percent of these areas are covered with impervious road building material or exposed bedrock. Impervious material greatly influences the hydrology of the surrounding areas.

Most areas are seeded. They are, however, costly to maintain, especially on cuts in south- to west-facing areas that freeze and thaw in the spring and fall. Some areas, especially those in metasedimentary rock formations, are susceptible to landslides during periods of intensive and prolonged rainfall. Also, metasedimentary rock formations may have a large amount of sulfur, which can increase the acidity of streams when the rocks are exposed by road building activities.

Onsite investigation is needed before the use and management of specific areas are planned.

The capability subclass is VIIs. The unit has not been assigned a woodland ordination symbol.

UfB—Udorthents-Urban land complex, 0 to 5 percent slopes, rarely flooded. This nearly level and gently sloping map unit occurs mainly as areas of Udorthents and areas of Urban land. Udorthents consist of areas of loamy, earthy material filled over soils on flood plains. These areas are 2 to 10 feet thick. The areas on flood plains were filled to reduce the hazard of flooding and to increase their value as construction sites. Urban land consists of impervious areas covered by buildings, roads and streets, and parking lots. Individual areas are generally 2 to 50 acres in size. Typically, they are about 60 percent loamy fill material that varies considerably in texture and degree of compaction and about 30 percent Urban land. They are long and narrow and are along stream channels. The Udorthents and areas of Urban land occur as areas too intricately mixed to be mapped separately.

Included in mapping are areas that have slope of more than 5 percent, small areas of natural soils, and areas that have stones, fragments of asphalt, and wood by-products. These inclusions make up about 10 percent of this map unit.

Onsite investigation is needed before the use and management of this map unit are planned. Foundation problems are common in areas of this map unit. Bulk density tests are needed to determine the suitability of these areas for foundations. These areas are rarely flooded for very brief periods. Surface runoff from the impervious areas during periods of intensive rainfall increases the hazard of flooding downstream. The areas of earthy fill material generally are vegetated and used for lawns, playgrounds, ball fields, or open areas.

The capability subclass is VIIs in areas of the Udorthents and VIIIs in areas of Urban land. This map unit has not been assigned a woodland ordination symbol.

WaD—Wayah sandy loam, 15 to 30 percent slopes, stony. This map unit consists mainly of moderately steep, very deep, well drained Wayah and similar soils on ridgetops in the high mountains. Individual areas are long and narrow and range from 10 to 80 acres in size.

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

Surface layer:

0 to 14 inches, black and very dark grayish brown sandy loam

Subsoil:

14 to 40 inches, dark yellowish brown gravelly sandy loam

Underlying material:

40 to 46 inches, pale brown gravelly sandy loam saprolite that has light gray and white mottles

46 to 65 inches, mottled yellowish brown, yellowish red, white, and pale brown gravelly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The weather is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Oconaluftee soils. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Oconaluftee soils are similar in appearance to the Wayah soil but formed from metasedimentary rock and are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Wayah soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are in saddles.

Nearly all of the acreage in this map unit is wooded. A few areas are in grassy balds or heath balds. Some areas are used for recreational development. Nearly all of this map unit is in the Nantahala National Forest or along the Blue Ridge Parkway.

This map unit is moderately suited to commercial timber. The severe climate, limited access, and the slope are the main management concerns. The productivity is significantly reduced by the severe climate. The unit is commonly used for timber production, however, because of the desirable species, which help to compensate for some of the management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, American beech, black oak, yellow buckeye, eastern hemlock, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and from various environmental factors.

Restricting the use of heavy equipment to dry periods helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope and the content of organic matter in the surface layer.

This map unit is moderately suited to recreational uses. The slope and a moderate hazard of erosion are management concerns. Many areas commonly are used for scenic overlooks and hiking trails. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to crops, pasture, hay, and building site development. The slope, limited access, the cold climate, surface stones, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope is the main limitation. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

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 map unit consists mainly of steep, very deep, well drained Wayah and similar soils on side slopes and ridgetops in the high mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. Individual areas range from 10 to 80 acres in size.

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

Surface layer:

0 to 14 inches, black and very dark grayish brown sandy loam

Subsoil:

14 to 40 inches, dark yellowish brown gravelly sandy loam

Underlying material:

40 to 46 inches, pale brown gravelly sandy loam saprolite that has light gray and white mottles

46 to 65 inches, mottled yellowish brown, yellowish red, white, and pale brown gravelly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The weather is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Oconaluftee soils. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Oconaluftee soils are similar in appearance to the Wayah soil but formed from metasedimentary rock and are near the geological break between metasedimentary rocks and crystalline rocks. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Wayah soil but have a dark surface layer that is

less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or are in gaps.

Nearly all of the acreage in this map unit is wooded. Some areas are used for recreational development. Most of this map unit is in the Nantahala National Forest or along the Blue Ridge Parkway.

This map unit is poorly suited to commercial timber. The main management concerns are the slope, the severe climate, limited access, and a severe hazard of erosion. The productivity is significantly reduced by the severe climate. The unit is commonly used for timber production, however, because of the desirable species, which help to compensate for some of the management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, American beech, black oak, yellow buckeye, eastern hemlock, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and from various environmental factors.

Restricting the use of heavy equipment to dry periods helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope and the content of organic matter in the surface layer.

This map unit is poorly suited to recreational uses. The slope and the severe hazard of erosion are the main management concerns. Some areas are used for scenic overlooks and hiking trails. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to crops, pasture, hay, and building site development. The slope, difficult access across the steep terrain, the cold climate, stones, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope, limited access, and the severe hazard of erosion are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

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 map unit consists mainly of very steep, very deep, well drained Wayah and similar soils on side slopes in the high mountains. Individual areas are irregular in shape and range from 10 to 80 acres in size.

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

Surface layer:

0 to 14 inches, black and very dark grayish brown sandy loam

Subsoil:

14 to 40 inches, dark yellowish brown gravelly sandy loam

Underlying material:

40 to 46 inches, pale brown gravelly sandy loam saprolite that has light gray and white mottles

46 to 65 inches, mottled yellowish brown, yellowish red, white, and pale brown gravelly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The weather is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Oconaluftee soils. Burton and Craggey

soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Oconaluftee soils are similar in appearance to the Wayah soil but formed from metasedimentary rock and are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Wayah soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Nearly all of the acreage in this map unit is wooded. A few areas are used for recreational development. Almost all of this map unit is in the Nantahala National Forest or along the Blue Ridge Parkway.

This map unit is poorly suited to commercial timber. The slope, the severe climate, limited access, and a severe hazard of erosion are the main management concerns. The productivity is significantly reduced by the severe climate. The unit is commonly used for timber production, however, because of the desirable species, which help to compensate for some of the management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, American beech, black oak, yellow buckeye, eastern hemlock, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and from various environmental factors.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to most recreational uses. A few areas are used for scenic overlooks and hiking trails. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hay, or building site development. The slope, limited access, the cold climate, stones, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope, limited access, and the severe hazard of erosion are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

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 map unit consists mainly of strongly sloping, very deep, well drained Wayah and similar soils on ridgetops in the high mountains. Individual areas are long and narrow and range from 10 to 80 acres in size.

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

Surface layer:
0 to 14 inches, black and very dark grayish brown sandy loam

Subsoil:
14 to 40 inches, dark yellowish brown gravelly sandy loam

Underlying material:
40 to 46 inches, pale brown gravelly sandy loam saprolite that has light gray and white mottles

46 to 65 inches, mottled yellowish brown, yellowish red, white, and pale brown gravelly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The climate is severe. It is cold, icy, and very windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Oconaluftee soils. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Oconaluftee soils are similar in appearance to the Wayah soil but formed from metasedimentary rock and are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Wayah soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Nearly all of the acreage in this map unit is wooded. Some areas are used for recreational development. Nearly all of this map unit is in the Nantahala National Forest or along the Blue Ridge Parkway.

This map unit is unsuited to commercial timber. The main management concerns are the high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. Limited access also is a management concern. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is moderately suited to recreational uses. The slope, stones on the surface, and limited access are the main management concerns. This unit is used for scenic overlooks, campsites, and hiking trails. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Frequent ice storms in winter and freezing and thawing in spring and fall increase the need for the trails to be properly maintained. Campsites that have a dependable source of water are scarce on this soil.

This map unit is unsuited to crops, pasture, hay, or building site development. The slope, difficult access across the steep terrain, and the harsh climate are management concerns.

This map unit is moderately suited to access roads. The slope and limited access are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

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 map unit consists mainly of moderately steep, very deep, well drained Wayah and similar soils on ridgetops in the high mountains. Individual areas are long and narrow and range from 10 to 80 acres in size.

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

Surface layer:

0 to 14 inches, black and very dark grayish brown sandy loam

Subsoil:

14 to 40 inches, dark yellowish brown gravelly sandy loam

Underlying material:

40 to 46 inches, pale brown gravelly sandy loam saprolite that has light gray and white mottles

46 to 65 inches, mottled yellowish brown, yellowish red, white, and pale brown gravelly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The weather is cold, icy, and very windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Oconaluftee soils. Burton and Craggey

Figure 16.—A stand of poorly formed northern red oak in an area of Wayah sandy loam, windswept, 15 to 30 percent slopes, stony, on Rough Butt Bald.

soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Oconaluftee soils are similar in appearance to the Wayah soil but formed from metasedimentary rock and are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Wayah soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Nearly all of the acreage in this map unit is wooded. Some areas are used for recreational development. Nearly all of this map unit is in the Nantahala National Forest or along the Blue Ridge Parkway.

This map unit is unsuited to commercial timber. The main management concerns are the high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees (fig. 16). Limited access

and the slope are also management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is moderately suited to recreational uses. It is used for scenic overlooks, campsites, and hiking trails. The slope and stones on the surface are the main management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Frequent ice storms in winter and freezing and thawing in spring and fall increase the need for the trails to be properly maintained. Campsites that have a dependable source of water are scarce on this soil.

This map unit is unsuited to crops, pasture, hay, or building site development. The slope, difficult access across the steep terrain, and the harsh climate are management concerns.

This map unit is poorly suited to access roads. The slope and limited access are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

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 map unit consists mainly of steep, very deep, well drained Wayah and similar soils on side slopes and ridgetops in the high mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. Individual areas range from 10 to 80 acres in size.

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

Surface layer:

0 to 14 inches, black and very dark grayish brown sandy loam

Subsoil:

14 to 40 inches, dark yellowish brown gravelly sandy loam

Underlying material:

40 to 46 inches, pale brown gravelly sandy loam saprolite that has light gray and white mottles

46 to 65 inches, mottled yellowish brown, yellowish red, white, and pale brown gravelly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The weather is cold, icy, and very windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Oconaluftee soils. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Oconaluftee soils are similar in appearance to the Wayah soil but formed from metasedimentary rock and are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Wayah soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Nearly all of the acreage in this map unit is wooded. A few areas are used for recreational development. Nearly all of this map unit is in the Nantahala National Forest or along the Blue Ridge Parkway.

This map unit is unsuited to commercial timber. The main management concerns are the high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, limited access, and the severe hazard of erosion are also management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is poorly suited to recreational uses. A

few areas are used for hiking trails and scenic overlooks. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Frequent ice storms in winter and freezing and thawing in spring and fall increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hay, and building site development. The slope, limited access, the harsh climate, stones on the surface, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope and limited access are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

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

WeF—Wayah sandy loam, windswept, 50 to 95 percent slopes, stony. This map unit consists mainly of very steep, very deep, well drained Wayah and similar soils on side slopes in the high mountains. Individual areas are irregular in shape and range from 10 to 80 acres in size.

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

Surface layer:

0 to 14 inches, black and very dark grayish brown sandy loam

Subsoil:

14 to 40 inches, dark yellowish brown gravelly sandy loam

Underlying material:

40 to 46 inches, pale brown gravelly sandy loam saprolite that has light gray and white mottles

46 to 65 inches, mottled yellowish brown, yellowish red, white, and pale brown gravelly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The weather is cold, icy, and very windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Oconaluftee soils. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Oconaluftee soils are similar in appearance to the Wayah soil but formed from metasedimentary rock and are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of the map unit.

Also included in mapping are soils that are similar to the Wayah soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes.

Almost all of the acreage in this map unit is wooded. A few areas are used for recreational development. Nearly all of this map unit is in the Nantahala National Forest or along the Blue Ridge Parkway.

This map unit is unsuited to commercial timber. The main management concerns are the high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, limited access, and a severe hazard of erosion are also management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is poorly suited to recreational uses. Some areas, however, are used for scenic overlooks and hiking trails. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Frequent ice storms in winter and freezing and thawing in spring and fall increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hay, or building site development. The slope, limited access, the harsh climate, stones on the surface, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The

slope is the main limitation. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

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

WtB—Whiteside-Tuckasegee complex, 2 to 8 percent slopes. This map unit occurs mainly as areas of a gently sloping, very deep, moderately well drained Whiteside soil and a well drained Tuckasegee soil. The unit is on toe slopes and along drainageways in coves in the intermediate mountains, primarily in the southern part of the county. Typically, the Tuckasegee soil is between drainageways and the Whiteside soil is along the drainageways. Individual areas are bowl shaped in the lower part and long and narrow further up the drainageways. They range from 2 to 30 acres in size. Typically, they are 35 to 45 percent Whiteside soil and 35 to 45 percent Tuckasegee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

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

Surface layer:
0 to 14 inches, very dark grayish brown fine sandy loam

Subsoil:
14 to 24 inches, yellowish brown sandy clay loam that has streaks of very dark grayish brown in old root channels
24 to 30 inches, yellowish brown sandy clay loam that has strong brown and gray mottles
30 to 47 inches, gray fine sandy loam that has yellowish brown and gray mottles

Underlying material:
47 to 53 inches, light brownish gray sandy loam that has brownish yellow mottles
53 to 70 inches, gray sandy clay loam that has yellowish brown mottles

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

Surface layer:
0 to 11 inches, very dark brown gravelly loam

Subsoil:
11 to 24 inches, dark yellowish brown loam and gravelly loam
24 to 60 inches, yellowish brown gravelly fine sandy loam and gravelly sandy clay loam

Permeability is moderate in the Whiteside soil and moderately rapid in the Tuckasegee soil. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas, where water may pond. The seasonal high water table is 1.5 to 3.0 feet below the surface in areas of the Whiteside soil and more than 6 feet below the surface in areas of the Tuckasegee soil.

Included in mapping are areas of Dellwood, Nikwasi, and Sylva soils. Dellwood and Nikwasi soils are subject to flooding. Sylva soils are poorly drained. Nikwasi soils are poorly drained or very poorly drained. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Whiteside and Tuckasegee soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are in convex areas. Where the surface layer is more than 20 inches thick, the soils are in concave areas.

Most of the acreage in this map unit is cleared of trees and used for high-value row crops, pasture, hay, specialty crops, or building site development. Most of the acreage in this map unit on U.S. Forest Service lands is used for commercial timber or recreational purposes.

This map unit is well suited to high-value row crops, such as cabbage and broccoli (fig. 17). The slope, the moderate hazard of erosion, and runoff from the surrounding uplands are the main management concerns. Ponding in concave areas of the Whiteside soil may delay spring planting in some fields. Grassed waterways, diversions, and field borders are needed to control surface runoff and erosion. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is well suited to pasture and hayland. The slope, soil compaction, and runoff from the higher surrounding uplands are the main management concerns. Land shaping before establishing pasture and hay helps to open outlets and drain surface water from depressions. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration.

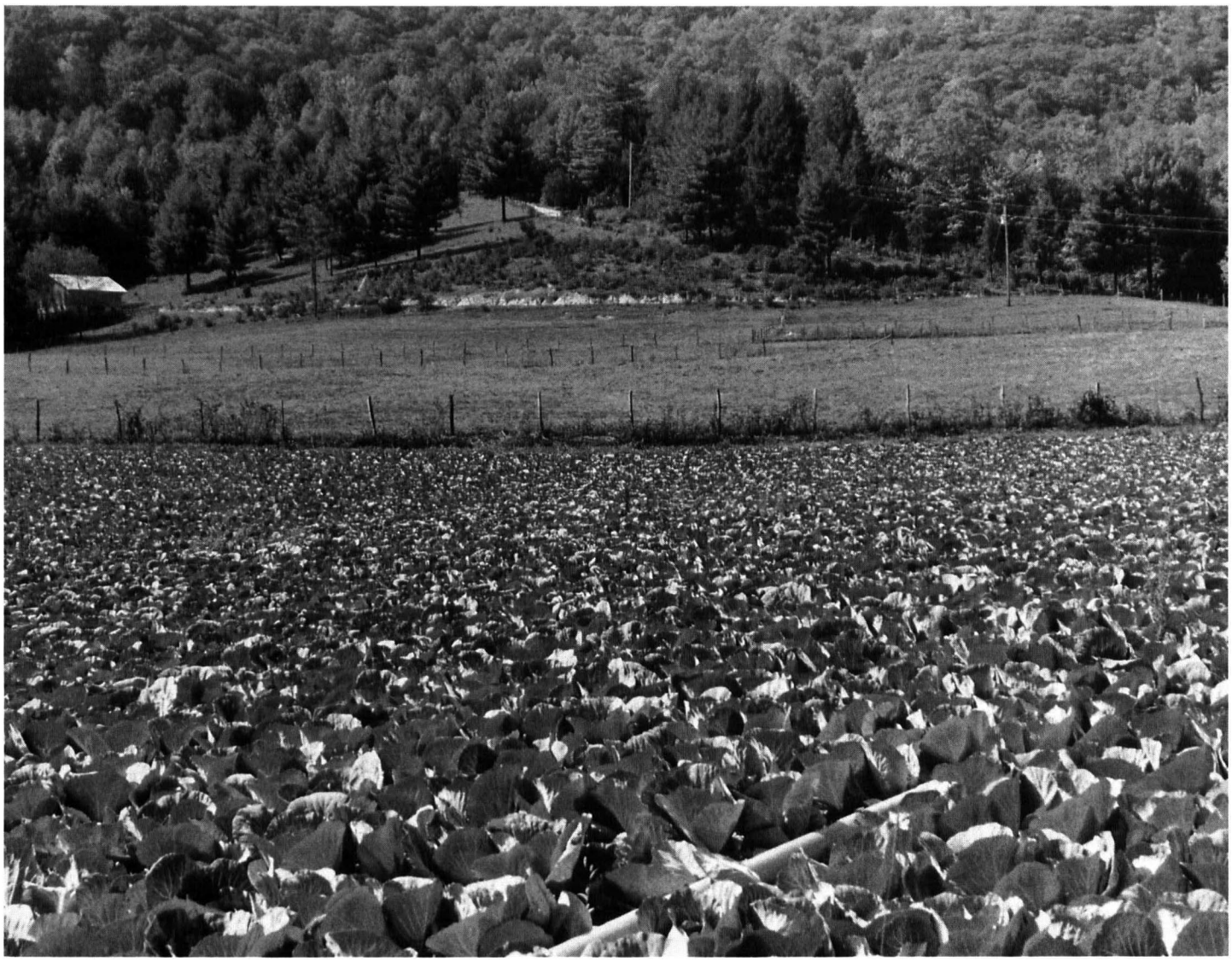


Figure 17.—Cabbage in an area of Whiteside-Tuckasegee complex, 2 to 8 percent slopes.

This map unit is well suited to specialty crops. Runoff from the higher surrounding uplands and the hazard of ponding in depressions are the main management concerns. The wetness in the Whiteside soil may interfere with the growth of Fraser fir. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, dog hobble, white birch, Bradford pear, and rhododendron. Fraser fir and eastern white pine are commonly grown for use as Christmas trees. This map unit is well suited to trees and other plants that must be dug during harvesting. Water management practices similar to those used in row crops are appropriate. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat. Establishing and maintaining sod in appropriate areas minimize erosion and help to control runoff.

This map unit commonly is not used for commercial timber on private land. It is used for commercial timber, however, on U.S. Forest Service lands. Plant competition and runoff from the higher adjacent areas are the main management concerns. Yellow-poplar is the most common tree. Other common trees include black cherry, American beech, northern red oak, sugar maple, yellow buckeye, white oak, red maple, yellow birch, sweet birch, black locust, eastern hemlock, and eastern white pine.

Hardwoods generally are preferred in stands that

have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Eastern white pine commonly is planted in old fields and other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When these soils are wet, skid trails and unsurfaced roads are erodible and very slick because of the content of organic matter in the surface layer and runoff from the higher surrounding uplands.

The Whiteside soil is poorly suited to building site development. The wetness and runoff from the surrounding uplands are the main management concerns. The Tuckasegee soil is well suited to building site development. Buildings should be designed so that runoff from the surrounding uplands is diverted.

This map unit is moderately suited to recreational uses. The wetness is the main limitation. The Tuckasegee soil is well suited to recreational uses. The unit commonly is used for campsites and hiking trails. Water sources, such as springs and streams, are common in areas of this unit.

This map unit is moderately suited to access roads. The wetness and runoff from the adjacent uplands are the main management concerns. The roads should be designed so that runoff from the adjacent uplands is diverted.

The capability subclass is IIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7A in areas of the Whiteside soil and 8A in areas of the Tuckasegee soil.

Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at (800) 457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

Nondiscrimination Statement

Nondiscrimination Policy

The U.S. Department of Agriculture (USDA) prohibits discrimination against its customers, employees, and applicants for employment on the basis of race, color, national origin, age, disability, sex, gender identity, religion, reprisal, and where applicable, political beliefs, marital status, familial or parental status, sexual orientation, whether all or part of an individual's income is derived from any public assistance program, or protected genetic information. The Department prohibits discrimination in employment or in any program or activity conducted or funded by the Department. (Not all prohibited bases apply to all programs and/or employment activities.)

To File an Employment Complaint

If you wish to file an employment complaint, you must contact your agency's EEO Counselor (http://directives.sc.egov.usda.gov/33081.wba) within 45 days of the date of the alleged discriminatory act, event, or personnel action. Additional information can be found online at http://www.ascr.usda.gov/complaint_filing_file.html.

To File a Program Complaint

If you wish to file a Civil Rights program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, found online at http://www.ascr.usda.gov/complaint_filing_cust.html or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter by mail to U.S. Department of Agriculture; Director, Office of Adjudication; 1400 Independence Avenue, S.W.; Washington, D.C. 20250-9419; by fax to (202) 690-7442; or by email to program.intake@usda.gov.

Persons with Disabilities

If you are deaf, are hard of hearing, or have speech disabilities and you wish to file either an EEO or program complaint, please contact USDA through the Federal Relay Service at (800) 877-8339 or (800) 845-6136 (in Spanish).

If you have other disabilities and wish to file a program complaint, please see the contact information above. If you require alternative means of communication for

program information (e.g., Braille, large print, audiotape, etc.), please contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

Supplemental Nutrition Assistance Program

For additional information dealing with Supplemental Nutrition Assistance Program (SNAP) issues, call either the USDA SNAP Hotline Number at (800) 221-5689, which is also in Spanish, or the State Information/Hotline Numbers (http://directives.sc.egov.usda.gov/33085.wba).

All Other Inquiries

For information not pertaining to civil rights, please refer to the listing of the USDA Agencies and Offices (http://directives.sc.egov.usda.gov/33086.wba).