United States Department of Agriculture

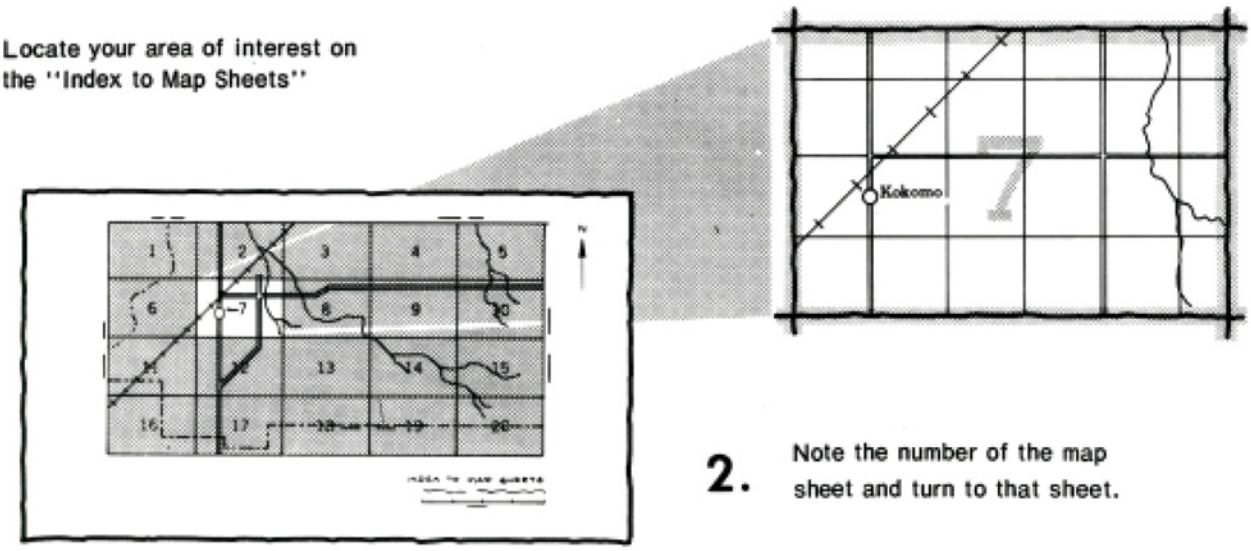
Soil Conservation Service

In cooperation with United States Department of Agriculture, Forest Service, and Tennessee Agricultural Experiment Station

Soil Survey of Unicoi County Tennessee

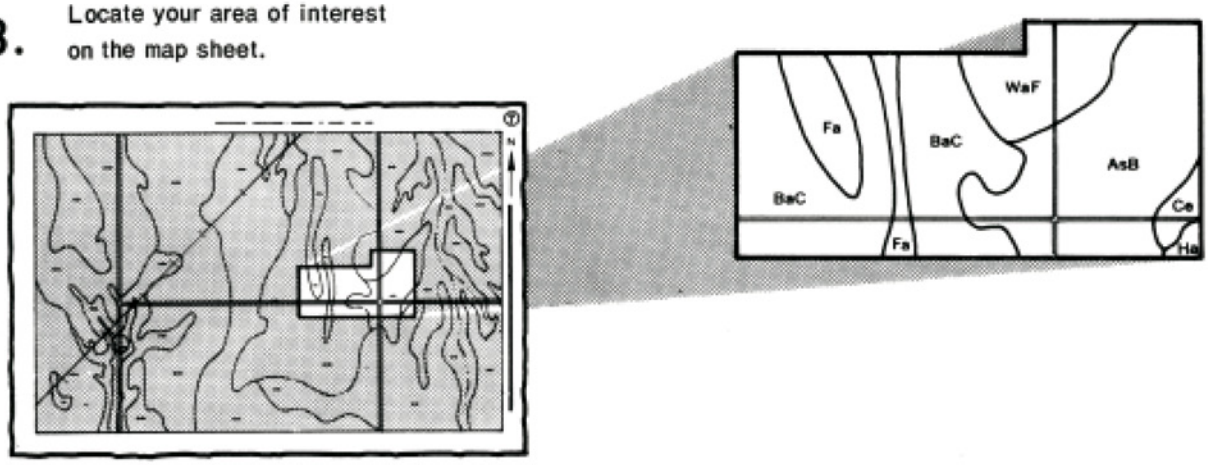
HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets"

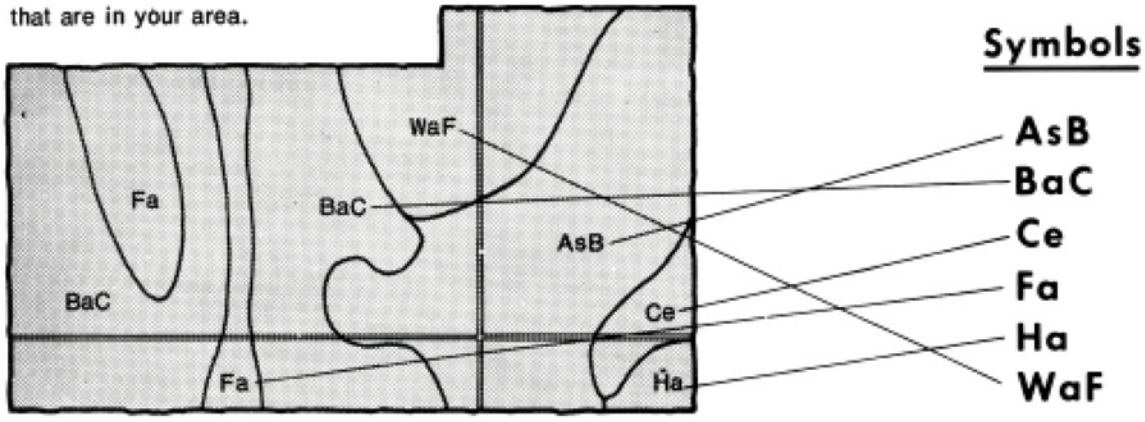


2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.

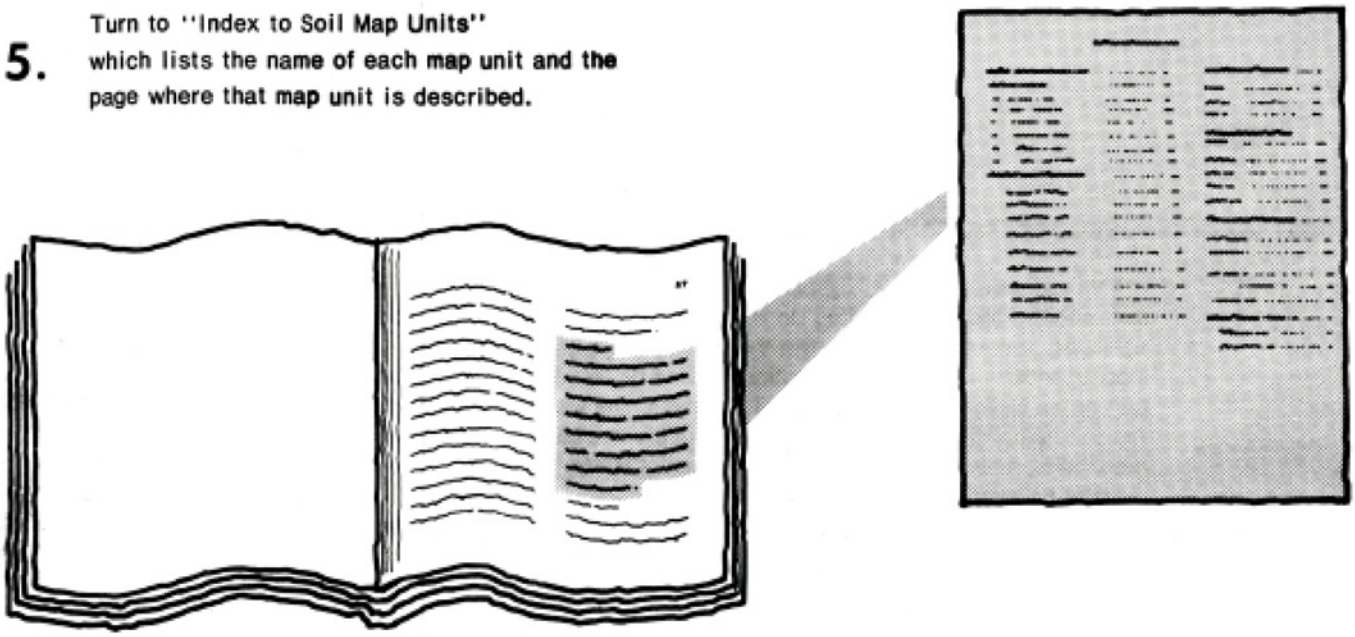


4. List the map unit symbols that are in your area.

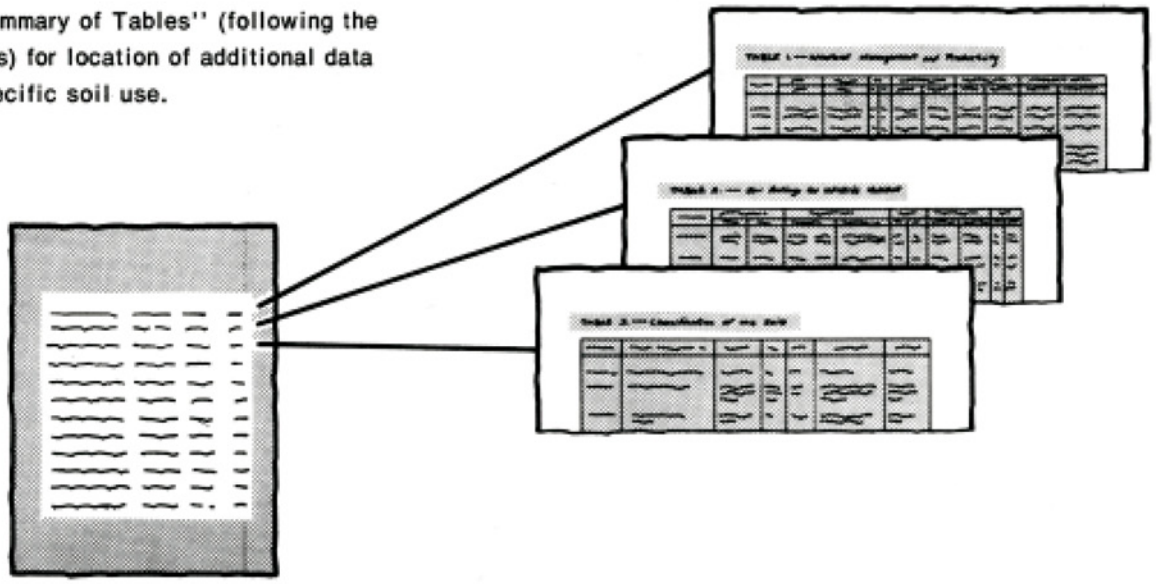


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1975-78. Soil names and descriptions were approved in 1980. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1978. This survey was made cooperatively by the Soil Conservation Service, the Forest Service, and the Tennessee Agricultural Experiment Station. It is part of the technical assistance furnished to the Unicoi County Soil Conservation District.

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

Cover: A typical valley scene in Unicoi County. Tate soils are in the foreground, and Ashe soils are on the hills in the background.

Contents

Soil Series

Issued September 1985

Index to Map Units

Summary of Tables

Foreword

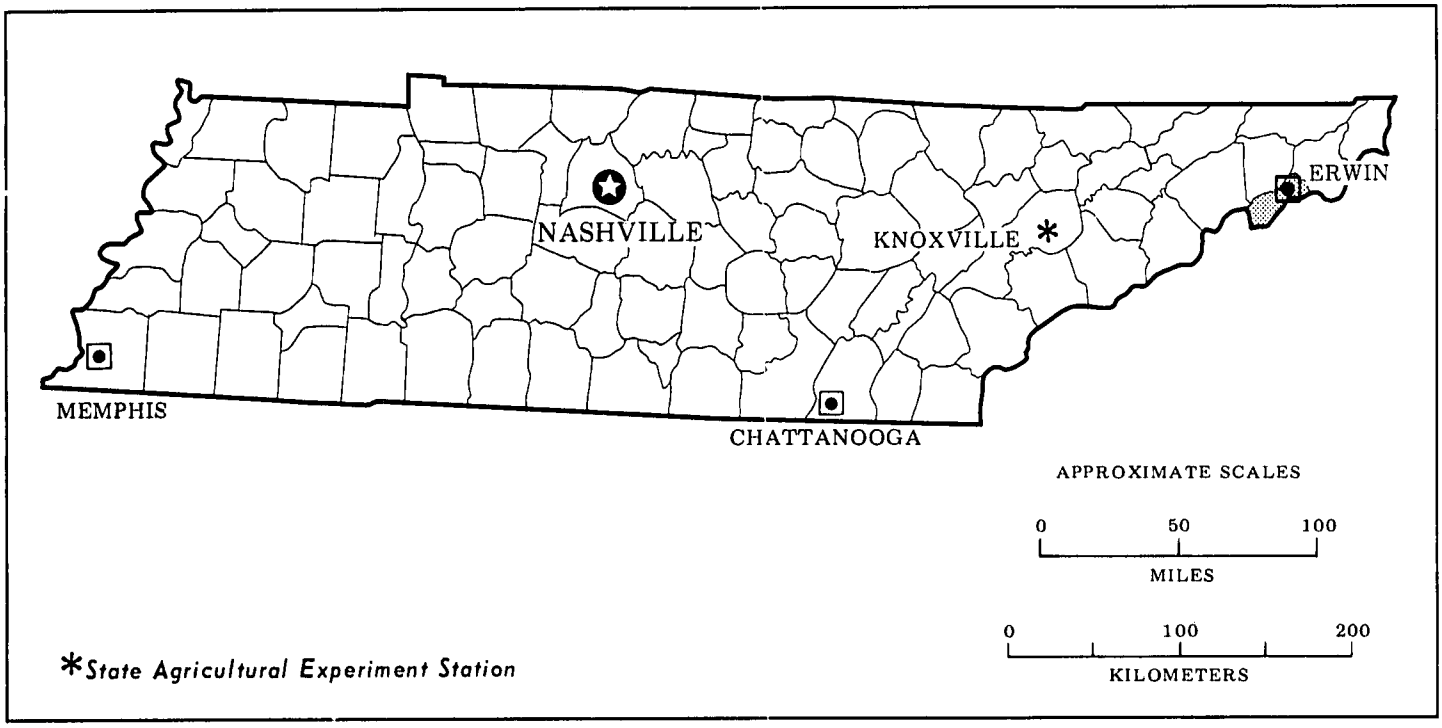
This soil survey contains information that can be used in land-planning programs in Unicoi County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact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

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure 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 Soil Conservation Service or the Cooperative Extension Service.

Donald C. Bivens
State Conservationist
Soil Conservation Service



Location of Unicoi County in Tennessee.

Soil Survey of Unicoi County, Tennessee

By Carlie McCowan, Soil Conservation Service

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

General Nature of the Survey Area

Unicoi County is in the northeastern part of Tennessee and has a total area of 185 square miles, or 118,400 acres. North Carolina forms the southeastern boundary of the county.

Erwin, the county seat, is near the Nolichucky River, about 15 miles south of Johnson City and 120 miles east of Knoxville.

Physiography

Unicoi County lies within the Unaka Mountains of the Blue Ridge Province. In Unicoi County, the Unaka Mountains generally consist of two parallel subordinate beds, which are separated by a long straight valley called Greasy Cove. The eastern bed is designated the Bald Mountains and the western, the Buffalo and Rich Mountains.

The stratigraphy of the county is very complex. Much folding and faulting has occurred. Deep gorges and valleys have been cut by geologic erosion, leaving very steep slopes, cliffs, and areas of rock material.

Elevation ranges from about 1,600 feet, where the Nolichucky River leaves the county at the Unicoi-Washington county line, to 5,516 feet at the summit of Big Bald Mountain.

The mountain ranges make up about 80 to 85 percent of the county. The southern tip of the county, which is underlain by granite, gneiss, and schist, takes in approximately 20 percent of the total acreage. The topography of this area is generally very rough and steep. The soils are moderately deep and loamy.

Part of the Unaka Range in Unicoi County is made up of the Ocoee Series. In this series are the Snowbird Group and the Sandsuck Formation. The Snowbird Group is made up of siltstone, feldspathic sandstone, phyllite, slate, and feldspathic quartzite. The Sandsuck Formation consists mainly of micaceous shale with some sandstone and conglomerate. Soils in these areas are generally shallow to moderately deep, loamy, and steep.

The Unicoi, Hampton, and Erwin Formations make up much of the mountain ranges on both sides of Greasy Cove. The Unicoi is made up of feldspathic sandstone, arkose, conglomerate, shale, and siltstone. The Hampton Formation consists of micaceous shale, siltstone, and feldspathic quartzite. The Erwin Formation is made up of shale, siltstone, sandstone, and quartzite. The soils in Greasy Cove are shallow to moderately deep, steep, loamy, and in places, stony.

Three dolomite formations underlie the valley—the Shady, Knox, and Honaker Formations. They are associated with a large band of sandstone, siltstone, shale, dolomite, and limestone called the Rome Formation. Large areas of these formations are covered by deep soils formed in colluvium from the adjacent mountains and alluvium from the larger streams (*3*).

Most of Unicoi County is drained by the Nolichucky River and its tributaries. The largest of these tributaries are the North and South Indian Creeks, Clark Creek, Bumpass Cove Creek, and Scioto Creek. Buffalo Creek drains the northeastern part of the county and flows into the Watauga River in Carter County.

The native vegetation of the area is hardwood and pine forest. Low-growing birch, spruce, and fir are at the very high elevations. Most of the extensive terrace and colluvial soils at the lower elevations have been cleared. The rough mountain land, owned by the Forest Service, is still in forest.

History and Development

Unicoi County was created by the Tennessee legislature from parts of Washington and Carter Counties on March 19, 1875. The county was named for the Unicoi Mountains. "Unicoi" was taken from the Indian word "unica," which means "white."

The Cherokee Indians were the first inhabitants of the area. They obtained most of their living from the forests and streams and engaged in only a limited amount of farming.

In 1771, Jacop Brown and another family opened a trading post on the Nolichucky River. Most of the early pioneers were chiefly of Scottish-Irish and English descent.

In 1970, the population of Unicoi County was 15,254. Erwin, the county seat and largest town, had a population of 4,715. The county seat was first named "Vanderbilt" and kept that name until changed to "Ervin" in 1879. Later it was changed to "Erwin."

The early industry of the county was mining. In Bumpass Cove, where most of the mines were located, high grade lead was mined prior to 1800. Production of iron started at the beginning of the nineteenth century, and mining of zinc and manganese later became important. In 1939, Bumpass Cove was the leading producer of metallurgical manganese in the United States.

Unicoi County is chiefly an industrial county, although farming and forestry furnish a large part of total income. Factories that manufacture plastic signs, ball bearings, electric motors, and industrial garments are mainly near Erwin. Other employment in the county includes the Clinchfield Railroad and a nuclear fuel processing plant. The railroad is the largest single employer in the county. Much of the county's work force is employed at factories in nearby Johnson City in Washington County.

Two Federal highways and two State highways cross the county. A part of the Appalachian Corridor highway system is near completion. The Clinchfield Railroad crosses the county from south to north through Erwin.

According to the U.S. Census of Agriculture, there were 380 farms in Unicoi County in 1974, compared to 612 in 1964. The average size farm in 1974 was 47 acres.

Most of the farmland is used for pasture, hay, corn, tobacco, apple orchards, strawberries, and small grain. Tall fescue is the principal pasture and hay crop. Tobacco is the number one cash crop and the most important source of farm income.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

In Unicoi County in winter, valleys are very cool and have occasional cold and warm spells; upper slopes and mountaintops are generally cold. In summer, valleys are very warm and frequently hot, and mountains that are warm during the day become cool at night. Precipitation is heavy and evenly distributed throughout the year. Summer precipitation falls chiefly during thunderstorms. In winter, precipitation in valleys is chiefly snow, although rains are frequent. Snow cover does not persist except at the highest elevations.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Unicoi, Tennessee, in the period 1957 to 1975. 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 37 degrees F, and the average daily minimum temperature is 25 degrees. The lowest temperature on record, which occurred at Unicoi on December 13, 1962, is -18 degrees. In summer, the average temperature is 70 degrees, and the average daily maximum temperature is 83 degrees. The highest recorded temperature, which occurred on June 23, 1964, is 94 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.

Of the total annual precipitation, 28 inches, or 55 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 18 inches. The heaviest 1-day rainfall during the period of record was 3.85 inches at Unicoi on March 12, 1963. Thunderstorms occur on about 46 days each year, and most occur in summer.

Heavy rains from prolonged storms, at any time of the year, occasionally cover the entire county and adjacent counties and cause severe flooding in valleys.

Average seasonal snowfall is 21 inches. The greatest snow depth at any one time during the period of record was 11 inches. On an average of 6 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 less than 55 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The prevailing wind is from the west-southwest. Average windspeed is highest, 8 miles per hour, in March.

How This Survey Was Made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of

drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, woodland managers, engineers, planners, developers and builders, home buyers, and others.

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, a map unit 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 other units but in a different pattern.

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

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

Each map unit is rated for *cultivated crops, specialty crops, woodland, urban uses,* and *recreation areas*. Cultivated crops are those grown extensively in the survey area. Specialty crops are the vegetables and fruits that generally require intensive management. Woodland refers to areas of native or introduced trees. Urban uses include residential, commercial, and industrial developments. Intensive recreation areas are campsites, picnic areas, ballfields, and other areas that are subject to heavy foot traffic. Extensive recreation areas are those used for nature study and as wilderness.

Soil Descriptions

1. Unaka-Ashe

Steep and very steep, well drained and somewhat excessively drained loamy soils that are about 2 to 3 1/2 feet deep over granite or gneiss bedrock; on high mountains

In this map unit the landscape consists of high mountains that have long linear ridges and long side slopes dissected by many hollows and coves.

This map unit makes up about 7 percent of the survey area. It is about 60 percent Unaka soils, 30 percent Ashe soils, and 10 percent soils of minor extent.

The well drained Unaka soils are on the ridgetops and the upper part of side slopes. They have a northerly aspect. The surface layer is very dark brown and dark brown loam, and the subsoil is dark yellowish brown and yellowish brown loam.

The somewhat excessively drained Ashe soils are on the lower part of side slopes. They have a southerly aspect. The surface layer is very dark grayish brown and dark yellowish brown loam, and the subsoil is yellowish brown loam.

Of minor extent in this unit are the deep, well drained Brookshire and Tusquitee soils, on foot slopes and benches and in coves.

Most of the acreage is still in forest consisting of yellow-poplar, white pine, red oak, and birch. A few areas have been cleared and are used for pasture.

The suitability of the soils for pasture is poor because of the steepness of slope. The less sloping soils are well suited to apple orchards.

The soils in this unit are well suited to white pine, yellow-poplar, and most Christmas tree species.

Urban and intensive recreation uses are very restricted because of the steepness of slope and depth to rock.

The soils in this unit are well suited to extensive recreation uses such as hiking and nature study because of the undisturbed condition of the forest and the presence of the Appalachian Trail. Most of the acreage is in the Cherokee National Forest.

2. Ditney-Maymead-Brookshire

Moderately steep to very steep, well drained loamy soils that are about 2 to more than 6 feet deep over feldspathic quartzite, arkosic sandstone, or slate bedrock; on high mountains and in coves

This map unit is in the Flint, Rich, and Unaka mountain ranges. In this unit, the landscape consists of high, rugged mountains, long linear ridges, and long side slopes dissected by many hollows and coves (fig. 1).

This map unit makes up about 54 percent of the survey area. It is about 52 percent Ditney soils, 15 percent Maymead soils, 10 percent Brookshire soils, and 23 percent soils of minor extent.

Ditney soils are on side slopes and ridges at the lower elevations. They have only southerly aspect at higher elevations. The surface layer is dark grayish brown loam, and the subsoil is yellowish brown loam.

Maymead soils are in coves and on the lower part of mountain side slopes. They have a surface layer of dark

Figure 1.—A typical landscape of the Ditney-Maymead-Brookshire map unit. A rockslide is in the immediate foreground.

grayish brown and dark yellowish brown loam and a subsoil of dark yellowish brown loam and cobbly loam.

Brookshire soils are on mountain foot slopes and in mountain coves. They have a surface layer of very dark grayish brown loam and a subsoil of dark yellowish brown and yellowish brown loam.

Of minor extent in this unit are the well drained Jeffrey soils and the cobbly Spivey soils in high mountain coves and the shallow cobbly Unicoi Variant soils on very high mountaintops.

The soils in this unit are almost entirely wooded. A few areas are cleared for pasture and wildlife plantings. The suitability of the soils for pasture and hay is poor because of the steepness of slope.

The soils in this unit have fair suitability for white pine, shortleaf pine, and loblolly pine at the lower elevations and for white pine, cherry, and birch at the higher elevations.

Urban and intensive recreation uses are very limited because of the steepness of slope and depth to rock.

The soils in this unit are well suited to extensive recreation uses such as hiking and nature study because of the undisturbed condition of the forest and the presence of the Appalachian Trail. Most of the acreage is in the Cherokee National Forest.

3. Calvin-Shouns

Sloping to steep, well drained shaly and loamy soils that are 1 to 6 feet deep over reddish shale bedrock; on dissected hills, ridges, and foot slopes

This map unit is in the north-central part of the county, from Buffalo Valley southwest to Erwin. The landscape consists of long linear ridges and many highly dissected, low, rounded hills. Adjacent foot slopes are generally smooth and concave.

This map unit makes up about 2 percent of the survey area. It is about 60 percent Calvin soils, 30 percent Shouns soils, and 10 percent soils of minor extent.

Calvin soils are on the dissected hills and ridges. They have a surface layer of dark reddish brown and reddish brown shaly silt loam and a subsoil of reddish brown very shaly silt loam.

Shouns soils are on foot slopes. They have a surface layer of dark yellowish brown loam and a subsoil of strong brown, yellowish red, and red clay loam.

Of minor extent in this unit are the deep clayey Dunmore soils on low rolling hills and the moderately deep clayey Sequoia soils on rounded hills.

About half the acreage has been cleared and is used for pasture, corn, and burley tobacco. The rest is in forest consisting of mixed oaks, hickory, red maple, and beech.

The soils in this unit have fair suitability for pasture and have poor suitability for most cultivated crops. Steepness of slope is the most limiting factor.

The suitability of the soils is fair for white pine, shortleaf pine, and loblolly pine.

The suitability of the soils for most urban and intensive recreation uses is poor because of steepness of slope and depth to bedrock.

The suitability of the soils for extensive recreation uses is only fair because much of the area is in small farms and urban areas.

4. Ashe-Evard

Moderately steep to very steep, well drained and somewhat excessively drained loamy soils that are about 2 to more than 5 feet deep over granite or gneiss bedrock; on side slopes of high mountains and on low mountains and foothills

This map unit consists of highly dissected mountainous areas and less sloping hills in valleys and coves.

This map unit makes up about 16 percent of the survey area. It is about 68 percent Ashe soils, 7 percent Evard soils, and 25 percent soils of minor extent.

Ashe soils are on the steeper, mountainous areas. They have a surface layer of very dark grayish brown and dark yellowish brown loam and a subsoil of yellowish brown loam.

Evard soils are on foothills and low mountains. They have a surface layer of brown loam and a subsoil of strong brown, yellowish red, and red clay loam.

Of minor extent in this unit are the moderately deep, well drained Ashe Variant soils on low hills and side slopes; the deep, well drained Tate and Tusquitee soils on benches and foot slopes; and the deep, well drained Toccoa soils on flood plains.

The soils in this unit are mainly in forest. The less sloping areas are used mainly for pasture and some apple orchards and row crops.

Overall, the suitability for cultivated crops and pasture is poor because most of the suitable less sloping soils make up only very small areas. The less sloping soils are well suited to apple orchards.

The soils in this unit have fair to good suitability for white pine, black walnut, yellow-poplar, and most species of Christmas trees. The steepness of slope is the main limitation to woodland use.

The suitability of the soils for urban development is poor because of the steepness of slope and the depth to bedrock. The suitability for extensive recreation uses is only fair because of farming and light urbanization in the valleys.

5. Tate-Shouns-Maymead Variant

Gently sloping to steep, well drained loamy and stony soils that are more than 5 feet deep over shale or quartzite bedrock; on foot slopes, terraces, benches, and fans

In this map unit the landscape consists of broad terraces, mountain foot slopes, and narrow bottom lands. Terraces were formed by the Nolichucky River, which drains most of the area. High mountains border most sides of the area.

This unit makes up 13 percent of the survey area. It is about 65 percent Tate soils, 10 percent Shouns soils, 10 percent Maymead Variant soils, and 15 percent soils of minor extent.

Tate soils are on the foot slopes, benches, and fans. They have a surface layer of brown loam and a subsoil of yellowish brown and strong brown clay loam.

Shouns soils are on terraces and foot slopes. They have a surface layer of dark yellowish brown loam and a subsoil of strong brown, yellowish red, and red clay loam.

Maymead Variant soils are on foot slopes and along streams that flow from high mountain areas. They have a surface layer of dark grayish brown very stony loam and a subsoil of dark yellowish brown very stony loam.

Of minor extent in this unit are the moderately well drained Cotaco soils on rolling terraces; the deep, well drained Tate soils on foot slopes and fans; and the deep, well drained Toccoa soils on flood plains.

The soils in this unit are used mainly for pasture and cultivated crops. Only a small part of the acreage is still in forest consisting of white pine, hemlock, mixed oaks, and yellow-poplar.

The suitability for cultivated crops is good for gently sloping soils not in urban development. The suitability of the soils for pasture and woodland is good.

The soils in this unit have fair suitability for urban development. Most of the urban areas in Unicoi County are on these soils, thus limiting the suitability for other uses.

These soils have good suitability for intensive recreation uses. Their suitability for extensive recreation uses is only fair because much of the unit is urbanized. A small acreage in the Cherokee National Forest is used for hiking and camping.

6. Dunmore-Shouns-Sequoia

Sloping to steep, well drained, dominantly clayey soils that are 5 to 6 or more feet deep over dolomitic limestone or hard shale bedrock; on low hills, terraces, and foot slopes

In this map unit the landscape consists mainly of a few steep hills, knobs, and terraces. The soils are sloping to steep. Most areas are drained by small streams, but some are drained by sinkholes.

This map unit makes up about 4 percent of the survey area. It is about 30 percent Dunmore soils, 30 percent Shouns soils, 15 percent Sequoia soils, and 25 percent soils of minor extent.

Dunmore soils are on the low hills. They have a surface layer that is yellowish red silty clay in the upper part. The lower part is mottled red, strong brown, brownish yellow, and yellowish red clay. In some areas, the Dunmore soils contain few to many rock outcrops.

Shouns soils are on the terraces and foot slopes. They have a surface layer of dark yellowish brown loam and a subsoil of strong brown, yellowish red, and red clay loam.

Sequoia soils are on rounded knobs and hilltops. They have a surface layer of dark grayish brown silt loam, a subsurface layer of yellowish brown silt loam, and a subsoil that is yellowish brown silty clay loam in the upper few inches and strong brown silty clay in the lower part.

Of minor extent in this unit are the deep, well drained loamy Sensabaugh soils in drainageways and on stream bottoms.

Most of the acreage has been cleared and is used for pasture, tobacco, corn, and other row crops. A small part is in forest consisting of red oak, chestnut oak, hickory, yellow-poplar, and Virginia pine.

The suitability of the soils for cultivated crops is poor because of slope. The suitability for pasture and forestry is good.

The soils in this unit have good suitability for urban development. A few areas are limited for septic tank filter fields because of slow permeability. Most of the acreage is now in farms and scattered urban areas. The suitability of these soils for intensive recreation uses is only fair because of slope. The suitability of the soils for extensive recreation uses is poor because most of the acreage is privately owned farms and urban communities.

7. Tate-Tusquitee

Gently sloping to steep, well drained loamy and stony soils that are more than 5 feet deep over limestone or feldspathic quartzite bedrock; on foot slopes, benches, and low terraces in coves

In this map unit the landscape consists of mostly undulating and rolling low terraces and foot slopes near high mountain areas. The area is mostly in coves surrounded by high mountains. Drainage is mostly by mountain streams, but a few areas are drained by sinkholes.

This map unit makes up about 2 percent of the survey area. It is about 75 percent Tate soils, 15 percent Tusquitee soils, and 10 percent soils of minor extent.

Tate soils are on foot slopes and benches. They have a surface layer of brown loam or dark brown stony loam and a subsoil of yellowish brown and strong brown clay loam or yellowish brown cobbly clay loam.

Tusquitee soils are on foot slopes and terraces. They have a surface layer of very dark grayish brown loam and a subsoil of yellowish brown loam.

Of minor extent in this unit are the deep, well drained loamy Toccoa soils and the deep, well drained stony Maymead Variant soils, on flood plains.

Most of the acreage has been cleared. The gently sloping soils are used for pasture, hay, and cultivated crops. The wooded areas consist of yellow-poplar, hemlock, white pine, and red oak.

The suitability of the soils for cultivated crops is good. The suitability of these soils for forestry is good also. White pine, yellow-poplar, black walnut, and Christmas trees have excellent growth potential.

The gently sloping soils in this unit have good suitability for urban development and intensive recreation uses. Suitability is fair for extensive recreation uses. A small acreage in the Cherokee National forest is used for hiking, nature study, and camping.

8. Ashe Variant-Tate

Sloping to steep, well drained loamy soils that are about 3 to 5 or more feet deep over weathered granite or gneiss bedrock; on low mountains, ridgetops, foot slopes, benches, and fans

This map unit consists of steep, mountainous terrain that is dissected by many hollows reaching almost to the ridgetops. The foot slopes and fans at the lower elevations are less sloping.

This map unit makes up about 2 percent of the survey area. It is about 80 percent Ashe Variant soils, 15 percent Tate soils, and 5 percent soils of minor extent.

Ashe Variant soils are on low mountains. They have a surface layer of dark yellowish brown loam and a subsoil of yellowish brown and strong brown loam.

Tate soils are on the foot slopes and fans. They have a surface layer of brown loam and a subsoil of yellowish brown and strong brown clay loam.

Of minor extent in this unit are the deep, well drained Tusquitee soils, on foot slopes and fans.

Most of the acreage is still in forest consisting of yellow-poplar, red oak, white pine, hemlock, and birch. Cleared areas are used for pasture, tobacco, corn, and gardens.

The suitability of the soils for cultivated crops and pasture is poor because of steep slopes. The suitability is good for black walnut, white pine, and yellow-poplar. The main limitation to woodland use is the steepness of slope.

The suitability of the soils for most urban and intensive recreation uses is also poor because of steep slopes. The suitability for extensive recreation uses is good because of the presence of a large expanse of forest and the Appalachian Trail.

Detailed Soil Map Units

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

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

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

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the 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, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Ditney loam, 20 to 35 percent slopes, is one of several phases in the Ditney series.

Some map units are made up of two or more major soils or one or more soils and a miscellaneous area (an area that has little or no soil material and supports little or no vegetation). These map units are called *soil complexes*. The soils making up a complex, and the miscellaneous area if included, occur 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 and miscellaneous area are somewhat similar in all areas. Dunmore-Rock outcrop complex, 10 to 20 percent slopes, is an example.

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

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

Soil Descriptions

AsE—Ashe loam, 20 to 35 percent slopes. This moderately deep, somewhat excessively drained, steep soil is in mountainous areas. This soil formed in material weathered from faulted and folded granite or gneiss. Areas are 20 to 100 acres or more.

Typically, the surface layer is very dark grayish brown and dark yellowish brown loam about 5 inches thick. The subsoil is yellowish brown loam and extends to a depth of 26 inches. The underlying material is saprolite of granite that crushes to a yellowish brown cobbly loam. Granite bedrock is at a depth of 32 inches.

Ashe soils are strongly acid or very strongly acid. Permeability is moderately rapid, and available water capacity is medium.

Included in mapping are small areas of soils less than 20 or more than 40 inches deep over bedrock. A few small areas of soils that have numerous cobblestones and a few that have slopes of less than 20 percent are also included.

Most of the acreage is in forest consisting of upland oaks, eastern white pine, hemlock, and yellow-poplar. A few small areas have been cleared for pasture.

This soil has poor suitability for pasture and urban uses. It has fair suitability for eastern white pine, Virginia pine, and shortleaf pine. The rugged topography and steep slopes are the main limitations to most uses.

This soil is in capability subclass VIe and woodland suitability group 3r.

AsF—Ashe loam, 35 to 60 percent slopes. This moderately deep, somewhat excessively drained, steep to very steep soil is in mountainous areas. The soil formed in material weathered from faulted and folded granite or gneiss. Areas are 20 to 100 acres or more.

Typically, the surface layer is very dark grayish brown and dark yellowish brown loam about 5 inches thick. The subsoil is yellowish brown loam and extends to a depth of 26 inches. The underlying material is saprolite of granite that crushes to a yellowish brown cobbly loam. Granite bedrock is at a depth of 32 inches.

Ashe soils are strongly acid or very strongly acid. Permeability is moderately rapid, and available water capacity is medium.

Included in mapping are small areas of soils less than 20 or more than 40 inches deep over bedrock. A few areas of soils that have rock outcrops and numerous cobblestones also are included.

Most of the acreage is in forest consisting of upland oaks, eastern white pine, hemlock, and yellow-poplar. A few small areas have been cleared for pasture.

This soil has poor suitability for pasture and urban uses.

The soil has fair suitability for eastern white pine, Virginia pine, and shortleaf pine. The rugged topography and steep to very steep slopes are the main limitations to most uses.

This soil is in capability subclass VIIe and woodland suitability group 3r.

AvE—Ashe Variant loam, 20 to 45 percent slopes. This moderately deep, well drained, steep soil is on low mountains and side slopes of mountains and is underlain by weathered acid crystalline rock. The slopes are moderately smooth and convex. Areas are 5 to 100 acres.

Typically, the surface layer is dark yellowish brown loam about 5 inches thick. The subsoil is yellowish brown loam between depths of 5 and 12 inches and strong brown loam between depths of 12 and 30 inches. Below the subsoil is 1 to 10 feet of granite or gneiss saprolite (fig. 2).

Included in mapping are small areas of soils that have a yellowish red subsoil. Also included are a few areas of Ashe soils and a few small areas of soils that are more than 40 inches deep to weathered rock.

This soil is strongly acid or very strongly acid throughout. Permeability is moderate, and available water capacity is medium.

Most of the acreage is in forest consisting of eastern white pine, upland oaks, maple, hemlock, and yellow-poplar. Cleared areas are used mostly for pasture.

The suitability of the soil for pasture is poor because of maintenance difficulty on the steep slopes. The suitability for apple orchards is poor also.

The suitability of the soil for eastern white pine, shortleaf pine, and yellow-poplar is good. The main limitation to woodland use is the steepness of slope.

This soil has poor suitability for most urban uses because of the steepness of slope.

This soil is in capability subclass VIe and woodland suitability group 2r.

Figure 2.—A cut in Ashe Variant loam, 20 to 45 percent slopes, showing the underlying granite saprolite.

BrE—Brookshire loam, 25 to 35 percent slopes. This soil is deep, well drained, and steep. It is on the concave lower slopes of mountainsides and in coves at the base of very steep mountains. It formed in material from feldspathic quartzite, phyllite, slate, granite, or gneiss. Areas are 10 to 50 acres.

Typically, the surface layer is very dark grayish brown loam about 6 inches thick. The subsoil is dark yellowish brown loam between depths of 6 and 14 inches and yellowish brown loam between depths of 14 and 42 inches. The underlying material is yellowish brown gravelly loam.

This soil is strongly acid or very strongly acid throughout the profile. Permeability is moderately rapid, and available water capacity is high.

Included in mapping are small areas of soils that have numerous cobblestones on the surface and throughout the subsoil. Also included are small areas of soils less than 40 inches deep to rock.

Most of the acreage is in forest consisting of yellow-poplar, red oak, buckeye, eastern white pine, hemlock, yellow birch, and a dense understory of rhododendron.

The suitability for pasture and most urban uses is poor because of the steep slope.

The suitability is good for eastern white pine, yellow-poplar, and most other important timber trees. The main limitation to woodland use is the steep slope.

This soil is in capability subclass VIe and woodland suitability group 2r.

BrF—Brookshire loam, 35 to 50 percent slopes. This soil is deep, well drained, and steep to very steep. It is on the concave lower slopes of mountainsides and in coves at the base of very steep mountains. It formed in material from feldspathic quartzite, phyllite, slate, granite, or gneiss. Areas are 10 to 100 acres.

Typically, the surface layer is very dark grayish brown loam about 6 inches thick. The subsoil is dark yellowish brown loam between depths of 6 and 14 inches and yellowish brown loam between depths of 14 and 42 inches. The underlying material is yellowish brown gravelly loam.

This soil is strongly acid or very strongly acid throughout the profile. Permeability is moderately rapid, and available water capacity is high.

Included in mapping are small areas of soils that have numerous cobblestones in the surface layer and throughout the subsoil. Also included are a few small areas of soils less than 40 inches deep to rock and areas of soils that have a surface layer that is very dark grayish brown or very dark brown and more than 10 inches thick.

All the acreage is in forest consisting of yellow-poplar, buckeye, red oak, eastern white pine, hemlock, yellow birch, and a dense understory of rhododendron.

The soil has poor suitability for pasture because of the steepness of slope.

The suitability is good for eastern white pine, yellow-poplar, birch, and most other important timber species. The main limitation to woodland use is the steepness of slope.

The suitability is poor for all urban uses because of the steepness of slope. Roadbanks are unstable and subject to landslides if cuts are made.

This soil is in capability subclass VIIe and woodland suitability group 2r.

Bu—Buncombe loamy sand. This deep, excessively drained, nearly level sandy soil is on flood plains. It formed in alluvium washed from soils underlain by quartzite, granite, and gneiss. It occurs in narrow strips along streams that flow from mountainous areas. Areas are 5 to 50 acres. The slopes range from 0 to 2 percent.

Typically, the surface layer is dark grayish brown loamy sand 4 inches thick. The substratum is stratified yellowish brown, dark yellowish brown, and light yellowish brown loamy sand and sand to a depth of 65 inches.

Permeability is rapid, and available water capacity is low. Floods of very brief duration occur once or more annually but rarely occur during the growing season. Reaction is medium acid.

Included in mapping are small areas of soils that have more than 10 percent by volume coarse fragments in the upper 20 inches. Also included are a few areas where the substratum is slightly acid.

About half the acreage is cleared and is used mainly for pasture. Forested areas are in yellow-poplar, sycamore, red maple, red oak, and black willow.

The suitability is poor for most commonly grown row crops because of low available water capacity. The suitability for pasture is only fair.

The suitability for yellow-poplar, sycamore, and cottonwood is good. Flooding and the sandy texture cause a moderate equipment limitation.

This soil has poor suitability for urban uses because of the rapid permeability and the flood hazard.

This soil is in capability subclass IIIs and woodland suitability group 2s.

CaD—Calvin shaly silt loam, 10 to 20 percent slopes. This moderately deep, well drained, moderately steep shaly soil is on dissected hills and ridges. It formed in material from maroon or reddish shale or siltstone. Areas are 2 to 10 acres.

Typically, the surface layer is dark reddish brown and reddish brown shaly silt loam about 5 inches thick. The subsoil, which is between depths of 5 and 25 inches, is reddish brown very shaly silt loam. The underlying material is reddish brown very shaly silt loam. Shale bedrock is at a depth of 35 inches.

This soil is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. Permeability is moderately rapid, and available water capacity is low.

Included in mapping are a few areas of soils that have a clay loam subsoil and a few areas of soils that are less than 20 inches deep to rock.

Most of the acreage has been cleared and is used for pasture. Forested areas are in chestnut oak, maple, beech, red oak, eastern white pine, and Virginia pine.

This soil has poor suitability for small grain. The suitability for pasture is fair. The moderately steep slopes and low available water capacity limit use for crops.

This soil has fair suitability for eastern white pine, loblolly pine, and Virginia pine. Slope, depth to rock, and

low available water capacity are the main limitations to woodland use.

The suitability is poor for most urban uses because of the moderately steep slopes and moderate depth to rock.

This soil is in capability subclass VIe and woodland suitability group 3f.

CaE—Calvin shaly silt loam, 20 to 45 percent slopes. This moderately deep, well drained, steep shaly soil is on dissected hills and ridges. The soil formed in material from maroon or reddish shale or siltstone. Areas are 2 to 20 acres.

Typically, the surface layer is dark reddish brown and reddish brown shaly silt loam about 5 inches thick. The subsoil, which is between depths of 5 and 25 inches, is reddish brown very shaly silt loam. The underlying material is reddish brown very shaly silt loam. Shale bedrock is at a depth of 35 inches.

This soil is strongly acid or very strongly acid throughout. Permeability is moderately rapid, and available water capacity is low.

Included in mapping are a few areas of soils that are less than 20 inches to rock and a few areas where erosion has exposed shale bedrock.

About half the acreage has been cleared and is used for pasture. Forested areas are in chestnut oak, maple, beech, eastern white pine, and Virginia pine.

This soil has poor suitability for pasture and hay. The steep slopes and low available water capacity limit production.

This soil has fair suitability for eastern white pine, loblolly pine, and Virginia pine. Slope, depth to rock, and low available water capacity are the main limitations to woodland use.

This soil has poor suitability for most urban uses because of the steepness of slope and depth to rock.

This soil is in capability subclass VIIe and woodland suitability group 3f.

Co—Cotaco loam. This deep, moderately well drained, gently sloping soil is on terraces. It formed in alluvium washed from mountainous areas. Slopes are 1 to 5 percent. Areas are 2 to 10 acres.

Typically, the surface layer is dark yellowish brown loam 6 inches thick. The subsoil is yellowish brown loam between depths of 6 and 10 inches; yellowish brown clay loam between depths of 10 and 25 inches; yellowish brown clay loam mottled with light gray and pale brown between depths of 25 and 34 inches; and reddish yellow clay loam mottled with light brownish gray, pale brown, and yellowish brown between depths of 34 and 42 inches. The substratum is reddish yellow clay loam mottled with light brownish gray and yellowish brown.

This soil is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. Permeability is moderate, and available water capacity is high.

Included in mapping are small areas of well drained and somewhat poorly drained soils. Also included are a few areas of soils that have a weakly developed fragipan in the lower part of the subsoil.

Most of the acreage has been cleared and is used for pasture, hay, corn, and burley tobacco. This soil is well suited to most cultivated crops.

The suitability of the soil for black walnut, yellow-poplar, and loblolly pine is fair to good. In a few areas the use of equipment is moderately limited because of wetness during periods of high rainfall.

The suitability for most urban uses is poor because of wetness.

This soil is in capability subclass IIe and woodland suitability group 2o.

DeD—Ditney loam, 10 to 20 percent slopes. This moderately deep, well drained, moderately steep soil is on mountaintops and side slopes of high mountains. This soil formed in material from arkose or feldspathic quartzite. Slopes are smooth and convex. Areas are 10 to 30 acres.

Typically, the surface layer is dark grayish brown loam about 2 inches thick. The subsurface layer is yellowish brown loam about 3 inches thick. The subsoil is yellowish brown loam that extends to a depth of about 21 inches. The substratum, which extends to a depth of about 26 inches, is yellowish brown cobbly loam. Feldspathic quartzite bedrock is below that depth.

This soil is strongly acid or very strongly acid throughout the profile. Permeability is moderately rapid, and available water capacity is medium.

Included in mapping are soils, in concave areas, that are more than 40 inches deep to bedrock. Also included are a few small areas of soils having more than 15 percent by volume coarse fragments in the surface layer and subsoil and a few areas of soils that have a clay loam subsoil.

Most of the acreage is forest consisting of upland oaks, Virginia pine, maple, and hemlock. The few cleared areas are used mainly for wildlife plantings.

This soil has poor suitability for pasture because of the moderately steep slope and poor accessibility.

This soil has fair suitability for eastern white pine, Virginia pine, and shortleaf pine. The moderately steep slope and depth to rock are the main limitations to woodland use.

The suitability of this soil for most urban uses is poor because of the moderately steep slope and depth to rock.

This soil is in capability subclass VIe and woodland suitability group 4r.

DeE—Ditney loam, 20 to 35 percent slopes. This moderately deep, well drained, steep soil is on side

slopes of high mountains. It formed in material from arkose or feldspathic quartzite. Slopes are moderately smooth and convex. Areas are 10 to 50 acres.

Typically, the surface layer is dark grayish brown loam 2 inches thick. The subsurface layer is yellowish brown loam about 3 inches thick. The subsoil is yellowish brown loam, which extends to a depth of about 21 inches. The substratum, which extends to a depth of 26 inches, is yellowish brown cobbly loam. Feldspathic quartzite bedrock is below that depth.

This soil is strongly acid or very strongly acid throughout the profile. Permeability is moderately rapid, and available water capacity is medium.

Included in mapping are soils, in concave areas, that are more than 40 inches deep to bedrock. Also included are a few small spots of soils that have a clay loam subsoil and soils having more than 15 percent by volume coarse fragments in the surface layer and subsoil.

Most of the acreage is in forest consisting of upland oaks, Virginia pine, maple, and hemlock. The few cleared areas are used mainly for wildlife plantings.

This soil has poor suitability for pasture because of steepness of slope.

This soil has fair suitability for eastern white pine, Virginia pine, and shortleaf pine. The main limitations are the steep slopes, depth to rock, and droughtiness.

The suitability for all urban uses is poor because of the steep slopes and depth to rock.

This soil is in capability subclass VIIe and woodland suitability group 4r.

DeF—Ditney loam, 35 to 60 percent slopes. This moderately deep, well drained, steep to very steep soil is on side slopes of high mountains. It formed in material from arkose or feldspathic quartzite. Slopes are moderately smooth and convex. In a few rough areas near the top of ridges, the thrust faulted bedrock is exposed. The areas vary greatly in size, but most are very large.

Typically, the surface layer is dark grayish brown loam 2 inches thick. The subsurface layer is yellowish brown loam about 3 inches thick. The subsoil is yellowish brown loam that extends to a depth of 21 inches. The substratum, which extends to a depth of about 26 inches, is yellowish brown cobbly loam. Feldspathic quartzite bedrock is below that depth.

This soil is strongly acid or very strongly acid throughout the profile. Permeability is moderately rapid, and available water capacity is medium.

Included in mapping are soils, in concave areas, that are more than 40 inches deep to bedrock and a few small areas of soils having more than 15 percent by volume coarse fragments in the surface layer and subsoil. Also included are a few small areas of soils less than 20 inches deep to rock and a few small areas of Rock outcrop.

Most of the acreage is forest consisting of upland oaks, maple, Virginia pine, and hemlock.

This soil has poor suitability for all uses except forest because of steepness of slope and depth to rock.

This soil has fair suitability for eastern white pine, Virginia pine, and shortleaf pine. The steep to very steep slopes, depth to bedrock, and droughtiness are the main limitations to woodland use.

This soil is in capability subclass VIIe and woodland suitability group 4r.

DnD—Dunmore silt loam, 10 to 20 percent slopes. This deep, well drained, moderately steep soil is on low hilly uplands (fig. 3) in valley areas underlain by dolomitic limestone. Sinks are evident in some areas. Slopes are mostly convex. Areas are 2 to 20 acres.

Typically, the surface layer is yellowish brown silt loam about 8 inches thick. The upper part of the subsoil is yellowish red silty clay. The lower part is mottled red, strong brown, brownish yellow, and yellowish red clay to a depth of 65 inches.

This soil is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. Permeability is moderate, and available water capacity is moderate.

Included in mapping are small areas of soils that have a silt loam or silty clay loam subsoil. Also included are a few areas of a moderately deep soil formed in shale residuum; small areas of Rock outcrop; and a few small areas of this Dunmore soil where slopes are less than 10 percent.

Most of the acreage has been cleared and is used for pasture. A few areas are used for burley tobacco and vegetable gardens. The acreage in forest consists of mixed oaks, hickory, maple, dogwood, and Virginia pine.

The suitability of the soil is poor for most row crops because of the erosion hazard on the moderately steep slopes. The suitability is good for pasture.

The suitability is good for black walnut, shortleaf pine, and loblolly pine. There are no significant limitations to woodland use and management.

The soil has fair suitability for most urban uses. The moderate shrink-swell potential and moderately steep slopes are limitations, but these can be overcome by good design and careful installation procedures.

This soil is in capability subclass IVe and woodland suitability group 3o.

DrD—Dunmore-Rock outcrop complex, 10 to 20 percent slopes. This complex consists of areas of deep, well drained, moderately steep Dunmore soils intermingled with areas of Rock outcrop. It is on hilly uplands in the limestone valley. Areas are 2 to 50 acres.

Dunmore soils make up 50 to 80 percent of the complex. Typically, the surface layer is yellowish brown silt loam about 8 inches thick. The upper part of the subsoil is yellowish red silty clay; and the lower part is

Figure 3.—A typical landscape of Dunmore silt loam, 10 to 20 percent slopes.

mottled yellowish red, reddish yellow, red, strong brown, and brownish yellow clay to a depth of 65 inches. Dunmore soils vary in depth. In most places between the rock outcrops, the Dunmore soils are more than 5 feet deep.

The Dunmore soils are strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. Permeability is moderate, and available water capacity is high.

Rock outcrop makes up 10 to 40 percent of the complex. It is massive dolomitic limestone.

Included in mapping are small areas of soil where the subsoil is yellowish brown silty clay loam and a few small areas, near rock outcrops, where the soil is less than 60 inches deep to bedrock.

Most of the acreage is in forest consisting of mixed oaks, hickory, maple, and Virginia pine. Cleared areas are used mainly for pasture.

The suitability of the soils for pasture is fair, but the rock outcrops make it difficult to maintain stands.

The suitability of the soils is poor for most urban uses because of the rock outcrops.

The suitability is fair for eastern white pine, loblolly pine, and shortleaf pine. The main limitations to woodland use are the rock outcrops.

This soil is in capability subclass IVe and woodland suitability group 3r.

DrE—Dunmore-Rock outcrop complex, 20 to 35 percent slopes. This complex consists of areas of deep,

well drained, steep Dunmore soils intermingled with areas of Rock outcrop. It is on uplands in the limestone valleys. Areas are 2 to 50 acres.

Dunmore soils make up 50 to 80 percent of the complex. Typically, the surface layer is yellowish brown silt loam about 8 inches thick. The upper part of the subsoil is yellowish red silty clay; and the lower part is mottled yellowish red, reddish yellow, red, strong brown, and brownish yellow clay to a depth of 65 inches. Dunmore soils vary in depth. In most places between the rock outcrops, the Dunmore soils are more than 5 feet deep.

The Dunmore soils are strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. Permeability is moderate, and available water capacity is high.

Rock outcrop makes up 10 to 40 percent of the complex. It is massive dolomitic limestone.

Included in mapping are small areas of soil where the subsoil is yellowish brown silty clay loam and a few small areas, near rock outcrops, where the soil is less than 60 inches deep to bedrock.

Most of the acreage is in forest consisting of mixed oaks, hickory, maple, and Virginia pine. Cleared areas are used for pasture.

The suitability of the soils for pasture is poor because of the steep slopes and rock outcrops.

The suitability is poor for most urban uses because of steep slopes and rock outcrops.

The suitability is fair for eastern white pine, loblolly pine, and shortleaf pine. The main limitations to woodland use are the steep slopes and rock outcrops.

The soils in this complex are in capability subclass VIe and woodland suitability group 3r.

EvD—Evard loam, 10 to 20 percent slopes. This deep, well drained, moderately steep soil is on foothills and low mountains. It formed in material from acid crystalline rocks. Slopes are smooth and convex. Areas are 2 to 20 acres.

Typically, the surface layer is brown loam about 5 inches thick. The subsoil is strong brown clay loam between depths of 5 and 10 inches, yellowish red clay loam between depths of 10 and 22 inches, and red clay loam between depths of 22 and 39 inches. Below the subsoil is 2 to 10 feet of saprolite of granite, gneiss, or schist.

This soil is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. Permeability is moderate, and available water capacity is medium.

Included in mapping are a few small areas of soils that have a clayey subsoil and areas of soils more than 40 inches deep to weathered rock.

About half the acreage is in forest consisting of upland oaks, maple, hickory, eastern white pine, and yellow-poplar. Most of the cleared areas are used for pasture. A few areas are used for corn, burley tobacco (fig. 4), and apple orchards.

This soil has poor suitability for most row crops because the areas are small and have moderately steep slopes. The suitability for pasture and apple orchards is good.

This soil has good suitability for loblolly pine, shortleaf pine, and eastern white pine. The steepness of slope is the main limitation to woodland use.

This soil has only fair suitability for most urban uses because of the steepness of slope.

This soil is in capability subclass IVe and woodland suitability group 3r.

EvE—Evard loam, 20 to 40 percent slopes. This deep, well drained, steep soil is on foothills and low mountains underlain by acid crystalline rocks. Slopes are smooth and convex. Areas are 2 to 20 acres.

Typically, the surface layer is brown loam about 5 inches thick. The subsoil is strong brown clay loam between depths of 5 and 10 inches, yellowish red clay loam between depths of 10 and 22 inches, and red clay loam between depths of 22 and 39 inches. Below the subsoil is 2 to 10 feet of saprolite of granite, gneiss, or schist.

This soil is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. Permeability is moderate, and available water capacity is medium.

Included in mapping are a few small areas of soils that have a clayey subsoil and a few areas of soils less than 20 inches deep to weathered rock.

Most of the acreage is in forest consisting of upland oaks, maple, eastern white pine, and yellow-poplar. Cleared areas are used mainly for pasture.

The suitability for pasture is fair, but areas are hard to maintain.

This soil has good suitability for loblolly pine, shortleaf pine, and eastern white pine. The steepness of slope is the main limitation to woodland use.

This soil has poor suitability for all urban uses because of the steepness of slope.

This soil is in capability subclass VIe and woodland suitability group 3r.

JeE—Jeffrey loam, 20 to 35 percent slopes. This moderately deep, well drained, steep soil is on side slopes in high mountain areas underlain by arkose or feldspathic quartzite. Slopes are moderately smooth and convex. Areas are 10 to 50 acres.

Typically, the surface layer is very dark brown loam about 8 inches thick. The subsoil is dark yellowish brown and yellowish brown cobbly loam that extends to a depth of about 30 inches. The substratum is yellowish brown cobbly loam, about 6 inches thick, that contains many fragments of feldspathic quartzite. Feldspathic quartzite bedrock is at a depth of about 36 inches.

Figure 4.—A typical landscape of Evard loam, 10 to 20 percent slopes. The tobacco bed in the right foreground is covered with a plastic cover before the soil is fumigated.

This soil is strongly acid or very strongly acid throughout the profile. Permeability is moderately rapid, and available water capacity is medium.

Included in mapping are soils, in concave areas, that are more than 40 inches deep to rock; a few small areas of soils that have more than 30 percent by volume coarse fragments in the surface layer and subsoil; a few small areas of soils that have a highly leached subsurface layer; and a few areas of Rock outcrop and rock slides on the top of Unaka Mountain, where the soil is shallower to bedrock.

Most of the acreage is forest consisting of upland oaks, yellow-poplar, gray birch, yellow birch, cherry, hemlock, and a dense understory of rhododendron. The few cleared areas are used for wildlife plantings.

This soil has poor suitability for pasture because of the steepness of slope.

This soil has fair suitability for eastern white pine and yellow-poplar. The steepness of slope and depth to rock are the main limitations to woodland use.

The suitability for most urban uses is poor because of steepness of slope and moderate depth to rock.

This soil is in capability subclass VIe and woodland suitability group 4r.

JeF—Jeffrey loam, 35 to 60 percent slopes. This moderately deep, well drained, steep and very steep soil is on side slopes in high mountain areas underlain by arkose or feldspathic quartzite. Slopes are moderately smooth and convex. Areas vary in size, but most are large.

Typically, the surface layer is very dark brown loam about 8 inches thick. The subsoil is dark yellowish brown and yellowish brown cobbly loam that extends to a depth of about 30 inches. The substratum is yellowish brown cobbly loam about 6 inches thick. It contains many fragments of feldspathic quartzite. Feldspathic quartzite bedrock is at a depth of about 36 inches.

This soil is strongly acid or very strongly acid throughout the profile. Permeability is moderately rapid, and available water capacity is medium.

Figure 5.—A rock slide in an area of Jeffrey loam, 35 to 60 percent slopes.

Included in mapping are soils, in concave areas, that are more than 40 inches deep to rock; a few small areas of soils that have more than 30 percent by volume coarse fragments in the surface layer and subsoil; and a few areas of soils that have a highly leached subsurface layer. A few areas of Rock outcrop and rock slides on the top of Unaka Mountain (fig. 5), where the Jeffrey soil is shallower than is typical of the series, have also been included.

Most of the acreage is forest consisting of gray birch, yellow birch, cherry, hemlock, yellow-poplar, upland oaks, and a dense understory of rhododendron. The few cleared areas are used for wildlife plantings.

This soil has poor suitability for pasture because of the steepness of slope.

This soil has fair suitability for eastern white pine and yellow-poplar. The steepness of slope and depth to rock are the main limitations to woodland use.

The suitability for urban uses is poor because of steepness of slope and moderate depth to rock.

This soil is in capability subclass VIIe and woodland suitability group 4r.

MaE—Maymead loam, 15 to 35 percent slopes. This deep, well drained, moderately steep to steep soil is on the lower part of mountainsides and in coves. Slopes are moderately smooth and concave. Areas are 5 to 50 acres.

Typically, the surface layer is dark grayish brown and dark yellowish brown loam about 5 inches thick. The subsoil, which extends to a depth of 62 inches, is yellowish brown loam and cobbly loam. It is underlain by feldspathic quartzite rock.

This soil is strongly acid or very strongly acid throughout. Permeability is moderately rapid, and available water capacity is high.

Included in mapping are small areas of soils that have more than 35 percent by volume cobblestones in the surface layer and throughout the subsoil. Also included are a few small areas of soils that have a clay loam subsoil and a few areas of soils less than 40 inches deep to rock.

Most of the acreage is in forest consisting of eastern white pine, yellow-poplar, upland oaks, and hemlock. Many areas have a dense understory of mountain-laurel and rhododendron. The few cleared areas are used for pasture or wildlife plantings.

The suitability for pasture is poor because of the moderately steep to steep slopes.

This soil has good suitability for yellow-poplar, black walnut, and eastern white pine. The steepness of slope is the main limitation to woodland use.

The suitability for most urban uses is poor, mainly because of the moderately steep to steep slopes.

This soil is in capability subclass VIe and woodland suitability group 2r.

MaF—Maymead loam, 35 to 50 percent slopes. This deep, well drained, steep to very steep soil is on the lower part of mountainsides and in coves. Slopes are moderately smooth and slightly concave. Areas vary in size, but most are large.

Typically, the surface layer is dark grayish brown and dark yellowish brown loam about 5 inches thick. The subsoil, which extends to a depth of 62 inches, is dark yellowish brown loam and cobbly loam. It is underlain by feldspathic quartzite rock.

This soil is strongly acid or very strongly acid throughout. Permeability is moderately rapid, and available water capacity is high.

Included in mapping are small areas of soils that have more than 35 percent by volume cobblestones on the surface and throughout the profile. Also included are a few small areas of soils that have a clay loam subsoil and a few areas of soils less than 40 inches deep to rock.

Nearly all the acreage is in forest consisting of eastern white pine, yellow-poplar, upland oaks, and hemlock. Many areas have a dense understory of mountain-laurel and rhododendron. The few cleared areas are used for pasture or wildlife plantings.

The suitability for pasture is poor because of steep to very steep slopes.

This soil has good suitability for yellow-poplar, black walnut, and eastern white pine. The steep to very steep slopes are the main limitations to woodland use.

The suitability for most urban uses is poor because of the steep to very steep slopes.

This soil is in capability subclass VIIe and woodland suitability group 2r.

Mv—Maymead Variant very stony loam, 1 to 10 percent slopes. This deep, well drained, gently sloping to sloping stony soil is on foot slopes and along drainageways near high mountain areas. Slopes are undulating and generally concave. Some areas have convex microrelief. Areas are 5 to 100 acres.

Typically, the surface layer is dark grayish brown very stony loam about 4 inches thick. The subsoil is dark yellowish brown very stony loam that extends to a depth of 35 inches. The underlying material is very stony sandy loam and very stony loamy sand to a depth of 50 inches or more.

This soil is strongly acid or very strongly acid throughout the profile. Permeability is moderately rapid, and available water capacity is medium.

Included in mapping are small areas of soils that average less than 35 percent by volume fragments of quartzite in the subsoil. Also included are a few areas of soils that have a clay loam subsoil, a few that have a dark surface layer, and a few small areas adjacent to drainageways that are subject to brief flooding.

Most of the acreage is in forest consisting of yellow-poplar, hemlock, buckeye, white oak, and a dense understory of rhododendron. In most areas that have been cleared, the surface stones were removed. Cleared areas are used for pasture.

The suitability is poor for pasture because of high stone content.

The suitability is good for eastern white pine, black walnut, and cove hardwood timber. The main limitations to woodland use are the large stones on the surface of the soil.

This soil has poor suitability for most urban uses because of high stone content.

This soil is in capability subclass VIs and woodland suitability group 2x.

Sb—Sensabaugh loam. This soil is deep, well drained, and nearly level to gently sloping. It is in narrow tracts along intermittent drainageways and small streams and on fans at the mouth of hollows. Slopes are 0 to 4 percent. Areas are 2 to 40 acres.

Typically, the surface layer is dark yellowish brown loam 8 inches thick. The subsoil is strong brown loam and gravelly loam that extends to a depth of 36 inches. The underlying material is strong brown gravelly fine sandy loam to a depth of 60 inches.

This soil is slightly acid or neutral throughout. Permeability is moderate or moderately rapid, and available water capacity is high.

Included in mapping are small areas of soils containing more than 15 percent gravel in the surface layer. Also included are a few moderately well drained areas.

Most of the acreage has been cleared and is used for pasture, hay, corn, and burley tobacco.

This soil has good suitability for most commonly grown crops. Potential flood damage to crops is very slight because floods are rare and seldom occur during the growing season.

Figure 6.—Cattle grazing in a pasture on Sequoia silt loam, 10 to 20 percent slopes.

The suitability for yellow-poplar, black walnut, and loblolly pine is good.

The suitability for most urban uses is poor because of the flood hazard.

This soil is in capability subclass I and woodland suitability group 2o.

SeD—Sequoia silt loam, 10 to 20 percent slopes. This moderately deep, well drained, moderately steep soil is on low hills underlain by shale. Slopes are smooth and convex. Areas are 2 to 10 acres.

Typically, the surface layer is dark grayish brown silt loam about 2 inches thick. The subsurface layer is yellowish brown silt loam about 4 inches thick. The subsoil is yellowish brown silty clay loam between depths of 6 and 10 inches and strong brown silty clay to a depth of 30 inches. The underlying material is weathered, acid shale that crushes to silt loam.

This soil is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. Permeability is moderately slow, and available water capacity is medium.

Included in mapping are small areas of shaly soils that are less than 20 inches deep to soft shale rock. Also included are a few small, severely eroded areas where the surface layer is silty clay.

Most of the acreage has been cleared and used for pasture (fig. 6). A few small areas are in corn and small grain. The forested areas consist of chestnut oak, red oak, hickory, maple, dogwood, and Virginia pine.

This soil has fair suitability for pasture. The erosion hazard on the moderately steep slopes and medium available water capacity are the main limitations.

The suitability is good for shortleaf pine, Virginia pine, and loblolly pine. The moderately steep slopes are the main limitation to woodland use.

This soil has poor suitability for most urban uses because of the moderately steep slopes, moderate shrink-swell potential, and moderately slow permeability.

This soil is in capability subclass VIe and woodland suitability group 3o.

SeE—Sequoia silt loam, 20 to 35 percent slopes. This moderately deep, well drained, steep soil is on low hills underlain by shale. Slopes are smooth and convex. Areas are 2 to 30 acres.

Typically, the surface layer is dark grayish brown silt loam about 2 inches thick. The subsurface layer is yellowish brown silt loam about 4 inches thick. The subsoil is yellowish brown silty clay loam between depths of 6 and 10 inches and strong brown silty clay to a depth of 30 inches. The underlying material is weathered, acid shale that crushes to a silt loam.

This soil is strongly acid or very strongly acid throughout. Permeability is moderately slow, and available water capacity is medium.

Included in mapping are small areas of shaly soils that are less than 20 inches deep to soft shale rock. Also included are a few small, severely eroded areas where the surface layer is silty clay.

Most of the acreage is in forest consisting of chestnut oak, red oak, hickory, maple, dogwood, and Virginia pine. A few small areas are cleared and used for pasture.

This soil has poor suitability for pasture because of a severe erosion hazard on the steep slopes.

The suitability is good for shortleaf pine, Virginia pine, and loblolly pine. The steepness of slope is the main limitation.

This soil has poor suitability for most urban uses because of steep slopes, moderate shrink-swell potential, and moderately slow permeability.

This soil is in capability subclass VIe and woodland suitability group 3r.

ShC—Shouns loam, 5 to 12 percent slopes. This deep, well drained, sloping soil is on foot slopes, benches, and terraces. Areas are 2 to 20 acres.

Typically, the surface layer is dark yellowish brown loam about 6 inches thick. The upper part of the subsoil is strong brown and yellowish red clay loam, and the lower part is red clay loam that extends to a depth of 52 inches. The underlying material is red cobbly clay loam.

This soil is medium acid or strongly acid throughout, except that the surface layer is less acid in limed areas. Permeability is moderate, and available water capacity is high.

Included in mapping are small areas of soils that have a clayey subsoil. Also included are a few areas of soils that have more than 15 percent by volume fragments of rock in the surface layer and the subsoil.

Most of the acreage has been cleared and is used for corn, pasture, hay, small grain, and vegetable crops. The acreage in forest is mostly yellow-poplar, eastern white pine, upland oaks, and hemlock.

This soil has good suitability for most commonly grown crops and for pasture. The hazard of erosion is moderate but can be controlled by use of cover crops and minimum tillage.

This soil has good suitability for black walnut, yellow-poplar, eastern white pine, and loblolly pine. There are no significant limitations to woodland use and management.

The suitability for most urban uses is good. Slope is a limitation but can be easily overcome by good design and careful construction procedures.

This soil is in capability subclass IIIe and woodland suitability group 3o.

ShD—Shouns loam, 12 to 25 percent slopes. This deep, well drained, moderately steep soil is on foot slopes, benches, and terraces. Slopes vary in surface characteristics but are mostly smooth and convex. Areas are 2 to 20 acres.

Typically, the surface layer is dark yellowish brown loam about 6 inches thick. The upper part of the subsoil is strong brown and yellowish red clay loam. The lower part is red clay loam that extends to a depth of 62 inches. The underlying material is red cobbly clay loam.

This soil is medium acid to strongly acid throughout, except that the surface layer is less acid in limed areas. Permeability is moderate, and available water capacity is high.

Included in mapping are small areas of soils that have a clayey subsoil. Also included are a few areas of soils that have more than 15 percent by volume fragments of rock in the surface layer and subsoil.

Most of the acreage has been cleared and is used for pasture. A few areas are used for corn, small grain, and vegetable crops. The acreage in forest is mostly yellow-poplar, eastern white pine, upland oaks, and hemlock.

The suitability for most row crops is poor because erosion is a hazard on the moderately steep slopes. The suitability for pasture is good.

This soil has good suitability for black walnut, yellow-poplar, eastern white pine, and loblolly pine. Slope is the main limitation to those uses.

The suitability for most urban uses is only fair. The slope is the main limiting factor.

This soil is in capability subclass IVe and woodland suitability group 3o.

ShE—Shouns loam, 25 to 35 percent slopes. This deep, well drained, steep soil is on foot slopes, benches, and terraces. Slopes vary but are mostly smooth and concave. Areas are 2 to 10 acres.

Typically, the surface layer is dark yellowish brown loam about 6 inches thick. The upper part of the subsoil is strong brown loam and yellowish red clay loam. The

lower part is red clay loam that extends to a depth of 62 inches. The underlying material is red cobbly clay loam.

This soil is medium to strongly acid throughout, except that the surface layer is less acid in limed areas. Permeability is moderate, and available water capacity is high.

Included in mapping are small areas of soils that have a clayey subsoil. Also included are a few small areas of soils in which more than 15 percent of the volume is fragments of rock in the surface layer and subsoil.

Most of the acreage is in forest consisting of yellow-poplar, eastern white pine, upland oaks, and Virginia pine. Cleared areas are used mostly for pasture.

The suitability for pasture is fair to good, but areas are hard to maintain.

The suitability is good for black walnut, yellow-poplar, eastern white pine, and loblolly pine. The main limitation is the steep slope.

This soil has poor suitability for most urban uses because of the steep slopes.

This soil is in capability subclass VIe and woodland suitability group 3r.

SpF—Spivey cobbly loam, 20 to 50 percent slopes. This deep, well drained, steep, cobbly soil is in high mountain coves. Slopes are dominantly smooth and concave. Areas are 5 to 40 acres.

Typically, the surface layer is very dark grayish brown and dark brown cobbly loam about 12 inches thick. The subsoil is dark brown and dark yellowish brown cobbly loam and extends to a depth of 55 inches. Below that depth, to 60 inches, is dark yellowish brown cobbly loam.

This soil is strongly acid or very strongly acid throughout. Permeability is moderately rapid, and available water capacity is high.

Included in mapping are small areas of soils that are less than 40 inches deep to bedrock. Also included are small areas of soils that have many large stones on the surface and throughout the soil and small areas of soils that average less than 35 percent by volume coarse fragments.

All the acreage is in forest consisting of yellow-poplar, hemlock, red oak, and birch and a dense understory of rhododendron.

This soil has poor suitability for pasture because of the steep slopes and coarse fragment content.

The suitability for urban uses is also poor because of the steep slopes and large stones.

The suitability for forestry is good, but slopes and large stones are limiting factors in woodland use.

This soil is in capability subclass VIIs and woodland suitability group 2x.

TaC—Tate loam, 4 to 12 percent slopes. This deep, well drained, sloping soil is on foot slopes, benches, and fans. Slopes are smooth and concave. Areas are 2 to 20 acres.

Typically, the surface layer is brown loam about 8 inches thick. The subsoil is yellowish brown clay loam between depths of 8 and 25 inches and strong brown clay loam between depths of 25 and 54 inches. Saprolite of granite that has yellowish brown clay loam in cracks and seams is below the subsoil.

This soil is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. Permeability is moderate, and available water capacity is high.

Included in mapping are small areas of soils that have 15 percent or more by volume fragments of rock throughout the surface layer and subsoil. Also included are a few small areas of soils that have a dark brown or very dark grayish brown surface layer 6 inches or more thick.

Most of the acreage has been cleared and is used for pasture, hay, corn, burley tobacco, vegetables, and apple orchards. The acreage in forest is mostly yellow-poplar, eastern white pine, upland oaks, and hemlock.

This soil has good suitability for all commonly grown row crops, vegetable crops, and small grain. Erosion is a moderate limitation if row crops are grown but can be controlled by use of cover crops and minimum tillage. The suitability is also good for pasture and hay. This soil has good suitability for apple orchards where air drainage is adequate.

The soil has good suitability for black walnut, yellow-poplar, eastern white pine, and loblolly pine. There are no significant limitations to woodland use and management.

The suitability for most urban uses is fair to good. The slope is a limitation but can be easily overcome by good design and careful construction procedures.

This soil is in capability subclass IIIe and woodland suitability group 2o.

TaD—Tate loam, 12 to 25 percent slopes. This deep, well drained, moderately steep soil is on foot slopes, benches, and fans. Slopes are smooth and concave. Areas are 2 to 20 acres.

Typically, the surface layer is brown loam about 8 inches thick. The subsoil is yellowish brown clay loam between depths of 8 and 25 inches and strong brown clay loam between depths of 25 and 54 inches. Below this is saprolite of granite that has yellowish brown clay loam in cracks and seams.

This soil is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. Permeability is moderate, and available water capacity is high.

Included in mapping are small areas of soils that have 15 percent or more by volume fragments of rock throughout the surface layer and subsoil; a few small areas of soils that are less than 40 inches deep to weathered rock; and a few areas of soils that have a

dark brown or very dark grayish brown surface layer 6 inches or more thick.

About half the acreage has been cleared and is used for pasture. A few areas are in burley tobacco, vegetables, and apple orchards. The acreage in forest is mostly yellow-poplar, upland oaks, eastern white pine, and hemlock.

This soil has poor suitability for most row crops because of the erosion hazard on the moderately steep slopes. Because of the shortage of less sloping land, burley tobacco and vegetables are grown, and results are good on this soil. The suitability for apple orchards is good. The suitability for pasture is also goods.

This soil has good suitability for black walnut, yellow-poplar, eastern white pine, and loblolly pine. The steepness of slope is the main limitation to woodland use.

This soil has only fair to poor suitability for most urban uses because of the steepness of slope.

This soil is in capability subclass IVe and woodland suitability group 2r.

TbC—Tate stony loam, 4 to 12 percent slopes. This deep, well drained, sloping soil is on foot slopes, benches, and fans. The slopes are smooth and concave. Areas are 2 to 20 acres.

Typically, the surface layer is dark brown stony loam about 3 inches thick. The subsurface layer is dark yellowish brown stony loam about 2 inches thick. The subsoil is yellowish brown cobbly clay loam that extends to a depth of about 56 inches. The substratum is yellowish brown cobbly sandy loam mottled with brownish yellow and yellowish red to a depth of 62 inches.

This soil is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. Permeability is moderate, and available water capacity is medium.

Included in mapping are small areas of soils that have only a few cobblestones and small areas of soils that have 35 percent or more by volume stones and cobblestones in the surface layer and throughout the subsoil. Also included are a few small areas of soils that have a dark brown surface layer 6 inches or more thick.

About half the acreage has been cleared and is used for pasture, hay, corn, burley tobacco, vegetables, and apple orchards. The acreage in forest consists of yellow-poplar, eastern white pine, upland oak, and hemlock.

This soil has poor suitability for most commonly grown crops. The main limitation is the large content of stones, which interfere with cultivation. The suitability for pasture is fair where there are fewer stones on the surface. This soil has fair suitability for apple orchards where the site has adequate air drainage.

This soil has good suitability for black walnut, yellow-poplar, eastern white pine, and loblolly pine. The large stones on the surface cause a moderate equipment limitation.

This soil has only fair suitability for most urban uses. The main limitation is stoniness. Slope is also a limitation but can be easily overcome by good design and careful construction procedures.

This soil is in capability subclass IIIs and woodland suitability group 2x.

TbD—Tate stony loam, 12 to 25 percent slopes. This deep, well drained, moderately steep soil is on foot slopes, benches, and fans. Slopes are smooth and concave. Areas are 2 to 20 acres.

Typically, the surface layer is dark brown stony loam about 3 inches thick. The subsurface layer is dark yellowish brown stony loam about 2 inches thick. The subsoil is yellowish brown cobbly clay loam that extends to a depth of about 56 inches. The substratum is yellowish brown cobbly sandy loam mottled with brownish yellow to a depth of about 62 inches.

This soil is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. Permeability is moderate, and available water capacity is medium.

Included in mapping are small areas of soils that have only a few cobblestones and small areas of soils that have 35 percent or more by volume stones and cobblestones in the surface layer and throughout the subsoil.

Less than half the acreage has been cleared and is used mainly for pasture. The acreage in forest consists of yellow-poplar, eastern white pine, upland oak, and hemlock.

This soil has poor suitability for most row crops because of the surface stoniness and moderately steep slopes. The suitability for apple orchards is fair. The suitability for pasture is poor because of the large stones.

This soil has fair to good suitability for black walnut, yellow-poplar, eastern white pine, and loblolly pine. The moderately steep slopes and large stones on the surface affect woodland use and management.

This soil has poor suitability for most urban uses because of the moderately steep slopes and large stones.

This soil is in capability subclass IVs and woodland suitability group 2x.

TbE—Tate stony loam, 25 to 45 percent slopes. This deep, well drained, steep soil is on foot slopes, benches, and fans. Slopes are smooth and concave. Areas are 2 to 20 acres.

Typically, the surface layer is dark brown stony loam about 3 inches thick. The subsurface layer is dark yellowish brown stony loam about 2 inches thick. The subsoil is yellowish brown cobbly clay loam that extends to a depth of about 56 inches. The substratum is

Figure 7.—Tobacco on Toccoa loam. Tate soils are on the foot slopes and benches. Ashe soils are on the hills in the background.

yellowish brown cobbly sandy loam mottled with brownish yellow and yellowish red to a depth of 62 inches.

This soil is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium.

Included in mapping are small areas of soils that have more than 35 percent stones and cobblestones in the surface layer and throughout the subsoil. Also included are a few small areas of soils, which are less than 40 inches deep to bedrock, and a few areas of soils that have a dark brown surface layer 6 inches or more in thickness.

Most of the acreage is in forest consisting of yellow-poplar, eastern white pine, upland oaks, and hemlock. Cleared areas are used mainly for pasture.

This soil has poor suitability for pasture because of the steepness of the slopes and the many stones on the surface.

This soil has fair to good suitability for black walnut, yellow-poplar, eastern white pine, and loblolly pine. Steep slopes and large stones affect woodland use and management.

This soil has poor suitability for most urban uses because of steep slopes and large stones.

This soil is in capability subclass VIIs and woodland suitability group 2x.

Figure 8. Homesites on Tusquitee loam, 1 to 4 percent slopes. A significant acreage of good farmland is converted to other uses each year in Unicoi County.

To—Toccoa loam. This deep, well drained, level soil is on flood plains. It formed in alluvium washed from soils underlain by acid, crystalline rocks. It occurs in narrow strips along small streams that flow from mountainous areas. Slopes are 0 to 2 percent. Areas are 2 to 30 acres.

Typically, the surface layer is brown loam 10 inches thick. The substratum is stratified brown, yellowish brown, and dark yellowish brown sandy loam and loamy sand to a depth of 82 inches.

This soil is slightly acid to strongly acid. Permeability is moderately rapid, and available water capacity is low to moderate. This soil is occasionally flooded for brief periods.

Included in mapping are small areas of soils in which 35 percent or more of the volume is waterworn gravel in the surface layer and subsoil. Also included are a few areas of soils that have sand or loamy sand in the surface layer and a few small areas where the soil is poorly drained or moderately well drained.

Most of the acreage has been cleared and is used for pasture, hay, corn, and burley tobacco (fig. 7). Forested areas are in yellow-poplar, eastern white pine, hemlock, and mixed oaks.

This soil has good suitability for most commonly grown crops. Flood damage to crops is very slight because floods rarely occur during the growing season.

The suitability for eastern white pine, yellow-poplar, black walnut, and loblolly pine is good.

This soil has poor suitability for urban uses because of the flood hazard.

This soil is in capability subclass 2w and woodland suitability group 1o.

TuB—Tusquitee loam, 1 to 4 percent slopes. This deep, well drained, gently sloping soil is on low terraces. Areas are 2 to 30 acres.

Typically, the surface layer is very dark grayish brown loam about 6 inches thick. The subsoil is dark yellowish

brown and yellowish brown clay loam to a depth of 60 inches.

This soil is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. Permeability is moderate, and available water capacity is high.

Included in mapping are small areas of soils that have a cobbly clay loam or cobbly loam subsoil. Also included are a few small areas of soils that have a dark brown surface layer less than 6 inches thick and a few soils near limestone areas that have a base saturation greater than 35 percent.

Most of the acreage is cleared and used for corn, pasture, hay, burley tobacco, small grain, and vegetable crops. This soil has good suitability for all commonly grown row crops and small grain. Suitability is also good for pasture and hay. This soil has high value for growing cash crops such as burley tobacco, tomatoes, and strawberries.

This soil has good suitability for black walnut, yellow-poplar, eastern white pine, and loblolly pine. There are no significant limitations to woodland use and management.

This soil has good suitability for most urban uses (fig. 8).

This soil is in capability subclass IIe and woodland suitability group 2o.

TuC—Tusquitee loam, 4 to 12 percent slopes. This deep, well drained, sloping soil is on benches, foot slopes, and fans. Slopes are smooth and concave. Areas are 2 to 20 acres.

Typically, the surface layer is very dark grayish brown loam about 8 inches thick. The subsoil is dark yellowish brown and yellowish brown clay loam to a depth of 60 inches.

This soil is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Permeability is moderate, and available water capacity is high.

Included in mapping are small areas of soils that have a dark brown surface layer less than 6 inches thick. Also included are a few small areas where more than 15 percent, by volume, of the surface layer and subsoil is rock fragments.

Most of the acreage has been cleared and is used for pasture, corn, burley tobacco, vegetables, and apple orchards. The acreage in forest is mostly in yellow-poplar, upland oaks, maple, and eastern white pine.

This soil has good suitability for all commonly grown row crops, vegetable crops, and small grain. Erosion is a moderate limitation in growing row crops but can be controlled by use of cover crops and minimum tillage. The suitability is also good for pasture and hay. Where the site has adequate air drainage, this soil is well suited to apple orchards.

This soil has good suitability for black walnut, yellow-poplar, eastern white pine, and loblolly pine. It has no significant limitations to woodland use and management.

This soil has good suitability for most urban uses. The slope is the main limitation and can be easily overcome by good design.

This soil is in capability subclass IIIe and woodland suitability group 2o.

TuD—Tusquitee loam, 12 to 25 percent slopes. This deep, well drained, moderately steep soil is on benches, foot slopes, and fans. Slopes are smooth and concave. Areas are 2 to 20 acres.

Typically, the surface layer is very dark grayish brown loam about 8 inches thick. The subsoil is dark yellowish brown and yellowish brown clay loam to a depth of 60 inches.

This soil is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Permeability is moderate, and available water capacity is high.

Included in mapping are small areas of soils that have a dark brown surface layer less than 6 inches thick. Also included are a few small areas where more than 15 percent, by volume, of the surface layer and subsoil is rock fragments.

About half the acreage is in forest consisting of yellow-poplar, upland oaks, maple, and eastern white pine. The cleared areas are used for pasture, burley tobacco, vegetables, and apple orchards.

The suitability for apple orchards on this soil is good. The suitability for pasture is also good.

This soil has good suitability for black walnut, yellow-poplar, eastern white pine, and loblolly pine. The steepness of slope is the only limitation to woodland use.

This soil has only fair to poor suitability for most urban uses because of the steepness of slope.

This soil is in capability subclass VIe and woodland suitability group 2r.

UDF—Udorthents, 35 to 60 percent slopes. These deep, well drained, steep to very steep soils are in areas strip mined for manganese. Piles of material removed during mining are in the mapped area. Piles of material removed from shaft mines are also in the mapped area. Slopes are complex.

These soils are extremely variable. They are mainly sandy loam, loam, clay loam, and clay and have no dominant color. Fragments of quartzite and manganese ore make up as much as 40 percent of the volume. In most places, the soils are more than 5 feet deep over quartzite or limestone bedrock.

Reaction ranges from slightly acid to strongly acid throughout. Permeability ranges from moderately rapid to slow.

Most of the acreage has a sparse vegetative cover of trees, shrubs, and weeds. Trees are mainly chestnut oak, pitch pine, Virginia pine, and black locust. A few small areas are completely bare.

These soils are poorly suited to all farming, forestry, and urban uses.

Udorthents are in capability subclass VIIe.

UkE—Unaka loam, 20 to 35 percent slopes. This moderately deep, well drained, steep soil is on side slopes of high mountain areas. The soil formed in material from granite or gneiss. Slopes are moderately smooth and convex. Areas are 10 to 50 acres.

Typically, the surface layer is very dark brown loam in the upper 3 inches and dark brown loam in the lower 5 inches. The subsoil is dark yellowish brown loam between depths of 8 and 12 inches and yellowish brown loam between depths of 12 and 24 inches. The underlying material is saprolite of granite that crushes to yellowish brown sandy loam. Granite bedrock is at a depth of about 32 inches.

This soil is strongly acid or very strongly acid throughout the profile. Permeability is moderate, and available water capacity is medium.

Included in mapping are soils, in concave areas, that are more than 40 inches deep to rock. Also included are a few small areas of soils that have a very dark brown surface layer more than 10 inches thick and a few soils that have many cobblestones on the surface and throughout the profile.

Most of the acreage is in forest consisting of yellow-poplar, black cherry, upland oaks, hemlock, buckeye, yellow birch, and eastern white pine. Cleared areas are used for pasture or wildlife plantings.

This soil has fair suitability for summer mountain pasture, but in winter the severe weather at the high elevations severely limits any grazing.

This soil has good suitability for yellow-poplar and eastern white pine. The main limitations to woodland use are the steepness of slope and the depth to rock.

The suitability for most urban uses is poor because of the steepness of slope and the depth to rock.

This soil is in capability subclass VIe and woodland suitability group 3r.

UkF—Unaka loam, 35 to 60 percent slopes. This moderately deep, well drained, steep and very steep soil is on side slopes of high mountain areas underlain by granite or gneiss. Slopes are moderately smooth and convex. Most areas are large.

Typically, the surface layer is very dark brown loam in the upper 3 inches and dark brown loam in the lower 5 inches. The subsoil is dark yellowish brown loam between depths of 8 and 12 inches and yellowish brown loam between depths of 12 and 24 inches. The underlying material is saprolite of granite that crushes to yellowish brown sandy loam. Granite bedrock is at a depth of 32 inches.

This soil is strongly acid or very strongly acid throughout the profile. Permeability is moderate, and available water capacity is medium.

Included with this soil in mapping are soils, in concave areas, that are deeper than 40 inches to rock. Also included are a few small areas of soils where the very dark brown surface layer is thicker than 10 inches and a few areas of soils that have many cobblestones on the surface and throughout the profile.

Most of the acreage is in forest consisting of yellow-poplar, black cherry, upland oaks, hemlock, buckeye, yellow birch, and eastern white pine.

This soil has poor suitability for pasture. The main limitations are the steep to very steep slopes and depth to rock.

The suitability for eastern white pine and yellow-poplar is good. The main limitations to woodland use are the steepness of slope and the depth to rock.

This soil has poor suitability for all urban uses because of steepness of slope and depth to rock.

This soil is in capability subclass VIIe and woodland suitability group 3r.

UnE—Unicoi Variant cobbly loam, 10 to 50 percent slopes. This shallow, somewhat excessively drained, moderately steep to very steep soil is on the top and upper side slopes of Unaka Mountain. Slopes are smooth and convex. The area is 1,500 acres.

Typically, the soil has a black organic layer about 5 inches thick on the surface. Below this is 8 inches of gray cobbly loam with brownish yellow mottles and black coatings. The next layer is mottled dark reddish brown, reddish brown, black, and reddish yellow cobbly loam about 4 inches thick. Hard feldspathic quartzite is at a depth of 12 inches.

This soil is very strongly acid or extremely acid throughout. Permeability is moderately rapid, and available water capacity is low.

Included in mapping are small areas of soils that are mostly organic material over rock. Also included are a few areas that are mostly cobblestones and stones with only a small amount of soil material.

All the acreage is in forest or brushland consisting of rhododendron, mountain-laurel, hemlock, fire cherry, yellow birch, huckleberry, and red spruce.

This soil has poor suitability for all uses because of poor accessibility, low available water capacity, and the extreme climatic conditions at such a high elevation. This soil is best suited to recreation uses.

This soil is in capability subclass VIIs and woodland suitability group 5x.

Prime Farmland

Prime farmland, as defined by the U.S. Department of Agriculture, is that land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce sustained high crop yields if acceptable farming methods are used. Prime farmland produces the highest yields with minimal inputs of energy and money, and farming it results in the least damage to the environment. Prime farmland is of major importance in satisfying the nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited, and it should be used with wisdom and foresight.

Prime farmland is either currently used for producing food or fiber or is available for this use. Urban or built-up land or water areas are not included. Urban and built-up land includes any unit of land of 10 acres or more that is used for residences, industrial sites, commercial sites, construction sites, institutional sites, railroad yards, small parks, cemeteries, airports, golf courses, sanitary landfills, sewage treatment plants, water-control structures and spillways, shooting ranges, and so forth.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. It has favorable temperature and growing season and acceptable reaction. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods or frequently flooded during the growing season. Slope ranges mainly from 0 to 6 percent.

About 2,620 acres of Unicoi County meets the soil requirements for prime farmland. Areas are scattered throughout the county, but most are mainly in map units 4, 5, and 7 of the general soil map.

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, difficult to cultivate, and less productive.

Soil map units that make up prime farmland in Unicoi County are listed in this section. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the section "Soil Maps for Detailed Planning."

The map units that meet the soil requirements for prime farmland are:

Co Cotaco loam
Sb Sensabaugh loam
To Toccoa loam
TuB Tusquitee loam, 1 to 4 percent slopes

Use and Management of the Soils

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

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

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

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

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

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

Crops and Pasture

Clarence H. Jent, Jr., conservation agronomist, Soil Conservation Service, assisted in preparing this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

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

In 1974, about 6,500 acres in the survey area was used for crops and pasture, according to the Census of Agriculture. Of this total, 4,000 acres was used for pasture; 1,500 acres for row crops, mainly corn and tobacco; and 1,000 acres for other crops, including orchards, strawberries, and tomatoes. Most of the soils in Unicoi County are too steep for row crop production. Soils that are suited to row crops are generally very productive. The acreage in crops and pasture has gradually been decreasing as more land is used for urban development.

Soil erosion is not a serious problem in most of the county. In the mountainous area, the soils are generally porous, and the infiltration rate is fast enough to prevent excessive runoff. Rainfall is more frequent in the mountains but is lower in intensity than in other areas. The clayey soils in the northeastern part of the county are more susceptible to erosion than most soils in other areas.

Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil, such as Dunmore and Sequoia soils. It is also damaging on soils that are shallow to rock, such as Unicoi Variant. Second, soil erosion results in sedimentation of streams. Control of erosion minimizes the pollution of streams by sediment and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

Erosion control practices provide a protective surface cover, reduce runoff, and increase infiltration. Contouring, contour stripcropping, and conservation tillage are good erosion control practices in the survey area. A cropping system that keeps vegetative cover on the soil for extended periods can hold soil losses to amounts that will not reduce the productivity of the soils. On livestock farms the legumes and grasses in the

cropping system reduce erosion on sloping land and also provide nitrogen and improve soil tilth.

Soil drainage is the major management need on some of the acreage in crops and pasture. Areas that need drainage are usually in narrow bottom lands and hollows that receive excess water from runoff or seepage. Most of these areas respond very favorably to artificial drainage.

Many soils on uplands are naturally strongly acid or very strongly acid, and in unlimed areas, ground limestone is needed to raise the pH level for good growth of most field crops. On all soils, lime and fertilizer should be added according to soil tests, the needs of the crop, and the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

Corn and burley tobacco are the main field crops grown in Unicoi County. Tobacco is the main source of farm income. Corn and tobacco are grown in all parts of the survey area, mainly in small acreages. Deep loamy soils such as Cotaco, Toccoa, Tate, Tusquitee, and Shouns soils are well suited to both crops. Because of the shortage of suitable land in the mountainous areas of the county, tobacco is sometimes grown on steeper, marginal areas. Yields are still high because of good rainfall distribution during the summer.

Small acreages of wheat and cane sorghum are also grown in the survey area. Most of the cane sorghum is used for livestock feed or made into sorghum molasses.

Special crops grown commercially in Unicoi County include tomatoes, strawberries, sweet corn, melons, and apples. Deep soils that are naturally well drained and that warm up early in spring are especially well suited to vegetable crops. Apples grow best on the higher mountain foot slopes. These areas have the necessary cool temperatures, good air drainage, good rainfall distribution, and high available water capacity.

Pasture and hay crops make up most of the land cleared and in farms in the survey area. Most of the pasture and hay consists of tall fescue and white clover; some areas are in orchardgrass, timothy, red clover, lespedeza, and alfalfa. Orchardgrass and tall fescue are well suited to pasture on many of the soils. Legumes should be seeded with grasses during establishment of pasture, and they should be added to pure grass pastures to improve the quality of the forage.

In general, the soils in the survey area that are well suited to crops are also well suited to urban development, except in flood-prone areas. The data about specific soils in this soil survey can be used in planning future land use. The potential of a soil for urban use should be weighed against its potential for use as farmland.

Yields Per Acre

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

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

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

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

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

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

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

Class I soils have few limitations that restrict their use.

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

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

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

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

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

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

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

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

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity.

Woodland Management and Productivity

Joseph H. Paugh, forester, Soil Conservation Service, assisted in preparing this section.

More than 94,000 acres in Unicoi County is commercial forest, about 54,000 acres of which is in the Cherokee National Forest. Originally, all the county was forested, but as the land was settled, more land suitable for agricultural uses was cleared. Although woodland makes up a large part of the county, most of it is on the steeper slopes of the mountainous areas.

Good stands of hardwood and pine are produced in the forests of the county. Most of the mountainous areas have oak-pine forests; however, the mountains at the southern end of the county produce mainly oak, eastern white pine, and yellow-poplar. At higher elevations, northern hardwoods become more abundant. The very high mountaintops, such as the top of Unaka Mountain, are covered with low-growing spruce and birch.

Many mountain coves, hollows, and foot slopes produce excellent hardwood sawtimber. A dense understory of rhododendron is common in most of the mountain forests and, in some areas, reaches a height of 15 feet. This dense growth often slows down natural reproduction.

In the northeastern part of the county, the topography is rolling and hilly and the soils formed over limestone and shale. There, the woodland is only in the steeper areas and rocky areas and consists mainly of oak and hickory.

The economic value of wood crops in Unicoi County is substantial. According to the 1971 Forest Statistics for Tennessee Counties, Unicoi County forests contained 259.8 million board feet of sawtimber. Of this total, hardwoods made up 161.2 million board feet, and softwoods, 98.6 million board feet. Forests had a net annual growth of 9.7 million board feet. Sawtimber removals averaged about 6 million board feet annually. Other woodland values are wildlife habitat, recreation, natural scenic beauty, and protection of our soil and water.

Table 6 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, t, d, c, s, f, and r.

In table 6, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that a few trees may be blown down by normal winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. It was determined at 35 years of age for American sycamore and 50 years for all other species. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Recreation

Unicoi County has the potential for a wide range of recreation activities. The Cherokee National Forest, which has many acres of woodland and many cool mountain streams, is a very popular site for camping, hunting, fishing, nature study, and hiking.

Most visitors to the area are attracted by the scenic beauty of the high rugged mountains and by the Appalachian Trail, which winds through the mountains of Unicoi County.

There are two Forest Service recreation areas in the county—the Rock Creek Recreation Area and the Limestone Cove Recreation Area. These areas have camping and picnic facilities.

There are several other recreation areas in Unicoi County, including tennis courts, ballfields, and a golf course.

The soils of the survey area are rated in table 7 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

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

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

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

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

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains,

and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

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

Wildlife Habitat

Gerald L. Montgomery, biologist, Soil Conservation Service, assisted in preparing this section.

The major kinds of wildlife in Unicoi County are associated with woodland. About 80 percent of the county is woodland, about 5 percent is openland (pasture and cropland), and the rest is mostly residential. Wetlands are scarce in the county.

Common wildlife species found in woodland include white-tailed deer, gray squirrel, wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, gray fox, raccoon, and black bear. The species attracted to openland include bobwhite quail, mourning dove, meadowlark, and cottontail rabbit. Wildlife found in wetlands include wood duck, rails, herons, shore birds, muskrat, and mink.

Deer populations in Unicoi County are moderate and fairly stable, and squirrel populations are high and stable. Grouse populations are moderate and stable. Turkey populations are now moderate but are increasing. Bear populations are low but stable. Populations of openland species are low because of the scarcity of openland in the county. Populations of waterfowl and other wetland species are extremely low.

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

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

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

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

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

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

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

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

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

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites.

Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, rushes, sedges, and reeds.

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

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

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants.

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

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

Engineering

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

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

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings without basements, and local roads and streets. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and

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

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

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

Sanitary Facilities

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

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

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

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

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

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

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of

landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

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

Construction Materials

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

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

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

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

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

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

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

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable

source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

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

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

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

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

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

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

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

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

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

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

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

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

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

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

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

an excessively coarse texture, and restricted permeability adversely affect maintenance.

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

Soil Properties

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

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

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

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

Engineering Index Properties

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

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

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

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

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

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

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

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

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

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

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

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

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

Soil and Water Features

Tables 15 and 16 give estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. The soils in this group have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist

chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 15.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Table 16 gives *depth to bedrock* if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

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

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

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

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*5*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 17, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

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

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquents (*Hapl*, meaning minimal horizonation, plus *aquent*, the suborder of the Entisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, nonacid, mesic Typic Haplaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*4*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*5*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Ashe Series

The Ashe series consists of moderately deep, somewhat excessively drained loamy soils that formed in residuum of acid crystalline rock. These soils are on side slopes of the Iron and Bald mountain ranges of the Unaka Mountains. Elevation ranges from about 2,000 to 4,000 feet. Slopes range from 20 to 60 percent.

Ashe soils are geographically associated with the Unaka, Evard, Maymead, Tate, and Tusquitee soils. Unaka soils are on higher lying ridges and side slopes and have a northerly aspect. They have an umbric epipedon. Evard soils, on foothills and low mountains,

have an argillic horizon. Tate and Tusquitee soils, on lower foot slopes and benches, have an argillic horizon.

Typical pedon of Ashe loam, 35 to 60 percent slopes, in a forested area 1 mile south of Earnestville; 300 yards north of Clear Branch Church:

O2—1 inch to 0; partly decomposed organic material.
A11—0 to 2 inches; very dark grayish brown (10YR 3/2) loam; weak fine granular structure; very friable; common fine and medium and few coarse roots; many fine and medium pores; few fragments of gneiss up to 4 inches across; strongly acid; abrupt smooth boundary.
A12—2 to 5 inches; dark yellowish brown (10YR 4/4) loam; weak fine and medium granular structure; friable; common fine and few medium roots; common fine and medium pores; few fragments of gneiss up to 4 inches across; strongly acid; clear smooth boundary.
B2—5 to 26 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; common fine and few medium roots; common fine and few medium pores; about 10 percent by volume fragments of gneiss up to 4 inches across; very strongly acid; gradual smooth boundary.
C—26 to 32 inches; yellowish brown (10YR 5/4) cobbly loam; massive; friable; few roots; about 25 percent by volume fragments of gneiss up to 6 inches across; very strongly acid.
R—32 inches; fractured granite gneiss.

Solum thickness ranges from 18 to 36 inches. Depth to hard granite or gneiss bedrock ranges from 20 to 40 inches. Reaction is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. Flakes of finely divided mica range from few to common in many pedons. The content of fragments of granite or gneiss by volume ranges from 5 to 15 percent throughout the solum and from 5 to 30 percent in the C horizon.

The A11 horizon ranges from 1 to 4 inches in thickness. It has value of 3 or 4 and chroma of 2 or 3. Texture is loam or sandy loam.

The A12 horizon has value of 4 or 5 and chroma ranging from 2 to 4. Texture is loam or sandy loam.

The B horizon has hue of 10YR or 7.5YR, value ranging from 4 to 6, and chroma ranging from 4 to 6. Texture is loam or sandy loam.

The C horizon has hue of 10YR and 7.5YR and chroma ranging from 4 to 6. Texture is loam, sandy loam, or cobbly loam.

Ashe Variant

The Ashe Variant consists of moderately deep, well drained loamy soils. These soils are on broad ridgetops, low mountains, and hillsides. They formed in residuum of acid crystalline rock. Elevation ranges from 2,000 to 3,500 feet above sea level. Slopes range from 20 to 45 percent.

Ashe Variant soils are geographically associated with the Ashe, Evard, and Tate soils. Ashe soils are on adjacent, steeper side slopes. These soils have a solum 20 to 40 inches thick over hard rock. Evard and Ashe soils are in similar positions. Evard soils have an argillic horizon. Tate soils are in lower lying colluvial positions. These soils have a solum more than 20 inches thick.

Typical pedon of Ashe Variant loam, 20 to 45 percent slopes, in a forested area 2 miles south of Limestone Cove on State Highway 107; 50 feet north of road:

A1—0 to 5 inches; dark yellowish brown (10YR 4/4) loam; moderate medium granular structure; friable; common fine and medium pores; common fine and medium roots; few fine flakes of mica; very strongly acid; clear smooth boundary.
B1—5 to 12 inches; yellowish brown (10YR 5/6) loam; weak fine and medium subangular blocky structure; friable; common fine and medium pores; common fine and few medium roots; few fine flakes of mica; very strongly acid; clear smooth boundary.
B21—12 to 20 inches; strong brown (7.5YR 5/6) loam; moderate medium subangular blocky structure; friable; few fine and medium pores; common fine and few medium roots; common fine flakes of mica; few soft fragments of granite; very strongly acid; gradual smooth boundary.
B22—20 to 30 inches; strong brown (7.5YR 5/8) loam; moderate medium subangular blocky structure; friable; few fine and medium pores; few fine and medium roots; common fine flakes of mica; 10 percent by volume soft fragments of granite up to 4 inches across; very strongly acid; gradual wavy boundary.
C—30 to 58 inches; granite saprolite that crushes to yellowish brown (10YR 5/8) sandy loam; many fragments of partly weathered granite.
Cr—58 inches; rippable granite saprolite.

Solum thickness ranges from 20 to 40 inches. Depth to soft granite or gneiss bedrock is 40 to 60 inches. Reaction is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. The content of soft fragments of granite or gneiss by volume ranges from 0 to 15 percent throughout the solum. Flakes of mica range from few to common throughout the soil.

The A horizon is 3 to 6 inches thick. It has hue of 10YR or 7.5YR, value ranging from 3 to 5, and chroma ranging from 2 to 4. Texture is loam or fine sandy loam.

The B horizon has hue of 10YR or 7.5YR, value ranging from 5 to 7, and chroma ranging from 3 to 8. It is clay loam, sandy clay loam, or loam.

The C horizon is saprolite that crushes to sandy loam that has few to many soft rock fragments. It has hue of

7.5YR, 10YR, and 2.5Y; value of 5 to 7; and chroma of 3 to 8.

Brookshire Series

The Brookshire series consists of deep, well drained loamy soils on mountain foot slopes and in mountain coves. These soils formed in colluvium that moved downslope from areas of soils weathered from feldspathic quartzite, phyllite, slate, granite, or gneiss. Slopes range from 10 to 50 percent. Elevation ranges from about 2,500 to 4,300 feet above sea level.

Brookshire soils are geographically associated with the Ashe, Unaka, Ditney, Jeffrey, and Spivey soils. Ashe and Ditney soils are on higher lying slopes and ridges. They are less than 40 inches deep to bedrock and do not have a dark surface layer. Spivey soils, on higher lying colluvial areas, are more than 35 percent by volume coarse fragments. Unaka and Jeffrey soils, on higher lying slopes and ridges, are less than 40 inches deep to bedrock.

Typical pedon of Brookshire loam, 25 to 35 percent slopes, in a forested area 2.5 miles northwest of U.S. Highway 19W-23 on Higgins Creek Road; 600 yards northwest of intersection of Birchfield Camp Creek and Higgins Creek:

O2—1 inch to 0; partly decomposed organic material.
A1—0 to 8 inches; very dark grayish brown (10YR 3/2) loam; weak fine granular structure; very friable; common fine and medium and few coarse roots; common fine and medium pores; 10 percent by volume fragments of feldspathic quartzite up to 3 inches across; strongly acid; abrupt smooth boundary.
B1—8 to 14 inches; dark yellowish brown (10YR 4/4) loam; weak fine and medium subangular blocky structure; friable; common fine and few medium and coarse roots; common fine and medium pores; 10 percent by volume fragments of feldspathic quartzite up to 3 inches across; strongly acid; gradual smooth boundary.
B2—14 to 42 inches; dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; friable; common fine and few medium roots; common fine and medium pores; 15 percent by volume fragments of feldspathic quartzite up to 3 inches across; strongly acid; gradual smooth boundary.
C—42 to 60 inches; yellowish brown (10YR 5/6) gravelly loam; massive; friable; few roots; few fine and medium pores; about 30 percent by volume soft and hard fragments of feldspathic quartzite up to 5 inches across; strongly acid.

Solum thickness ranges from 40 to 55 inches. Depth to hard rock is 6 feet or more. Reaction is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. Flakes of finely divided mica range from none to common throughout the soil. The content of rock fragments by volume ranges from 5 to 15 percent in each horizon and generally increases with depth.

The A horizon ranges from 6 to 10 inches in thickness. It has chroma of 2 or 3 and texture of loam or gravelly loam.

The B horizon has hue of 7.5YR or 10YR. Texture is loam or gravelly loam.

The C horizon is loam or gravelly loam. It has value of 4 or 5 and chroma ranging from 4 to 6. In some areas, the C horizon is saprolite of granite or gneiss that crushes to sandy loam.

Buncombe Series

The Buncombe series consists of deep, excessively drained sandy soils on flood plains bordering stream channels. These soils formed in recent alluvium washed from soils underlain by quartzite, granite, and gneiss. Slopes range from 0 to 2 percent.

Buncombe soils are geographically associated with Toccoa soils. Toccoa and Buncombe soils are in similar positions. Toccoa soils have a loam surface layer and are well drained.

Typical pedon of Buncombe loamy sand in a forested area 300 yards north of Chestoa Bridge; 50 feet east of the Nolichucky River:

A1—0 to 4 inches; dark grayish brown (10YR 4/2) loamy sand; weak medium granular structure; very friable; common fine and medium roots; common fine flakes of mica; slightly acid; abrupt smooth boundary.
C1—4 to 20 inches; yellowish brown (10YR 5/4) fine to medium sand; single grain; loose; few fine and medium roots; common fine flakes of mica; medium acid; abrupt smooth boundary.
C2—20 to 25 inches; yellowish brown (10YR 5/4) loamy sand; single grain; loose; common fine flakes of mica; medium acid; abrupt smooth boundary.
C3—25 to 35 inches; dark yellowish brown (10YR 4/4) loamy sand; single grain; loose; common fine flakes of mica; medium acid; abrupt smooth boundary.
C4—35 to 65 inches; light yellowish brown (10YR 6/4) medium sand; single grain; loose; common fine flakes of mica; about 10 percent by volume cobbles up to 6 inches across; medium acid.

Thickness of sandy material and depth to bedrock range from 5 to 10 feet or more. Reaction is medium acid. The content of waterworn gravel by volume ranges up to 10 percent to a depth of 20 inches and up to 20 percent below that depth. Flakes of mica range from few to many throughout the profile.

The A horizon has hue of 10YR or 2.5Y. Texture is loamy sand or loamy fine sand.

The C horizon has hue of 10YR or 2.5Y, value ranging from 4 to 6, and chroma ranging from 2 to 4. Texture is loamy fine sand, loamy sand, or sand. Lenses of sandy loam occur in some pedons.

Buncombe soils in other survey areas have an average annual soil temperature between 59 degrees and 72 degrees F. Because the Buncombe soils in this survey area have an average annual temperature of about 55 degrees F, they are considered taxadjuncts to the series. This difference, however, does not affect the use and behavior of the soils.

Calvin Series

The Calvin series consists of moderately deep, well drained shaly soils. These soils are on dissected hills and ridges underlain by maroon or reddish shale or siltstone. Slopes range from 10 to 45 percent. Elevation ranges from 1,800 to 2,400 feet above sea level.

Calvin soils are geographically associated with the Shouns and Dunmore soils. Shouns soils, in adjacent concave positions, have an argillic horizon. Dunmore soils, at slightly lower elevations, have a clayey B horizon and formed in residuum of limestone.

Typical pedon of Calvin shaly silt loam, 20 to 45 percent slopes, in a forested area 1 mile south of U.S. Highways 19W and 23 on Dry Creek Road; 0.2 mile northeast on paved road; 250 feet northwest of road:

O2—1 inch to 0; partly decomposed organic material.
A1—0 to 1 inch; dark reddish brown (5YR 3/2) shaly silt loam; weak fine granular structure; very friable; common fine and medium and few coarse roots; many fine and medium pores; about 15 percent by volume coarse fragments up to 3 inches across; strongly acid; abrupt smooth boundary.
A2—1 to 5 inches; reddish brown (2.5YR 5/4) shaly silt loam; moderate fine and medium granular structure; friable; common fine and medium and few coarse roots; common fine and medium pores; about 15 percent by volume coarse fragments up to 3 inches across; strongly acid; clear smooth boundary.
B2—5 to 25 inches; reddish brown (2.5YR 4/4) very shaly silt loam; weak fine subangular blocky structure; friable; few fine and medium roots; common fine and medium pores; 40 percent by volume coarse fragments up to 4 inches across; very strongly acid; gradual smooth boundary.
C—25 to 35 inches; reddish brown (2.5YR 4/4) very shaly silt loam; massive; friable; 60 percent by volume coarse fragments up to 4 inches across; very strongly acid; gradual wavy boundary.
R—35 inches; dusky red shale.

Solum thickness ranges from 20 to 35 inches. Depth to soft rock ranges from 20 to 40 inches.

The content of coarse fragments by volume ranges from 5 to 25 percent in the A horizon, from 35 to 50 percent in the B horizon, and from 45 to 75 percent in the C horizon. Reaction is strongly acid or very strongly acid throughout, except where the surface layer has been limed.

The A1 horizon ranges from 1 to 4 inches in thickness. It has hue of 7.5YR or 5YR, value ranging from 3 to 5, and chroma ranging from 2 to 4. In most pedons texture is shaly silt loam, but in some pedons it is shaly loam.

The A2 horizon is 1 to 4 inches thick. It has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 3 or 4. In most pedons texture is shaly silt loam, but in some, it is shaly loam.

The B horizon has hue ranging from 5YR to 10R, value of 4 or 5, and chroma of 3 to 6. Texture is shaly or very shaly silt loam, or in places, shaly loam.

The C horizon has the same range of colors as given for the B horizon. In most pedons texture is very shaly silt loam, but in some pedons it is very shaly loam. The C horizon is underlain by fractured maroon or reddish shale or siltstone.

Cotaco Series

The Cotaco series consists of deep, moderately well drained loamy soils on terraces. These soils formed in alluvium washed from soils underlain by arkose, quartzite, granite, and gneiss. Elevation ranges from 1,650 to 2,000 feet above sea level. Slopes range from 1 to 5 percent.

Cotaco soils are geographically associated with the Tusquitee, Shouns, and Toccoa soils. Tusquitee soils, which are on adjacent terraces, are well drained and have an umbric epipedon more than 6 inches thick. Shouns soils, on adjacent higher lying terraces, are well drained and have hues of 5YR and 2.5YR. Toccoa soils, which are on adjacent flood plains, do not have an argillic horizon.

Typical pedon of Cotaco loam in a pasture 1 mile south of Erwin; 50 feet northwest of Love Chapel Christian Church:

Ap—0 to 6 inches; dark yellowish brown (10YR 4/4) loam; weak fine granular structure; friable; common fine and medium pores; common fine and very fine roots; few fine flakes of mica; medium acid; clear smooth boundary.
B1—6 to 10 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; common fine and few medium pores; common fine roots; few fine flakes of mica; strongly acid; gradual smooth boundary.
B21t—10 to 25 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few fine and medium pores; few fine roots; thin patchy clay films on faces of peds; few fine flakes of mica; strongly acid; gradual smooth boundary.

B22t—25 to 34 inches; yellowish brown (10YR 5/6) clay loam; common fine distinct mottles of light gray (10YR 7/2) and pale brown (10YR 6/3); moderate medium subangular blocky structure; firm; few medium pores; few fine roots; thin patchy clay films on faces of peds and in pores; few fine flakes of mica; few small cobbles; strongly acid; gradual smooth boundary.

B3—34 to 42 inches; reddish yellow (5YR 6/8) clay loam; common medium distinct mottles of light brownish gray (10YR 6/2), pale brown (10YR 6/3), and yellowish brown (10YR 5/6); weak medium subangular blocky structure; firm; few fine flakes of mica; few cobbles; strongly acid; gradual smooth boundary.

C—42 to 65 inches; reddish yellow (5YR 6/8) clay loam; common medium distinct mottles of light brownish gray (10YR 6/2) and yellowish brown (10YR 5/4); massive; firm; few fine flakes of mica; few cobbles; strongly acid.

Solum thickness ranges from 26 to 46 inches. Depth to bedrock ranges from 5 to 20 feet or more. The content of waterworn cobbles by volume ranges from 0 to 5 percent in the solum and from 5 to 25 percent in the C horizon. Reaction is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. Flakes of mica range from none to few throughout the profile.

The A horizon has value ranging from 4 to 6 and chroma of 2 to 4. Texture is silt loam or loam.

The B1 and B2t horizons have hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 6 to 8. Texture is commonly clay loam and less commonly sandy clay loam. Few to common fine or medium gray, grayish brown, or pale brown mottles are present in the lower part of the B22t horizon.

The B3 horizon has hue ranging from 5YR to 10YR, value of 4 to 6, and chroma of 1 to 6. Texture is clay loam or loam.

In the C horizon, colors are the same as those in the B3 horizon. Texture is clay loam, loam, or sandy loam.

Ditney Series

The Ditney series consists of moderately deep, well drained loamy soils on high mountains. These soils are on all aspects at lower elevations but only on southerly aspects at higher elevations. They formed in residuum of arkose or feldspathic quartzite with small amounts of slate, conglomerate, and graywacke. Elevation ranges from 2,000 to 4,000 feet above sea level. Slopes range from 10 to 60 percent.

Ditney soils are geographically associated with the Jeffrey, Tusquitee, Tate, and Maymead soils. Jeffrey soils, which are on higher lying ridges and side slopes, have a northerly aspect. They have an umbric epipedon. Tusquitee and Maymead soils, which are in adjacent colluvial positions, are more than 40 inches deep to rock. Tusquitee soils have an umbric epipedon. Tate soils, on lower foot slopes, have an argillic horizon.

Typical pedon of Ditney loam, 35 to 60 percent slopes, 200 feet southeast of the top of Buffalo Mountain, above Laughren Chapel:

A1—0 to 2 inches; dark grayish brown (10YR 4/2) loam; moderate fine granular structure; very friable; many fine and medium pores; common fine and medium and few coarse roots; 10 percent by volume fragments of feldspathic quartzite; strongly acid; abrupt smooth boundary.

A2—2 to 5 inches; yellowish brown (10YR 5/4) loam; weak medium granular structure; friable; many fine and medium pores; common fine and few medium and coarse roots; 10 percent by volume fragments of feldspathic quartzite; very strongly acid; clear smooth boundary.

B2—5 to 21 inches; yellowish brown (10YR 5/6) loam; weak fine and medium subangular blocky structure; friable; common fine and medium roots; common medium pores; 15 percent by volume fragments of feldspathic quartzite; very strongly acid; gradual wavy boundary.

C—21 to 26 inches; yellowish brown (10YR 5/4) cobbly loam; massive; friable; about 30 percent by volume fragments of feldspathic quartzite up to 12 inches across; very strongly acid.

R—26 inches; feldspathic quartzite bedrock.

Solum thickness ranges from 20 to 30 inches. Depth to hard arkose or feldspathic quartzite bedrock ranges from 30 to 40 inches. Reaction is strongly acid or very strongly acid throughout the profile. The content of coarse fragments by volume ranges from 10 to 20 percent in the A and B horizons and from about 10 to 40 percent in the C horizon.

The A1 horizon ranges from 1 to 4 inches in thickness. It has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Texture is loam or sandy loam.

The A2 horizon ranges from 2 to 4 inches in thickness. It has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Texture is loam or sandy loam.

The B horizon ranges from 14 to 30 inches in thickness. It has hue of 10YR or 7.5YR, value of 4 or 5, and chroma ranging from 4 to 6. Texture is loam, sandy loam, or their cobbly counterparts.

The C horizon ranges from 4 to 10 inches in thickness. It has the same range of colors given for the B horizon. Texture is cobbly loam or very cobbly loam or sandy loam. In some areas is saprolite that crushes to sandy loam.

The R layer is most commonly arkose or feldspathic quartzite bedrock.

Dunmore Series

The Dunmore series consists of deep, well drained clayey soils that formed in residuum of dolomitic limestone bedrock. These soils are on uplands in valley areas. Elevation ranges from about 1,650 to 2,000 feet above sea level. Slopes range from 5 to 35 percent.

Dunmore soils are geographically associated with the Sequoia and Shouns soils. Sequoia soils, on higher lying hills and ridges, formed in residuum of acid shale. Shouns soils, in similar positions, formed in colluvium and alluvium.

Typical pedon of Dunmore silt loam, 10 to 20 percent slopes, in a cultivated area 0.5 mile south of county line on U.S. Highway 19W-23; east 0.2 mile on county road; 150 yards south of road:

Ap—0 to 8 inches; yellowish brown (10YR 5/4) silt loam; moderate medium granular structure; friable; common fine roots; common fine and medium pores; medium acid; clear smooth boundary.

B21t—8 to 22 inches; yellowish red (5YR 5/6) silty clay; strong medium subangular blocky structure; firm; few fine roots; few fine pores; thin continuous clay films on faces of peds; strongly acid; gradual smooth boundary.

B22t—22 to 40 inches; yellowish red (5YR 5/6) clay; common distinct reddish yellow (7.5YR 6/8) and red (2.5YR 5/6) mottles; strong medium subangular and angular blocky structure; firm; few fine roots; few fine pores; thin continuous clay films on faces of peds; very strongly acid; gradual smooth boundary.

B23t—40 to 65 inches; mottled red (2.5YR 4/6), strong brown (7.5YR 5/8), brownish yellow (10YR 6/6), and yellowish red (5YR 5/8) clay; strong medium angular blocky structure; very firm; thick continuous clay films on faces of peds; very strongly acid.

Solum thickness and depth to dolomitic limestone bedrock range from 60 to more than 80 inches. Reaction is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. The content of chert fragments by volume ranges from 0 to 10 percent throughout the profile.

The A horizon has hues of 10YR, 7.5YR, and 5YR; value of 4 or 5; and chroma ranging from 3 to 6. Texture is silt loam or silty clay loam.

The Bt horizon has hue of 7.5YR, 5YR, or 2.5YR; value of 4 or 5; and chroma ranging from 6 to 8. Texture is silty clay or clay.

Evard Series

The Evard series consists of deep, well drained loamy soils that formed in residuum of acid crystalline rock. These soils are on low mountains and foothills of mountainous areas. Elevations range from 2,000 to 3,200 feet above sea level. Slopes range from 10 to 40 percent.

Evard soils are geographically associated with Ashe, Ashe Variant, and Tate soils. Ashe soils, on adjacent higher lying positions, do not have an argillic horizon. Evard and Ashe Variant soils are in similar positions. Ashe Variant soils have hues of 10YR and 7.5YR, and they commonly have a B horizon more than 20 inches thick. Tate soils, in adjacent concave positions, have a solum thicker than 40 inches.

Typical pedon of Evard loam, 20 to 40 percent slopes, in a pasture 3.5 miles west of Rocky Fork at Devil Fork Gap on county road; 100 feet north of road; 100 feet east of the Appalachian Trail:

Ap—0 to 5 inches; brown (7.5YR 4/4) loam; moderate fine and medium granular structure; friable; common fine and very fine roots; common fine and medium pores; few fine flakes of mica; strongly acid; clear smooth boundary.

B1—5 to 10 inches; strong brown (7.5YR 5/6) clay loam; weak medium subangular blocky structure; friable; common fine roots; common fine and medium pores; few fine flakes of mica; strongly acid; clear smooth boundary.

B21t—10 to 22 inches; yellowish red (5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few thin patchy clay films on faces of peds; few fine roots; few fine and medium pores; common fine flakes of mica; very strongly acid; gradual smooth boundary.

B22t—22 to 34 inches; red (2.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; common thin patchy clay films on faces of peds; few fine roots; few fine and medium pores; common fine flakes of mica; very strongly acid; gradual smooth boundary.

B3—34 to 39 inches; red (2.5YR 5/6) clay loam; weak medium subangular blocky structure; friable; few roots and pores; common fine flakes of mica; 10 to 20 percent by volume soft fragments of granite up to 4 inches across; very strongly acid; gradual wavy boundary.

Cr—39 to 60 inches; saprolite of granite that crushes to sandy loam; red (2.5YR 5/6) and yellowish red (5YR 5/6) clay loam is in cracks and seams.

Solum thickness ranges from 30 to 40 inches. Depth to hard granite or gneiss ranges from 5 to 12 feet. Reaction is strongly acid or very strongly acid throughout, except that the surface is less acid in limed areas. The content of soft fragments of granite or gneiss by volume ranges from 5 to 20 percent in the lower part of the B horizon. Flakes of mica range from few to common throughout the profile.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma ranging from 3 to 6. Texture is loam or fine sandy loam.

The B horizon has hue of 7.5YR, 5YR, or 2.5YR, value ranging from 4 to 6, and chroma ranging from 6 to 8. Texture is clay loam or sandy clay loam. In some pedons the B3 horizon is absent.

The C horizon is saprolite that crushes to sandy loam. Colors are the same as for the B horizon.

Jeffrey Series

The Jeffrey series consists of moderately deep, well drained loamy soils on side slopes of high mountains. These soils formed in residuum of arkose or feldspathic quartzite with small areas of slate, conglomerate, and graywacke. Elevation ranges from 3,000 to 4,500 feet above sea level. These soils are on all aspects at high elevations. At the lower elevations, they generally have a northerly aspect. Slopes range from 20 to 60 percent.

Jeffrey soils are geographically associated with the Ditney, Spivey, and Brookshire soils. Ditney soils, on lower mountainsides, have a more southerly aspect and do not have a dark colored surface layer. Spivey and Brookshire soils, in adjacent coves, are more than 40 inches deep to bedrock. Spivey soils have more than 35 percent coarse fragments in the control section.

Typical pedon of Jeffrey loam, 35 to 60 percent slopes, in a forested area 1 mile southeast of top of Unaka Mountain; 50 feet north of road:

O2—2 inches to 0; partly decomposed organic material.

A1—0 to 8 inches; very dark brown (10YR 2/2) loam; weak fine granular structure; very friable; common fine and few medium and coarse roots; many fine and medium pores; 10 percent by volume fragments of quartzite up to 6 inches across; very strongly acid; abrupt smooth boundary.

B1—8 to 12 inches; dark yellowish brown (10YR 4/4) cobbly loam; weak fine and medium subangular blocky structure; friable; common fine and few medium and coarse roots; common fine and medium pores; about 15 percent by volume fragments of quartzite up to 6 inches across; very strongly acid; gradual smooth boundary.

B2—12 to 30 inches; yellowish brown (10YR 5/4) cobbly loam; friable; weak medium subangular blocky structure; few fine roots; common fine and medium pores; about 20 percent by volume fragments of quartzite up to 6 inches across; very strongly acid; gradual smooth boundary.

C—30 to 36 inches; yellowish brown (10YR 5/4) cobbly loam; massive; friable; about 40 percent by volume fragments of quartzite up to 8 inches across; very strongly acid.

R—36 inches; fractured feldspathic quartzite bedrock.

Solum thickness ranges from 18 to 30 inches. Hard arkose or feldspathic quartzite bedrock is at a depth of 20 to 40 inches. Reaction is strongly acid or very strongly acid throughout. Fragments of arkose, quartzite, and slate by volume range from 5 to 30 percent on the surface and throughout the solum and from 15 to 50 percent in the C horizon.

The A horizon is 5 to 9 inches thick. It has hue of 10YR, value of 2 or 3, and chroma of 2 or 3. Texture is loam or fine sandy loam.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. Texture is sandy loam, cobbly loam, or loam.

The C horizon has the same range of color as given for the B horizon. It is loam, sandy loam, or their cobbly or very cobbly counterparts.

The R layer is arkose or feldspathic quartzite bedrock.

Maymead Series

The Maymead series consists of deep, well drained loamy soils on the lower part of mountainsides and in coves. These soils formed in colluvium that moved downslope from soils weathered from feldspathic quartzite, arkose, slate, phyllite, granite, or gneiss. Elevation ranges from 1,800 to 3,200 feet above sea level. Slopes range from 15 to 50 percent.

The Maymead soils are geographically associated with the Ashe, Ditney, Brookshire, and Tate soils. Ashe and Ditney soils, which are on higher lying slopes and ridges, are less than 40 inches deep to bedrock. Brookshire soils, which have a dark surface layer, are in similar positions at higher elevations or have a northerly aspect at lower elevations. Tate soils, in similar positions at lower elevations, have an argillic horizon.

Typical pedon of Maymead loam, 35 to 50 percent slopes, in a forested area 3.5 miles southeast of Erwin on Rock Creek Road; 0.4 mile northwest of Indian Grave Gap; 50 feet south of road:

O1—4 inches to 0; partly decomposed organic mat of hardwood and rhododendron leaves.

A1—0 to 1 inch; dark grayish brown (10YR 4/2) loam; weak fine and medium granular structure; very friable; many fine and medium roots; about 10 percent by volume fragments of feldspathic quartzite 1 to 4 inches across; strongly acid; abrupt smooth boundary.

A2—1 to 5 inches; dark yellowish brown (10YR 4/4) loam; weak medium granular structure; very friable; common fine and medium roots; about 10 percent by volume fragments of feldspathic quartzite up to 4 inches across; strongly acid; clear smooth boundary.

B1—5 to 11 inches; yellowish brown (10YR 5/4) loam; weak fine subangular blocky structure; friable; common fine and medium roots; about 10 percent

by volume of feldspathic quartzite fragments 1 to 4 inches across; strongly acid; clear smooth boundary.
B2—11 to 44 inches; yellowish brown (10YR 5/6) cobbly loam; weak medium subangular blocky structure; friable; common fine and medium roots; about 20 percent by volume fragments of feldspathic quartzite 1 to 6 inches across; strongly acid; gradual smooth boundary.
B3—44 to 62 inches; yellowish brown (10YR 5/6) cobbly loam; weak fine subangular blocky structure; very friable; few fine roots; about 35 percent by volume fragments of feldspathic quartzite up to 6 inches across; strongly acid; gradual smooth boundary.
R—62 inches; hard feldspathic quartzite bedrock; thin seams of yellowish brown sandy loam material in cracks.

Solum thickness ranges from 35 to 70 inches. Depth to hard rock ranges from 40 to 70 inches. Reaction is strongly acid or very strongly acid throughout. The content of fragments of feldspathic quartzite, arkose, granite, or gneiss by volume averages 15 to 35 percent in the control section but 10 to 50 percent in the subhorizons. Coarse fragments generally increase in number and size as depth increases. The soil is strongly acid or very strongly acid. Flakes of mica range from none to common throughout the profile.

The A horizon has hue of 10YR, value of 4 or 5, and chroma ranging from 2 to 4. The upper 1 to 4 inches may have value of 3 and chroma of 2 or 3. Texture is loam or sandy loam.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma ranging from 4 to 6. Texture is loam, cobbly loam, or cobbly sandy loam.

The C horizon, if present, has the same range in color and texture as the B horizon, but it lacks structure and commonly contains more larger coarse fragments.

Maymead Variant

The Maymead Variant consists of deep, well drained stony soils that formed in stony or cobbly alluvium and colluvium. These soils are in drainageways and on stream bottoms and valley floors near high mountain areas. Elevation ranges from about 1,600 to 3,000 feet. Slopes range from 1 to 10 percent.

Maymead Variant soils are geographically associated with the Ditney, Maymead, and Tate soils. Ditney soils, which are on higher lying ridges and side slopes, are less than 40 inches deep to bedrock, and they have less than 35 percent coarse fragments. Maymead soils, on higher lying colluvial positions, have less than 35 percent coarse fragments in the control section. Tate soils, on higher lying colluvial benches, have an argillic horizon and less than 35 percent coarse fragments in the control section.

Typical pedon of Maymead Variant very stony loam, 1 to 10 percent slopes, in a forested area 2 miles southeast of Erwin on Rock Creek Road; 200 feet southwest of park office in Rock Creek Recreation Area:

O2—1 inch to 0; partly decomposed organic material.
A1—0 to 4 inches; dark grayish brown (10YR 4/2) very stony loam; weak fine granular structure; very friable; common fine and few medium roots; many fine and common medium pores; 40 percent of surface area covered with rounded and semirounded fragments of quartzite dominantly 3 to 18 inches across; strongly acid; clear smooth boundary.
B1—4 to 9 inches; dark yellowish brown (10YR 4/4) very stony loam; weak fine and medium subangular blocky structure; friable; common fine and medium roots; common fine and medium pores; 40 percent by volume rounded and semirounded fragments of quartzite dominantly 3 to 18 inches across; strongly acid; gradual smooth boundary.
B2—9 to 35 inches; dark yellowish brown (10YR 4/4) very stony loam; weak fine subangular blocky structure; friable; few roots; few fine and medium pores; 50 percent by volume rounded and semirounded fragments of quartzite dominantly 5 to 18 inches across; strongly acid; gradual smooth boundary.
C1—35 to 44 inches; dark yellowish brown (10YR 4/4) very stony sandy loam; massive; friable; 60 percent by volume rounded and semirounded quartzite fragments dominantly 5 to 18 inches across; strongly acid; gradual smooth boundary.
C2—44 to 60 inches; yellowish brown (10YR 5/4) very stony loamy sand; single grain; loose; 60 percent by volume rounded and semirounded fragments of quartzite dominantly 5 to 22 inches across; strongly acid.

Solum thickness ranges from 30 to 50 inches. Depth to rock is greater than 5 feet. Reaction is strongly acid or very strongly acid throughout. The content of rounded and semirounded gravel, cobbles, and stones by volume ranges from 35 to 60 percent in the solum and to as much as 80 percent in the C horizon.

The A horizon has value of 3 or 4 and chroma ranging from 2 to 4. Texture is stony, very stony, cobbly, or very cobbly loam or sandy loam.

The B horizon ranges from 25 to 45 inches in thickness. It has value of 4 or 5 and chroma ranging from 3 to 6. Texture is stony loam, very stony loam, stony sandy loam, or very stony sandy loam.

The C horizon is 20 inches or more thick. It has value of 4 or 5 and chroma ranging from 4 to 6. Texture is very stony or very cobbly loamy sand or sandy loam.

Sensabaugh Series

The Sensabaugh series consists of deep, well drained loamy soils. These soils are in narrow tracts along

intermittent drainageways and small streams and on fans at the mouth of hollows. Elevation ranges from about 1,650 to 2,000 feet above sea level. Slopes range from 0 to 4 percent.

Sensabaugh soils are geographically associated with the Shouns, Calvin, and Dunmore soils. Shouns soils, on higher lying colluvial positions, have an argillic horizon. The moderately deep Calvin soils, on higher lying steep hills, have more than 35 percent coarse fragments. Dunmore soils, on higher lying hillsides, have an argillic horizon and a clayey subsoil.

Typical pedon of Sensabaugh loam in a pasture 0.7 mile south of Unicoi-Carter county line; 100 feet west of Buffalo Creek:

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) loam; moderate fine granular structure; very friable; many fine and medium pores; many fine and very fine roots; about 5 percent by volume gravel up to 3 inches across; neutral; clear smooth boundary.

B21—8 to 20 inches; strong brown (7.5YR 5/6) loam; weak fine subangular blocky structure; friable; common fine and few medium pores; common fine and very fine roots; about 15 percent by volume gravel up to 3 inches across; very slightly acid; gradual smooth boundary.

B22—20 to 36 inches; strong brown (7.5YR 5/6) gravelly loam; moderate fine and medium subangular blocky structure; friable; few fine and medium pores; common fine roots; about 15 percent by volume gravel up to 3 inches across; very slightly acid; abrupt smooth boundary.

C—36 to 60 inches; strong brown (7.5YR 5/6) gravelly fine sandy loam; massive; friable; few fine roots; about 30 percent by volume gravel up to 3 inches across; very slightly acid.

Solum thickness ranges from 24 to 55 inches. Depth to bedrock ranges from 5 to 10 feet or more. Reaction is very slightly acid or neutral. The content of gravel by volume is as much as 15 percent in the A horizon, about 5 to 40 percent in the B horizon, and 15 to 50 percent in the C horizon.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma ranging from 2 to 4. The range includes a thin A horizon that is 2 to 4 inches thick and has value of 3 and chroma of 2 or 3. Texture is loam or silt loam.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma ranging from 3 to 6. Texture is loam, silt loam, clay loam, silty clay loam, or their gravelly counterparts.

The C horizon has the same range of colors as that in the B horizon. Texture is loam, fine sandy loam, or their gravelly counterparts. It is stratified in some areas with lenses of loamy sand.

Sequoia Series

The Sequoia series consists of moderately deep, well drained clayeyWvvsoils. These soils are on low shale hills in the ridge and valley areas. They formed in material weathered from acid shale. Elevation ranges from 1,700 to 2,700 feet above sea level. Slopes range from 10 to 35 percent.

Sequoia soils are geographically associated with the Calvin and Dunmore soils. Calvin soils, on adjacent higher lying hills and ridges, have a shaly silt loam or shaly loam B horizon. Dunmore soils, in similar positions underlain by dolomite, are more than 40 inches deep.

Typical pedon of Sequoia silt loam, 10 to 20 percent slopes, in a wooded area 2 miles northeast of Unicoi along Back Road; 100 yards west of Coopers Cemetery:

O2—2 inches to 0; partly decomposed organic material.

A1—0 to 2 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many fine and medium pores; many fine and few medium roots; very strongly acid; abrupt smooth boundary.

A2—2 to 6 inches; yellowish brown (10YR 5/4) silt loam; moderate fine and medium granular structure; friable; common fine and medium pores; common fine and few medium roots; very strongly acid; clear smooth boundary.

B1—6 to 10 inches; yellowish brown (10YR 5/8) silty clay loam; moderate medium subangular blocky structure; firm; few fine pores; few fine roots; thin discontinuous clay films on faces of peds; very strongly acid; gradual smooth boundary.

B21t—10 to 23; strong brown (7.5YR 5/8) silty clay; strong medium subangular and angular blocky structure; firm; thick continuous clay films on faces of peds; very strongly acid; gradual smooth boundary.

B22t—23 to 30 inches; strong brown (7.5YR 5/8) silty clay; common fine to medium faint brownish yellow (10YR 6/8) mottles; massive parting to weak medium angular blocky structure; firm; thick discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

Cr—30 to 60 inches; weathered, acid shale; yellowish brown (10YR 5/8) silt loam with a few streaks of red (2.5YR 5/6); shale structure evident; very strongly acid.

Solum thickness and depth to soft shale range from 20 to 40 inches. Depth to hard shale is more than 5 feet. Reaction is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. The content of soft shale fragments by volume ranges to about 25 percent in the B2 horizon and generally increases with depth.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma ranging from 2 to 8. Texture is silt loam except in eroded areas, where it is silty clay loam or silty clay.

The B1 horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 or 5, and chroma ranging from 4 to 8. Texture is silty clay loam or silty clay.

The Bt horizon has hue of 7.5YR or 5YR and chroma of 6 or 8. Texture is silty clay or clay.

The Cr horizon is soft acid shale that has thin seams of silty or clayey material in cracks and in coatings on shale fragments or slightly weathered shale that crushes to yellowish brown silt loam.

Shouns Series

The Shouns series consists of deep, well drained loamy soils that formed on foot slopes, benches, and terraces. Slopes range from 5 to 35 percent. Elevation ranges from 1,700 to 2,200 feet above sea level.

Shouns soils are geographically associated with the Tate, Calvin, and Dunmore soils. Tate soils, which are in similar positions, have hues of 10YR and 7.5YR. Calvin soils, on higher lying hills and ridges, do not have an argillic horizon and are less than 40 inches deep to rock. Dunmore soils, on adjacent rolling hills, have a clayey subsoil.

Typical pedon of Shouns loam, 5 to 12 percent slopes, in a pasture 300 yards south of rock quarry near Marbleton Community and 75 feet east of railroad:

Ap—0 to 6 inches; dark yellowish brown (10YR 4/4) loam; moderate medium and fine granular structure; friable; common fine and medium pores; common fine roots; few fragments of quartzite up to 5 inches across; medium acid; clear smooth boundary

B1—6 to 13 inches; strong brown (7.5YR 5/6) loam; moderate medium subangular blocky structure; friable; common fine and few medium pores; common fine roots; few fragments of quartzite up to 5 inches across; few thin discontinuous clay films on faces of peds; strongly acid; gradual smooth boundary.

B21t—13 to 21 inches; yellowish red (5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few fine and medium pores; few fine roots; thin discontinuous clay films on faces of peds; few small fragments of quartz 1 to 2 inches in diameter; few fragments of quartzite up to 5 inches across; strongly acid; gradual smooth boundary.

B22t—21 to 30 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few fine pores; few fine roots; thin discontinuous clay films on faces of peds; common fragments of quartz 1 to 2 inches in diameter; few fragments of quartzite up to 5 inches across; strongly acid; gradual smooth boundary.

B23t—30 to 52 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few fine pores; continuous clay films on faces of peds; common fragments of quartz 1 to 2 inches in diameter; few fragments of quartzite up to 5 inches across; strongly acid; gradual smooth boundary.

C—52 to 75 inches; red (2.5YR 4/6) cobbly clay loam; massive; friable; clay coatings on rock fragments; many fragments of quartz 1 to 2 inches in diameter; about 15 percent by volume fragments of quartzite up to 5 inches across; strongly acid.

Solum thickness ranges from 45 to 80 inches. Depth to bedrock ranges from 5 to 8 feet or more. The soil is medium acid or strongly acid throughout, except for the surface layer in limed areas. The content of fragments of quartzite, shale, or siltstone by volume is as much as 15 percent in the A and B horizons and 30 percent in the C horizon.

The A horizon has hue ranging from 10YR to 5YR, value of 4 or 5, and chroma ranging from 3 to 6. Texture is silt loam or loam.

The B1 horizon has hue of 10YR or 7.5YR and chroma of 4 or 6. Texture is loam or clay loam.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 to 8. Texture is silty clay loam, clay loam, or their cobbly counterparts.

The C horizon has the same range of colors and textures as given for the B horizon.

Spivey Series

The Spivey series consists of deep, well drained cobbly soils in high mountain coves. These soils formed in colluvium from soils underlain by feldspathic quartzite, granite, and gneiss. In some areas the surface is covered with many large stones. Slopes range from 20 to 50 percent. Elevation ranges from about 3,000 to 4,800 feet above sea level.

Spivey soils are geographically associated with the Jeffrey, Unaka, and Brookshire soils. Jeffrey and Unaka soils, on adjacent side slopes and ridges, are less than 40 inches deep to bedrock. Brookshire soils, which are in lower lying colluvial areas, have less than 35 percent coarse fragments.

Typical pedon of Spivey cobbly loam, 20 to 50 percent slopes, in a forested area 0.3 mile northeast of Beauty Spot on Unaka Mountain; 300 yards northwest of road:

O2—1 inch to 0; partly decomposed organic matter.

A11—0 to 8 inches; very dark grayish brown (10YR 3/2) cobbly loam; weak fine and medium granular structure; very friable; common fine, medium, and coarse roots; common fine and medium pores; 45 percent by volume fragments of quartzite 1 to 8

inches across and some as large as 2 feet; strongly acid; abrupt smooth boundary.
A12—8 to 12 inches; dark brown (10YR 3/3) cobbly loam; weak fine and medium granular structure; very friable; common fine and medium and few coarse roots; common fine and medium pores; 45 percent by volume fragments of quartzite up to 8 inches in diameter; strongly acid; clear smooth boundary.
B1—12 to 20 inches; dark brown (10YR 4/3) cobbly loam; weak fine subangular blocky structure; friable; common fine and few medium roots; common fine pores; 40 percent by volume fragments of quartzite up to 8 inches in diameter; strongly acid; gradual smooth boundary.
B21—20 to 44 inches; dark yellowish brown (10YR 4/4) cobbly loam; weak medium subangular blocky structure; friable; common fine roots; common fine pores; 40 percent by volume fragments of quartzite up to 8 inches in diameter; very strongly acid; gradual smooth boundary.
B22—44 to 55 inches; dark yellowish brown (10YR 4/4) cobbly loam; weak medium subangular blocky structure; friable; few fine roots; few fine pores; 35 percent by volume fragments of quartzite up to 8 inches in diameter; very strongly acid.
C—55 to 60 inches; dark yellowish brown (10YR 4/4) cobbly loam; massive; friable; 40 percent by volume fragments of quartzite up to 8 inches in diameter; very strongly acid.

Solum thickness ranges from 40 to 60 inches. Depth to hard bedrock ranges from 50 to 75 inches. Reaction is strongly acid or very strongly acid. The content of fragments of quartzite and arkose by volume ranges from 30 to 60 percent throughout the soil. The fragments are commonly 1 to 10 inches in diameter, but in some areas the stones are as much as 3 feet in diameter.

The A horizon ranges from 10 to 15 inches in thickness. It has hue of 10YR, value of 2 or 3, and chroma of 2 or 3. Texture is cobbly loam or very cobbly loam.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma ranging from 3 to 6.

The C horizon has the same range in color as the B horizon.

Tate Series

The Tate series consists of deep, well drained loamy soils on foot slopes, benches, and fans. Elevation ranges from 1,700 to 2,500 feet. Slopes range from 4 to 45 percent.

Tate soils are geographically associated with the Ashe, Ditney, Maymead, and Tusquitee soils. Ashe and Ditney soils, on higher lying convex positions, do not have an argillic horizon and are less than 40 inches deep. Maymead soils, in similar positions at higher elevations, do not have an argillic horizon. Tusquitee soils, in similar positions, have a dark colored surface layer.

Typical pedon of Tate loam, 4 to 12 percent slopes, in a pasture 0.5 mile south of Coffee Ridge up Slip Creek; 50 feet west of road, in field:

Ap—0 to 8 inches; brown (10YR 4/3) loam; moderate medium granular structure; friable; many fine and medium pores; common fine and very fine roots; medium acid; clear smooth boundary.
B1—8 to 15 inches; yellowish brown (10YR 5/4) clay loam; weak medium subangular blocky structure; friable; common fine and medium pores; common fine roots; strongly acid; gradual smooth boundary.
B21t—15 to 25 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few discontinuous clay films on faces of peds; common fine and few medium pores; common fine roots; very strongly acid; gradual smooth boundary.
B22t—25 to 40 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; common discontinuous clay films on faces of peds; common fine and few medium pores; few fine roots; very strongly acid; gradual smooth boundary.
B3—40 to 54 inches; strong brown (7.5YR 5/6) clay loam; weak medium subangular blocky structure; friable; few discontinuous clay films on faces of peds; few fine pores; many small quartz pebbles; few fragments of soft granite; very strongly acid; gradual wavy boundary.
C—54 to 60 inches; saprolite of granite with yellowish brown (10YR 5/6) clay loam in cracks and seams.

Solum thickness ranges from 40 to 60 inches. Depth to hard rock is more than 5 feet. Reaction is strongly acid or very strongly acid throughout, except that the surface layer is less acid in limed areas. The content of fragments of granite, gneiss, arkose, or feldspathic quartzite by volume ranges up to 15 percent in the solum and 30 percent in the C horizon. Flakes of mica range from none to common throughout the profile.

The A horizon has value ranging from 4 to 6 and chroma of 2 or 3. Texture is loam or fine sandy loam.

The B horizon has hue of 10YR, 7.5YR, or 2.5Y; value of 5 or 6; and chroma ranging from 4 to 8. Texture is clay loam, sandy clay loam, or less commonly loam.

The C horizon is granite saprolite or cobbly colluvium with yellowish brown clay loam in cracks and seams.

Toccoa Series

The Toccoa series consists of deep, well drained loamy soils on flood plains. These soils formed in alluvium washed from soils underlain by acid crystalline

rock. Elevation ranges from about 1,640 to 2,800 feet above sea level. Slopes range from 0 to 2 percent.

Toccoa soils are geographically associated with the Tusquitee and Cotaco soils, which are on adjacent terraces. Tusquitee soils are well drained and have an argillic horizon. Cotaco soils are moderately well drained and have an argillic horizon.

Typical pedon of Toccoa loam in a cultivated field 150 yards southeast of the intersection of South Indian Creek and the Nolichucky River:

Ap—0 to 10 inches; brown (10YR 4/3) loam; weak fine granular structure; very friable; few fine roots; common fine flakes of mica; slightly acid; clear smooth boundary.

C1—10 to 21 inches; brown (7.5YR 4/4) sandy loam; weak fine granular structure grading toward massive; very friable; few fine roots; common fine flakes of mica; medium acid; abrupt smooth boundary.

C2—21 to 31 inches; brown (10YR 4/4) loamy sand; single grain; loose; common fine flakes of mica; medium acid; abrupt smooth boundary.

C3—31 to 36 inches; yellowish brown (10YR 5/4) loamy sand; single grain; loose; common fine flakes of mica; medium acid; abrupt smooth boundary.

C4—36 to 75 inches; dark yellowish brown (10YR 4/4) sandy loam; massive; very friable; common fine flakes of mica; medium acid; abrupt smooth boundary.

C5—75 to 82 inches; yellowish brown (10YR 5/4) loamy sand; single grain; loose; common fine flakes of mica; slightly acid.

Depth to stratified loamy sand ranges from 15 to 35 inches. Depth to bedrock ranges from 5 to 10 feet or more. Reaction ranges from slightly acid to strongly acid. Reaction is commonly highest in the C horizon, except where the surface layer is heavily limed. The content of waterworn gravel by volume ranges from 0 to 10 percent in the A horizon and to about 35 percent in the lower C horizon. Flakes of mica range from few to common throughout.

The A horizon has value of 4 or 5 and chroma of 3 or 4. Texture is loam or fine sandy loam.

The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma ranging from 4 to 6. Texture is sandy loam, loamy sand, or their gravelly counterparts. It is stratified, and many areas have very thin lenses of loam or sand.

Toccoa soils in other survey areas have an average annual soil temperature between 59 degrees and 72 degrees F. Because Toccoa soils in this survey area have an average annual soil temperature of about 55 degrees F and are slightly more sandy in the lower part of the control section, they are considered taxadjuncts to the series. These differences, however, do not affect the use and behavior of the soils.

Tusquitee Series

The Tusquitee series consists of deep, well drained loamy soils. These soils formed in colluvium on benches, foot slopes, and low terraces. Elevation ranges from 2,000 to 3,300 feet above sea level. Slopes range from 1 to 25 percent.

Tusquitee soils are geographically associated with the Tate, Unaka, Ashe, and Brookshire soils. Tate and Tusquitee soils are in similar positions, but Tate soils do not have a dark surface horizon. Unaka soils, on higher lying convex positions, have a solum less than 40 inches thick and do not have an argillic horizon. Ashe soils, on adjacent side slopes, have a solum less than 40 inches thick and do not have an argillic horizon. Brookshire soils, which are in similar positions at higher elevations, do not have an argillic horizon.

Typical pedon of Tusquitee loam, 12 to 25 percent slopes, in a pasture 3 miles southwest of Flag Pond on Rice Creek Road; 500 yards south up gravel drive; 175 feet east of drive:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) loam; weak medium granular structure; very friable; common fine and medium pores; common fine and very fine roots; few fine flakes of mica; few fragments of granite up to 4 inches across; medium acid; clear smooth boundary.

B1—8 to 18 inches; dark yellowish brown (10YR 4/4) clay loam; weak fine and medium subangular blocky structure; friable; common fine and few medium pores; common fine roots; common fine flakes of mica; few fragments of granite up to 4 inches across; strongly acid; gradual smooth boundary.

B21t—18 to 39 inches; dark yellowish brown (10YR 4/4) clay loam; weak medium subangular blocky structure; friable; few fine and medium pores; few fine roots; common fine flakes of mica; few fragments of granite up to 4 inches across; thin discontinuous clay films on faces of peds and coarse fragments; strongly acid; gradual smooth boundary.

B22t—39 to 60 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few fine and medium pores; few fine roots; common fine flakes of mica; 10 percent by volume fragments of granite and quartz up to 4 inches across; common fragments of quartz up to 2 inches in diameter; thin discontinuous clay films on faces of peds and coarse fragments; strongly acid.

Solum thickness is greater than 40 inches. Depth to hard rock is more than 6 feet. Reaction is strongly acid throughout, except for the surface layer in limed areas. The content of fragments of quartz, granite, or gneiss by volume ranges from 0 to about 15 percent throughout

the solum. Flakes of mica range from few to common throughout the profile.

The A horizon ranges from 6 to 10 inches in thickness. It has hue of 10YR or 7.5YR, value of 2 or 3, and chroma ranging from 1 to 3. Texture is loam or fine sandy loam.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma ranging from 3 to 6. Texture is clay loam, sandy clay loam, or less commonly loam.

Unaka Series

The Unaka series consists of moderately deep, well drained loamy soils. These soils are on the upper slopes of high mountains underlain by granite, gneiss, or schist. Elevation ranges from 3,600 to nearly 5,000 feet above sea level. These soils have mainly east and north aspects at the lower elevations. Slopes range from 20 to 60 percent.

Unaka soils are geographically associated with the Tusquitee and Ashe soils. Tusquitee soils, in adjacent coves, are more than 40 inches deep to bedrock. Ashe soils, at slightly lower elevations, do not have dark surface layers.

Typical pedon of Unaka loam, 20 to 35 percent slopes, in a forested area near the top of Divide Mountain, 200 yards north of field on abandoned road, 0.3 mile northeast of benchmark "Sugar:"

A11—0 to 3 inches; very dark brown (10YR 2/2) loam; weak medium and fine granular structure; very friable; many fine and medium roots; common fine flakes of mica; few small fragments of granite; strongly acid; clear smooth boundary.

A12—3 to 8 inches; dark brown (10YR 3/3) loam; weak medium granular structure; very friable; many fine and medium roots; common fine flakes of mica; few small fragments of granite; strongly acid; clear smooth boundary.

B1—8 to 12 inches; dark yellowish brown (10YR 4/4) loam; weak medium and fine subangular blocky structure; many fine roots; common fine flakes of mica; few small fragments of granite; strongly acid; clear smooth boundary.

B2—12 to 24 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; common fine roots; common fine flakes of mica; few fragments of granite; strongly acid; clear wavy boundary.

Cr—24 to 32 inches; saprolite of granite that crushes to sandy loam; yellowish brown (10YR 6/4) loam in cracks and seams; strongly acid.

R—32 inches; hard granite bedrock.

Solum thickness ranges from 18 to 36 inches. Depth to hard granite, gneiss, or schist rock ranges from 20 to 40 inches. The content of fragments of granite, gneiss, or schist by volume ranges from about 5 to 20 percent in each layer of the solum. Flakes of finely divided mica range from few to common throughout the soil. Reaction is strongly acid or very strongly acid.

The A horizon ranges from 5 to 9 inches in thickness. It has value of 2 or 3 and chroma of 2 or 3.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6.

The Cr horizon is mainly saprolite of granite or gneiss that crushes to sandy loam. In some pedons the C horizon is loam with a hue of 10YR, value of 4 or 5, and chroma of 4 to 6.

The R layer is hard granite or gneiss bedrock.

Unicoi Variant

The Unicoi Variant consists of shallow, somewhat excessively drained cobbly soils that formed in residuum of feldspathic quartzite rock. These soils are on the top and upper side slopes of Unaka Mountain. Elevation is 4,400 or more feet above sea level. Slopes range from 10 to 50 percent.

Unicoi Variant soils are geographically associated with the Jeffrey and Spivey soils. Jeffrey soils, at lower elevations, are 20 to 40 inches deep to bedrock and contain less than 35 percent coarse fragments. Spivey soils, which are in colluvial positions at lower elevations, have an umbric epipedon and are more than 40 inches deep to bedrock.

Typical pedon of Unicoi Variant cobbly loam, 10 to 50 percent slopes, in a forested area 150 yards east of Pleasant Garden Overlook on Unaka Mountain:

O2—5 inches to 0; black (7.5YR 2/0), decomposed organic material; many fine and medium roots.

A2—0 to 8 inches; gray (10YR 6/1) cobbly loam; few medium distinct brownish yellow (10YR 6/8) mottles; very dark gray (10YR 3/1) and black (7.5YR 2/0) coatings on ped surfaces, in root channels, and other openings; massive with some weak coarse blocky structure; firm; common fine roots mostly between peds and in other weak areas; about 35 percent by volume fragments of feldspathic quartzite up to 8 inches across and a few stones up to 3 feet in diameter; very strongly acid; gradual wavy boundary.

B2—8 to 12 inches; mottled dark reddish brown (5YR 3/3), reddish brown (5YR 4/4), black (7.5YR 2/0), and reddish yellow (7.5YR 6/8) cobbly loam; weak medium subangular blocky and weak medium granular structure; friable; few fine roots mostly between peds and in other weak areas; about 45 percent by volume fragments of feldspathic quartzite up to 8 inches across and a few stones up to 3 feet in diameter; very strongly acid; gradual wavy boundary.

R—12 inches; fractured, hard feldspathic quartzite.

Solum thickness and depth to hard feldspathic quartzite rock range from 10 to 20 inches. Reaction is very strongly acid or extremely acid throughout. The content of fragments of hard feldspathic quartzite by volume ranges from 35 to 50 percent throughout the soil.

The O2 horizon and the O1 horizon, if present, range from 3 to 5 inches in thickness. They have hue of 10YR, 7.5YR, or 5YR; value of 2 to 4; and chroma of 0 or 1. Texture is cobbly loam or cobbly sandy loam.

The A2 horizon has hue of 10YR, 7.5YR, or 5YR; value ranging from 2 to 6; and chroma ranging from 0 to 8. Texture is cobbly loam or cobbly sandy loam.

The B2 horizon has hue of 7.5YR or 5YR, value ranging from 2 to 6, and chroma ranging from 0 to 8. Texture is cobbly loam or cobbly sandy loam.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing

crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a

soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual.* The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified

size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial melt water. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1957-75 at Unicoi, Tennessee]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	48.5	24.2	36.4	70	-8	16	4.05	2.72	5.26	10	8.6
February---	50.5	25.0	37.8	72	-3	30	4.26	2.78	5.59	9	4.5
March------	58.9	31.6	45.3	81	8	90	4.77	3.03	6.33	10	3.9
April------	69.8	40.1	55.0	84	20	168	4.23	2.88	5.45	9	.0
May--------	76.5	47.8	62.1	87	28	375	4.88	3.19	6.40	10	.0
June-------	81.9	54.7	68.3	91	38	549	4.71	2.98	6.27	8	.0
July-------	83.9	58.5	71.2	91	45	657	5.56	3.78	7.18	10	.0
August-----	83.4	58.1	70.8	91	44	645	4.63	3.00	6.11	8	.0
September--	79.3	52.4	65.9	90	32	477	3.66	2.15	4.99	7	.0
October----	70.0	40.3	55.2	83	20	184	3.27	1.65	4.59	6	.0
November---	59.6	32.6	46.1	77	11	28	3.36	2.30	4.33	8	1.1
December---	50.0	26.2	38.1	72	1	22	3.85	1.74	5.57	8	3.2
Yearly:	67.7	41.0	54.4	93	-9	3,241	51.23	45.15	57.12	103	21.3

[1] A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1957-75 at Unicoi, Tennessee]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 22	May 6	May 21
2 years in 10 later than--	April 17	April 30	May 15
5 years in 10 later than--	April 7	April 20	May 5
First freezing temperature in fall:			
1 year in 10 earlier than--	October 18	October 7	September 25
2 years in 10 earlier than--	October 23	October 12	September 30
5 years in 10 earlier than--	October 31	October 22	October 10

TABLE 3.--GROWING SEASON

[Recorded in the period 1957-75 at Unicoi, Tennessee]

Probability	Daily minimum temperature		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	186	167	131
8 years in 10	193	173	140
5 years in 10	206	184	157
2 years in 10	219	195	174
1 year in 10	226	201	183

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AsE	Ashe loam, 20 to 35 percent slopes	930	0.8
AsF	Ashe loam, 35 to 60 percent slopes	14,650	12.4
AvE	Ashe Variant loam, 20 to 45 percent slopes	2,000	1.7
BrE	Brookshire loam, 25 to 35 percent slopes	1,330	1.1
BrF	Brookshire loam, 35 to 50 percent slopes	5,980	5.1
Bu	Buncombe loamy sand	400	0.3
CaD	Calvin shaly silt loam, 10 to 20 percent slopes	220	0.2
CaE	Calvin shaly silt loam, 20 to 45 percent slopes	2,300	1.9
Co	Cotaco loam	370	0.3
DeD	Ditney loam, 10 to 20 percent slopes	300	0.3
DeE	Ditney loam, 20 to 35 percent slopes	900	0.8
DeF	Ditney loam, 35 to 60 percent slopes	37,000	31.3
DnD	Dunmore silt loam, 10 to 20 percent slopes	390	0.3
DrD	Dunmore-Rock outcrop complex, 10 to 20 percent slopes	400	0.3
DrE	Dunmore-Rock outcrop complex, 20 to 35 percent slopes	990	0.8
EvD	Evard loam, 10 to 20 percent slopes	480	0.4
EvE	Evard loam, 20 to 40 percent slopes	930	0.8
JeE	Jeffrey loam, 20 to 35 percent slopes	960	0.8
JeF	Jeffrey loam, 35 to 60 percent slopes	5,130	4.3
MaE	Maymead loam, 15 to 35 percent slopes	1,100	0.9
MaF	Maymead loam, 35 to 50 percent slopes	9,750	8.2
Mv	Maymead Variant very stony loam, 1 to 10 percent slopes	1,900	1.6
Sb	Sensabaugh loam	440	0.4
SeD	Sequoia silt loam, 10 to 20 percent slopes	360	0.3
SeE	Sequoia silt loam, 20 to 35 percent slopes	410	0.3
ShC	Shouns loam, 5 to 12 percent slopes	1,700	1.4
ShD	Shouns loam, 12 to 25 percent slopes	1,500	1.3
ShE	Shouns loam, 25 to 35 percent slopes	890	0.8
SpF	Spivey cobbly loam, 20 to 50 percent slopes	850	0.7
TaC	Tate loam, 4 to 12 percent slopes	3,660	3.1
TaD	Tate loam, 12 to 25 percent slopes	1,890	1.6
TbC	Tate stony loam, 4 to 12 percent slopes	1,560	1.3
TbD	Tate stony loam, 12 to 25 percent slopes	3,150	2.7
TbE	Tate stony loam, 25 to 45 percent slopes	3,010	2.5
To	Toccoa loam	1,410	1.2
TuB	Tusquitee loam, 1 to 4 percent slopes	400	0.3
TuC	Tusquitee loam, 4 to 12 percent slopes	390	0.3
TuD	Tusquitee loam, 12 to 25 percent slopes	1,180	1.0
UDF	Udorthents, 35 to 60 percent slopes	680	0.6
UkE	Unaka loam, 20 to 35 percent slopes	300	0.3
UkF	Unaka loam, 35 to 60 percent slopes	4,700	4.0
UnE	Unicoi Variant cobbly loam, 10 to 50 percent slopes	1,510	1.3
	Total	118,400	100.0

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn	Tobacco	Pasture
	Bu	Lb	AUM*
AsE---- Ashe	---	---	4.0
AsF---- Ashe	---	---	---
AvE---- Ashe Variant	---	---	5.0
BrE---- Brookshire	---	---	7.0
BrF---- Brookshire	---	---	---
Bu**---- Buncombe	60	1,700	4.0
CaD---- Calvin	70	---	6.0
CaE---- Calvin	---	---	---
Co---- Cotaco	110	2,400	6.0
DeD---- Ditney	---	---	3.5
DeE, DeF---- Ditney	---	---	---
DnD---- Dunmore	60	1,700	6.0
DrD, DrE---- Dunmore-Rock outcrop	---	---	4.0
EvD---- Evard	---	---	6.0
EvE---- Evard	---	---	6.0
JeE---- Jeffrey	---	---	4.5
JeF---- Jeffrey	---	---	---
MaE---- Maymead	---	---	5.5
MaF---- Maymead	---	---	---
Mv---- Maymead Variant	---	---	4.0
Sb---- Sensabaugh	120	2,500	7.5

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Tobacco	Pasture
	Bu	Lb	AUM*
SeD, SeE---------- Sequoia	---	---	4.5
ShC---------- Shouns	85	2,300	7.5
ShD---------- Shouns	75	2,100	7.0
ShE---------- Shouns	---	---	6.5
SpF---------- Spivey	---	---	---
TaC---------- Tate	95	2,500	7.0
TaD---------- Tate	---	---	7.0
TbC---------- Tate	95	2,500	5.5
TbD, TbE---------- Tate	---	---	5.0
To---------- Toccoa	90	2,800	6.5
TuB---------- Tusquitee	110	2,800	8.0
TuC---------- Tusquitee	100	2,600	8.0
TuD---------- Tusquitee	---	---	6.0
UDF Udorthents			
UkE---------- Unaka	---	---	5.0
UkF---------- Unaka	---	---	---
UnE---------- Unicoi Variant	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** Yields are for areas protected from flooding.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Fraser fir, Scotch pine, and Norway spruce are Christmas tree species. Dashes indicate that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
AsE---------- Ashe	3r	Slight	Moderate	Moderate	--------	Pitch pine----------	57	Fraser fir, Scotch pine, Norway spruce, shortleaf pine, eastern white pine.
						Shortleaf pine------	56	
						Virginia pine-------	65	
						Eastern white pine--	84	
						Yellow-poplar-------	104	
AsF---------- Ashe	3r	Slight	Severe	Severe	--------	Pitch pine----------	57	Fraser fir, Scotch pine, Norway spruce, shortleaf pine, eastern white pine, yellow-poplar.
						Shortleaf pine------	56	
						Virginia pine-------	65	
						Eastern white pine--	84	
						Yellow-poplar-------	104	
AvE---------- Ashe Variant	2r	Slight	Moderate	Slight	Slight	Eastern white pine--	90	Fraser fir, Scotch pine, Norway spruce, yellow-poplar, shortleaf pine, eastern white pine.
						Shortleaf pine------	80	
						Yellow-poplar-------	100	
BrE, BrF---------- Brookshire	2r	Moderate	Moderate	Slight	Slight	Yellow-poplar-------	100	Fraser fir, Scotch pine, Norway spruce, yellow-poplar, black walnut, eastern white pine, northern red oak.
						Northern red oak----	80	
						Yellow birch--------	---	
						Black cherry--------	---	
Bu---------- Buncombe	2s	Slight	Moderate	Moderate	--------	Eastern cottonwood--	100	Eastern cottonwood, loblolly pine, American sycamore, yellow-poplar.
						American sycamore---	90	
						Sweetgum------------	90	
						Loblolly pine-------	90	
						Yellow-poplar-------	100	
CaD, CaE---------- Calvin	3f	Slight	Moderate	Severe	Slight	Northern red oak----	67	Eastern white pine, loblolly pine, Virginia pine.
						Eastern white pine--	---	
						Virginia pine-------	---	
Co---------- Cotaco	2o	Slight	Slight	Slight	Slight	Northern red oak----	83	Loblolly pine, yellow-poplar, white oak, black walnut, oak, sweetgum.
						Yellow-poplar-------	---	
						Loblolly pine-------	---	
						Virginia pine-------	---	
						Shortleaf pine------	---	
						Black oak-----------	---	
						Black walnut--------	---	
DeD, DeE, DeF------ Ditney	4r	Moderate	Severe	Slight	Slight	Shortleaf pine------	60	Shortleaf pine, Virginia pine, eastern white pine.
						Virginia pine-------	60	
						Northern red oak----	60	
						Eastern white pine--	70	
DnD---------- Dunmore	3o	Slight	Slight	Slight	Slight	Yellow-poplar-------	90	Yellow-poplar, black walnut, shortleaf pine, eastern white pine, loblolly pine.
						White oak-----------	70	
						Southern red oak----	70	
						Shortleaf pine------	70	
						Eastern white pine--	80	
						Virginia pine-------	70	
DrD*, DrE*: Dunmore----------	3r	Moderate	Moderate	Slight	Slight	Yellow-poplar-------	90	Yellow-poplar, black walnut, shortleaf pine, eastern white pine, loblolly pine.
						White oak-----------	70	
						Southern red oak----	70	
						Shortleaf pine------	70	
						Eastern white pine--	80	
						Virginia pine-------	70	
Rock outcrop.								

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
EvD, EvE---------- Evard	3r	Severe	Severe	Slight	Slight	Loblolly pine-------	80	Loblolly pine, shortleaf pine, eastern white pine, yellow-poplar.
						Pitch pine----------	70	
						Shortleaf pine------	70	
						Virginia pine-------	70	
						Eastern white pine--	80	
						Yellow-poplar-------	90	
						White oak----------	---	
						Southern red oak----	---	
JeE, JeF---------- Jeffrey	4r	Moderate	Severe	Moderate	Slight	Eastern white pine--	70	Eastern white pine, yellow-poplar.
						Yellow-poplar-------	80	
						Northern red oak----	60	
MaE, MaF---------- Maymead	2r	Moderate	Moderate	Slight	Slight	Yellow-poplar-------	90	Fraser fir, Scotch pine, Norway spruce, yellow-poplar, black walnut, eastern white pine.
						Northern red oak----	75	
Mv---------- Maymead Variant	2x	Slight	Moderate	Moderate	Slight	Yellow-poplar-------	100	Fraser fir, Scotch pine, Norway spruce, black walnut, yellow-poplar, eastern white pine.
						Northern red oak----	80	
						Eastern white pine--	85	
Sb---------- Sensabaugh	2o	Slight	Slight	Slight	Slight	Yellow-poplar-------	100	Yellow-poplar, black walnut, loblolly pine.
						White oak----------	80	
						Shortleaf pine------	80	
						Virginia pine-------	75	
SeD---------- Sequoia	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Loblolly pine, shortleaf pine, Virginia pine.
						Loblolly pine-------	83	
						Shortleaf pine------	63	
						Virginia pine-------	71	
SeE---------- Sequoia	3r	Moderate	Moderate	Slight	Slight	Northern red oak----	70	Loblolly pine, shortleaf pine, Virginia pine.
						Loblolly pine-------	83	
						Shortleaf pine------	63	
						Virginia pine-------	71	
ShC, ShD---------- Shouns	3o	Slight	Slight	Slight	Slight	Yellow-poplar-------	90	Yellow-poplar, shortleaf pine, loblolly pine, eastern white pine, black walnut.
						Shortleaf pine------	70	
						Loblolly pine-------	80	
						Virginia pine-------	70	
						Eastern white pine--	80	
						Black walnut--------	---	
						Northern red oak----	80	
ShE---------- Shouns	3r	Moderate	Moderate	Moderate	Slight	Northern red oak----	80	Yellow-poplar, eastern white pine, loblolly pine, shortleaf pine, black walnut.
						Yellow-poplar-------	90	
						Shortleaf pine------	70	
						Loblolly pine-------	80	
						Virginia pine-------	70	
						Eastern white pine--	80	
						Black walnut--------	---	
SpF---------- Spivey	2x	Moderate	Severe	Moderate	Moderate	Yellow-poplar-------	100	Fraser fir, Scotch pine, Norway spruce, yellow-poplar, eastern white pine.
						Northern red oak----	80	
						Eastern white pine--	90	
TaC---------- Tate	2o	Slight	Slight	Slight	--------	Loblolly pine-------	90	Fraser fir, Scotch pine, Norway spruce, northern red oak, shortleaf pine, eastern white pine, black walnut, yellow-poplar.
						Shortleaf pine------	75	
						Virginia pine-------	80	
						Eastern white pine--	90	
						Northern red oak----	80	
						Yellow-poplar-------	95	

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
TaD---------- Tate	2r	Moderate	Moderate	Slight	--------	Loblolly pine--------- Shortleaf pine-------- Virginia pine--------- Eastern white pine--- Northern red oak----- Yellow-poplar---------	90 75 80 90 80 95	Fraser fir, Scotch pine, Norway spruce, northern red oak, shortleaf pine, eastern white pine, black walnut, yellow-poplar.
TbC, TbD, TbE------ Tate	2x	Moderate	Moderate	Slight	--------	Loblolly pine--------- Shortleaf pine-------- Virginia pine--------- Eastern white pine--- Northern red oak----- Yellow-poplar---------	90 75 80 90 80 95	Fraser fir, Scotch pine, Norway spruce, northern red oak, shortleaf pine, eastern white pine, black walnut, yellow-poplar.
To---------- Toccoa	1o	Slight	Slight	Slight	Slight	Loblolly pine--------- Yellow-poplar--------- Sweetgum------------ Southern red oak-----	90 107 100 ---	Loblolly pine, yellow-poplar, American sycamore, cherrybark oak.
TuB, TuC---------- Tusquitee	2o	Slight	Slight	Slight	--------	Shortleaf pine-------- Eastern white pine--- Northern red oak----- Yellow-poplar--------- White oak------------ Hickory------------- Black locust--------- Black walnut---------	75 90 80 95 --- --- --- ---	Fraser fir, Scotch pine, Norway spruce, northern red oak, eastern white pine, black walnut, yellow-poplar.
TuD---------- Tusquitee	2r	Moderate	Moderate	Slight	--------	Shortleaf pine-------- Eastern white pine--- Northern red oak----- Yellow-poplar--------- White oak------------ Hickory------------- Black locust--------- Black walnut---------	75 90 80 95 --- --- --- ---	Fraser fir, Scotch pine, Norway spruce, northern red oak, eastern white pine, black walnut, yellow-poplar.
UkE---------- Unaka	3r	Moderate	Severe	Moderate	Slight	Shortleaf pine-------- Virginia pine--------- Eastern white pine--- Northern red oak----- Yellow-poplar---------	70 80 90 75 100	Fraser fir, Scotch pine, Norway spruce, eastern white pine, black walnut, yellow-poplar.
UkF---------- Unaka	3r	Moderate	Severe	Severe	Slight	Shortleaf pine-------- Virginia pine--------- Eastern white pine--- Northern red oak----- Yellow-poplar---------	70 80 90 75 100	Fraser fir, Scotch pine, Norway spruce, eastern white pine, black walnut, yellow-poplar.
UnE---------- Unicoi Variant	5x	Slight	Severe	Severe	Moderate	Red spruce---------- Hemlock------------- Yellow birch---------	--- --- ---	Red spruce.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
AsE---------- Ashe	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
AsF---------- Ashe	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
AvE---------- Ashe Variant	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BrE, BrF---------- Brookshire	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Bu---------- Buncombe	Severe: floods.	Moderate: too sandy, floods.	Severe: floods.	Moderate: too sandy, floods.
CaD---------- Calvin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
CaE---------- Calvin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Co---------- Cotaco	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.
DeD---------- Ditney	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
DeE, DeF---------- Ditney	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
DnD---------- Dunmore	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
DrD*, DrE*: Dunmore----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.				
EvD---------- Evard	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
EvE---------- Evard	Severe. slope.	Severe: slope.	Severe: slope.	Moderate: slope.
JeE, JeF---------- Jeffrey	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
MaE, MaF---------- Maymead	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Mv---------- Maymead Variant	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Severe: large stones.
Sb---------- Sensabaugh	Severe: flooding.	Slight----------	Moderate: slope, small stones.	Slight.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
SeD---------- Sequoia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.
SeE---------- Sequoia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.
ShC---------- Shouns	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
ShD---------- Shouns	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
ShE---------- Shouns	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
SpF---------- Spivey	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
TaC---------- Tate	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
TaD---------- Tate	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
TbC---------- Tate	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
TbD---------- Tate	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
TbE---------- Tate	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
To---------- Toccoa	Severe: flooding.	Slight----------	Moderate: flooding.	Slight.
TuB---------- Tusquitee	Slight----------	Slight----------	Severe: slope.	Slight.
TuC---------- Tusquitee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
TuD---------- Tusquitee	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
UDF*. Udorthents				
UkE, UkF---------- Unaka	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
UnE---------- Unicoi Variant	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: large stones, slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor"]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AsE---Ashe	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
AsF---Ashe	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
AvE---Ashe Variant	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BrE, BrF---Brookshire	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Bu---Buncombe	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
CaD---Calvin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CaE---Calvin	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Co---Cotaco	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
DeD---Ditney	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
DeE, DeF---Ditney	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
DnD---Dunmore	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
DrD*, DrE*: Dunmore	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
EvD---Evard	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EvE---Evard	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
JeE, JeF---Jeffrey	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
MaE, MaF---Maymead	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Mv---Maymead Variant	Very poor.	Poor	Good	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
Sb---Sensabaugh	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
SeD, SeE---Sequoia	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ShC---Shouns	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
ShD---- Shouns	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ShE---- Shouns	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SpF---- Spivey	Very poor.	Very poor.	Fair	Good	Poor	Very poor.	Very poor.	Poor	Fair	Very poor.
TaC---- Tate	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TaD---- Tate	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
TbC---- Tate	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TbD---- Tate	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
TbE---- Tate	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
To---- Toccoa	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TuB---- Tusquitee	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TuC---- Tusquitee	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TuD---- Tusquitee	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
UDF*. Udorthents										
UkE---- Unaka	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
UkF---- Unaka	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
UnE---- Unicoi Variant	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
AsE, AsF---------- Ashe	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.
AvE---------- Ashe Variant	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BrE, BrF---------- Brookshire	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Bu---------- Buncombe	Severe: cutbanks cave.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
CaD, CaE---------- Calvin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Co---------- Cotaco	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
DeD, DeE, DeF----- Ditney	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
DnD---------- Dunmore	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
DrD*, DrE*: Dunmore----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
Rock outcrop.					
EvD---------- Evard	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
EvE---------- Evard	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
JeE, JeF---------- Jeffrey	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
MaE, MaF---------- Maymead	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Mv---------- Maymead Variant	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Moderate: large stones.
Sb---------- Sensabaugh	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
SeD, SeE---------- Sequoia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
ShC---------- Shouns	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.
ShD, ShE---------- Shouns	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
SpF---------- Spivey	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
TaC---------- Tate	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
TaD---------- Tate	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
TbC---------- Tate	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
TbD, TbE---------- Tate	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
To---------- Toccoa	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
TuB---------- Tusquitee	Slight----------	Slight----------	Slight----------	Moderate: slope.	Slight.
TuC---------- Tusquitee	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
TuD---------- Tusquitee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
UDF*. Udorthents					
UkE, UkF---------- Unaka	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
UnE---------- Unicoi Variant	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AsE, AsF Ashe	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope.
AvE Ashe Variant	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: area reclaim, slope.
BrE, BrF Brookshire	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: slope.	Severe: seepage, slope.	Poor: small stones, slope.
Bu Buncombe	Severe: poor filter, floods.	Severe: seepage.	Severe: seepage, floods, too sandy.	Severe: seepage, floods.	Poor: seepage, too sandy.
CaD, CaE Calvin	Severe: depth to rock, slope.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Co Cotaco	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: small stones, wetness.
DeD, DeE, DeF Ditney	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope, thin layer.
DnD Dunmore	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
DrD*, DrE*: Dunmore	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Rock outcrop.					
EvD Evard	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Moderate: slope.
EvE Evard	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
JeE, JeF Jeffrey	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope, thin layer.
MaE, MaF Maymead	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Mv Maymead Variant	Severe: large stones.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: large stones.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Sb Sensabaugh	Moderate: flooding, wetness, percs slowly.	Severe: seepage, flooding.	Severe: seepage, wetness.	Severe: seepage.	Poor: small stones.
SeD Sequoia	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: slope.	Poor: area reclaim, too clayey, hard to pack.
SeE Sequoia	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: area reclaim, too clayey, hard to pack.
ShC Shouns	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
ShD, ShE Shouns	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
SpF Spivey	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
TaC Tate	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Moderate: slope.	Fair: slope.
TaD Tate	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: slope.
TbC Tate	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Moderate: slope.	Fair: slope.
TbD, TbE Tate	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: slope.
To Toccoa	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Good.
TuB Tusquitee	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
TuC Tusquitee	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: slope.
TuD Tusquitee	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope, seepage.	Poor: slope.
UDF*. Udorthents					
UkE, UkF Unaka	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
UnE---------- Unicoi Variant	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: seepage, depth to rock, slope.	Poor: area reclaim, small stones, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable"]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AsE Ashe	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
AsF Ashe	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
AvE Ashe Variant	Severe: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
BrE, BrF Brookshire	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Bu Buncombe	Good	Probable	Improbable: too sandy.	Fair: too sandy.
CaD Calvin	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CaE Calvin	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Co Cotaco	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
DeD Ditney	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
DeE, DeF Ditney	Poor: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
DnD Dunmore	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
DrD*, DrE*: Dunmore	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Rock outcrop.				
EvD Evard	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
EvE Evard	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
JeE, JeF Jeffrey	Poor: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
MaE, MaF---------- Maymead	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Mv---------- Maymead Variant	Fair: large stones, low strength.	Poor: large stones.	Fair: large stones.	Poor: large stones.
Sb---------- Sensabaugh	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
SeD---------- Sequoia	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
SeE---------- Sequoia	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
ShC---------- Shouns	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
ShD---------- Shouns	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
ShE---------- Shouns	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
SpF---------- Spivey	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
TaC---------- Tate	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, slope.
TaD---------- Tate	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
TbC---------- Tate	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, large stones, slope.
TbD---------- Tate	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
TbE---------- Tate	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
To---------- Toccoa	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
TuB, TuC---------- Tusquitee	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
TuD---------- Tusquitee	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
UDF*. Udorthents				
UkE, UkF Unaka	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
UnE Unicoi Variant	Poor: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, thin layer.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
AsE, AsF---------- Ashe	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope.
AvE---------- Ashe Variant	Severe: seepage, slope.	Moderate: seepage, thin layer.	Severe: no water.	Slope, deep to water.	Slope----------	Slope.
BrE, BrF---------- Brookshire	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope, droughty.
Bu---------- Buncombe	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water, floods.	Too sandy------	Droughty.
CaD, CaE---------- Calvin	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Co---------- Cotaco	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Slope----------	Erodes easily, wetness.	Erodes easily.
DeD---------- Ditney	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
DeE, DeF---------- Ditney	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
DnD---------- Dunmore	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
DrD*, DrE*: Dunmore----------	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
Rock outcrop.						
EvD---------- Evard	Slight---------	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
EvE---------- Evard	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
JeE, JeF---------- Jeffrey	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
MaE, MaF---------- Maymead	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope.
Mv---------- Maymead Variant	Severe: seepage.	Severe: large stones.	Severe: no water.	Deep to water	Large stones---	Large stones, droughty.
Sb---------- Sensabaugh	Severe: seepage.	Moderate: large stones.	Moderate: deep to water, slow refill.	Deep to water	Large stones---	Large stones.
SeD---------- Sequoia	Moderate: depth to rock.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
SeE---------- Sequoia	Moderate: depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
ShC, ShD---------- Shouns	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
ShE---------- Shouns	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
SpF---------- Spivey	Severe: seepage, slope.	Moderate: seepage, piping, large stones.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
TaC, TaD, TbC, TbD---------- Tate	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
TbE---------- Tate	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
To---------- Toccoa	Severe: seepage.	Severe: piping.	Moderate: deep to water.	Flooding-------	Favorable------	Favorable.
TuB---------- Tusquitee	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
TuC, TuD---------- Tusquitee	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
UDF*. Udorthents						
UkE, UkF---------- Unaka	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope, depth to rock.
UnE---------- Unicoi Variant	Severe: seepage, depth to rock, slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AsE, AsF--------- Ashe	0-5	Loam----------	SM, SM-SC, ML, CL-ML	A-4	0-5	90-100	85-100	65-95	40-55	<25	NP-7
	5-26	Loam, sandy loam, fine sandy loam.	SM, SM-SC	A-4	5-15	85-100	80-95	60-95	35-45	<25	NP-7
	26-32	Sandy loam-------	SM	A-2, A-4	15-35	75-95	70-95	55-95	30-45	---	NP
AvE----------	0-12	Loam----------	SM, SM-SC	A-4	0-5	90-100	85-100	65-95	40-55	<25	NP-7
Ashe Variant	12-30	Loam----------	SM, SM-SC	A-4	5-15	85-100	80-95	60-95	35-45	<25	NP-7
	30-50	Sandy loam-------	SM	A-2, A-4	15-35	75-95	70-95	55-95	30-45	---	NP
BrE, BrF--------- Brookshire	0-52	Loam, gravelly loam.	ML, CL, GC, GM	A-4, A-2	0-5	85-95	75-95	45-75	35-65	<30	3-10
Bu----------	0-4	Loamy sand-------	SM	A-2, A-3	0	98-100	98-100	90-97	7-32	---	NP
Buncombe	4-65	Loamy sand, sand	SM, SP-SM	A-2, A-3	0	98-100	98-100	98-100	7-32	---	NP
CaD, CaE--------- Calvin	0-5	Shaly silt loam	ML, CL	A-4	0-15	70-95	70-90	65-90	55-75	---	---
	5-25	Shaly silt loam, channery loam, very shaly clay loam.	ML, SM, GM	A-2, A-4, A-6	0-15	70-95	55-90	40-90	30-75	22-38	NP-11
	25-35	Shaly silt loam, very shaly silt loam, very channery loam.	GM, SM, SC, GC	A-2, A-1, A-4, A-6	0-20	35-75	30-65	15-60	15-40	23-39	3-13
	35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Co----------	0-10	Loam----------	ML, CL-ML, SM, SM-SC	A-4	0-5	80-100	75-95	55-85	35-80	<30	NP-7
Cotaco	10-34	Gravelly sandy clay loam, clay loam, loam.	SC, SM, GC, CL	A-2, A-4, A-6, A-1-B	0-10	60-100	50-95	40-70	20-70	<35	NP-15
DeD, DeE, DeF---- Ditney	0-21	Loam----------	ML, CL-ML, SM-SC, SM	A-4, A-2-4	2-15	95-100	90-100	65-80	30-60	<30	NP-10
	21-26	Loam, sandy loam, cobbly loam.	ML, CL-ML, SM-SC, SM	A-4, A-2-4	10-30	65-100	60-100	45-75	25-60	<30	NP-10
DnD----------	0-8	Silt loam--------	CL-ML, CL, ML	A-4, A-6	0-5	80-100	75-90	65-80	60-75	18-30	3-11
Dunmore	8-65	Clay, silty clay	MH, CH	A-7	0-5	85-100	75-95	70-95	65-95	50-70	20-36
DrD*, DrE*:											
Dunmore---------	0-8	Silt loam--------	CL-ML, CL, ML	A-4, A-6	0-5	80-100	75-90	65-80	60-75	18-30	3-11
	8-65	Clay, silty clay	MH, CH	A-7	0-5	85-100	75-95	70-95	65-95	50-70	20-36
Rock outcrop.											
EvD, EvE--------- Evard	0-5	Loam----------	SM	A-2, A-4	0-5	80-100	75-100	65-90	20-50	<28	NP-7
	5-39	Sandy clay loam, clay loam.	SM, SC, ML, CL	A-2, A-4, A-6	0-2	90-100	85-100	60-95	30-60	25-40	7-14
	39-60	Sandy loam, loam, sandy clay loam.	SM, SC, ML, CL	A-2, A-4	0-5	80-100	75-100	60-95	20-55	<25	NP-9
	60-72	Sandy loam, loam, loamy sand.	SM	A-2, A-4	0-15	75-100	70-95	60-90	15-50	<30	NP
JeE, JeF--------- Jeffrey	0-30	Loam----------	ML, SM	A-4	2-15	80-90	70-85	65-80	40-60	<30	NP-7
	30-36	Cobbly sandy loam, cobbly loam.	ML, SM, GM	A-4, A-2	5-20	65-90	55-85	45-75	30-60	<30	NP-7

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
MaE, MaF----------	0-5	Loam----------	ML, CL-ML	A-4	0-3	80-95	75-90	65-80	50-60	<25	NP-7
Maymead	5-62	Gravelly loam, cobbly loam, cobbly and loam.	CL-ML, CL, SM, GM	A-4, A-2	10-25	70-90	65-85	55-70	34-55	20-28	3-9
Mv----------	0-44	Very stony loam	CL-ML, CL	A-4, A-6	30-65	70-95	65-85	55-80	50-70	20-33	5-14
Maymead Variant											
	44-60	Very stony loamy sand.	SM, SM-SC	A-1, A-2	30-80	70-95	60-90	35-65	12-30	<20	NP
Sb----------	0-20	Loam----------	CL-ML, CL, ML	A-4	0-5	90-100	75-95	65-85	55-75	<29	3-9
Sensabaugh	20-36	Gravelly loam, gravelly clay loam, gravelly silty clay loam.	SM-SC, SC, GM-GC, GC	A-4, A-6	5-25	70-90	55-75	45-65	35-55	22-36	6-15
	36-60	Gravelly loam, gravelly clay loam, gravelly fine sandy loam.	SM-SC, SC, GM-GC, GC	A-4, A-6, A-2	5-30	55-90	25-75	25-65	20-55	20-36	6-15
SeD, SeE----------	0-6	Silt loam--------	CL, CL-ML	A-4, A-6	0	95-100	95-100	85-100	80-95	23-35	5-15
Sequoia	6-30	Silty clay, clay, shaly silty clay.	CL, MH, CH	A-7	0	70-100	65-100	60-100	55-95	43-74	20-40
	30-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
ShC, ShD, ShE----	0-6	Loam----------	ML, CL, CL-ML	A-4, A-6	0	80-100	75-100	65-95	55-90	<30	3-12
Shouns	6-52	Silty clay loam, clay loam.	CL, ML	A-4, A-6	0	80-100	75-100	70-95	60-90	25-40	8-17
	52-75	Silty clay loam, clay loam, cobbly clay loam.	CL, ML	A-6, A-4, A-7	10-25	75-100	65-90	60-85	50-75	30-45	10-20
SpF----------	0-60	Cobbly loam------	GM, GC, SM, GM-GC	A-2, A-4	15-30	45-75	40-70	35-50	25-40	<28	2-10
Spivey											
TaC, TaD----------	0-8	Loam----------	CL, ML, SM, SC	A-4, A-6	0-5	96-100	86-98	68-98	40-80	<38	NP-13
Tate	8-54	Clay loam, sandy clay loam, loam.	CL, ML, CL-ML	A-4, A-6	5-15	94-100	87-100	75-99	40-85	20-40	2-12
	54-60	Gravelly fine sandy loam.	GM, GM-GC	A-4, A-2-4	15-35	40-75	40-65	35-60	30-50	<25	NP-7
TbC, TbD, TbE----	0-5	Stony loam-------	CL, ML, SM, SC	A-4, A-6	10-20	96-100	86-98	68-98	40-80	<38	NP-13
Tate	5-56	Cobbly clay loam, cobbly loam.	CL, ML, CL-ML	A-4, A-6	5-15	94-100	87-100	75-99	40-85	20-40	2-12
	56-62	Cobbly sandy loam.	GM, GM-GC	A-4, A-2-4	15-35	40-75	40-65	35-60	30-50	<25	NP-7
To----------	0-10	Loam----------	SM, ML	A-2, A-4	0	98-100	95-100	85-100	25-60	<30	NP-4
Toccoa	10-82	Sandy loam, loam	SM, ML	A-2, A-4	0	95-100	90-100	60-100	30-55	<30	NP-4
TuB, TuC, TuD----	0-8	Loam----------	ML, MH, SM	A-5, A-7	2-10	90-100	80-100	65-95	40-75	40-55	5-15
Tusquitee	8-42	Clay loam, sandy clay loam, loam.	ML, CL-ML, SM-SC, SM	A-4, A-6	2-15	90-100	75-100	65-95	36-75	25-40	4-12
	42-60	Gravelly sandy loam, gravelly fine sandy loam.	GM, SM-SC, SM, GM-GC	A-4, A-1, A-2	15-50	45-90	40-85	30-75	13-50	<25	NP-7
UDF*.											
Udorthents											

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
UkE, UkF--------- Unaka	0-8	Loam-----------	ML, CL-ML CL-ML	A-4	2-15	85-95	70-90	65-80	40-65	<30	NP-7
	8-24	Loam, cobbly loam.	ML, SM, CL-ML	A-4	2-20	85-95	70-90	65-80	40-65	<30	NP-7
	24-32	Weathered bedrock	---	---	---	---	---	---	---	---	---
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
UnE--------- Unicoi Variant	0-12	Cobbly loam------	GM, GM-GC, SM, SM-SC	A-2, A-1-B	20-50	60-75	40-65	30-50	20-35	<25	NP-6

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol > means more than. Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
AsE, AsF--------- Ashe	0-5 5-26 26-32	2.0-6.0 2.0-6.0 2.0-6.0	0.13-0.18 0.10-0.14 0.08-0.12	4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Low---------- Low----------	0.17 0.17 0.24	2
AvE-------------- Ashe Variant	0-12 12-30 30-50	2.0-6.0 2.0-6.0 2.0-6.0	0.13-0.18 0.10-0.18 0.08-0.12	4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Low---------- Low----------	0.17 0.17 0.24	3
BrE, BrF--------- Brookshire	0-52	2.0-20	0.08-0.14	5.1-5.5	Low----------	0.15	4
Bu--------------- Buncombe	0-4 4-65	>6.0 >6.0	0.06-0.10 0.03-0.07	6.1-6.5 4.5-6.0	Low---------- Low----------	0.10 0.10	5
CaD, CaE--------- Calvin	0-5 5-25 25-35 35	2.0-6.0 2.0-6.0 2.0-6.0 ---	0.10-0.16 0.08-0.16 0.06-0.10 ---	4.5-6.0 4.5-6.0 4.5-6.0 ---	Low---------- Low---------- Low---------- ----------	0.20 0.20 0.20 ----	3-2
Co--------------- Cotaco	0-10 10-34	0.6-6.0 0.6-2.0	0.12-0.20 0.07-0.15	3.6-5.5 3.6-5.5	Low---------- Low----------	0.37 0.28	3
DeD, DeE, DeF---- Ditney	0-21 21-26	2.0-6.0 2.0-6.0	0.10-0.13 0.05-0.10	4.5-5.5 4.5-5.5	Low---------- Low----------	0.17 0.17	2
DnD-------------- Dunmore	0-8 8-65	0.6-2.0 0.6-2.0	0.17-0.20 0.12-0.17	4.5-6.0 4.5-5.5	Low---------- Moderate-------	0.32 0.20	5
DrD*, DrE*: Dunmore--------- Rock outcrop.	0-8 8-65	0.6-2.0 0.6-2.0	0.17-0.20 0.12-0.17	4.5-6.0 4.5-5.5	Low---------- Moderate-------	0.32 0.20	5
EvD, EvE--------- Evard	0-5 5-39 39-60 60-72	2.0-6.0 0.6-2.0 0.6-2.0 0.6-2.0	0.10-0.14 0.12-0.16 0.10-0.14 0.08-0.12	4.5-6.0 4.5-5.5 4.5-5.5 4.5-6.0	Low---------- Low---------- Low---------- Low----------	0.20 0.24 0.24 0.24	4
JeE, JeF--------- Jeffrey	0-30 30-36	0.6-6.0 0.6-6.0	0.10-0.15 0.07-0.13	4.5-5.5 4.5-5.5	Low---------- Low----------	0.17 0.17	2
MaE, MaF--------- Maymead	0-5 5-62	2.0-6.0 2.0-6.0	0.15-0.18 0.10-0.15	4.5-5.5 4.5-5.5	Low---------- Low----------	0.17 0.17	4
Mv--------------- Maymead Variant	0-44 44-60	2.0-6.0 6.0-20	0.06-0.10 0.02-0.06	4.5-5.5 4.5-5.5	Low---------- Low----------	0.28 0.24	4
Sb--------------- Sensabaugh	0-20 20-36 36-60	0.6-6.0 0.6-6.0 0.6-6.0	0.12-0.18 0.10-0.15 0.08-0.14	5.6-7.8 5.6-7.8 5.6-7.8	Low---------- Low---------- Low----------	0.20 0.20 0.20	5
SeD, SeE--------- Sequoia	0-6 6-30 30-60	0.6-2.0 0.2-0.6 ---	0.17-0.20 0.08-0.16 ---	4.5-5.5 4.5-5.5 ---	Low---------- Moderate------- ----------	0.37 0.24 ----	3
ShC, ShD, ShE---- Shouns	0-6 6-52 52-75	0.6-2.0 0.6-2.0 0.6-2.0	0.13-0.20 0.12-0.18 0.09-0.15	5.1-6.0 5.1-6.0 5.1-6.0	Low---------- Low---------- Low----------	0.24 0.28 0.28	5

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
SpF---------- Spivey	0-60	0.6-6.0	0.06-0.11	4.5-5.5	Low----------	0.17	4
TaC, TaD---------- Tate	0-8	2.0-6.0	0.17-0.19	5.1-6.0	Low----------	0.24	4
	8-54	0.6-2.0	0.17-0.19	5.1-6.0	Low----------	0.28	
	54-60	2.0-6.0	0.08-0.14	5.1-5.5	Low----------	0.17	
TbC, TbD, TbE---- Tate	0-5	2.0-6.0	0.17-0.19	5.1-6.0	Low----------	0.24	4
	5-56	0.6-2.0	0.17-0.19	5.1-6.0	Low----------	0.28	
	56-62	2.0-6.0	0.08-0.14	5.1-5.5	Low----------	0.17	
To---------- Toccoa	0-10	2.0-6.0	0.09-0.12	5.1-6.5	Low----------	0.10	4
	10-82	2.0-6.0	0.09-0.12	5.1-6.5	Low----------	0.10	
TuB, TuC, TuD---- Tusquitee	0-8	2.0-6.0	0.11-0.22	5.1-6.0	Low----------	0.17	4
	8-42	0.6-2.0	0.15-0.21	5.1-6.0	Low----------	0.20	
	42-60	2.0-6.0	0.08-0.14	5.1-6.0	Low----------	0.20	
UDF*. Udorthents							
UkE, UkF---------- Unaka	0-8	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.17	2
	8-24	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.17	
	24-32	---	---	---	----------	----	
	32	---	---	---	----------	----	
UnE---------- Unicoi Variant	0-12	2.0-6.0	0.06-0.11	4.5-5.5	Low----------	0.20	1

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," and "apparent" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
AsE, AsF---------- Ashe	B	None----------	---	---	>6.0	---	---
AvE---------- Ashe Variant	B	None----------	---	---	>6.0	---	---
BrE, BrF---------- Brookshire	C	None----------	---	---	>6.0	---	---
Bu---------- Buncombe	A	Frequent--------	Very brief----	Dec-Mar	>6.0	---	---
CaD, CaE---------- Calvin	C	None----------	---	---	>6.0	---	---
Co---------- Cotaco	C	None----------	---	---	1.5-2.5	Apparent	Nov-May
DeD, DeE, DeF---------- Ditney	C	None----------	---	---	>6.0	---	---
DnD---------- Dunmore	B	None----------	---	---	>6.0	---	---
DrD*, DrE*: Dunmore----------	B	None----------	---	---	>6.0	---	---
Rock outcrop.							
EvD, EvE---------- Evard	B	None----------	---	---	>6.0	---	---
JeE, JeF---------- Jeffrey	B	None----------	---	---	>6.0	---	---
MaE, MaF---------- Maymead	B	None----------	---	---	>6.0	---	---
Mv---------- Maymead Variant	A	None----------	---	---	>6.0	---	---
Sb---------- Sensabaugh	B	Rare----------	---	---	4.0-6.0	Apparent	Jan-Apr
SeD, SeE---------- Sequoia	C	None----------	---	---	>6.0	---	---
ShC, ShD, ShE---------- Shouns	B	None----------	---	---	>6.0	---	---
SpF---------- Spivey	B	None----------	---	---	>6.0	---	---
TaC, TaD, TbC, TbD, TbE- Tate	B	None----------	---	---	>6.0	---	---
To---------- Toccoa	B	Occasional------	Brief---------	Jan-Dec	2.5-5.0	Apparent	Dec-Apr
TuB, TuC, TuD---------- Tusquitee	B	None----------	---	---	>6.0	---	---

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
UDF* Udorthents							
UkE, UkF---------- Unaka	B	None----------	---	---	>6.0	---	---
UnE---------- Unicoi Variant	D	None----------	---	---	>6.0	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL FEATURES

[The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
AsE, AsF---- Ashe	20-40	Hard	Moderate----	Low----	High.
AvE---- Ashe Variant	40-60	Soft	Moderate----	Low----	High.
BrE, BrF---- Brookshire	>60	---	Moderate----	Low----	Moderate.
Bu---- Buncombe	>60	---	Low----	Low----	Moderate.
CaD, CaE---- Calvin	20-40	Soft	Moderate----	Low----	Moderate.
Co---- Cotaco	>60	---	Moderate----	Moderate----	High.
DeD, DeE, DeF---- Ditney	20-40	Hard	Moderate----	Low----	Moderate.
DnD---- Dunmore	>60	---	Moderate----	High----	Moderate.
DrD*, DrE*: Dunmore----	>60	---	Moderate----	High----	Moderate.
Rock outcrop.					
EvD, EvE---- Evard	>60	---	Moderate----	Moderate----	High.
JeE, JeF---- Jeffrey	20-40	Hard	Moderate----	Low----	Moderate.
MaE, MaF---- Maymead	>40	Hard	Moderate----	Low----	Moderate.
Mv---- Maymead Variant	>60	---	Moderate----	Low----	High.
Sb---- Sensabaugh	>60	---	Moderate----	Low----	Low.
SeD, SeE---- Sequoia	20-40	Soft	Moderate----	High----	Moderate.
ShC, ShD, ShE---- Shouns	>60	---	Moderate----	Moderate----	Moderate.
SpF---- Spivey	50-75	Hard	Moderate----	Low----	Moderate.
TaC, TaD, TbC, TbD, TbE Tate	>60	---	Moderate----	Moderate----	Moderate.
To---- Toccoa	>60	---	Moderate----	Low----	Moderate.
TuB, TuC, TuD---- Tusquitee	>60	---	Moderate----	Moderate----	Moderate.
UDF*. Udorthents					

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
UkE, UkF---------- Unaka	20-40	Hard	Moderate----------	Low----------	Moderate.
UnE---------- Unicoi Variant	7-20	Hard	Moderate----------	Low----------	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Ashe	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Ashe Variant	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Brookshire	Coarse-loamy, mixed, mesic Umbric Dystrochrepts
*Buncombe	Mixed, thermic Typic Udipsamments
Calvin	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Cotaco	Fine-loamy, mixed, mesic Aquic Hapludults
Ditney	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Dunmore	Clayey, kaolinitic, mesic Typic Paleudults
Evard	Fine-loamy, oxidic, mesic Typic Hapludults
Jeffrey	Coarse-loamy, mixed, mesic Umbric Dystrochrepts
Maymead	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Maymead Variant	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Sensabaugh	Fine-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
Sequoia	Clayey, mixed, mesic Typic Hapludults
Shouns	Fine-loamy, mixed, mesic Typic Hapludults
Spivey	Loamy-skeletal, mixed, mesic Typic Haplumbrepts
Tate	Fine-loamy, mixed, mesic Typic Hapludults
*Toccoa	Coarse-loamy, mixed, nonacid, thermic Typic Udifluvents
Tusquitee	Fine-loamy, mixed, mesic Humic Hapludults
Unaka	Coarse-loamy, mixed, mesic Umbric Dystrochrepts
Unicoi Variant	Loamy-skeletal, mixed, frigid Lithic Dystrochrepts

* A taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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