United States Department of Agriculture

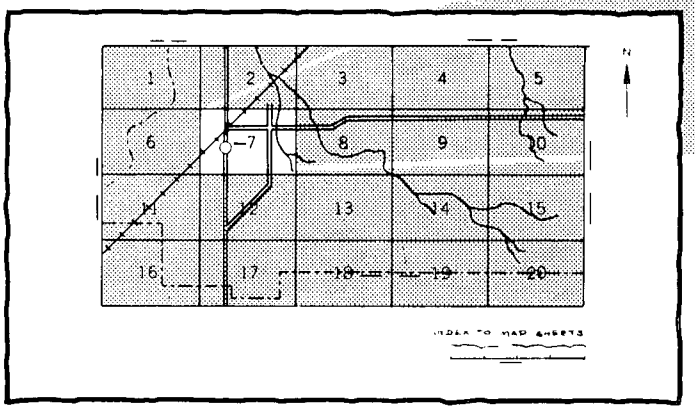
Soil Conservation Service

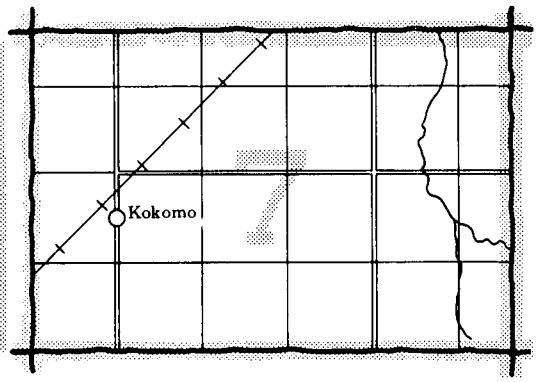
In cooperation with Virginia Polytechnic Institute and State University

Soil Survey of Greene County, Virginia

HOW TO USE

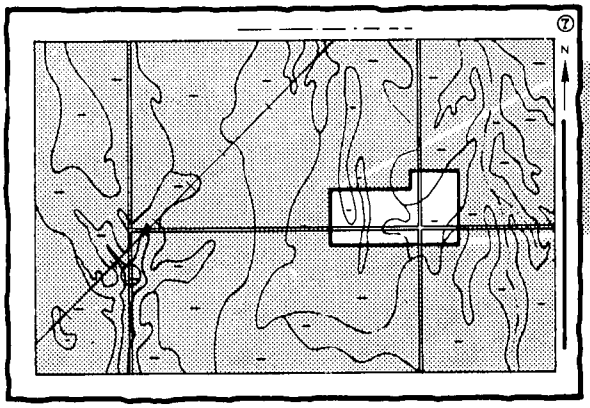
1. Locate your area of interest on the "Index to Map Sheets"

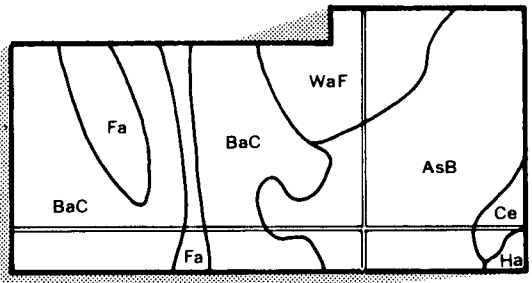




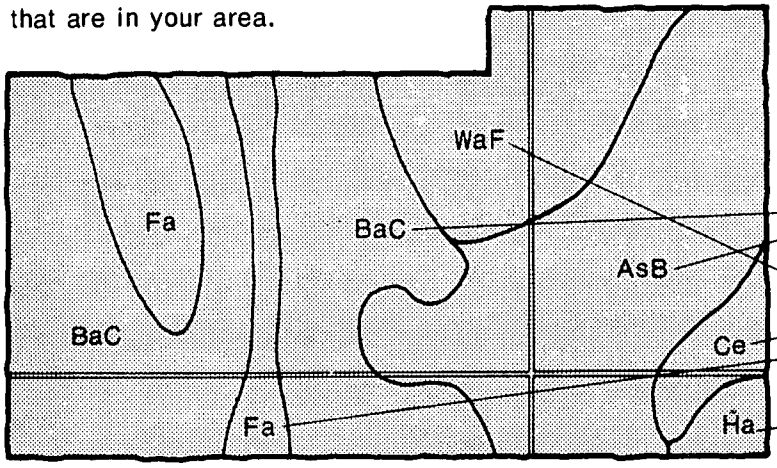
2. Note the number of the map sheet and turn to that sheet.

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





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

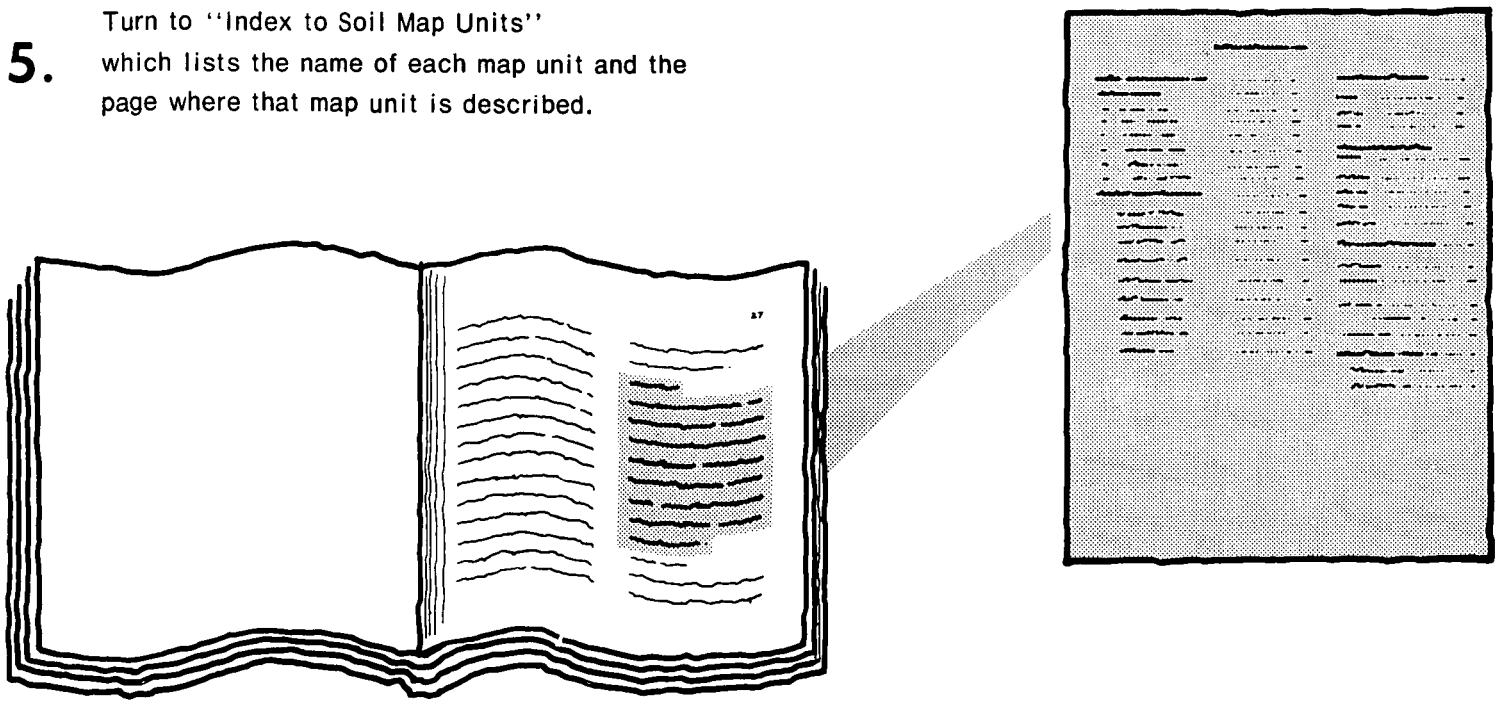


Symbols

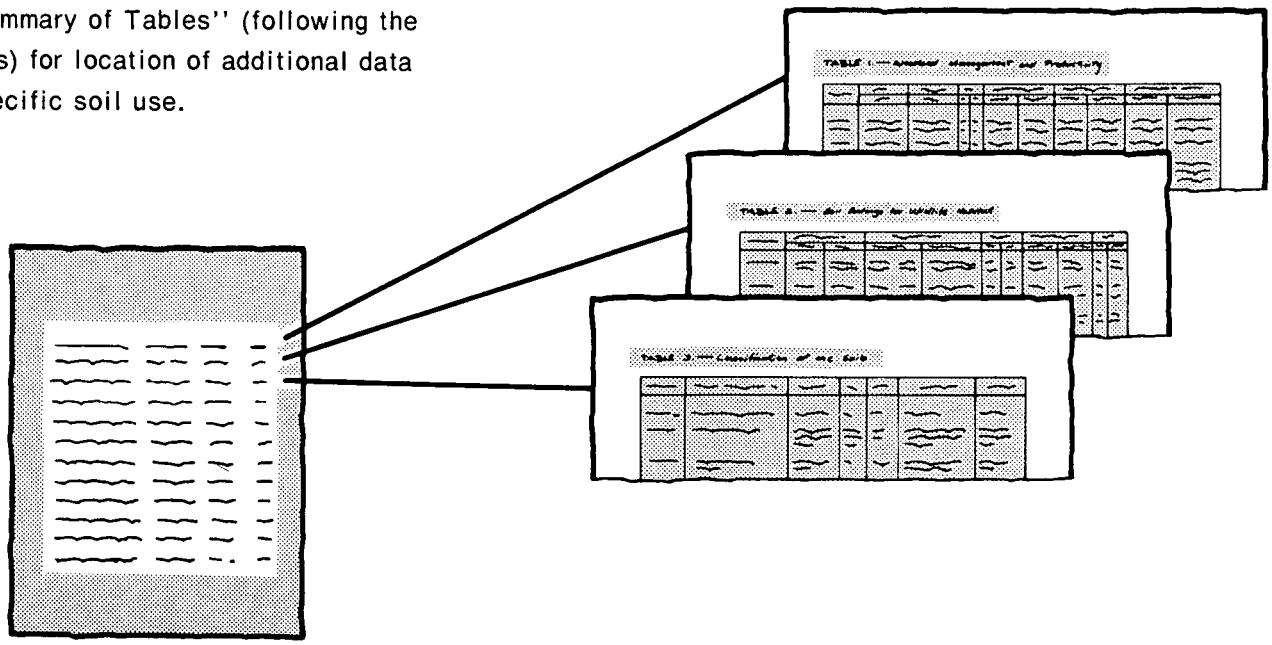
AsB
BaC
Ce
Fa
Ha
WaF

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 completed in 1982. Soil names and descriptions were approved in 1983. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1982. This survey was made cooperatively by the Soil Conservation Service and the Virginia Polytechnic Institute and State University and was financed in part by the Virginia Soil and Water Conservation Commission and the Greene County Board of Supervisors. The survey is part of the technical assistance furnished to the Culpeper Soil and Water 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: The foreground consists of Elioak loam, 7 to 15 percent slopes, and Ashe sandy loam, 15 to 25 percent slopes. Myersville and Catoctin soils are in the background.

Contents

Soil Series

Issued July 1986

Index to Map Units

Summary of Tables

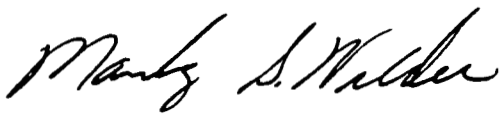
Foreword

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

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



Manly S. Wilder
State Conservationist
Soil Conservation Service

Soil Survey of Greene County, Virginia

By Steven K. Thomas and E. Darlene Crawford

Fieldwork by Steven K. Thomas, E. Darlene Crawford, David E. Starner, and Richard W. Rhodes, Virginia Polytechnic Institute and State University

United States Department of Agriculture
Soil Conservation Service
In cooperation with
Virginia Polytechnic Institute and State University

GREENE COUNTY is in north-central Virginia and has an area of 153 square miles, or 97,900 acres, 60 percent of which is forested (fig. 1). Most of the forested land is in the Blue Ridge. The Shenandoah National Park covers about 15,000 acres in the county.

Greene County was formed from a part of Orange County in 1838 and was named after Revolutionary War General Nathaniel Greene. The population of the county in 1980 was 7,625. Stanardsville, the only incorporated town in Greene County, is the county seat.

The general relief of the county consists of a dissected, rolling Piedmont plateau bordered on the west by the Blue Ridge. The northern half of Greene County is in the Rappahannock River watershed, and the southern half is in the James River watershed. U.S. Route 33 is generally on the drainage divide. Water is available from wells and springs throughout the county and from the Rapidan River.

The soils in the county are of many different kinds and formed in materials weathered from micaceous schist, phyllite, sandstone, granite, diorite, biotite gneiss, and basaltic lava. Most of the soils, with the exception of those on the steeper Piedmont and mountain slopes, are suited to farming and nonfarm uses.

Although the eastern half of Greene County is becoming urbanized, agriculture still is the main enterprise in the county. The principal sources of farm income are field crops such as corn, livestock, dairy products, and poultry products. Of increasing interest are vineyards and orchards.

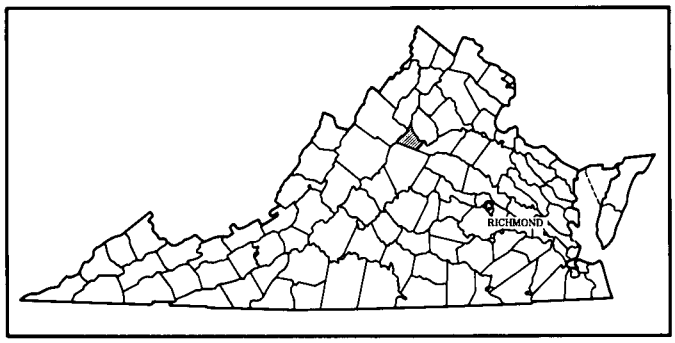


Figure 1.—Location of Greene County in Virginia.

Climate

Prepared by Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

Greene County has two climate zones. The warmer, more humid zone consists of the Piedmont section,

starting at the base of the Blue Ridge and continuing eastward to the Orange County line. The cooler, less humid zone lies entirely within the Blue Ridge and its major foothills.

Table 1 gives data on temperature and precipitation for the eastern part of the survey area, as recorded at Charlottesville, Virginia, in the period 1949 to 1978. 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 28 degrees. The lowest temperature on record, which occurred at Charlottesville on January 17, 1977, is -2 degrees. In summer the average temperature is 75 degrees, and the average daily maximum temperature is 85 degrees. The highest recorded temperature, which occurred at Charlottesville on September 7, 1954, is 107 degrees.

Growing degree days for the eastern part of the county 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 (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 46 inches. Of this, 24 inches, or 54 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 20 inches. The heaviest 1-day rainfall during the period of record was 7.49 inches at Charlottesville on June 22, 1972. Thunderstorms occur on about 24 days each year, and most occur in summer.

The average seasonal snowfall is 23 inches. The greatest snow depth at any one time during the period of record was 20 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 about 55 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 10 miles per hour, in March.

Table 4 gives data on temperature and precipitation for the western part of the survey area, as recorded at Big Meadows, Virginia, in the period 1949 to 1978.

In winter the average temperature is 29 degrees F, and the average daily minimum temperature is 20 degrees. The lowest temperature on record, which occurred at Big Meadows on January 17, 1977, is -16 degrees. In summer the average temperature is 65 degrees, and the average daily maximum temperature is 74 degrees. The highest recorded temperature, which occurred at Big Meadows on July 14, 1954, is 90 degrees.

Growing degree days for the western part of the county are shown in table 4. 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 (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 51 inches. Of this, 27 inches, or 53 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 21 inches. The heaviest 1-day rainfall during the period of record was 10.71 inches at Big Meadows on October 15, 1954. Thunderstorms occur on about 13 days each year, and most occur in summer.

The average seasonal snowfall is 45 inches. The greatest snow depth at any one time during the period of record was 35 inches. On an average of 13 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 45 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 15 miles per hour, in March.

Physiography, Relief, and Drainage

Greene County is in two physiographic provinces, the Piedmont and the Blue Ridge (fig. 2). The eastern two thirds of the county is in the Piedmont Plateau. Elevation in the county ranges from about 410 feet above sea level along the Rapidan River in the eastern part of the survey area to about 3,587 feet above sea level on Hightop Mountain in the western part of the survey area.

Generally, the Piedmont is dissected and rolling and consists of gently sloping and strongly sloping ridgetops and strongly sloping to steep side slopes. The steeper side slopes are along the major drainageways. The soils of the Piedmont commonly are very deep and well drained and have a clayey subsoil. However, they range from moderately deep to very deep and from excessively drained to poorly drained and have a loamy or clayey subsoil.

The Blue Ridge consists of strongly sloping to very steep ridges and side slopes. The soils of the Blue Ridge commonly are well drained to excessively drained and have a loamy subsoil and stones on the surface.

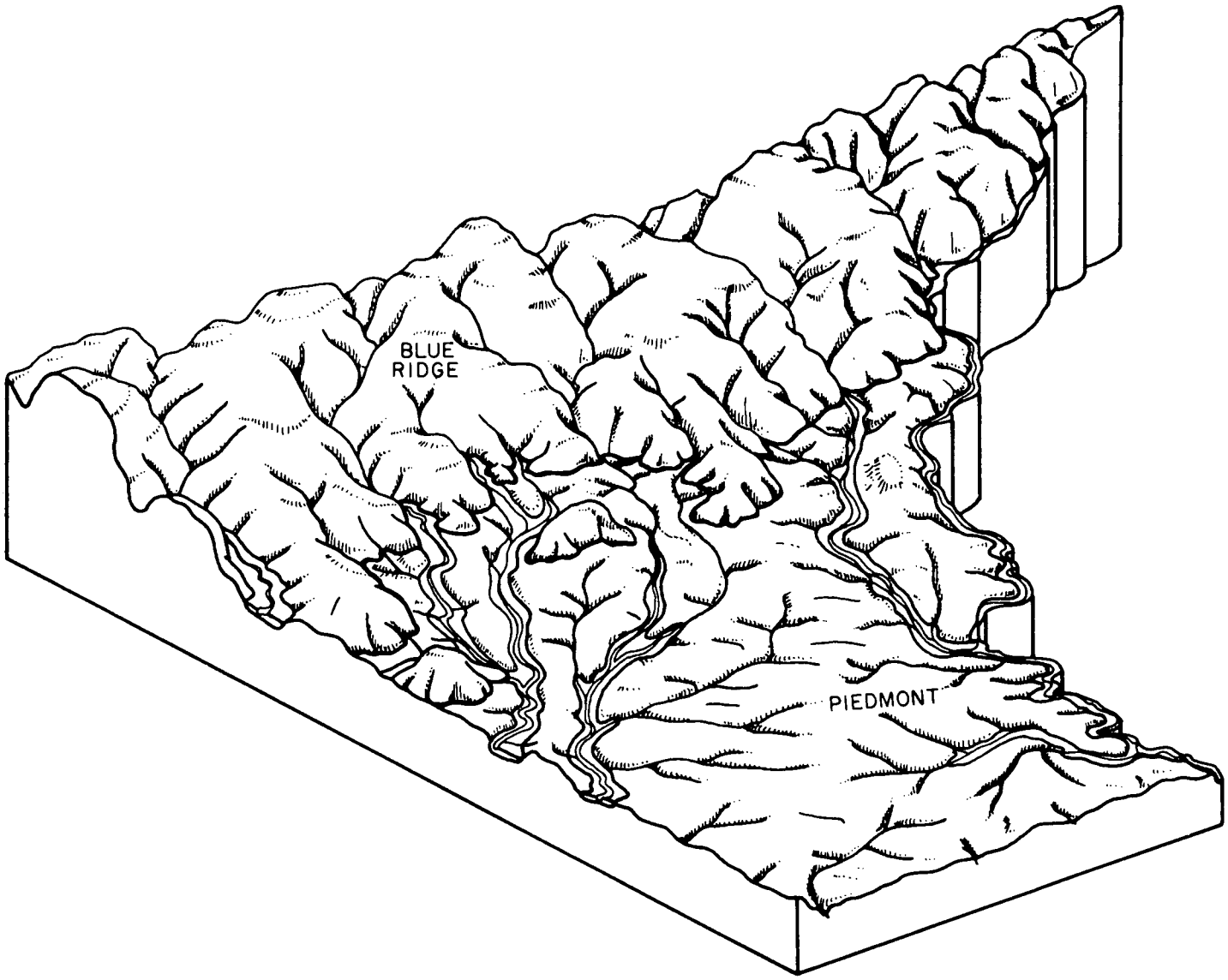


Figure 2.—The topography of Greene County.

Long, broad flood plains are along the Rapidan River, the Conway River, the South River, Swift Run, the Roach River, the Lynch River, and other large streams in the county. The soils of the flood plains commonly are well drained but range to poorly drained. They mostly have a loamy subsoil, but those near the mountains have a cobbly subsoil.

The part of the survey area north of U.S. Route 33 is drained by the Conway, South, and Rapidan Rivers and their tributaries. South of U.S. Route 33, the survey area is drained by Swift Run, the Roach River, and the Lynch River and their tributaries. The drainage pattern is mainly dendritic.

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, rangeland and woodland managers, engineers, planners, developers and builders, home buyers, and others.

Map Unit Composition

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

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

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

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, 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.

The soils on the boundaries of the general soil map of Greene County do not in all instances match the soils on the general soil maps of adjacent counties. The differences are the result of differences in the methods of soil classification at the time each county was surveyed.

Soil Descriptions

Areas on flood plains and terraces along and near major streams

This unit is in the Piedmont physiographic province and is the least extensive in the county. Most of the areas are farmed. The soils formed in alluvial material washed from the Blue Ridge and adjacent uplands.

1. Craigsville-Kinkora-Comus

Well drained and poorly drained soils with a loamy or clayey subsoil; formed in alluvial deposits

This map unit consists of nearly level flood plains, levees, flood basins, and terraces. Small intermittent drainageways and open ditches cross a few areas of this unit. Some other areas are in depressions that do not have a drainage outlet. Slopes range from 0 to 2 percent.

This unit makes up about 8 percent of the county. The unit is about 22 percent Craigsville soils, 12 percent Kinkora soils, 10 percent Comus soils, and 56 percent minor soils.

Craigsville soils are on flood plains near the mountains. The soils have a surface layer of brown cobbly sandy loam and a subsoil of strong brown very gravelly sandy loam. They are well drained and in places have stones or boulders on the surface. They are frequently flooded for very brief periods.

Kinkora soils are on low terraces and in flood basins. The soils have a surface layer of dark grayish brown silt loam and a subsoil of gray silty clay loam and clay. They are poorly drained and are rarely flooded for very brief periods.

Comus soils are on flood plains. The soils have a surface layer of yellowish brown fine sandy loam and a subsoil of dark yellowish brown loam and fine sandy loam. They are well drained and are frequently flooded for very brief periods.

The minor soils in the unit are moderately well drained and somewhat poorly drained Codorus soils in flood basins, well drained Dyke and Unison soils on terraces, and well drained Suches soils on flood plains.

About 80 percent of the acreage of this unit has been cleared, and most of the cleared areas are in crops. The major crops are corn and hay grasses and legumes, such as clover. The remainder of the cleared land is in pasture. The areas adjacent to the streams are susceptible to damage by flooding. Keeping such areas in permanent pastures or woodland helps reduce the erosion caused by flooding. The uncleared land generally is too small, too wet, or too cobbly to clear. Flood protection, irrigation, or drainage commonly is needed for crops in those areas.

The soils in this unit are suitable for trees. Productivity is generally moderately high. Seasonal wetness sometimes limits seedling survival. Mixed hardwoods and pines are managed in this unit. The wetter areas contain water-tolerant hardwoods.

This unit is poorly suited to use as a site for sanitary facilities and building site development. Flooding and wetness are the main limitations.

Areas on uplands on the dissected Piedmont plateau

These units are in the Piedmont physiographic province and are the most extensive in the county. Most of the gently sloping and strongly sloping areas are farmed. The steeper areas are in woodland or pasture.

Most of the soils formed in residuum from igneous and metamorphic rocks. A few formed in mountain colluvium.

2. Elioak-Hazel-Glenelg

Well drained and excessively drained soils with a clayey or loamy subsoil; formed in the weathered products of mica schist, phyllite, and sandstone

This unit consists of an upland topography dissected by many drainageways (fig. 3). The ridgetops generally are narrow and gently sloping to strongly sloping. The side slopes are strongly sloping to steep, are narrow to somewhat broad, and are steepest near streams. Slopes range from 2 to 45 percent.

This unit makes up about 11 percent of the county. The unit is about 59 percent Elioak soils, 14 percent Hazel soils, 10 percent Glenelg soils, and 17 percent minor soils.

Elioak soils generally are on gently sloping to moderately steep ridgetops and side slopes. The soils have a surface layer generally of brown loam and a subsoil of red clay. Some areas are eroded and have a surface layer of clay loam. The soils are well drained.

Hazel soils are mostly on strongly sloping to steep side slopes and in some areas are on strongly sloping points of ridges. The soils have a surface layer of yellowish brown loam and a subsoil of strong brown silt loam. They are excessively drained.

Glenelg soils are mostly on strongly sloping to moderately steep side slopes and in some areas are on strongly sloping points of ridges. The soils have a surface layer of yellowish brown loam and a subsoil of strong brown silt loam. They are well drained.

The minor soils in the unit are poorly drained Chatuge and Hatboro soils along drainageways and well drained Meadowville soils along drainageways, on foot slopes, and in depressions.

About half of the acreage of this unit is cleared. Most of the cleared areas on ridgetops and side slopes are used for pasture and hay grasses and legumes. Some of the cleared areas are used for corn and some for housing developments and industry. The uncleared acreage consists mostly of steep side slopes and narrow ridges covered by mixed hardwoods and pines. Some areas are in loblolly plantations. The slope and an erosion hazard are limitations for farming.

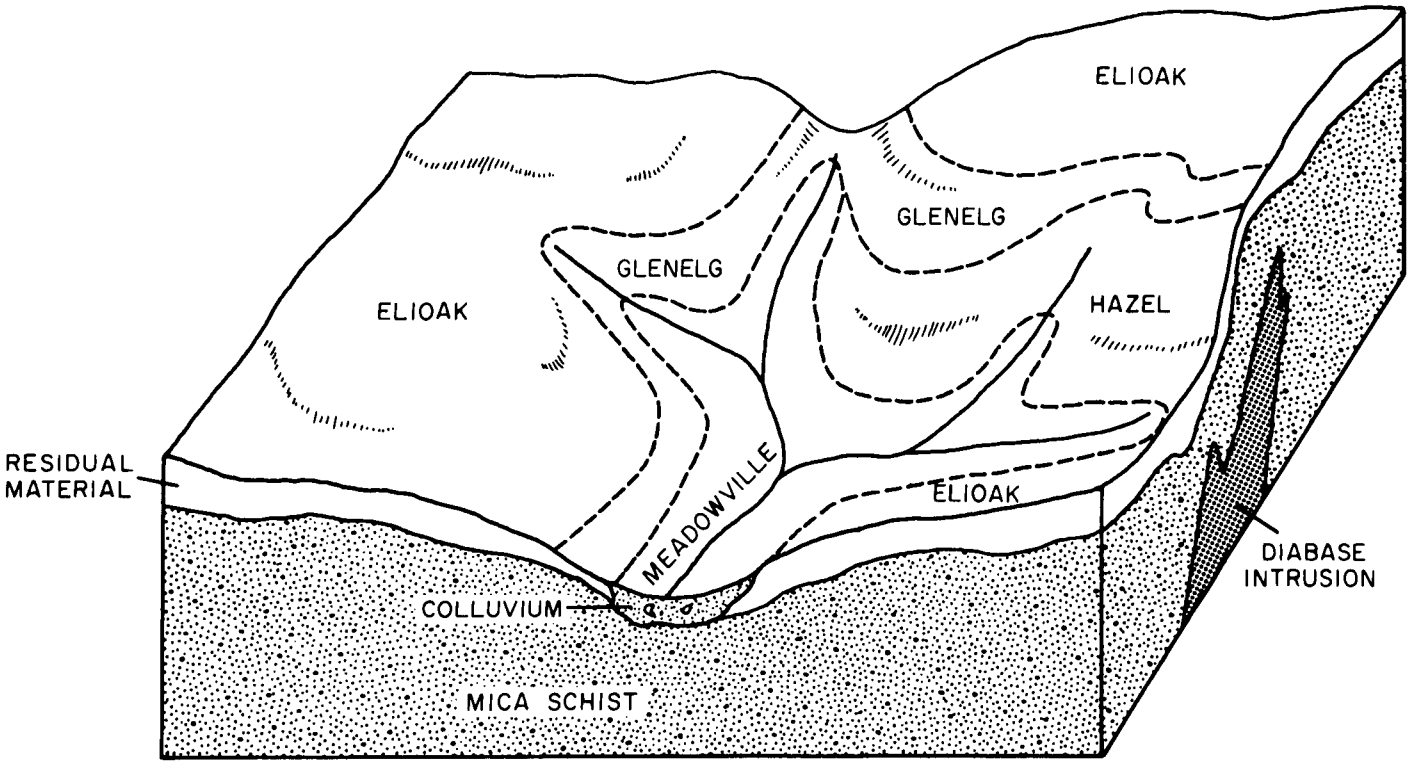


Figure 3.—Typical pattern of soils and underlying material in the Elioak-Hazel-Glenelg unit.

The soils in this unit are suitable for trees. Productivity is generally high except in areas that have a clayey surface layer or that are shallow to bedrock. Erosion is a hazard on side slopes and logging trails.

This unit is suitable as a site for sanitary facilities and building site development. Slope, a clayey subsoil, and the depth to bedrock of the Hazel soils are the main limitations.

3. Elioak-Meadowville

Well drained soils with a clayey or loamy subsoil; formed in the weathered products of hornblende granite

This unit consists of an upland topography of gently sloping to strongly sloping ridgetops, strongly sloping to moderately steep side slopes, and broad, gently sloping valleys. The steeper slopes are along the major streams. Slopes range from 2 to 25 percent.

This unit makes up about 5 percent of the county. The unit is about 60 percent Elioak soils, 19 percent Meadowville soils, and 21 percent minor soils.

Elioak soils are on gently sloping or strongly sloping ridgetops and side slopes. The soils have a surface layer mainly of brown loam and a subsoil of red clay. Some areas are eroded and have a surface layer of clay loam.

Meadowville soils are gently sloping and are on foot slopes and along drainageways. The soils have a surface layer of dark brown fine sandy loam and a subsoil of reddish brown and yellowish red clay loam.

The minor soils in the unit are somewhat excessively drained Ashe soils on the steeper side slopes, well drained Buckhall soils on ridgetops and side slopes, and poorly drained Chatuge and Hatboro soils along drainageways.

About 70 percent of the acreage of this unit has been cleared. The use of the cleared land is about evenly divided between crops and pasture. The major crops are corn and hay grasses and legumes. A few areas are in housing developments or industry. The uncleared land is commonly a mixture of hardwoods and pines. Some small isolated areas are dominantly shortleaf pine. The gently sloping and strongly sloping ridgetops and side slopes are mostly well suited to cultivated crops, but the steeper side slopes are subject to erosion. The foot slopes and drainageways generally are too small to be used for cultivated crops.

The soils in this unit are suitable for trees. Productivity is moderately high. Mixed hardwoods and pines are usually managed on this unit. Erosion is a hazard on side slopes and logging trails.

This unit is moderately suitable as a site for sanitary facilities and building site development. Slope and the clayey subsoil are the main limitations.

4. Elioak-Ashe-Meadowville

Well drained and somewhat excessively drained soils with a clayey or loamy subsoil; formed in the weathered products of granite and gneiss

This unit consists of an upland topography of gently sloping to strongly sloping ridgetops, strongly sloping to very steep side slopes, and narrow valleys. The steeper slopes are along the major streams. Slopes range from 2 to 75 percent.

This unit makes up about 30 percent of the county. It is about 43 percent Elioak soils, 23 percent Ashe soils, 10 percent Meadowville soils, and 24 percent minor soils.

Elioak soils are on gently sloping or strongly sloping ridgetops and side slopes. They are well drained. The soils have a surface layer mainly of brown loam and a subsoil of red clay. Some areas are eroded and have a surface layer of clay loam.

Ashe soils are mostly on moderately steep to very steep side slopes. They are somewhat excessively drained. The soils have a surface layer of dark brown sandy loam and a subsoil of strong brown sandy loam. Some areas have stones on the surface.

Meadowville soils are gently sloping and are on foot slopes and along drainageways. The soils have a surface layer of dark brown fine sandy loam and a subsoil of reddish brown and yellowish red clay loam. They are well drained.

The minor soils in the unit are well drained Buckhall soils on ridgetops and side slopes and poorly drained Chatuge and Hatboro soils along drainageways.

About 60 percent of the acreage of this unit has been cleared. The use of the cleared land is about evenly divided between crops and pasture. The major crops are corn and hay grasses and legumes. A few areas are in housing developments or industry. The uncleared land is commonly a mixture of hardwoods and pines. A few areas are in loblolly pine plantations. The gently sloping to strongly sloping areas are mostly well suited to cultivated crops. Stones on the surface and an erosion hazard limit cultivation on the steeper side slopes. The drainageways and foot slopes generally are too small to be used for cultivated crops.

The soils in this unit are suitable for trees. Productivity is moderately high. Mixed hardwoods and pines are usually managed in this unit. Erosion is a hazard on side slopes and logging trails.

This unit is moderately suitable as a site for sanitary facilities and building site development. Slope and a clayey subsoil are the main limitations.

5. Braddock-Elioak-Ashe

Well drained and somewhat excessively drained soils with a clayey or loamy subsoil; formed in the weathered products of granite, gneiss, and colluvium

This unit consists of an upland topography of gently sloping to moderately steep ridgetops and moderately steep to very steep side slopes forming the foot slopes of the Blue Ridge. Slopes range from 2 to 75 percent.

This unit makes up about 6 percent of the county. The unit is about 35 percent Braddock soils, 34 percent Elioak soils, 21 percent Ashe soils, and 10 percent minor soils.

Braddock soils are generally on gently sloping terraces and strongly sloping to moderately steep side slopes. They are well drained. The soils have a surface layer mainly of brown loam and a subsoil of red clay. Some areas are eroded and have a surface layer of clay loam.

Elioak soils are on ridgetops and strongly sloping to moderately steep side slopes. They are well drained. The soils have a surface layer mainly of brown loam and a subsoil of red clay. Some areas are eroded and have a surface layer of clay loam.

Ashe soils are mostly on moderately steep to very steep side slopes. They are somewhat excessively drained. The soils have a surface layer of dark brown sandy loam and a subsoil of strong brown sandy loam. Some areas have stones on the surface.

The minor soils in the unit are well drained Buckhall and Chester soils on ridgetops and side slopes, poorly drained Hatboro soils along drainageways, well drained Thurmont soils on foot slopes dissected by many drainageways, and well drained Unison soils on terraces.

About 70 percent of the acreage of this unit is cleared. Most of the cleared areas are used for pasture and hay grasses and legumes. Some are used for corn. The uncleared acreage consists of steep side slopes and very stony areas that are generally in mixed hardwoods and pines. Slope and an erosion hazard are the main limitations for farming.

The soils of this unit are suitable for trees. Productivity is moderately high to high. The steep slopes, stones on the surface, and a clayey surface layer limit the use of logging equipment. Erosion is a hazard on side slopes and logging trails.

This unit is moderately suitable as a site for sanitary facilities and building site development. Slope, stones on the surface, and a clayey subsoil are the main limitations.

Areas on uplands in the Blue Ridge

These units include most of the rough, steepest part of the county. They are mainly in woodland. Some areas have been developed for recreation. The soils formed mainly in residuum or colluvium from igneous or metamorphic rock.

6. Parker-Chester

Somewhat excessively drained and well drained soils with a loamy subsoil; formed in the weathered products of granite, granite gneiss, and granodiorite

This unit consists of strongly sloping to very steep, narrow mountain ridgetops and side slopes that have stones on the surface. Rock outcrops are common. Slopes range from 7 to 70 percent.

This unit makes up about 20 percent of the county. The unit is 75 percent Parker soils, 11 percent Chester soils, and 14 percent minor soils.

Parker soils are generally on ridgetops and moderately steep to very steep side slopes. The soils have a surface layer of very dark grayish brown very gravelly loam and a subsoil of brownish yellow very gravelly loam. They are somewhat excessively drained.

Chester soils are generally on moderately steep ridgetops and side slopes. The soils have a surface layer of dark brown loam and a subsoil of strong brown and yellowish red clay loam. They are well drained.

The minor soils are somewhat excessively drained Ashe soils on side slopes at lower elevations, excessively drained Cataska soils, well drained Elioak soils on uplands at lower elevations, and well drained Thurmont soils on colluvial fans and along drainageways.

About 5 percent of the acreage of this unit has been cleared. Most of the cleared land is used for permanent pasture. This unit is severely restricted for farming because of the narrow ridgetops, stones on the surface, and slope. The uncleared land is a mixed hardwood and pine forest.

The soils in this unit are suitable for trees. The dominant hardwood species are chestnut oak and some red oak, white oak, maple, and poplar. Mountain laurel is a major understory species in this unit and generally grows in a thicker stand on the north-facing slopes. Productivity is moderately high to high, but the stones on the surface and the slope limit timber

Slope makes this unit generally unsuitable as a site for sanitary facilities and building site development.

7. Lew-Myersville-Catoctin

Well drained soils with a loamy subsoil; formed in the weathered products of greenstone and schist

This unit consists of strongly sloping to very steep mountain ridgetops and side slopes that have stones on the surface (fig. 4). The ridgetops are broad and benched. Rock outcrops are common. Slopes range from 7 to 80 percent.

This unit makes up 20 percent of the county. The unit is about 35 percent Lew soils, 30 percent Myersville soils, 28 percent Catoctin soils, and 7 percent minor soils.

Lew soils are strongly sloping to very steep. They are along drainageways, on alluvial fans, and on colluvial foot slopes. The soils have a surface layer of very dark grayish brown very channery loam and a subsoil of yellowish brown very channery clay loam.

Myersville soils are on strongly sloping to very steep ridgetops and side slopes. They have a surface layer of dark brown channery silt loam and a subsoil of strong brown channery silt loam and silty clay loam.

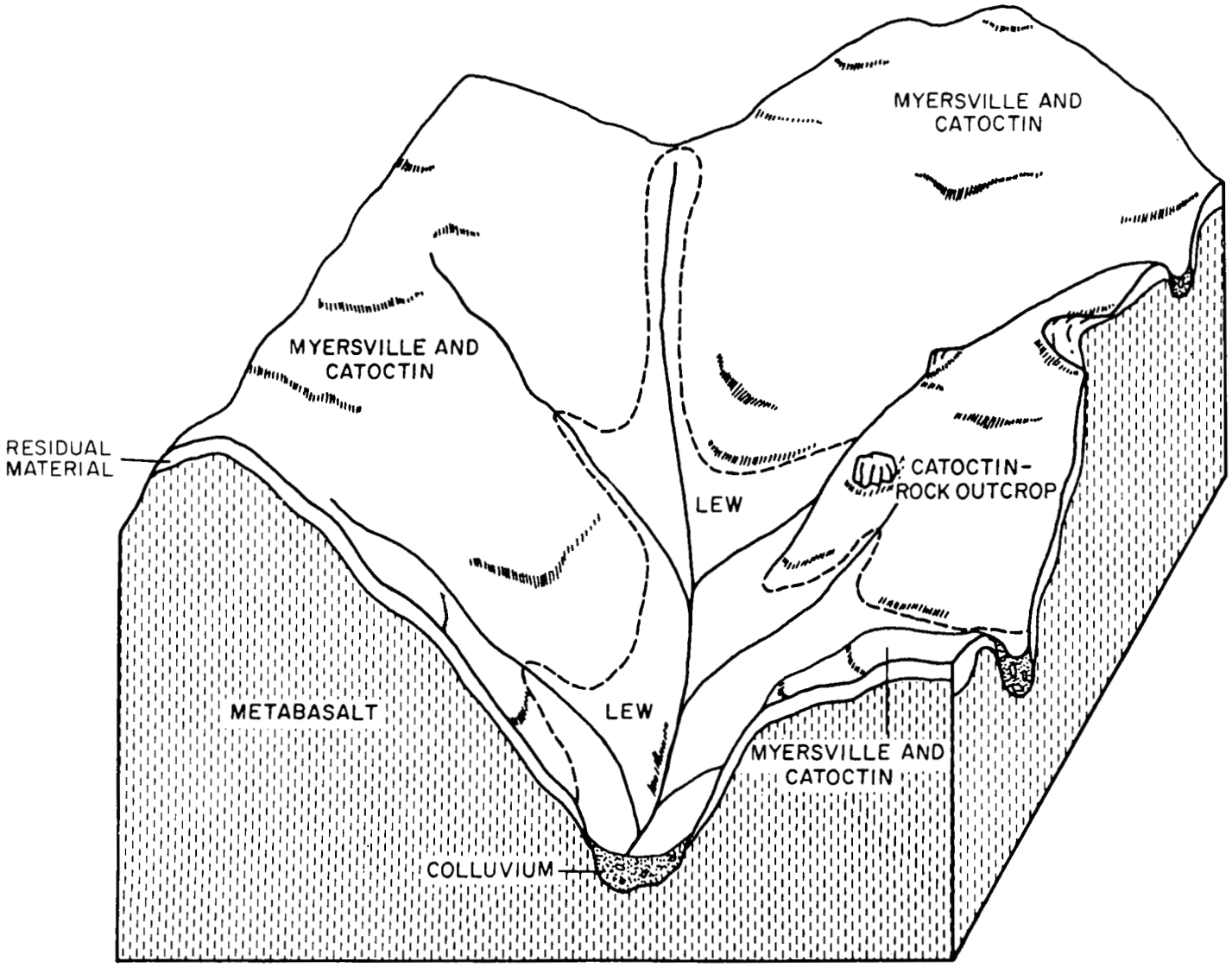


Figure 4.—Typical pattern of soils and underlying material in the Lew-Myersville-Catoctin unit.

Catoctin soils are on strongly sloping to very steep ridgetops and side slopes adjacent to areas of rock outcrop. They have a surface layer of dark brown channery silt loam and a subsoil of yellowish brown channery silt loam.

The minor soils in the unit are well drained Chester soils on mountain ridgetops and side slopes and somewhat excessively drained Parker soils on mountain ridgetops and side slopes.

About 5 percent of the acreage of this unit has been cleared. Most of the cleared land is used for recreational housing developments. The remainder of the cleared land is used for permanent pasture. This unit is severely restricted for farming because of the stones on the surface and the slope. The uncleared land is a mixed hardwood and pine forest.

The soils in this unit are suitable for trees. The predominant hardwood species are red oak, white oak, maple, and poplar. Productivity is very high, but the stones on the surface and the slope limit timber management.

Slope and the stones on the surface make this unit generally unsuitable as a site for sanitary facilities and building site development.

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, 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, Elioak clay loam, 15 to 25 percent slopes, severely eroded, is one of several phases in the Elioak series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Suches-Codorus complex is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Myersville and Catoctin very stony silt loams, 7 to 15 percent slopes, is an undifferentiated group in this survey area.

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

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

Table 5 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

AsC—Ashe sandy loam, 7 to 15 percent slopes. This soil is moderately deep and somewhat excessively drained. It is on strongly sloping side slopes and ends of ridges. The areas range from about 2 to 25 acres.

Typically, the surface layer is dark brown sandy loam 5 inches thick. The subsurface layer is yellowish brown sandy loam 5 inches thick. The subsoil is strong brown sandy loam 12 inches thick. The substratum is 16 inches thick. It is strong brown fine sandy loam in the upper part and variegated red, brown, black, and white coarse sandy loam in the lower part. Bedrock is at a depth of 38 inches.

Included with this soil in mapping are small areas of Buckhall, Chester, and Elioak soils on ridgetops and side slopes. Some areas have a gravelly surface layer.

The permeability of this Ashe soil is moderately rapid. Available water capacity is low. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock range from 20 to 40 inches. In unlimed areas the surface and subsurface layers and the subsoil are very strongly acid or strongly acid. Surface runoff is medium. Potential frost action and shrink-swell potential are low.

This soil is used mainly for woodland and pasture.

Low available water capacity and slope make this soil poorly suited to cultivated crops. The erosion hazard is moderate in areas without adequate plant cover. Conservation tillage and cropping systems that include grasses and legumes help to reduce runoff and control erosion in cultivated areas.

Pasture and hay grasses and legumes, including alfalfa, are moderately well suited to this soil. Low available water capacity is a limitation. Maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, and using proper stocking rates and applying lime and fertilizer are the main pasture management practices.

The potential productivity for timber is moderately high on this soil. The soil is easily managed for woodland.

The depth to bedrock, seepage, and slope limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IVe.

AsD—Ashe sandy loam, 15 to 25 percent slopes. This soil is moderately deep and somewhat excessively drained. It is on moderately steep side slopes. The areas range from about 2 to 50 acres.

Typically, the surface layer is dark brown sandy loam 5 inches thick. The subsurface layer is yellowish brown sandy loam 5 inches thick. The subsoil is strong brown sandy loam 12 inches thick. The substratum is 16 inches thick. It is strong brown fine sandy loam in the upper part and variegated red, brown, black, and white coarse sandy loam in the lower part. Bedrock is at a depth of 38 inches.

Included with this soil in mapping are small areas of Buckhall, Chester, and Elioak soils on side slopes. Some areas have a gravelly surface layer, and some are very stony.

The permeability of this Ashe soil is moderately rapid. Available water capacity is low. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock range from 20 to 40 inches. In unlimed areas the surface and subsurface layers and the subsoil are very strongly acid or strongly acid. Surface runoff is rapid. Potential frost action and shrink-swell potential are low.

Slope and the low available water capacity make this soil generally unsuitable for cultivated crops. The erosion hazard is severe in areas without adequate plant cover.

This soil is moderately well suited to pasture and poorly suited to hay (fig. 5). Slope and low available water capacity are the main limitations. Maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer are the main pasture management practices.

The potential productivity for timber is moderately high on this soil, and most areas are wooded. The low available water capacity causes a high rate of seedling mortality, and slope limits the use of equipment.

The depth to bedrock, seepage, and slope limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIe.

AsE—Ashe sandy loam, 25 to 75 percent slopes. This soil is moderately deep and somewhat excessively drained. It is on steep and very steep side slopes. The areas range from about 2 to 30 acres.

Typically, the surface layer is dark brown sandy loam 5 inches thick. The subsurface layer is yellowish brown sandy loam 5 inches thick. The subsoil is strong brown sandy loam 12 inches thick. The substratum is 16 inches thick. It is strong brown fine sandy loam in the upper part and variegated red, brown, black, and white coarse sandy loam in the lower part. Bedrock is at a depth of 38 inches.

Included with this soil in mapping are small areas of Buckhall, Chester, and Elioak soils on moderately steep side slopes. Some areas have a gravelly surface layer or rock outcrop on the surface, and some are very stony.

The permeability of this Ashe soil is moderately rapid. Available water capacity is low. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock range from 20 to 40 inches. In unlimed areas the surface and subsurface layers and the subsoil are very strongly acid or strongly acid. Surface runoff is very rapid. Potential frost action and shrink-swell potential are low.

Slope and the low available water capacity make this soil generally unsuitable for cultivated crops. The erosion hazard is severe in areas without adequate plant cover.

This soil is poorly suited to pasture and generally unsuited to hay. Slope and the low available water capacity are the main limitations. Maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer are the main pasture management practices.

The potential productivity for timber is moderately high on this soil, and most areas are wooded. The low available water capacity causes a high rate of seedling mortality, and slope limits the use of equipment.

The depth to bedrock, seepage, and slope limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIIe.

AvD—Ashe very stony sandy loam, 15 to 25 percent slopes. This soil is moderately deep and somewhat excessively drained. It is on moderately steep side slopes. The areas range from about 2 to 25 acres. Stones about 18 inches in diameter cover from 3 to 15 percent of the surface.

Figure 5.—Pasture on an area of Ashe sandy loam, 15 to 25 percent slopes.

Typically, the surface layer is dark brown sandy loam 5 inches thick. The subsurface layer is yellowish brown sandy loam 5 inches thick. The subsoil is strong brown sandy loam 12 inches thick. The substratum is 16 inches thick. It is strong brown fine sandy loam in the upper part and variegated red, brown, black, and white coarse sandy loam in the lower part. Bedrock is at a depth of 38 inches.

Included with this soil in mapping are small areas of Buckhall, Chester, and Elioak soils on side slopes. Some areas consist of extremely stony soils, and some have rock outcrops.

The permeability of this Ashe soil is moderately rapid. Available water capacity is low. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock range from 20 to 40 inches. In unlimed areas the surface and subsurface layers and the subsoil are very strongly acid or strongly acid. Surface runoff is rapid. Potential frost action and shrink-swell potential are low.

Slope and the stones on the surface make this soil generally unsuited to cultivated crops. The erosion hazard is severe in areas without adequate plant cover.

This soil is poorly suited to pasture and generally unsuited to hay. Slope, the stones on the surface, and the low available water capacity are the main limitations. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is moderately high on this soil, and most areas are wooded. The low

available water capacity causes a high rate of seedling mortality, and slope and the stones on the surface limit the use of equipment.

Slope, seepage, the depth to bedrock, and the stones on the surface limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIs.

AvE—Ashe very stony sandy loam, 25 to 75 percent slopes. This soil is moderately deep and somewhat excessively drained. It is on steep and very steep side slopes. The areas range from about 2 to 50 acres. Stones about 18 inches in diameter cover from 3 to 15 percent of the surface.

Typically, the surface layer is dark brown sandy loam 5 inches thick. The subsurface layer is yellowish brown sandy loam 5 inches thick. The subsoil is strong brown sandy loam 12 inches thick. The substratum is 16 inches thick. It is strong brown fine sandy loam in the upper part and variegated red, brown, black, and white coarse sandy loam in the lower part. Bedrock is at a depth of 38 inches.

Included with this soil in mapping are small areas of moderately steep Buckhall, Chester, and Elioak soils on side slopes. Some areas are extremely stony, and some have rock outcrops.

The permeability of this Ashe soil is moderately rapid. Available water capacity is low. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock range from 20 to 40 inches. In unlimed areas the surface and subsurface layers and the subsoil are very strongly acid or strongly acid. Surface runoff is very rapid. Potential frost action and shrink-swell potential are low.

Slope and the stones on the surface make this soil generally unsuitable for farming. The erosion hazard is severe in areas without adequate plant cover.

The potential productivity for timber is moderately high on this soil, and most areas are wooded. The low available water capacity causes a high rate of seedling mortality, and slope and the stones on the surface limit the use of equipment.

Slope, seepage, the depth to bedrock, and the stones on the surface limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIIs.

BaB—Belvoir sandy loam, 2 to 7 percent slopes. This soil is very deep, somewhat poorly drained, and gently sloping. It is on foot slopes, at heads of drainageways, and along intermittent drainageways. The areas range from about 2 to 25 acres.

Typically, the surface layer is dark yellowish brown sandy loam 6 inches thick. The subsoil is 32 inches thick and is mottled. It is yellowish brown sandy clay loam and clay loam in the upper 22 inches. The lower 10 inches is yellowish brown, brittle sandy clay loam. The substratum is mottled yellowish brown, gray, and strong brown clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Chatuge, Meadowville, and Thurmont soils on foot slopes and at the heads of and along drainageways. Also included are soils with a clayey subsoil and soils with slopes of more than 7 percent.

The permeability of this Belvoir soil is moderate in the upper part of the subsoil, slow in the lower part, and slow to moderate in the substratum. Available water capacity is low. Natural fertility and organic matter content are low. The rooting zone extends to a depth of 16 to 30 inches, and root growth is restricted by the lower part of the subsoil. The depth to bedrock is more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is slow to medium. Potential frost action is high. Shrink-swell potential is moderate. A seasonal high water table is perched at a depth of 12 to 24 inches.

This soil is used mainly for woodland and pasture.

This soil is moderately well suited to cultivated crops, but small grains tend to lodge. Slow permeability in the lower part of the subsoil, the seasonal high water table, and the restricted rooting depth are the main limitations. The erosion hazard is moderate in areas without adequate plant cover. Conservation tillage and using grasses and water-tolerant legumes in the cropping system are practices that help to reduce runoff and control erosion. Installing drainage helps to improve the suitability of the soil for some crops.

This soil is well suited to pasture and hay and to water-tolerant legumes, but seasonal wetness and the frost action potential make the soil generally unsuited to alfalfa. The main pasture management practices are artificial drainage, maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer. Grazing when the soil is wet causes compaction.

The potential productivity for timber is moderately high on this soil. Seasonal wetness limits the use of equipment, and the restricted rooting causes a hazard of uprooting during windy periods.

The slow permeability in the lower part of the subsoil and seasonal wetness limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIIw.

BcB—Braddock loam, 2 to 7 percent slopes. This soil is very deep and well drained. It is on gently sloping ridgetops. The areas range from about 5 to 50 acres.

Typically, the surface layer is brown loam 6 inches thick. The subsoil extends to a depth of 60 inches or more. It is yellowish red clay loam in the upper part and red clay in the lower part.

Included with this soil in mapping are small areas of Elioak and Unison soils on ridgetops. Also included are areas with a clayey surface layer.

The permeability and available water capacity of this Braddock soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. The soil in unlimed areas is very strongly acid or strongly acid. Surface runoff is medium. Potential frost action and shrink-swell potential are moderate.

This soil is used mainly for cultivated crops, hay, and pasture.

This soil is well suited to cultivated crops, especially corn and small grains (fig. 6). The erosion hazard is moderate in areas without adequate plant cover. Conservation tillage and using grasses and legumes in the cropping system are practices that help to reduce runoff and control erosion.

This soil is well suited to pasture and hay grasses and legumes, including alfalfa. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil, and the soil is easily managed for woodland.

Low strength, the clayey subsoil, permeability, and the shrink-swell potential limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIe.

BcC—Braddock loam, 7 to 15 percent slopes. This soil is very deep and well drained. It is on strongly sloping ridgetops and side slopes. The areas range from about 5 to 50 acres.

Typically, the surface layer is brown loam 6 inches thick. The subsoil extends to a depth of 60 inches or more. It is yellowish red clay loam in the upper part and red clay in the lower part.

Figure 6.—Harvesting corn for silage on Braddock loam, 2 to 7 percent slopes.

Included with this soil in mapping are small areas of Elioak and Unison soils on ridgetops. Also included are areas with a clayey surface layer.

The permeability and available water capacity of this Braddock soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. The soil in unlimed areas is very strongly acid or strongly acid. Surface runoff is medium. Potential frost action and shrink-swell potential are moderate.

This soil is used mainly for hay and pasture.

This soil is moderately well suited to cultivated crops, especially corn and small grains. The erosion hazard is moderate in areas without adequate plant cover. Conservation tillage and using grasses and legumes in the cropping system are practices that help to reduce runoff and control erosion.

This soil is well suited to pasture and hay grasses and legumes, including alfalfa. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil, and the soil is easily managed for woodland.

Slope, low strength, the clayey subsoil, permeability, and the shrink-swell potential limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIIe.

BdD3—Braddock clay loam, 15 to 25 percent slopes, severely eroded. This soil is very deep and well drained. It is on moderately steep side slopes. Erosion has removed much of the original surface layer, and the subsoil is exposed in places. The areas of the soil range from about 5 to 50 acres.

Typically, the surface layer is brown clay loam 6 inches thick. The subsoil extends to a depth of 60 inches or more. It is yellowish red clay loam in the upper part and red clay in the lower part.

Included with this soil in mapping are small areas of Elioak and Unison soils on side slopes. Also included are areas with stones on the surface.

The permeability and available water capacity of this Braddock soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. The soil in unlimed areas is very strongly acid or strongly acid. Surface runoff is rapid. Potential frost action and shrink-swell potential are moderate.

This soil is used mainly for pasture.

Slope and the clayey surface layer make this soil generally unsuited to cultivated crops. The erosion hazard is severe in areas without adequate plant cover. The soil is moderately well suited to pasture and poorly suited to hay. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil, but slope and the clayey surface layer limit the use of equipment.

Slope, the clayey texture, permeability, and the shrink-swell potential limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIe.

BuC—Buckhall loam, 7 to 15 percent slopes. This soil is very deep and well drained. It is on strongly sloping ridgetops and side slopes. The areas range from about 2 to 90 acres.

Typically, the surface layer is yellowish brown loam 9 inches thick. The subsoil is yellowish red and is 25 inches thick. It is clay in the upper part and mottled loam in the lower part. The substratum is variegated yellow, white, and red loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ashe, Chester, and Elioak soils. The Ashe soils are on side slopes and ends of ridges. The Chester and Elioak soils are on ridgetops and side slopes. Also included are areas with a clayey surface layer or a surface layer of gravelly loam and areas with stones on the surface.

The permeability and available water capacity of this Buckhall soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is medium. Potential frost action is moderate. Shrink-swell potential is low.

This soil is used mainly for hay and pasture.

This soil is moderately well suited to cultivated crops, especially corn and small grains. The erosion hazard is moderate in areas without adequate plant cover. Conservation tillage and using grasses and legumes in the cropping system are practices that help to reduce runoff and control erosion.

This soil is well suited to pasture and hay grasses and legumes, including alfalfa. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is moderately high on this soil, and the soil is easily managed for woodland.

Slope, low strength, the clayey subsoil, and the permeability limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIIe.

BuD—Buckhall loam, 15 to 25 percent slopes. This soil is very deep and well drained. It is on moderately

steep side slopes. The areas range from about 2 to 50 acres.

Typically, the surface layer is yellowish brown loam 9 inches thick. The subsoil is yellowish red and is 25 inches thick. It is clay in the upper part and mottled loam in the lower part. The substratum is variegated yellow, white, and red loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ashe, Chester, and Elioak soils. The Ashe soils are on side slopes and ends of ridges. The Chester and Elioak soils are on ridgetops and side slopes. Also included are areas with a clayey surface layer or a surface layer of gravelly loam and areas with stones on the surface.

The permeability and available water capacity of this Buckhall soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is rapid. Potential frost action is moderate. Shrink-swell potential is low.

This soil is used mainly for woodland and pasture.

Slope makes this soil poorly suited to cultivated crops. The erosion hazard is severe in areas without adequate plant cover. Conservation tillage and using grasses and legumes in the cropping system help to reduce runoff and control erosion in cultivated areas.

The soil is moderately well suited to pasture and poorly suited to hay. Slope is a limitation. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is moderately high on this soil. Slope limits the use of equipment.

Slope, low strength, the clayey subsoil, and the permeability limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IVe.

CaE—Cataska very stony silt loam, 25 to 75 percent slopes. This soil is moderately deep and excessively drained. It is on steep and very steep side slopes. The areas range from about 5 to 200 acres. Stones about 24 inches in diameter cover 3 to 15 percent of the surface.

Typically, the surface layer is very dark grayish brown channery silt loam 2 inches thick. The subsurface layer is yellowish brown channery loam 5 inches thick. The subsoil is yellowish brown very channery silt loam 10 inches thick. The substratum is yellowish brown extremely channery loam 19 inches thick. Bedrock is at a depth of 36 inches.

Included with this soil in mapping are small areas of soils that are more than 40 inches deep to bedrock, soils where stones cover up to 50 percent of the surface, and soils on ridgetops near the Rockingham County line that have slopes of more than 75 percent.

The permeability of this Cataska soil is moderately rapid to rapid. Available water capacity is very low. Natural fertility is low, and organic matter content is moderate. The rooting zone and depth to bedrock range from 20 to 40 inches. Root growth is limited by a high content of rock fragments in the soil. In unlimed areas the surface and subsurface layers and the subsoil are very strongly acid or strongly acid. Surface runoff is very rapid. Potential frost action is moderate. Shrink-swell potential is low.

Slope and the stones on the surface make this soil generally unsuited to farming. The erosion hazard is severe in areas without adequate plant cover.

This soil is used mainly for woodland, but the potential productivity for timber is low. The high rock fragment content, the very low available water capacity, and the depth to bedrock cause a high rate of seedling mortality. Slope and the rock fragment content limit the use of equipment.

Slope, the rock fragments, and the depth to bedrock limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIIs.

CcE—Catoctin-Rock outcrop complex, 25 to 80 percent slopes. This unit is on steep and very steep side slopes. The areas range from about 5 to 100 acres. Stones about 24 inches in diameter cover from 15 to 50 percent of the surface. The areas are about 55 percent moderately deep and well drained Catoctin soils, 30 percent Rock outcrop, and 15 percent other soils. The Catoctin soils and Rock outcrop are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Catoctin soils is dark brown channery silt loam 5 inches thick. The subsoil is 13 inches thick. It is yellowish brown channery silt loam and reddish brown channery silty clay loam. The substratum is yellowish brown extremely channery silt loam 8 inches thick. Bedrock is at a depth of 26 inches.

Included with this unit in mapping are small areas of soils that are more than 40 inches deep to bedrock, small areas of soils that have slopes of less than 25 percent, and small areas that are more than 30 percent Rock outcrop.

The permeability of these Catoctin soils is moderately rapid. Available water capacity is very low. Natural fertility is medium, and organic matter content is moderate. The rooting zone and depth to bedrock range from 20 to 40 inches. Root growth is limited by a high content of rock fragments in the soil. The surface layer and subsoil are strongly acid through slightly acid, and the substratum is moderately acid through neutral. Surface runoff is very rapid. Potential frost action is moderate. Shrink-swell potential is low.

Slope and the areas of exposed rock make this unit generally unsuitable for farming. The erosion hazard is severe in areas without adequate plant cover.

The potential productivity for timber is moderate on this soil, and most areas are wooded. Slope and the exposed rock limit the use of equipment. The high rock fragment content, the very low available water capacity, and the depth to bedrock cause a high rate of seedling mortality.

Slope, the depth to bedrock, the rock fragments, and the exposed rock limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIIs.

CgB—Chatuge sandy loam, 1 to 4 percent slopes. This soil is gently sloping, very deep, and poorly drained. It is along intermittent drainageways, on colluvial foot slopes, and on alluvial fans. The areas range from about 2 to 25 acres. This soil is occasionally flooded for brief periods.

Typically, the surface layer is dark grayish brown sandy loam 6 inches thick. The subsoil is 35 inches thick. It is light brownish gray sandy loam in the upper part and gray sandy loam and sandy clay loam in the lower part. The substratum extends to a depth of 60 inches or more. It is gray sandy loam and variegated brown, white, and yellow loam.

Included with this soil in mapping are small areas of Codorus, Meadowville, and Suches soils. The Codorus and Suches soils are on flood plains. The Meadowville soils are in drainageways and on foot slopes and alluvial fans. Also included are soils that contain more sand than this Chatuge soil and soils that have a surface layer of gravelly sandy loam.

The permeability of this Chatuge soil is moderate in the subsoil and rapid in the substratum. Available water capacity is moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid through moderately acid. Surface runoff is slow. Potential frost action is high. Shrink-swell potential is moderate. A seasonal high water table is between the surface and a depth of 12 inches.

This soil is used mainly for woodland and pasture.

Flooding and seasonal wetness make this soil poorly suited to cultivated crops. Small grains on this soil tend to lodge. Delaying planting and installing drainage increase the suitability of the soil for crops.

This soil is moderately well suited to pasture and hay. Flooding and seasonal wetness are the main limitations. The main pasture management practices are installing drainage, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer. Grazing when the soil is wet causes compaction of the surface layer.

The potential productivity for timber is very high on this soil. Seasonal wetness limits the use of equipment and causes a high rate of seedling mortality. Controlling competing vegetation is a management concern.

Flooding and seasonal wetness limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IVw.

ChC—Chester loam, 7 to 15 percent slopes. This soil is very deep and well drained. It is on strongly sloping ridgetops and side slopes. The areas range from about 2 to 50 acres.

Typically, the surface layer is dark brown loam 7 inches thick. The subsoil is strong brown and yellowish red clay loam 39 inches thick. The substratum is variegated strong brown and yellowish red loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ashe, Elioak, and Thurmont soils on ridgetops and side slopes. Also included are small areas of soils with slopes of less than 7 percent, severely eroded soils, and soils with stones on the surface.

The permeability and available water capacity of this Chester soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is medium. Potential frost action is moderate. Shrink-swell potential is low.

This soil is used mainly for woodland, hay, and pasture.

This soil is moderately well suited to cultivated crops, especially corn and small grains. The erosion hazard is moderate in areas without adequate plant cover. Conservation tillage and using grasses and legumes in the cropping system are practices that help to reduce runoff and control erosion.

This soil is well suited to pasture and hay grasses and legumes, including alfalfa. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil, and the soil is easily managed for woodland.

Slope and permeability limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIIe.

ChD—Chester loam, 15 to 25 percent slopes. This soil is very deep and well drained. It is on moderately steep side slopes. The areas range from about 2 to 25 acres.

Typically, the surface layer is dark brown loam 7 inches thick. The subsoil is strong brown and yellowish

red clay loam 39 inches thick. The substratum is variegated strong brown and yellowish red loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ashe, Elioak, and Thurmont soils on side slopes. Also included are small areas of severely eroded soils and soils with stones on the surface.

The permeability and available water capacity of this Chester soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is rapid. Potential frost action is moderate. Shrink-swell potential is low.

This soil is used mainly for woodland and pasture.

Slope makes this soil poorly suited to cultivated crops. The erosion hazard is severe in areas without adequate plant cover. Conservation tillage and using grasses and legumes in the cropping system help to reduce runoff and control erosion in cultivated areas.

The soil is moderately well suited to pasture and poorly suited to hay. Slope is a limitation. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil. Slope limits the use of equipment.

Slope and permeability limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IVe.

CmC—Chester and Parker soils, very stony, 7 to 15 percent slopes. This unit is on strongly sloping ridgetops. The areas range from about 5 to 25 acres. Stones about 24 inches in diameter cover from 3 to 15 percent of the surface. Some areas consist mostly of Chester soils, some mostly of Parker soils, and some of both. The total acreage of the unit is about 50 percent very deep, well drained Chester soils; 30 percent deep and very deep, somewhat excessively drained Parker soils; and 20 percent other soils.

Typically, the surface layer of the Chester soils is dark brown loam 7 inches thick. The subsoil is strong brown and yellowish red clay loam 39 inches thick. The substratum is variegated strong brown and yellowish red loam to a depth of 60 inches or more.

Typically, the surface layer of the Parker soils is very dark grayish brown very gravelly loam 3 inches thick. The subsurface layer is dark yellowish brown very gravelly loam 3 inches thick. The subsoil is brownish yellow very gravelly loam 19 inches thick. The substratum is brownish yellow extremely cobbly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Elioak and Thurmont soils. The Elioak soils are on ridgetops and side slopes at low elevations. The Thurmont soils are on foot slopes, in saddles, and along drainageways. Also included are areas with a darker surface layer than these Chester and Parker soils, areas of rock outcrop, areas with slopes of less than 7 percent, and areas where stones cover 15 to 50 percent of the surface.

The permeability and available water capacity of these Chester soils is moderate. Natural fertility is low, and organic matter content is moderate. The rooting zone and depth to bedrock in the Chester soils are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is medium. Potential frost action is moderate, and shrink-swell potential is low.

The permeability of these Parker soils is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is low. Natural fertility is low, and organic matter content is moderate. The root zone and depth to bedrock in the Parker soils are at least 48 inches, but a high content of rock fragments in the soil restricts root growth. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is medium. Potential frost action is moderate, and shrink-swell potential is low.

The stones on the surface, slope, and the high rock fragment content and low available water capacity of the Parker soils make this unit generally unsuitable for cultivated crops. The erosion hazard is moderate in areas without adequate plant cover.

This soil is poorly suited to pasture and generally unsuited to hay. The stones on the surface and the very low available water capacity and high rock fragment content of the Parker soils are limitations. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

Most areas of this unit are wooded. The potential productivity for timber is high on the Chester soils and moderately high on the Parker soils. The high rock fragment content and low available water capacity of the Parker soils causes a high rate of seedling mortality, and the stones on the surface limit the use of equipment.

Slope and the rock fragment content and depth to bedrock in the Parker soils limit this unit for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIs.

CmD—Chester and Parker soils, very stony, 15 to 25 percent slopes. This unit is on moderately steep ridgetops and side slopes. The areas range from about 5 to 50 acres. Stones about 24 inches in diameter cover from 3 to 15 percent of the surface. Some areas consist mostly of Chester soils, some mostly of Parker soils, and some of both. The total acreage of the unit is about 50

percent very deep, well drained Chester soils; 30 percent deep and very deep, somewhat excessively drained Parker soils; and 20 percent other soils.

Typically, the surface layer of the Chester soils is dark brown loam 7 inches thick. The subsoil is strong brown and yellowish red clay loam 39 inches thick. The substratum is variegated strong brown and yellowish red loam to a depth of 60 inches or more.

Typically, the surface layer of the Parker soils is very dark grayish brown very gravelly loam 3 inches thick. The subsurface layer is dark yellowish brown very gravelly loam 3 inches thick. The subsoil is brownish yellow very gravelly loam 19 inches thick. The substratum is brownish yellow extremely cobbly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Elioak and Thurmont soils. The Elioak soils are on ridgetops and side slopes at low elevations. The Thurmont soils are on foot slopes, in saddles, and along drainageways. Also included are areas with a darker surface layer than these Chester and Parker soils, areas of rock outcrop, and areas where stones cover 15 to 50 percent of the surface.

The permeability and available water capacity of these Chester soils is moderate. Natural fertility is low, and organic matter content is moderate. The rooting zone and depth to bedrock in the Chester soils are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is rapid. Potential frost action is moderate, and shrink-swell potential is low.

The stones on the surface, slope, and the high rock fragment content and low available water capacity of the Parker soils make this unit generally unsuitable for cultivated crops. The erosion hazard is severe in areas without adequate plant cover.

This soil is poorly suited to pasture and generally unsuited to hay. The stones on the surface and the very low available water capacity and high rock fragment content of the Parker soils are limitations. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

Most areas of this unit are wooded. The potential productivity for timber is high on the Chester soils and moderately high on the Parker soils. The high rock fragment content and low available water capacity of the Parker soils causes a high rate of seedling mortality, and the stones on the surface limit the use of equipment.

Slope and the rock fragment content and depth to bedrock in the Parker soils limit this unit for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIs.

Cn—Codorus silt loam. This soil is very deep and moderately well drained and somewhat poorly drained. It is on nearly level stream terraces. The areas range from about 2 to 30 acres. They are occasionally flooded for very brief periods. Slopes range from 0 to 4 percent.

Typically, the surface layer is dark brown silt loam 13 inches thick. The subsoil is mottled, yellowish brown silty clay loam 30 inches thick. The substratum is mottled gray and brown sandy clay loam and sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Comus, Craigsville, Kinkora, and Suches soils. The Comus, Craigsville, and Suches soils are on levees. The Kinkora soils are in flood basins.

The permeability of this Codorus soil is moderate in the subsoil and rapid in the substratum. Available water capacity is high. Natural fertility is low, and organic matter content is moderate. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid through moderately acid in the upper part and strongly acid through slightly acid in the lower part. Surface runoff is slow. Potential frost action is high. Shrink-swell potential is low. A seasonal high water table is at a depth of 12 to 24 inches.

This soil is used mainly for cultivated crops, hay, and pasture.

This soil is well suited to cultivated crops, especially corn, but small grains tend to lodge. Flooding and seasonal wetness are the main limitations for cultivated crops.

The soil is well suited to pasture and hay and water-tolerant legumes. Flooding and seasonal wetness make the soil unsuited to alfalfa. The main pasture management practices are providing drainage, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer. Grazing when the soil is wet causes compaction of the surface layer.

The potential productivity for timber is very high on this soil. Flooding and seasonal wetness limit the use of equipment and cause a high rate of seedling mortality.

Flooding and seasonal wetness limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIw.

Cs—Comus fine sandy loam. This soil is very deep and well drained. It is on nearly level natural levees. The areas range from about 5 to 50 acres. This soil is frequently flooded for very brief periods. Slopes range from 0 to 2 percent.

Typically, the surface layer is yellowish brown fine sandy loam 7 inches thick. The subsoil is dark yellowish brown loam and fine sandy loam 30 inches thick. The substratum is brown loam and variegated loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Codorus, Craigsville, Hatboro, and Suches soils on flood plains. Also included are soils that are sandier than this Comus soil.

The permeability and available water capacity of this Comus soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid through moderately acid. Surface runoff is slow. Potential frost action is moderate. Shrink-swell potential is low.

This soil is used mainly for cultivated crops, hay, and pasture.

This soil is well suited to cultivated crops, especially corn, and to pasture and hay and water-tolerant legumes. Flooding is the main limitation, and the soil is unsuited to alfalfa. The main pasture management practices are rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is very high on this soil, and the soil is easily managed for woodland.

Flooding and the permeability limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIw.

Cv—Craigsville cobbly sandy loam. This soil is very deep, nearly level, and well drained. It is on levees and in scour channels. The areas range from about 5 to 50 acres and are frequently flooded for very brief periods. Slopes range from 0 to 2 percent.

Typically, the surface layer is brown cobbly sandy loam 6 inches thick. The subsoil is strong brown very gravelly sandy loam 16 inches thick. The substratum is brown extremely cobbly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Codorus, Comus, Hatboro, and Suches soils on flood plains. Also included are areas with stones on the surface.

The permeability of this Craigsville soil is rapid. Available water capacity is low. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches, but root growth is limited by a high content of rock fragments. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is slow. Potential frost action is moderate. Shrink-swell potential is low.

This soil is used mainly for pasture and cultivated crops (fig. 7).

This soil is moderately well suited to cultivated crops, such as corn, and to pasture and hay and water-tolerant legumes. The soil is unsuited to alfalfa. Flooding, low available water capacity, and the high rock fragment content are the main limitations for farming. The main pasture management practices are rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil. Plant competition is a management concern.

Flooding and the rock fragments in the soil limit building site development and limit the soil as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIIs.

DkB3—Dyke clay loam, 2 to 7 percent slopes, severely eroded. This soil is very deep and well drained. It is on gently sloping ridgetops. Erosion has removed much of the original surface layer, and the subsoil is exposed in places. The areas range from about 5 to 50 acres.

Typically, the surface layer is dark reddish brown clay loam 8 inches thick. The subsoil is dark red, very sticky clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Elioak soils on the edges of the unit.

The permeability and available water capacity of this Dyke soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is medium. Potential frost action and shrink-swell potential are moderate.

This soil is used mainly for cultivated crops, hay, and pasture.

This soil is moderately well suited to cultivated crops, especially corn and small grains. The erosion hazard is moderate in areas without adequate plant cover. Conservation tillage and using grasses and legumes in the cropping system are practices that help to reduce runoff and control erosion.

This soil is well suited to pasture and hay grasses and legumes, including alfalfa. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil. Plant competition is a management concern, and the clayey surface layer limits the use of equipment.

The low strength, clayey subsoil, permeability, and shrink-swell potential limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIIe.

DkC3—Dyke clay loam, 7 to 15 percent slopes, severely eroded. This soil is very deep and well drained. It is on strongly sloping ridgetops and side slopes. Erosion has removed much of the original surface layer, and the subsoil is exposed in places. The areas range from about 5 to 50 acres.

Figure 7.—A pasture of fescue on Craigsville cobbly sandy loam.

Typically, the surface layer is dark reddish brown clay loam 8 inches thick. The subsoil is dark red, very sticky clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ashe and Elioak soils on ridgetops and side slopes.

The permeability and available water capacity of this Dyke soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is medium. Potential frost action and shrink-swell potential are moderate.

This soil is used mainly for cultivated crops, hay, and pasture.

Slope and the clayey texture of the surface layer make this soil poorly suited to cultivated crops. The erosion hazard is severe in areas without adequate plant cover. Conservation tillage and using grasses and legumes in the cropping system are practices that help to reduce erosion in cultivated areas.

This soil is moderately well suited to pasture and hay grasses and legumes, including alfalfa. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil. Plant competition is a management concern, and the clayey surface layer limits the use of equipment.

Slope and the low strength, clayey subsoil, permeability, and shrink-swell potential limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IVe.

ElB—Elioak loam, 2 to 7 percent slopes. This soil is very deep and well drained. It is on gently sloping ridgetops. The areas range from about 3 to 100 acres.

Typically, the surface layer is brown loam 6 inches thick. The subsoil is red clay 43 inches thick. The substratum is variegated red, white, and brown fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ashe, Buckhall, Glenelg, and Meadowville soils. The Ashe soils are on the points of ridges and sloping areas.

The Buckhall and Glenelg soils are on ridgetops. The Meadowville soils are along drainageways. Also included are soils that have a clay surface layer.

The permeability and available water capacity of this Elioak soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid through moderately acid. Surface runoff is medium. Potential frost action and shrink-swell potential are moderate.

This soil is used mainly for cultivated crops, hay, and pasture.

This soil is well suited to cultivated crops, especially corn and small grains. The erosion hazard is moderate in areas without adequate plant cover. Conservation tillage and using grasses and legumes in the cropping system are practices that help to reduce runoff and control erosion.

This soil is well suited to pasture and hay grasses and legumes, including alfalfa. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil, and the soil is easily managed for woodland.

Low strength, the clayey subsoil, permeability, and the shrink-swell potential limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIe.

EIC—Elioak loam, 7 to 15 percent slopes. This soil is very deep and well drained. It is on strongly sloping ridgetops and side slopes. The areas range from about 2 to 50 acres.

Typically, the surface layer is brown loam 6 inches thick. The subsoil is red clay 43 inches thick. The substratum is variegated red, white, and brown fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ashe, Glenelg, and Meadowville soils. The Ashe soils are on the points of ridges and sloping areas. The Glenelg soils are on ridgetops. The Meadowville soils are along drainageways. Also included are soils that have a clay surface layer.

The permeability and available water capacity of this Elioak soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid through moderately acid. Surface runoff is medium. Potential frost action and shrink-swell potential are moderate.

This soil is used mainly for cultivated crops, hay, and pasture.

This soil is moderately well suited to cultivated crops, especially corn and small grains. The erosion hazard is moderate in areas without adequate plant cover. Conservation tillage and using grasses and legumes in the cropping system are practices that help to reduce runoff and control erosion.

This soil is well suited to pasture and hay grasses and legumes, including alfalfa. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil, and the soil is easily managed for woodland.

Slope, low strength, the clayey subsoil, permeability, and the shrink-swell potential limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIIe.

EnC3—Elioak clay loam, 7 to 15 percent slopes, severely eroded. This soil is very deep and well drained. It is on strongly sloping side slopes and ridgetops. The areas range from about 2 to 300 acres. Erosion has removed much of the original surface layer, and the subsoil is exposed in places.

Typically, the surface layer is brown clay loam 6 inches thick. The subsoil is red clay 43 inches thick. The substratum is variegated red, white, and brown fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ashe, Glenelg, and Meadowville soils. The Ashe and Glenelg soils are on ridges and side slopes. The Meadowville soils are along drainageways. Also included are areas of very stony soils.

The permeability and available water capacity of this Elioak soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid through moderately acid. Surface runoff is medium. Potential frost action and shrink-swell potential are moderate.

This soil is used mainly for hay and pasture (fig. 8).

This soil is poorly suited to cultivated crops. Slope is a limitation, and the erosion hazard is severe in areas without adequate plant cover. This soil has poor tilth, and erosion of the original surface layer has removed most of the organic matter and many nutrients, causing poor germination. Conservation tillage and using grasses and legumes in the cropping system are practices that help reduce runoff and control erosion.

This soil is moderately well suited to pasture and hay grasses and legumes, including alfalfa. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

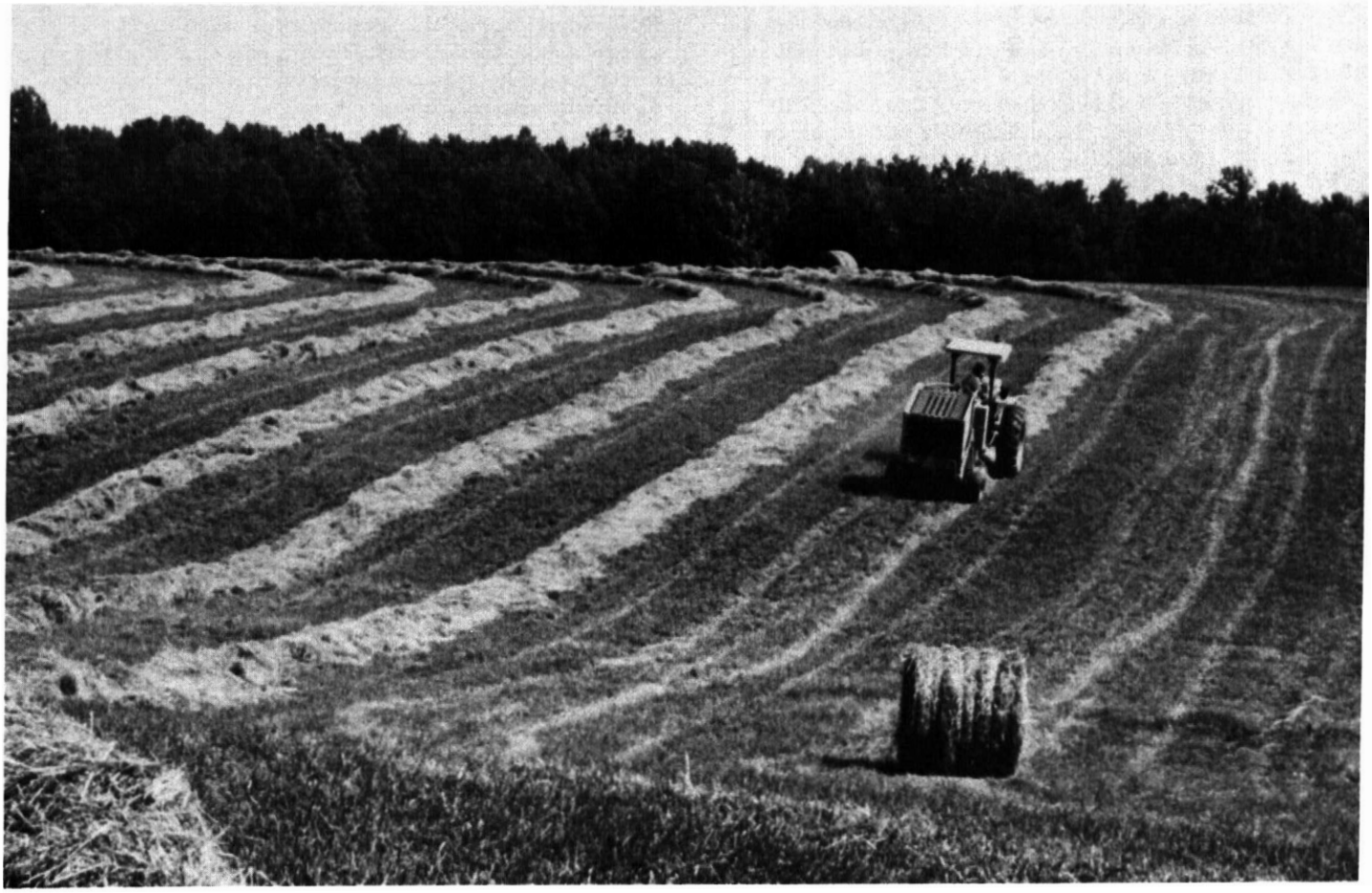


Figure 8.—Harvesting hay on Elioak clay loam, 7 to 15 percent slopes, severely eroded.

The potential productivity for timber is high on this soil. The clay in the surface layer limits the use of equipment and causes a high rate of seedling mortality.

Slope and the low strength, clayey subsoil, permeability, and shrink-swell potential limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IVe.

EnD3—Elioak clay loam, 15 to 25 percent slopes, severely eroded. This soil is very deep and well drained. It is on moderately steep side slopes. The areas range from about 2 to 100 acres. Erosion has removed much of the original surface layer, and the subsoil is exposed in places.

Typically, the surface layer is brown clay loam 6 inches thick. The subsoil is red clay 43 inches thick. The substratum is variegated red, white, and brown fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ashe, Glenelg, and Meadowville soils. The Ashe and Glenelg soils are on ridges and side slopes. The Meadowville soils are along drainageways. Also included are areas of very stony soils.

The permeability and available water capacity of this Elioak soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid through moderately acid. Surface runoff is rapid. Potential frost action and shrink-swell potential are moderate.

This soil is used mainly for pasture and woodland.

This soil is generally unsuitable for cultivated crops. Slope is a limitation, and the erosion hazard is severe in areas without adequate plant cover. This soil has poor tilth, and erosion of the original surface layer has removed most of the organic matter and many nutrients, causing poor germination.

The soil is moderately well suited to pasture and poorly suited to hay. Slope is a limitation. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil. Slope and the clay in the surface layer limit the use of equipment, and the clay causes a high rate of seedling mortality.

Slope and the low strength, clayey subsoil, permeability, and shrink-swell potential limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIe.

GIC—Glenelg loam, 7 to 15 percent slopes. This soil is very deep and well drained. It is on strongly sloping side slopes and ridgetops. The areas range from about 5 to 30 acres.

Typically, the surface layer is yellowish brown loam 5 inches thick. The subsoil is strong brown loam 22 inches thick. The substratum is variegated yellowish brown and strong brown loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Elioak and Hazel soils on ridges and side slopes. Also included are areas where the surface layer has more gravel and sand than this Glenelg soil.

The permeability and available water capacity of this Glenelg soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is medium. Potential frost action is moderate. Shrink-swell potential is low.

This soil is used mainly for pasture and woodland.

This soil is moderately well suited to cultivated crops, especially corn and small grains. The erosion hazard is moderate in areas without adequate plant cover. Conservation tillage and using grasses and legumes in the cropping system are practices that help to reduce runoff and control erosion.

This soil is well suited to pasture and hay grasses and legumes, including alfalfa. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil, and the soil is easily managed for woodland.

Slope limits the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIIe.

GID—Glenelg loam, 15 to 25 percent slopes. This soil is very deep and well drained. It is on moderately steep side slopes. The areas range from about 5 to 30 acres.

Typically, the surface layer is yellowish brown loam 5 inches thick. The subsoil is strong brown loam 22 inches thick. The substratum is variegated yellowish brown and strong brown loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Elioak and Hazel soils on ridges and side slopes. Also included are areas where the surface layer has more gravel and sand than this Glenelg soil.

The permeability and available water capacity of this Glenelg soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is rapid. Potential frost action is moderate. Shrink-swell potential is low.

Slope makes this soil poorly suited to cultivated crops. The erosion hazard is severe in areas without adequate plant cover. Conservation tillage and using grasses and legumes in the cropping system help to reduce runoff and control erosion in cultivated areas.

The soil is moderately well suited to pasture and poorly suited to hay. Slope is a limitation. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil, and most areas are wooded. Slope limits the use of equipment.

Slope limits the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IVe.

Hb—Hatboro loam. This soil is very deep and poorly drained. It is on nearly level flood basins. The areas range from about 2 to 25 acres. They are frequently flooded for very brief periods. Slopes range from 0 to 2 percent.

Typically, the surface layer is brown loam 15 inches thick. The subsoil is 25 inches thick. It is mottled, grayish brown clay loam in the upper part and mottled grayish brown, strong brown, and dark brown sandy clay loam in the lower part. The substratum is light brownish gray loamy sand and gray sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Codorus, Comus, Craigsville, Kinkora, and Suches soils. The Codorus, Comus, Craigsville, and Suches soils are on flood plains. The Kinkora soils are in flood basins. Also included are soils that contain more sand and gravel than this Hatboro soil.

The permeability of this Hatboro soil is moderate in the subsoil and moderately rapid in the substratum. Available water capacity is moderate. Natural fertility is low, and

organic matter content is moderate. The rooting zone and depth to bedrock are more than 60 inches. The soil is very strongly acid through neutral to a depth of about 30 inches and moderately acid or slightly acid at a depth of more than 30 inches. Surface runoff is very slow, and water is ponded on the surface of some areas. Potential frost action is high. Shrink-swell potential is low. A seasonal high water table is at a depth of 6 inches.

This soil is used mainly for woodland and pasture.

This soil is moderately well suited to cultivated crops, especially corn, but small grains tend to lodge. Flooding and seasonal wetness are the main limitations for cultivated crops.

This soil is well suited to pasture and hay but is unsuited to legumes. Flooding and seasonal wetness are the main limitations. The main pasture management practices are providing drainage, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer. Grazing when the soil is wet causes compaction of the surface layer.

The potential productivity for timber is moderate on this soil. Seasonal wetness limits the use of equipment.

Flooding and seasonal wetness limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIIw.

HzD—Hazel loam, 15 to 25 percent slopes. This soil is moderately deep and excessively drained. It is on moderately steep side slopes. The areas range from about 5 to 30 acres.

Typically, the surface layer is yellowish brown loam 3 inches thick. The subsoil is strong brown silt loam 11 inches thick. The substratum is variegated red, brown, and black channery silt loam 23 inches thick. Bedrock is at a depth of 37 inches.

Included with this soil in mapping are small areas of Elioak and Glenelg soils on side slopes. Also included are areas of rock outcrop and soils with a surface layer of gravelly loam.

The permeability of this Hazel soil is moderately rapid. Available water capacity is low. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock range from 20 to 40 inches. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is rapid. Potential frost action is moderate. Shrink-swell potential is low.

Slope and the low available water capacity make this soil generally unsuitable for cultivated crops. The erosion hazard is severe in areas without adequate plant cover.

This soil is moderately well suited to pasture and poorly suited to hay. Slope and low available water capacity are the main limitations. Maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer are the main pasture management practices.

The potential productivity for timber is moderately high on this soil, and most areas are wooded. The low available water capacity causes a high rate of seedling mortality, and slope limits the use of equipment.

The depth to bedrock, seepage, and slope limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIe.

HzE—Hazel loam, 25 to 45 percent slopes. This soil is moderately deep and excessively drained. It is on steep side slopes. The areas range from about 5 to 30 acres.

Typically, the surface layer is yellowish brown loam 3 inches thick. The subsoil is strong brown silt loam 11 inches thick. The substratum is variegated red, brown, and black channery silt loam 23 inches thick. Bedrock is at a depth of 37 inches.

Included with this soil in mapping are small areas of Elioak and Glenelg soils on side slopes. Also included are areas of rock outcrop and soils with a surface layer of gravelly loam.

The permeability of this Hazel soil is moderately rapid. Available water capacity is low. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock range from 20 to 40 inches. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is very rapid. Potential frost action is moderate. Shrink-swell potential is low.

Slope makes this soil generally unsuited to cultivated crops and hay and poorly suited to pasture. The erosion hazard is severe in areas without adequate plant cover. The main pasture management practices are rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is moderate on this soil. Slope limits the use of equipment.

The depth to bedrock, seepage, and slope limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIIe.

Kn—Kinkora silt loam. This soil is very deep and poorly drained. It is on nearly level flood basins. The areas range from about 2 to 30 acres. They are rarely flooded for brief periods. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark grayish brown silt loam 9 inches thick. The subsurface layer is mottled, grayish brown silty clay loam 7 inches thick. The subsoil is mottled and is 23 inches thick. It is light brownish gray silty clay loam in the upper part and gray clay in the lower part. The substratum is light gray cobbly sandy clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Codorus, Hatboro, and Suches soils. The Codorus and Suches soils are on flood plains, and the Hatboro soils

are in flood basins. Also included are areas that have more sand, gravel, and cobblestones throughout than this Kinkora soil.

The permeability of this Kinkora soil is slow. Available water capacity is moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface and subsurface layers and the subsoil are extremely acid through strongly acid. Surface runoff is slow, and water is ponded on the surface of some areas. Potential frost action and shrink-swell potential are high. A seasonal high water table is between the surface and a depth of 6 inches.

This soil is used mainly for cultivated crops, hay, and pasture.

This soil is moderately well suited to cultivated crops, especially corn, but small grains tend to lodge. Flooding and seasonal wetness are the main limitations for cultivated crops.

This soil is well suited to pasture and hay but is unsuited to legumes. Flooding and seasonal wetness are the main limitations. The main pasture management practices are providing drainage, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer. Grazing when the soil is wet causes compaction of the surface layer.

The potential productivity for timber is very high on this soil. Flooding and seasonal wetness limit the use of equipment and cause a high rate of seedling mortality.

Flooding, seasonal wetness, low strength, the shrink-swell potential, and the permeability limit this soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIIw.

LeC—Lew extremely stony loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on foot slopes and alluvial fans, in saddles, and along drainageways. The areas range from about 5 to 50 acres. Stones about 24 inches in diameter cover from 15 to 50 percent of the surface.

Typically, the surface layer is very dark grayish brown very channery loam 4 inches thick. The subsurface layer is dark yellowish brown very channery silt loam 9 inches thick. The subsoil extends to a depth of 60 inches or more. It is multicolored very channery clay loam that is mottled in the lower part.

Included with this soil in mapping are small areas of Catoctin and Myersville soils on ridges and side slopes. Also included are soils with slopes of less than 7 percent, areas of rock outcrop, areas where stones cover less than 15 percent of the surface, and areas where stones cover as much as 90 percent of the surface.

The permeability and available water capacity of this Lew soil are moderate. Natural fertility is medium, and organic matter content is moderate. The rooting zone and depth to bedrock are more than 60 inches, but a high rock fragment content limits root growth. In unlimed areas the surface and subsurface layers and the subsoil are very strongly acid through moderately acid. Surface runoff is medium. Potential frost action and shrink-swell potential are moderate.

Slope and the stones on the surface make this soil generally unsuitable for farming. The erosion hazard is moderate in areas without adequate plant cover.

The potential productivity for timber is high on this soil, and most areas are wooded. The stones on the surface limit the use of equipment, and plant competition is a management concern.

The rock fragments in the soil and slope limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIIs.

LeD—Lew extremely stony loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on foot slopes and alluvial fans, in saddles, and along drainageways. The areas range from about 5 to 50 acres. Stones about 24 inches in diameter cover from 15 to 50 percent of the surface.

Typically, the surface layer is very dark grayish brown very channery loam 4 inches thick. The subsurface layer is dark yellowish brown very channery silt loam 9 inches thick. The subsoil extends to a depth of 60 inches or more. It is multicolored very channery clay loam that is mottled in the lower part.

Included with this soil in mapping are small areas of Catoctin and Myersville soils on ridges and side slopes. Also included are areas of rock outcrop, areas where stones cover less than 15 percent of the surface, and areas where stones cover up to 90 percent of the surface.

The permeability and available water capacity of this Lew soil are moderate. Natural fertility is medium, and organic matter content is moderate. The rooting zone and depth to bedrock are more than 60 inches, but a high rock fragment content limits root growth. In unlimed areas the surface and subsurface layers and the subsoil are very strongly acid through moderately acid. Surface runoff is rapid. Potential frost action and shrink-swell potential are moderate.

Slope and the stones on the surface make this soil generally unsuitable for farming. The erosion hazard is moderate in areas without adequate plant cover.

The potential productivity for timber is high on this soil, and most areas are wooded. The stones on the surface limit the use of equipment, and plant competition is a management concern.

The rock fragments in the soil and slope limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIIs.

LeE—Lew extremely stony loam, 25 to 75 percent slopes. This soil is very deep and well drained. It is along steep and very steep side slopes and drainageways. The areas range from about 5 to 150 acres. Stones about 24 inches in diameter cover from 15 to 50 percent of the surface.

Typically, the surface layer is very dark grayish brown very channery loam 4 inches thick. The subsurface layer is dark yellowish brown very channery silt loam 9 inches thick. The subsoil extends to a depth of 60 inches or more. It is multicolored very channery clay loam that is mottled in the lower part.

Included with this soil in mapping are small areas of Catoctin and Myersville soils on ridges and side slopes. Also included are areas of rock outcrop, areas where stones cover less than 15 percent of the surface, and areas where stones cover up to 90 percent of the surface.

The permeability and available water capacity of this Lew soil are moderate. Natural fertility is medium, and organic matter content is moderate. The rooting zone and depth to bedrock are more than 60 inches, but a high rock fragment content limits root growth. In unlimed areas the surface and subsurface layers and the subsoil are very strongly acid through moderately acid. Surface runoff is very rapid. Potential frost action and shrink-swell potential are moderate.

Slope and the stones on the surface make this soil generally unsuitable for farming. The erosion hazard is moderate in areas without adequate plant cover.

The potential productivity for timber is high on this soil, and most areas are wooded. Slope and the stones on the surface limit the use of equipment, and plant competition is a management concern.

The rock fragments in the soil and slope limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIIs.

MvB—Meadowville fine sandy loam, 2 to 7 percent slopes. This soil is gently sloping, deep or very deep, and well drained. It is along intermittent drainageways, in heads of drainageways and saddles, and on foot slopes. The areas range from about 2 to 25 acres.

Typically, the surface layer is dark brown fine sandy loam 7 inches thick. The subsoil is 34 inches thick. It is reddish brown clay loam in the upper part and yellowish red clay loam and sandy clay loam in the lower part. The substratum is yellowish red sandy clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Belvoir, Chatuge, Glenelg, and Elioak soils. The Belvoir and Chatuge soils are in and near drainageways and saddles and are on foot slopes. The Elioak and Glenelg soils are on ridgetops and side slopes. Some areas have gravelly layers below the surface layer.

The permeability and available water capacity of this Meadowville soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 48 inches. In unlimed areas the surface layer and subsoil are very strongly acid through moderately acid. Surface runoff is slow. Potential frost action and shrink-swell potential are moderate. A seasonal high water table is at a depth of 36 to 60 inches.

This soil is used mainly for hay and pasture.

This soil is well suited to cultivated crops, especially corn. The erosion hazard is slight. Conservation tillage and using grasses and water-tolerant legumes in the cropping system are practices that help to control erosion.

The soil is well suited to pasture and hay and to water-tolerant legumes, but seasonal wetness limits the growth of alfalfa. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil, and the soil is easily managed for woodland.

Seasonal wetness, slope, and the shrink-swell potential limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIe.

MxC—Myersville and Catoctin very stony silt loams, 7 to 15 percent slopes. This unit consists of well drained, strongly sloping soils on ridgetops. The areas range from about 5 to 100 acres. Stones about 24 inches in diameter cover from 3 to 15 percent of the surface. The unit is about 50 percent very deep Myersville soils, 35 percent moderately deep Catoctin soils, and 15 percent other soils. The Myersville and Catoctin soils are so intermingled that it was not practical to map them separately.

Typically, the Myersville soils have a surface layer of dark brown channery silt loam 5 inches thick. The subsoil is 25 inches thick. It is strong brown channery silty clay loam and channery silt loam. The substratum is variegated extremely channery silty clay loam 42 inches thick. Bedrock is at a depth of 72 inches.

Typically, the surface layer of the Catoctin soils is dark brown channery silt loam 5 inches thick. The subsoil is 13 inches thick. It is yellowish brown channery silt loam and reddish brown channery silty clay loam. The substratum is yellowish brown extremely channery silt loam 8 inches thick. Bedrock is at a depth of 26 inches.

Included with this unit in mapping are small areas of Lew soils on foot slopes and alluvial fans, in saddles, and along drainageways. Also included are areas of rock outcrop, soils with slopes of less than 7 percent, areas where stones cover 15 to 50 percent of the surface, and

areas where stones cover less than 3 percent of the surface.

The permeability and available water capacity of these Myersville soils are moderate. Natural fertility is medium, and organic matter content is moderate. The root zone and depth to bedrock in the Myersville soils are more than 60 inches. In unlimed areas of the Myersville soils, the surface layer and subsoil are very strongly acid through moderately acid. Surface runoff is medium. Potential frost action is moderate, and shrink-swell potential is low.

The permeability of these Catoctin soils is moderately rapid, and available water capacity is very low. Natural fertility is medium, and organic matter content is moderate. The rooting zone and depth to bedrock in the Catoctin soils are 20 to 40 inches, and the high rock fragment content limits root growth. In unlimed areas of the Catoctin soils, the surface layer and subsoil are strongly acid through slightly acid. Surface runoff is medium. Potential frost action is moderate, and shrink-swell potential is low.

The stones on the surface, slope, and the very low available water capacity and high rock fragment content of the Catoctin soils make this unit generally unsuited to cultivated crops and hay and poorly suited to pasture. The erosion hazard is moderate in areas without adequate plant cover. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is very high on the Myersville soils and moderate on the Catoctin soils. Most areas are wooded. Plant competition is a management concern on the Myersville soils. The very low available water capacity and high rock fragment content of the Catoctin soils cause a high rate of seedling mortality.

Slope, the rock fragments in the soil, the depth to bedrock, and the permeability of the Myersville soils limit the unit for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIs.

MyD—Myersville and Catoctin extremely stony silt loams, 15 to 25 percent slopes. This unit consists of well drained, moderately steep soils on ridgetops and side slopes. The areas range from about 5 to 100 acres. Stones about 24 inches in diameter cover from 15 to 50 percent of the surface. The unit is about 50 percent very deep Myersville soils, 35 percent moderately deep Catoctin soils, and 15 percent other soils. The Myersville and Catoctin soils are so intermingled that it was not practical to map them separately.

Typically, the Myersville soils have a surface layer of dark brown channery silt loam 5 inches thick. The subsoil is 25 inches thick. It is strong brown channery silty clay loam and channery silt loam. The substratum is variegated extremely channery silty clay loam 42 inches thick. Bedrock is at a depth of 72 inches.

Typically, the surface layer of the Catoctin soils is dark brown channery silt loam 5 inches thick. The subsoil is 13 inches thick. It is yellowish brown channery silt loam and reddish brown channery silty clay loam. The substratum is yellowish brown extremely channery silt loam 8 inches thick. Bedrock is at a depth of 26 inches.

Included with this unit in mapping are small areas of Lew soils on foot slopes and alluvial fans, in saddles, and along drainageways. Also included are areas of rock outcrop, areas where stones cover less than 15 percent of the surface, and areas where stones cover up to 90 percent of the surface.

The permeability and available water capacity of these Myersville soils are moderate. Natural fertility is medium, and organic matter content is moderate. The root zone and depth to bedrock in the Myersville soils are more than 60 inches. In unlimed areas of the Myersville soils, the surface layer and subsoil are very strongly acid through moderately acid. Surface runoff is rapid. Potential frost action is moderate, and shrink-swell potential is low.

The permeability of these Catoctin soils is moderately rapid, and available water capacity is very low. Natural fertility is medium, and organic matter content is moderate. The rooting zone and depth to bedrock in the Catoctin soils are 20 to 40 inches, and the high rock fragment content limits root growth. In unlimed areas of the Catoctin soils, the surface layer and subsoil are strongly acid through slightly acid. Surface runoff is rapid. Potential frost action is moderate, and shrink-swell potential is low.

The stones on the surface, slope, and the very low available water capacity and high rock fragment content of the Catoctin soils make this unit generally unsuitable for farming. The hazard of erosion is severe in areas without adequate plant cover.

The potential productivity for timber is very high on the Myersville soils and moderate on the Catoctin soils. Most areas are wooded. Plant competition is a management concern on the Myersville soils. Slope and the stones on the surface limit the use of equipment. The very low available water capacity and high rock fragment content of the Catoctin soils cause a high rate of seedling mortality.

Slope, the rock fragments in the soil, the depth to bedrock, and the permeability of the Myersville soils limit the unit for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIIs.

MyE—Myersville and Catoctin extremely stony silt loams, 25 to 80 percent slopes. This unit consists of well drained, steep and very steep soils on side slopes. The areas range from about 5 to 400 acres. Stones about 24 inches in diameter cover from 15 to 50 percent

of the surface. This unit is about 50 percent very deep Myersville soils, 35 percent moderately deep Catoctin soils, and 15 percent other soils. The Myersville and Catoctin soils are so intermingled that it was not practical to map them separately.

Typically, the Myersville soils have a surface layer of dark brown channery silt loam 5 inches thick. The subsoil is 25 inches thick. It is strong brown channery silty clay loam and channery silt loam. The substratum is variegated extremely channery silty clay loam 42 inches thick. Bedrock is at a depth of 72 inches.

Typically, the surface layer of the Catoctin soils is dark brown channery silt loam 5 inches thick. The subsoil is 13 inches thick. It is yellowish brown channery silt loam and reddish brown channery silty clay loam. The substratum is yellowish brown extremely channery silt loam 8 inches thick. Bedrock is at a depth of 26 inches.

Included with this unit in mapping are small areas of Lew soils on concave side slopes and along drainageways. Also included are areas of rock outcrop, areas where stones cover up to 90 percent of the surface, and areas where stones cover less than 15 percent of the surface.

The permeability and available water capacity of these Myersville soils are moderate. Natural fertility is medium, and organic matter content is moderate. The root zone and depth to bedrock in the Myersville soils are more than 60 inches. In unlimed areas of the Myersville soils, the surface layer and subsoil are very strongly acid through moderately acid. Surface runoff is very rapid. Potential frost action is moderate, and shrink-swell potential is low.

The permeability of these Catoctin soils is moderately rapid, and available water capacity is very low. Natural fertility is medium, and organic matter content is moderate. The rooting zone and depth to bedrock in the Catoctin soils are 20 to 40 inches, and the high rock fragment content limits root growth. In unlimed areas of the Catoctin soils, the surface layer and subsoil are strongly acid through slightly acid. Surface runoff is very rapid. Potential frost action is moderate, and shrink-swell potential is low.

Slope and the stones on the surface make this unit generally unsuitable for farming.

The potential productivity for timber is very high on the Myersville soils and moderate on the Catoctin soils. Most areas are wooded. Plant competition is a management concern on the Myersville soils. Slope and the stones on the surface limit the use of equipment. The very low available water capacity and high rock fragment content of the Catoctin soils cause a high rate of seedling mortality.

Slope, the rock fragments in the soil, the depth to bedrock, and the permeability of the Myersville soils limit the unit for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIIs.

PrE—Parker extremely stony loam, 25 to 70 percent slopes. This soil is deep and very deep and is somewhat excessively drained. It is on steep and very steep side slopes. The areas range from about 5 to 800 acres. Stones about 24 inches in diameter cover from 15 to 50 percent of the surface.

Typically, the surface layer is very dark grayish brown very gravelly loam 3 inches thick. The subsurface layer is dark yellowish brown very gravelly loam 3 inches thick. The subsoil is brownish yellow very gravelly loam 19 inches thick. The substratum is brownish yellow extremely cobbly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Chester and Thurmont soils. The Chester soils are on moderately steep side slopes. The Thurmont soils are along drainageways and on foot slopes. Also included are small areas in which the surface layer is darker than in this Parker soil, areas of rock outcrop, areas where stones cover less than 15 percent of the surface, and areas where stones cover up to 90 percent of the surface.

The permeability of this Parker soil is moderately rapid. Available water capacity is low. Natural fertility is low, and organic matter content is moderate. The rooting zone and depth to bedrock are more than 48 inches, but root growth is limited by a high content of rock fragments. In unlimed areas the surface and subsurface layers and the subsoil are very strongly acid or strongly acid. Surface runoff is very rapid. Potential frost action is moderate. Shrink-swell potential is low.

Slope and the stones on the surface make this soil generally unsuitable for farming. The erosion hazard is severe in areas without adequate plant cover.

The potential productivity for timber is moderately high on this soil, and most areas are wooded. The rock fragments in the soil and the low available water capacity cause a high rate of seedling mortality. The slope and the stones on the surface limit the use of equipment.

Slope and the rock fragments in the soil limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields. In some areas the depth to bedrock is less than 60 inches and is a further limitation for community development.

The capability subclass is VIIs.

Sc—Suches-Codorus complex. This unit consists of very deep, nearly level soils on flood plains and along drainageways. The Suches soils are on levees, and the Codorus soils are in scour channels. These soils are frequently flooded for brief periods. Slopes range from 0 to 2 percent. The areas range from about 2 to 200 acres. They are about 45 percent well drained Suches soils, 30 percent moderately well drained and somewhat poorly drained Codorus soils, and 25 percent other soils.

The Suches and Codorus soils are so intermingled that it was not practical to map them separately.

Typically, the Suches soils have a surface layer of dark brown fine sandy loam 12 inches thick. The subsoil is 37 inches thick. It is yellowish brown loam in the upper part and variegated brown loam and sandy loam in the lower part. The substratum is variegated brown sandy loam to a depth of 60 inches or more.

Typically, the Codorus soils have a surface layer of brown loam 11 inches thick. The subsoil is 34 inches thick. It is yellowish brown loam in the upper part and mottled, brown and gray silt loam and loam in the lower part. The substratum is yellowish brown loamy sand to a depth of 60 inches or more.

Included with this unit in mapping are small areas of Comus, Craigsville, Hatboro, and Kinkora soils. The Comus, Craigsville, and Hatboro soils are on flood plains and along drainageways. The Kinkora soils are in flood basins.

The permeability and available water capacity of these Suches soils are moderate. Natural fertility is low, and organic matter content is moderate. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil of the Suches soils are very strongly acid through moderately acid. Surface runoff is very slow or slow. Potential frost action in the Suches soils is moderate, and shrink-swell potential is low. The seasonal high water table in the Suches soils is at a depth of 30 to 60 inches.

The permeability of these Codorus soils is moderate in the subsoil and moderately rapid or rapid in the substratum. Available water capacity is moderate. Natural fertility is low, and organic matter content is moderate. In unlimed areas the surface layer of the Codorus soils is very strongly acid through moderately acid and the subsoil is strongly acid through slightly acid. Surface runoff is very slow or slow. Potential frost action is high in the Codorus soils, and shrink-swell potential is low. The Codorus soils have a seasonal high water table at a depth of 12 to 24 inches.

These soils are used mainly for hay and pasture.

These soils are well suited to cultivated crops, especially corn, but small grains tend to lodge. Flooding and seasonal wetness are the main limitations.

The soils are well suited to pasture and hay and water-tolerant legumes but are unsuited to alfalfa. Flooding and seasonal wetness are the main limitations. The main pasture management practices are maintaining a mixture of grasses and water-tolerant legumes, providing drainage, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer. Grazing when the soils are wet causes compaction of the surface layer.

The potential productivity for timber is very high on these soils. Flooding and seasonal wetness limit the use of equipment and cause a high rate of seedling mortality. Plant competition is a management concern.

Flooding and seasonal wetness limit the soils for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIw.

ThC—Thurmont loam, 7 to 15 percent slopes. This soil is very deep and well drained. It is on strongly sloping ridgetops and side slopes. The areas range from about 2 to 30 acres.

Typically, the surface layer is light olive brown loam 5 inches thick. The subsoil is 26 inches thick. It is strong brown clay loam that is mottled in the lower part. The substratum extends to a depth of 60 inches or more. It is variegated brown, black, and red sandy clay loam and sandy loam.

Included with this soil in mapping are small areas of Belvoir, Buckhall, and Chester soils. The Belvoir soils are on foot slopes and along drainageways. The Buckhall and Chester soils are on ridgetops and side slopes. Also included are soils with slopes of less than 7 percent, soils with a surface layer of gravelly loam, and soils with stones on the surface.

The permeability and available water capacity of this Thurmont soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is medium. Potential frost action is moderate. Shrink-swell potential is low. A seasonal high water table is at a depth of 48 to 72 inches.

This soil is used mainly for hay and pasture.

This soil is moderately well suited to cultivated crops such as corn and small grains. Slope is a limitation, and the erosion hazard is moderate in areas without adequate plant cover. Conservation tillage and using grasses and water-tolerant legumes in the cropping system help to reduce runoff and control erosion.

The soil is well suited to pasture and hay and to water-tolerant legumes, but seasonal wetness limits the growth of alfalfa. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil. Plant competition is the main management concern.

Seasonal wetness, permeability, and slope limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIIe.

ThD—Thurmont loam, 15 to 25 percent slopes. This soil is very deep and well drained. It is on moderately steep side slopes. The areas range from about 2 to 30 acres.

Typically, the surface layer is light olive brown loam 5 inches thick. The subsoil is 26 inches thick. It is strong

brown clay loam that is mottled in the lower part. The substratum extends to a depth of 60 inches or more. It is variegated brown, black, and red sandy clay loam and sandy loam.

Included with this soil in mapping are small areas of Belvoir, Buckhall, and Chester soils. The Belvoir soils are along drainageways and on foot slopes. The Buckhall and Chester soils are on side slopes. Also included are soils with a surface layer of gravelly loam and areas with stones on the surface.

The permeability and available water capacity of this Thurmont soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is rapid. Potential frost action is moderate. Shrink-swell potential is low. A seasonal high water table is at a depth of 48 to 72 inches.

This soil is used mainly for woodland and pasture.

Slope makes this soil poorly suited to cultivated crops. The erosion hazard is severe in areas without adequate plant cover. Conservation tillage and using grasses and legumes in the cropping system help to reduce runoff and control erosion in cultivated areas.

This soil is moderately well suited to pasture grasses and water-tolerant legumes but poorly suited to hay. Wetness limits the growth of alfalfa, and slope is a limitation. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil. Slope limits the use of equipment. Plant competition is a management concern.

Seasonal wetness, permeability, and slope limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IVe.

TvD—Thurmont very stony loam, 15 to 25 percent slopes. This soil is moderately steep, very deep, and well drained. It is on foot slopes and side slopes and along drainageways. The areas range from about 2 to 30 acres. Stones about 18 inches in diameter cover from 3 to 15 percent of the surface.

Typically, the surface layer is light olive brown loam 5 inches thick. The subsoil is 26 inches thick. It is strong brown clay loam that is mottled in the lower part. The substratum extends to a depth of 60 inches or more. It is variegated brown, black, and red sandy clay loam and sandy loam.

Included with this soil in mapping are small areas of Buckhall, Chester, Lew, and Parker soils. The Buckhall, Chester, and Parker soils are on side slopes. The Lew soils are on foot slopes and side slopes. Also included are soils with slopes of less than 15 percent and areas where stones cover 15 to 50 percent of the surface.

The permeability and available water capacity of this Thurmont soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. Surface runoff is rapid. Potential frost action is moderate. Shrink-swell potential is low. A seasonal high water table is at a depth of 48 to 72 inches.

Slope and the stones on the surface make this soil generally unsuitable for cultivated crops and hay and poorly suited to pasture. The erosion hazard is severe in areas without adequate plant cover. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is high on this soil, and most areas are wooded. Slope and the stones on the surface limit the use of equipment. Plant competition is a management concern.

Slope, seasonal wetness, permeability, and the stones on the surface limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is VIIs.

Ud—Udorthents, smoothed. This unit mainly consists of soils in areas that have been excavated or filled. The thickness of the fill material is variable but is generally more than 20 inches. The soils are shallow, moderately deep, deep, and very deep; well drained, moderately well drained, and somewhat poorly drained; and nearly level, gently sloping, strongly sloping, and moderately steep. They are on uplands, stream terraces, and flood plains. The areas range from about 2 to 50 acres.

Included with this unit in mapping are small areas of Ashe, Braddock, Craigsville, and Elioak soils. The Ashe, Braddock, and Elioak soils are on ridgetops and side slopes. The Craigsville soils are on flood plains.

Some areas of this unit are used as sites for buildings, landfills, and highways. The properties and characteristics of the unit are so variable, however, that onsite investigation is needed to determine the suitability of the unit for any use.

This unit is not assigned to a capability subclass.

UnA—Unison loam, 0 to 2 percent slopes. This soil is very deep and well drained. It is on nearly level stream terraces. The areas range from about 2 to 50 acres.

Typically, the surface layer is brown loam 9 inches thick. The subsoil is strong brown clay 38 inches thick. The substratum is strong brown very cobbly clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Codorus, Comus, and Craigsville soils on flood plains. Also included are soils with a clayey subsoil.

The permeability and available water capacity of this Unison soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid through moderately acid. Surface runoff is slow. Potential frost action and shrink-swell potential are moderate.

This soil is used mainly for cultivated crops, hay, and pasture.

This soil is well suited to cultivated crops, especially corn and small grains. The erosion hazard is slight. Conservation tillage and using grasses and legumes in the cropping system help to control erosion.

The soil is well suited to pasture and hay, including alfalfa. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is very high on this soil. Plant competition is a management concern.

Low strength, the clayey subsoil, permeability, and the shrink-swell potential limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability class is I.

UnB—Unison loam, 2 to 7 percent slopes. This soil is very deep and well drained. It is on gently sloping ridgetops and stream terraces. The areas range from about 2 to 50 acres.

Typically, the surface layer is brown loam 9 inches thick. The subsoil is strong brown clay 38 inches thick. The substratum is strong brown very cobbly clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Codorus, Comus, Craigsville, and Elioak soils. The Codorus, Comus, and Craigsville soils are on flood plains. The Elioak soils are on ridgetops. Also included are soils with a clayey surface layer.

The permeability and available water capacity of this Unison soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid through moderately acid. Surface runoff is medium. Potential frost action and shrink-swell potential are moderate.

This soil is used mainly for cultivated crops, hay, and pasture.

This soil is well suited to cultivated crops, especially corn and small grains. The erosion hazard is moderate in areas without adequate plant cover. Conservation tillage and using grasses and legumes in the cropping system are practices that help to reduce runoff and control erosion.

This soil is well suited to pasture and hay grasses and legumes, including alfalfa. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is very high on this soil. Plant competition is a management concern.

Low strength, the clayey subsoil, permeability, and the shrink-swell potential limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIe.

UnC—Unison loam, 7 to 15 percent slopes. This soil is very deep and well drained. It is on strongly sloping ridgetops, side slopes, and stream terraces. The areas range from about 2 to 50 acres.

Typically, the surface layer is brown loam 9 inches thick. The subsoil is strong brown clay 38 inches thick. The substratum is strong brown very cobbly clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Codorus and Elioak soils. The Codorus soils are on stream terraces. The Elioak soils are on ridgetops and side slopes. Also included are soils that have a clayey surface layer.

The permeability and available water capacity of this Unison soil are moderate. Natural fertility and organic matter content are low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the surface layer and subsoil are very strongly acid through moderately acid. Surface runoff is medium. Potential frost action and shrink-swell potential are moderate.

This soil is used mainly for hay and pasture.

This soil is moderately well suited to cultivated crops, especially corn and small grains. The erosion hazard is moderate in areas without adequate plant cover. Conservation tillage and using grasses and legumes in the cropping system are practices that help to reduce runoff and control erosion.

This soil is well suited to pasture and hay grasses and legumes, including alfalfa. The main pasture management practices are maintaining a mixture of grasses and legumes, rotational grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for timber is very high on this soil. Plant competition is a management concern.

Slope, low strength, the clayey subsoil, permeability, and the shrink-swell potential limit the soil for building site development and as a site for sanitary facilities, including septic tank absorption fields.

The capability subclass is IIIe.

Prime Farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited, and the U.S. Department of Agriculture recognizes that government, as well as individuals, must encourage and facilitate the use of our Nation's prime farmland with wisdom and foresight.

Prime farmland, as defined by the U.S. Department of Agriculture, is the 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 a sustained high yield of crops when it is treated and managed using acceptable farming methods. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland may now be in crops, pasture, woodland, or other land, but not urban or built-up land or water areas. It must either be used for producing food or fiber or be available for those uses.

The prime farmland in the county usually has an adequate and dependable supply of moisture from precipitation or irrigation. It also has favorable temperature and growing season and acceptable levels of acidity or alkalinity. 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 and is not flooded during the growing season. The slope range is mainly from 0 to 6 percent. For more detailed information on the criteria for prime farmland, consult the local staff of the Soil Conservation Service. About 9,990 acres, or nearly 10 percent of the land area of Greene County, meets the soil requirements for prime farmland.

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

The soil map units that make up prime farmland in Greene County are listed in table 6. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 5. 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 "Detailed Soil Map Units."

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help 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, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

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

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The 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.

The 1978 Census of Agriculture Preliminary Report lists about 42,000 acres of farmland in the survey area. This total consists of about 3,000 acres for row crops such as corn, 6,500 acres for hay, 8,500 acres for pasture, 18,000 acres of woodland and wooded pasture, and 6,000 acres for miscellaneous use. Although a small acreage of cropland and pasture has been converted to residential development, the total farm acreage in crops in the county has been gradually increasing.

Soil erosion is the major concern on most of the cropland in Greene County. Most of the soils in the county, except for those on flood plains and some low stream terraces, have slopes of more than 2 percent and thus have a moderate to severe hazard of erosion.

Erosion of the surface layer reduces the organic matter content, water-holding capacity, and fertility of the soil, thus lowering its potential productivity and making seedbed preparation difficult. Erosion further results in the sedimentation of streams and lakes, lowering the quality of water for fish and wildlife.

Erosion is especially harmful to soils that have a clayey subsoil and to soils in which bedrock is close to the surface. For example, in the Braddock, Dyke, Elioak, and Unison soils, erosion of the surface layer exposes a clayey subsoil that is less productive than the original surface layer and more difficult to till. In the Ashe, Catoctin, and Hazel soils, erosion not only exposes a less productive subsoil, but also decreases the amount of productive soil material between the surface and the bedrock.

Erosion-control practices provide a protective surface cover, reduce runoff, and increase infiltration. For example, a cropping system that keeps plant cover on the soil for extended periods minimizes soil losses and thus preserves the productive capacity of the soil. A conservation cropping system that consists of a rotation of hay or pasture with row crops reduces erosion, increases the organic matter content of the surface layer, increases fertility and available water capacity, and improves soil tilth.

Using sod in waterways and contour tillage are common erosion-control practices in the survey area and are suited to most areas of Braddock, Buckhall, Dyke, Elioak, and Unison soils (fig. 9).

Conservation tillage, using winter cover crops, and leaving crop residue on the surface reduce runoff and increase infiltration. These practices are suitable for most of the soils in the county but are more difficult to use on severely eroded areas than on areas that have little or no erosion.

Fertility is low in most of the soils in the county, and most unlimed areas are strongly acid or very strongly acid. Thus, applications of lime and fertilizer are needed for crops on most of the soils.

Drainage is needed on a small acreage of cropland in the county. Belvoir, Codorus, Hatboro, and Kinkora soils, for example, are so wet that they require subsurface drainage to be suitable for crops commonly grown in the county. The Codorus and Kinkora soils often stay wet through the spring, and clods form on the surface if the soils are plowed when wet. The type of drainage system needed varies according to the type of soil being drained. In soils with slow permeability, such as Kinkora soils, subsurface drainage lines generally are spaced more closely than in moderately permeable Hatboro soils.

Field crops suited to the soils and climate of the survey area are corn, soybeans, grain sorghum, wheat, rye, barley, and oats. Conservation cropping systems that use rotations of grasses and legumes help to maintain good tilth and fertility. Pastures consist of tall fescue, orchardgrass, bluegrass, and clover. The major pasture management concerns are the prevention of overgrazing and maintaining a mixture of grasses and legumes. The common pasture management practices are weed control, the use of proper stocking rates, rotational grazing, restriction of grazing when the soils

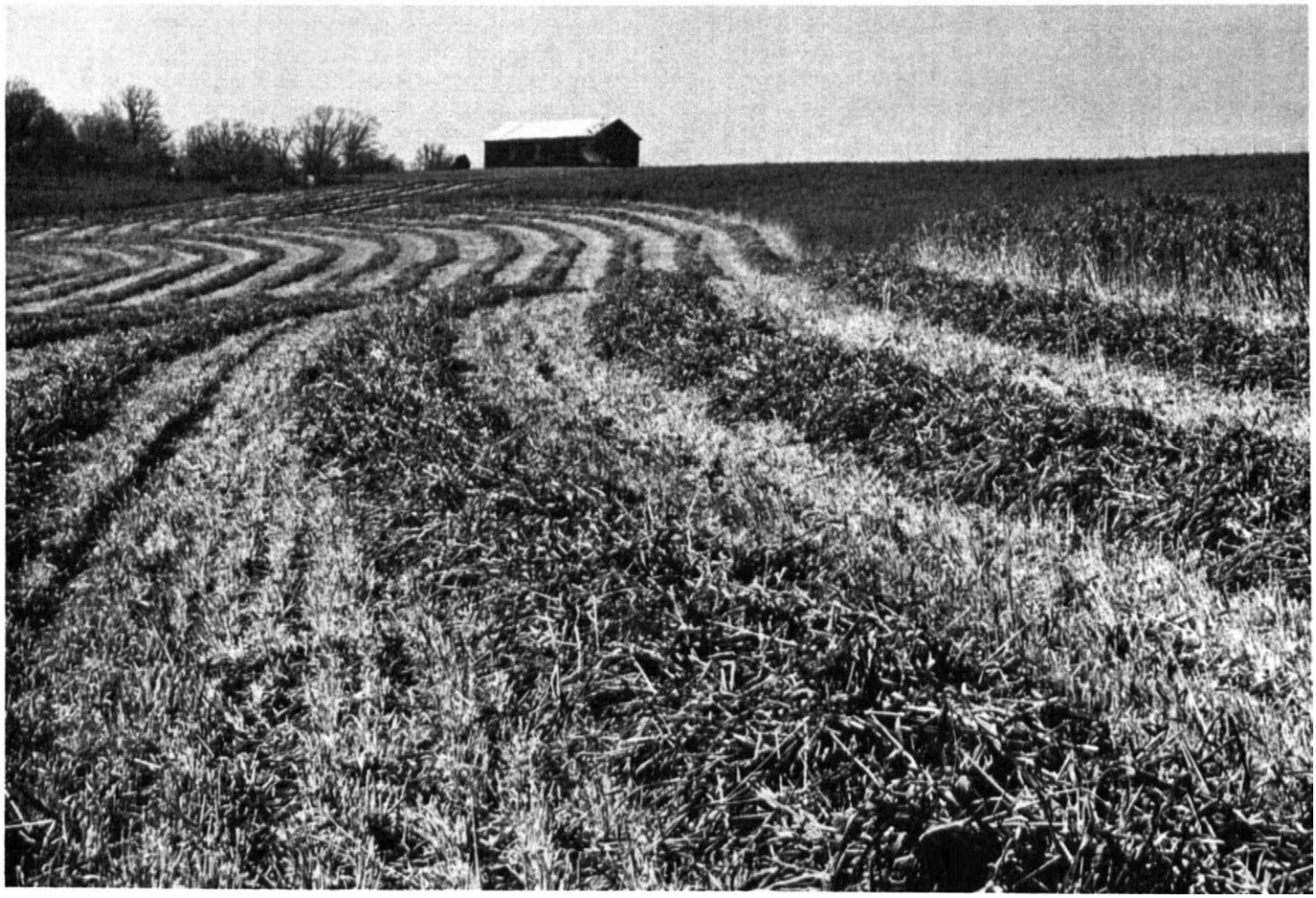


Figure 9.—Contour farming on Elioak loam, 7 to 15 percent slopes.

are wet, and the use of lime and fertilizer. The major plants grown and harvested for hay are Kentucky-31 fescue, orchardgrass, ryegrass, red clover, and alfalfa.

The main special crops grown in the county, generally on a small scale, are apples, peaches, vegetables, grapes, strawberries, and nursery plants. Most of the deep, well drained upland soils are suited to these special crops. Of prime importance is good air drainage for fruits and early-season vegetables.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management and the capability classification of each soil are shown in table 7. 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 7 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for 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 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 (fig. 10).

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. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

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

Figure 10.—An area of Myersville and Catoctin extremely stony silt loams, 15 to 25 percent slopes, in capability subclass VIIs.

Woodland Management and Productivity

Table 8 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 8, *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 few trees may be blown down by strong 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. 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

The soils of the survey area are rated in table 9 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 9, 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 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

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

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

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not

wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

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

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

Wildlife Habitat

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 10, 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, oats, and barley.

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

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

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 blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are American hazelnut, autumn-olive, and crabapple.

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

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, cattail, pickerel weed, 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. The wildlife attracted to these areas include bobwhite quail, mourning dove, meadowlark, field sparrow, cottontail, rabbit, and red fox.

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

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

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, corrosivity, shrink-swell potential, available water capacity, 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 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or to a very firm dense layer, stone content, soil texture, and slope. The time of the year that excavations

can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and 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, 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, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

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

Sanitary Facilities

Table 12 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 12 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, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

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

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

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock, flooding, 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 or bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil (fig. 11). 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 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, 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

Figure 11.—A landfill on Elioak loam, 7 to 15 percent slopes.

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 13 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 13, 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 14 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, irrigation, terraces and diversions, and grassed waterways.

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

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

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a 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 and permeability of the aquifer. 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 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, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts or sulfur. Availability of drainage outlets is not considered in the ratings.

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

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 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 affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts, 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 15 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 the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "cobbly." 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 ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The

estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are 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 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

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

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

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

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils 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. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams or runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 17 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 the average, 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 17 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 17.

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. An *artesian* water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

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

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 (*4*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 18 shows the classification of the soils in the survey area. 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 Ultisol.

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 Udult (*Ud*, meaning udic moisture regime, plus *ult*, from Ultisol).

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 Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that have an udic moisture regime).

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

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, mesic Typic Hapludults.

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 (*3*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*4*). 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 soils of the Ashe series are moderately deep and somewhat excessively drained. They formed in materials weathered from granitic and gneissic rocks. They are on uplands in the Piedmont physiographic province. Slopes range from 7 to 75 percent.

Ashe soils are near Braddock, Chatuge, Dyke, and Elioak soils. The Ashe soils contain less clay than the Braddock, Dyke, or Elioak soils and are better drained than the Chatuge soils.

Typical pedon of Ashe sandy loam, 15 to 25 percent slopes, about 1.1 miles north-northeast of the

intersection of U.S. Routes 29 and 33, 1.6 miles south-southwest of the intersection of U.S. Route 29 and VA-645, and 1 mile northeast of Ruckersville:

Oi—1 inch to 0, partially decomposed leaves and twigs.
A—0 to 5 inches, dark brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; many very fine, fine, medium, and coarse roots; many fine discontinuous tubular pores between peds; 12 percent rock fragments; few fine flakes of mica; strongly acid; clear wavy boundary.
E—5 to 10 inches, yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; friable; many very fine, fine, medium, and coarse roots; many fine discontinuous tubular pores between peds; 12 percent rock fragments; few fine flakes of mica; strongly acid; clear wavy boundary.
Bw—10 to 22 inches, strong brown (7.5YR 5/6) sandy loam; weak fine subangular blocky structure; friable; common very fine, fine, and medium roots; common fine discontinuous tubular pores between peds; 12 percent rock fragments; few fine flakes of mica; strongly acid; clear smooth boundary.
C—22 to 30 inches, strong brown (7.5YR 5/6) fine sandy loam; massive; friable; common very fine, fine, and medium roots; many fine discontinuous vesicular pores; 15 percent rock fragments; few fine flakes of mica; strongly acid; abrupt irregular boundary.
Cr—30 to 38 inches, mottled strong brown (7.5YR 5/6), yellowish brown (10YR 5/6), yellowish red (5YR 5/6), black (10YR 2/1), and white (10YR 8/1) slightly weathered granite rock that crushes to coarse sandy loam under moderate pressure; massive; very firm; 15 percent rock fragments; few fine flakes of mica; strongly acid.
R—38 inches, hard fractured granite bedrock.

The solum thickness ranges from 14 to 36 inches. The depth to bedrock ranges from 20 to 40 inches. The content of rock fragments ranges from 5 to 15 percent in the solum and up to 30 percent in the C horizon. Reaction in unlimed areas is very strongly acid or strongly acid.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. The E horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 through 4. The A and E horizons are sandy loam or loam.

The Bw horizon has hue of 7.5YR or 10YR and value and chroma of 4 through 6. It is sandy loam, loam, or fine sandy loam.

The C and Cr horizons are similar in color and texture to the Bw horizon, or they are variegated brown, red, black, and white.

Belvoir Series

The soils of the Belvoir series are very deep and somewhat poorly drained. They formed in colluvial and residual materials weathered from crystalline rocks. The soils are in the Piedmont physiographic province. They are on foot slopes, at heads of drainageways, and along intermittent drainageways. Slopes range from 2 to 7 percent.

Belvoir soils are near Braddock, Chatuge, Elioak, and Thurmont soils. The Belvoir soils are more poorly drained than the Braddock, Elioak, or Thurmont soils; are better drained than the Chatuge soils; and have a fragipan, which is not typical of any of those soils.

Typical pedon of Belvoir sandy loam, 2 to 7 percent slopes, about 0.2 mile east of the intersection of VA-627 and VA-615, 1/2 mile northwest of the intersection of VA-615 and VA-650, and 1.6 miles north-northwest of Dyke:

Ap—0 to 6 inches, dark yellowish brown (10YR 4/4) sandy loam; weak fine granular structure; friable; common very fine and fine roots; many medium discontinuous tubular pores between peds; 2 percent rock fragments; very slightly acid; clear smooth boundary.
Bt1—6 to 12 inches, yellowish brown (10YR 5/6) sandy clay loam; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few very fine and fine roots; common medium discontinuous tubular pores between peds; thin patchy clay films on faces of peds; slightly acid; clear smooth boundary.
Bt2—12 to 28 inches, yellowish brown (10YR 5/8) clay loam; common medium distinct strong brown (7.5YR 5/8) and grayish brown (10YR 5/2) mottles; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few very fine roots; common medium discontinuous tubular pores between peds; thin patchy clay films on faces of peds; strongly acid; clear wavy boundary.
Bx—28 to 38 inches, yellowish brown (10YR 5/6) sandy clay loam; many medium distinct strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; weak coarse platy structure parting to weak fine and medium subangular blocky; firm, brittle, slightly sticky, slightly plastic; few medium discontinuous vesicular pores within peds; thin patchy clay films on faces of peds; strongly acid; clear smooth boundary.
2C1—38 to 44 inches, yellowish brown (10YR 5/6) clay; common medium distinct strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; massive; firm, slightly sticky, slightly plastic; few medium discontinuous vesicular pores; few fine flakes of mica; strongly acid; abrupt smooth boundary.
2C2—44 to 63 inches, mottled brownish yellow (10YR 6/6), gray (10YR 6/1), and strong brown (7.5YR 5/8) clay; massive; firm, sticky, plastic; few fine discontinuous vesicular pores; very strongly acid.

The solum thickness ranges from 30 to 60 inches. The depth to the fragipan ranges from 16 to 30 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 15 percent in the solum and 0 to 30 percent in the substratum. Mottles with chroma of 2 or less are in the upper 24 inches of the argillic horizon. Reaction in unlimed areas is very strongly acid or strongly acid.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 6. It is loam or sandy loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 through 8. It is sandy clay loam, clay loam, or loam.

The Bx horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 through 8. It is fine sandy loam, sandy loam, sandy clay loam, or loam.

The 2C horizon has hue of 7.5YR or 10YR, value of 4 through 7, and chroma of 1 through 8. The fine-earth fraction is loam, sandy clay loam, clay loam, or clay.

Braddock Series

The soils of the Braddock series are very deep and well drained. They formed in alluvial and colluvial materials weathered from crystalline rocks. They are on dissected alluvial fans and terraces in the Blue Ridge and Piedmont physiographic provinces. Slopes range from 2 to 25 percent.

Braddock soils are near Ashe, Belvoir, and Thurmont soils and Udorthents. The Braddock soils contain more clay than the Ashe, Belvoir, or Thurmont soils and have a subsoil, which is not typical in the Udorthents.

Typical pedon of Braddock loam, 2 to 7 percent slopes, about 1 mile northeast of the intersection of VA-810 and VA-634, 1 mile northwest of the intersection of U.S. Route 33 and VA-646, and 2 miles northwest of Stanardsville:

Ap—0 to 6 inches, brown (7.5YR 4/4) loam; many medium distinct reddish brown (5YR 4/4) mottles; moderate medium granular structure; friable, slightly sticky, slightly plastic; many very fine and fine roots; common fine and medium discontinuous tubular pores between peds; 7 percent rock fragments; slightly acid; clear wavy boundary.

Bt1—6 to 17 inches, yellowish red (5YR 4/6) clay loam; common medium distinct reddish brown (2.5YR 4/4) mottles; moderate medium subangular blocky structure; friable, very sticky, very plastic; common very fine and fine roots; common fine and medium discontinuous tubular pores between peds; thin patchy clay films on faces of peds; 5 percent rock fragments; strongly acid; gradual wavy boundary.

Bt2—17 to 38 inches, red (2.5YR 4/6) clay; moderate fine and medium subangular blocky structure; firm, very sticky, very plastic; common very fine roots; common fine and medium discontinuous tubular pores between peds; thin patchy clay films on faces of peds; 5 percent rock fragments; strongly acid; diffuse smooth boundary.

Bt3—38 to 72 inches, red (2.5YR 4/6) clay; few medium distinct strong brown (7.5YR 4/6 and 5/6) mottles; moderate fine and medium subangular blocky structure; firm, very sticky, very plastic; few very fine roots; common fine and medium discontinuous tubular pores between peds; thin patchy clay films on faces of peds; 5 percent rock fragments; strongly acid.

The solum thickness is at least 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 35 percent in the A horizon and from 0 to 45 percent in the Bt horizon. Reaction in unlimed areas is very strongly acid or strongly acid.

The Ap horizon has hue of 5YR through 10YR, value of 2 through 5, and chroma of 1 through 6. In wooded areas the A horizon is less than 6 inches thick and has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 through 3. The Ap and A horizons in the fine-earth fraction mainly are sandy loam, fine sandy loam, or loam. The Ap horizon is clay loam in eroded areas.

The Bt horizon has hue of 10R through 5YR, value of 3 through 5, and chroma of 6 or 8; hue of 5YR and value of 3 are limited to individual subhorizons. Some pedons have a BC horizon that is variegated red, yellow, and brown. The Bt and BC horizons in the fine-earth fraction are clay loam, sandy clay, or clay.

Some pedons have a C horizon that is variable in color and texture.

Buckhall Series

The soils of the Buckhall series are very deep and well drained. They formed in materials weathered from granitic and gneissic rocks. They are on uplands in the Piedmont physiographic province. Slopes range from 7 to 25 percent.

Buckhall soils are near Chester, Elioak, and Thurmont soils. The Buckhall soils contain more clay than the Chester or Thurmont soils and are not as red as the Elioak soils.

Typical pedon of Buckhall loam, 7 to 15 percent slopes, about 0.2 mile northeast of the intersection of VA-810 and VA-631, 1 mile north of the intersection of VA-810 and VA-633, and 2.6 miles northeast of Dyke:

Ap—0 to 9 inches, yellowish brown (10YR 5/6) loam; moderate fine and medium granular structure; friable, slightly sticky, slightly plastic; many very fine and fine roots; common fine discontinuous tubular pores between peds; 5 percent rock fragments; few fine flakes of mica; strongly acid; abrupt smooth boundary.

Bt—9 to 27 inches, yellowish red (5YR 5/8) clay; moderate fine and medium subangular blocky structure; firm, sticky, plastic; common very fine and fine roots; many fine discontinuous tubular pores between peds; thick continuous clay films on faces of peds; few fine flakes of mica; strongly acid; clear smooth boundary.

BCt—27 to 36 inches, yellowish red (5YR 5/8) loam; many medium distinct reddish yellow (7.5YR 6/8) and white (10YR 8/1) mottles; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; few very fine roots; many fine discontinuous tubular pores between peds; thin discontinuous clay films on faces of peds; common fine flakes of mica; very strongly acid; clear wavy boundary.

C—36 to 62 inches, mottled reddish yellow (7.5YR 6/8), white (10YR 8/1), and yellowish red (5YR 5/8) loam; massive; friable; common fine discontinuous vesicular pores; common fine flakes of mica; very strongly acid.

The solum thickness ranges from 25 to 50 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 20 percent throughout. Reaction in unlimed areas is very strongly acid or strongly acid.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 1 through 6. Some pedons have an E horizon that has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 3 through 6. The A and E horizons in the fine-earth fraction mainly are sandy loam, coarse sandy loam, or loam. The Ap horizon in eroded areas is sandy clay loam or clay loam.

The Bt horizon has hue of 5YR through 10YR, value of 5 or 6, and chroma of 4 through 8. It is clay loam or clay in the fine-earth fraction. The BCt horizon is variegated red, brown, yellow, and white. It is loam or sandy clay loam in the fine-earth fraction.

The C horizon is variegated red, yellow, brown, and white. The fine-earth fraction is sandy loam, loam, sandy clay loam, or clay loam.

Cataska Series

The soils of the Cataska series are moderately deep and excessively drained. They formed in materials weathered from siltstone, shale, and phyllite. They are on uplands in the Blue Ridge physiographic province. Slopes range from 25 to 75 percent.

Cataska soils are near Catoctin, Lew, and Myersville soils. The Cataska soils have lower base saturation than the Catoctin soils and are shallower than the Lew or Myersville soils.

Typical pedon of Cataska channery silt loam, in an area of Cataska very stony silt loam, 25 to 75 percent slopes, about 0.1 mile northeast of Ivy Creek Overlook and 1/2 mile south of Brown Mountain Overlook on Skyline Drive:

Oi—1 inch to 0, partially decomposed leaves and twigs.

A—0 to 2 inches, very dark grayish brown (10YR 3/2) channery silt loam; weak fine granular structure; friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common fine discontinuous tubular pores between peds; 25 percent rock fragments; very strongly acid; abrupt smooth boundary.

E—2 to 7 inches, yellowish brown (10YR 5/4) channery loam; weak fine granular structure; friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common fine discontinuous tubular pores between peds; 30 percent rock fragments; very strongly acid; clear smooth boundary.

Bw—7 to 17 inches, yellowish brown (10YR 5/6) very channery silt loam; weak fine granular structure; friable, slightly sticky, slightly plastic; common very fine and fine roots; common fine discontinuous tubular pores between peds; 45 percent rock fragments; very strongly acid; clear smooth boundary.

Cr—17 to 36 inches, yellowish brown (10YR 5/4) slightly weathered siltstone that crushes to extremely channery loam under moderate pressure; massive; friable, slightly sticky, slightly plastic; 80 percent rock fragments; very strongly acid; abrupt smooth boundary.

R—36 inches, hard fractured siltstone bedrock.

The solum thickness ranges from 12 to 20 inches. The depth to bedrock ranges from 20 to 40 inches. The content of rock fragments ranges from 15 to 35 percent in the A and E horizons and 35 to 80 percent in the Bw and Cr horizons. Reaction is very strongly acid or strongly acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2. The E horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. The A and E horizons are silt loam or loam in the fine-earth fraction.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 6. It is silt loam or loam in the fine-earth fraction.

The color and texture of the Cr horizon are similar to those of the Bw horizon.

Catoctin Series

The soils of the Catoctin series are moderately deep and well drained. They formed in materials weathered from metabasalts and associated metavolcanic and metasedimentary rocks. They are on uplands in the Blue Ridge physiographic province. Slopes range from 7 to 80 percent.

Catoctin soils are near Cataska, Lew, and Myersville soils. The Catoctin soils have higher base saturation than the Cataska soils and are not as deep as the Lew or Myersville soils.

Typical pedon of Catoctin channery silt loam, in an area of Myersville and Catoctin very stony silt loams, 7 to 15 percent slopes, about 0.9 mile northeast of the intersection of VA-632 and VA-637, at Mountain Grove Chapel in Bacon Hollow and 2 miles south-southeast of the intersection of Skyline Drive and the Greene and Rockingham County lines:

A—0 to 5 inches, dark brown (10YR 3/3) channery silt loam; moderate fine granular structure; very friable, slightly sticky, slightly plastic; many very fine and fine roots; common fine discontinuous tubular pores between peds; 30 percent rock fragments; moderately acid; clear wavy boundary.

Bw—5 to 18 inches, yellowish brown (10YR 5/6) channery silt loam; weak very fine subangular blocky structure, interrupted by thin lenses and irregularly shaped areas of reddish brown (5YR 4/4) channery silty clay loam with moderate very fine and fine subangular blocky structure and thin patchy clay films on faces of peds and in pores; friable, slightly sticky, slightly plastic; common very fine and fine roots; common fine discontinuous tubular pores between peds; 30 percent rock fragments; moderately acid; abrupt wavy boundary.

C—18 to 26 inches, yellowish brown (10YR 5/6) extremely channery silt loam; massive; friable, slightly sticky, slightly plastic; few very fine roots; common fine discontinuous vesicular pores; 70 percent rock fragments; slightly acid; clear wavy boundary.

R—26 inches, hard greenstone bedrock.

The solum thickness ranges from 12 to 30 inches. The depth to bedrock ranges from 20 to 40 inches. The content of rock fragments ranges from 5 to 35 percent in the A and E horizons, 15 to 55 percent in the Bw horizon, and 35 to 80 percent in the C horizon. Reaction is strongly acid through slightly acid in the solum and moderately acid through neutral in the C horizon.

The A horizon has hue of 7.5YR or 10YR, value of 3, and chroma of 2 or 3. Some pedons have an E horizon that has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 through 8. The A and E horizons are silt loam or loam in the fine-earth fraction.

The Bw horizon has hue of 5YR through 2.5Y, value of 4 through 6, and chroma of 4 through 8. The fine-earth fraction is silt loam or loam and pockets of silty clay loam or clay loam.

The C horizon is variegated yellow, brown, green, and red. It is silt loam or loam in the fine-earth fraction.

Chatuge Series

The soils of the Chatuge series are very deep and poorly drained. They formed in colluvial materials weathered from crystalline rocks. They are along intermittent drainageways and on foot slopes in the Piedmont physiographic province. Slopes range from 1 to 4 percent.

Chatuge soils are near but wetter than Ashe, Belvoir, Elioak, and Meadowville soils.

Typical pedon of Chatuge sandy loam, 1 to 4 percent slopes, about 0.9 mile south-southeast of the intersection of VA-606 and VA-607, 1/2 mile northeast of the intersection of VA-607 and VA-670, and 2.5 miles south of Ruckersville:

Ap—0 to 6 inches, dark grayish brown (10YR 4/2) sandy loam; few fine distinct strong brown (7.5YR 5/8) mottles; weak fine granular structure; friable; many very fine, fine, and medium roots; common fine discontinuous tubular pores between peds; 4 percent rock fragments; few fine flakes of mica; very strongly acid; abrupt smooth boundary.

Bg—6 to 9 inches, light brownish gray (10YR 6/2) sandy loam; few fine distinct strong brown (7.5YR 5/8) and yellow (10YR 7/8) mottles; weak thick platy structure parting to weak medium subangular blocky; friable; common very fine and fine roots; common fine discontinuous tubular pores between peds and vesicular pores within peds; thin very patchy clay films on faces of peds and in pores; 4 percent rock fragments; very few fine flakes of mica; strongly acid; clear wavy boundary.

Btg1—9 to 15 inches, gray (10YR 6/1) sandy loam; many fine and medium distinct brownish yellow (10YR 6/6) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; common very fine and fine roots; common fine discontinuous tubular pores between peds; thin patchy clay films on faces of peds and in pores; 4 percent rock fragments; few fine flakes of mica; very strongly acid; clear smooth boundary.

Btg2—15 to 36 inches, gray (10YR 6/1) sandy clay loam; common fine and medium distinct strong brown (7.5YR 5/8) mottles; moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine and fine roots; common fine discontinuous tubular pores between peds; thin patchy clay films on faces of peds and in pores; 5 percent rock fragments; strongly acid; clear wavy boundary.

Btg3—36 to 41 inches, gray (10YR 6/1) sandy clay loam; few fine distinct brownish yellow (10YR 6/8) mottles; weak thick platy structure parting to weak medium subangular blocky; friable, slightly sticky, slightly plastic; few very fine roots; few fine discontinuous vesicular pores within peds; thin patchy clay films on faces of peds; 4 percent rock fragments; common fine flakes of mica; very strongly acid; abrupt wavy boundary.

Cg1—41 to 56 inches, gray (N 6/0) sandy loam; massive; friable; few very fine and fine roots; common fine discontinuous vesicular pores; 10

percent rock fragments; common fine flakes of mica; strongly acid; abrupt wavy boundary.

2Cg2—56 to 65 inches, mottled brown, white, and yellow highly weathered bedrock that crushes to loam; massive; friable, slightly sticky, slightly plastic; common fine discontinuous vesicular pores; 10 percent rock fragments; many fine flakes of mica; very strongly acid.

The solum thickness ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 15 percent in the solum and from 10 to 50 percent in the C horizon. Reaction in unlimed areas is very strongly acid through moderately acid.

The Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 1 through 4. In wooded areas the A horizon is less than 10 inches thick and has hue of 10YR, value of 3, and chroma of 1 through 3. The Ap and A horizons are sandy loam, silt loam, or loam.

The B horizon is neutral or has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 0 through 2. It commonly is mottled in hue of 5YR through 10YR, value of 4 through 7, and chroma of 4 through 8. The B horizon is sandy loam, sandy clay loam, clay loam, or silty clay loam.

The C horizon is gray or variegated gray, yellow, white, and brown. The fine-earth fraction is coarse sand, loamy sand, sandy loam, sandy clay loam, loam, or clay loam. Stone lines are in some pedons.

Chester Series

The soils of the Chester series are very deep and well drained. They formed in materials weathered from granodiorite, granite gneiss, and biotite gneiss. They are on uplands in the Piedmont and Blue Ridge physiographic provinces. Slopes range from 7 to 25 percent.

Chester soils are near Buckhall, Parker, and Thurmont soils. The Chester soils contain less clay than the Buckhall soils and fewer rock fragments than the Parker soils. The seasonal high water table in the Chester soils is at a greater depth than in the Thurmont soils.

Typical pedon of Chester loam, 7 to 15 percent slopes, about 1.3 miles west of the intersection of U.S. Route 33 and VA-638, 0.9 mile north-northwest of the intersection of VA-634 and VA-635, and 1 mile west of Lydia:

Oi—1 inch to 0, partially decomposed leaves and twigs.

Ap—0 to 7 inches, dark brown (10YR 4/3) loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; common fine discontinuous tubular pores between peds; 10 percent rock fragments; strongly acid; abrupt wavy boundary.

Bt1—7 to 12 inches, strong brown (7.5YR 4/6) clay loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common fine discontinuous tubular pores between peds; 10 percent rock fragments; strongly acid; clear smooth boundary.

Bt2—12 to 17 inches, strong brown (7.5YR 5/8) clay loam; moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few very fine, fine, and medium roots; common fine discontinuous tubular pores between peds; thin patchy clay films on faces of peds and in pores; 5 percent rock fragments; strongly acid; clear wavy boundary.

Bt3—17 to 39 inches, yellowish red (5YR 5/8) clay loam; few medium distinct yellowish brown (10YR 5/6) mottles in the lower part; moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few very fine and fine roots; common fine discontinuous tubular pores between peds; thin continuous clay films on faces of peds and in pores; 5 percent rock fragments; strongly acid; clear smooth boundary.

BCt—39 to 46 inches, yellowish red (5YR 5/8) clay loam; many medium distinct reddish yellow (7.5YR 6/8) mottles; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; few very fine and fine roots; common fine discontinuous tubular pores between peds; thin very patchy clay films on faces of peds; 5 percent rock fragments; strongly acid; clear smooth boundary.

C—46 to 62 inches, mottled strong brown (7.5YR 5/8) and yellowish red (5YR 5/8) loam; massive; friable, slightly sticky, slightly plastic; few very fine and fine roots; common fine discontinuous vesicular pores; 2 percent rock fragments; strongly acid.

The solum thickness ranges from 30 to 50 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 20 percent throughout. Reaction in unlimed areas is very strongly acid or strongly acid.

The Ap horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 3 through 6. In wooded areas the A horizon has hue of 5YR through 10YR, value of 3, and chroma of 1 or 2. The Ap and A horizons are loam or silt loam in the fine-earth fraction. Some pedons have an E horizon with the same range of color and texture as the Ap horizon.

The B horizon has hue of 2.5YR through 10YR, value of 3 through 6, and chroma of 4 through 8. The hue generally becomes redder with depth. The B horizon in the fine-earth fraction is silt loam, silty clay loam, or clay loam. The BC horizon has colors similar to those of the B or C horizon. The BC horizon in the fine-earth fraction is loam, silt loam, clay loam, or sandy clay loam.

The C horizon has hue of 2.5YR through 10YR, value of 3 through 8, and chroma of 1 through 8 and commonly is mottled. The fine-earth fraction is silt loam, loam, or sandy loam.

Codorus Series

The soils of the Codorus series are very deep and moderately well drained and somewhat poorly drained. They formed in alluvial materials weathered from crystalline rocks. They are on flood plains in the Piedmont physiographic province. Slopes range from 0 to 4 percent.

Codorus soils are near Comus, Craigsville, Hatboro, Kinkora, and Suches soils. The Codorus soils are wetter than the Comus, Craigsville, or Suches soils and are better drained than the Hatboro or Kinkora soils.

Typical pedon of Codorus loam, in an area of Suches-Codorus complex, about 1 mile southeast of the intersection of VA-622 and VA-624, 1.2 miles northeast of the intersection of VA-624 and VA-623, near Greene Mountain Lake, 2 miles south of Stanardsville:

Ap—0 to 11 inches, brown (10YR 4/3) loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; few fine discontinuous tubular pores between peds; common fine flakes of mica; moderately acid; abrupt smooth boundary.

Bw1—11 to 18 inches, yellowish brown (10YR 5/4) loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common fine discontinuous tubular pores between peds; common fine flakes of mica; strongly acid; clear smooth boundary.

Bw2—18 to 31 inches, yellowish brown (10YR 5/4) loam; many fine, medium, and coarse distinct strong brown (7.5YR 5/6) and light gray (10YR 7/2) mottles; weak very thick platy structure parting to weak medium subangular blocky; friable, slightly sticky, slightly plastic; few very fine roots; common fine discontinuous tubular pores between peds and vesicular pores within peds; common fine flakes of mica; moderately acid; clear wavy boundary.

Bw3—31 to 39 inches, strong brown (7.5YR 5/6) and yellowish brown (10YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak very thick platy structure parting to weak medium subangular blocky; friable, slightly sticky, slightly plastic; common fine discontinuous tubular pores between peds and vesicular pores within peds; many fine flakes of mica; moderately acid; clear smooth boundary.

Bw4—39 to 45 inches, strong brown (7.5YR 5/6) loam; common medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/4) mottles; weak very thick platy structure; friable, slightly sticky, slightly plastic; few fine discontinuous tubular pores between peds and vesicular pores within peds; common fine flakes of mica; strongly acid; abrupt wavy boundary.

2C—45 to 60 inches, yellowish brown (10YR 5/4) loamy sand; single grain; loose; common fine discontinuous vesicular pores; few fine flakes of mica; moderately acid.

The solum thickness ranges from 30 to 60 inches. The depth to the 2C horizon ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 15 percent in the solum and 0 to 70 percent in the 2C horizon. Some pedons have a C horizon that is 0 to 25 percent rock fragments. In unlimed areas reaction is very strongly acid through moderately acid in the upper part of the solum and strongly acid through slightly acid in the lower part of the solum and in the C horizon.

The Ap horizon has hue of 10YR, value of 4 through 6, and chroma of 2 or 3. In wooded areas the A horizon has hue of 10YR, value of 3, and chroma of 2 or 3. The Ap and A horizons are loam or silt loam.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam, silt loam, or silty clay loam.

The 2C horizon has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 2 through 4. It is stratified and ranges from sand to silt in the fine-earth fraction.

Comus Series

The soils of the Comus series are very deep and well drained. They formed in recent alluvial materials weathered from crystalline rocks. They are on flood plains in the Piedmont physiographic province. Slopes range from 0 to 2 percent.

Comus soils are near Codorus, Craigsville, Hatboro, and Kinkora soils. The Comus soils are better drained than the Codorus, Hatboro, or Kinkora soils and contain fewer rock fragments than the Craigsville soils.

Typical pedon of Comus fine sandy loam about 0.6 mile southwest of the intersection of VA-604 and VA-648, 1.3 miles east of the intersection of VA-602 and VA-603, and 1 mile west of Celt:

Ap—0 to 7 inches, yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; friable; many very fine, fine, and medium roots; few fine discontinuous tubular pores between peds; strongly acid; abrupt smooth boundary.

Bw1—7 to 16 inches, dark yellowish brown (10YR 4/4) loam; weak fine granular and subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine and fine roots; common fine discontinuous tubular pores between peds; 2

percent rock fragments; few fine flakes of mica; moderately acid; clear wavy boundary.
Bw2—16 to 25 inches, dark yellowish brown (10YR 4/6) fine sandy loam; weak fine subangular blocky structure; friable; common very fine and fine roots; common fine discontinuous tubular pores between peds; few fine flakes of mica; moderately acid; clear smooth boundary.
Bw3—25 to 37 inches, dark yellowish brown (10YR 4/4) loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine and fine roots; common fine discontinuous tubular pores between peds; few fine flakes of mica; moderately acid; clear smooth boundary.
C1—37 to 45 inches, yellowish brown (10YR 5/4) loam, common fine distinct strong brown (7.5YR 4/6) mottles; massive; friable, slightly sticky, slightly plastic; common very fine and fine roots; few fine discontinuous vesicular pores; 2 percent rock fragments; few fine flakes of mica; moderately acid; clear smooth boundary.
2C2—45 to 63 inches, mottled strong brown (7.5YR 4/6), yellowish brown (10YR 5/4), and grayish brown (10YR 5/2) loamy sand; single grain; loose; few very fine and fine roots; common fine discontinuous vesicular pores; few fine flakes of mica; moderately acid.

The solum thickness ranges from 24 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 15 percent in the solum and 0 to 40 percent in the 2C horizon. Reaction in unlimed areas is very strongly acid through moderately acid.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 through 4. In wooded areas the A horizon has hue of 7.5YR or 10YR, value of 3, and chroma of 1 or 2. The Ap and A horizons are silt loam, loam, or fine sandy loam.

The B horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 4 through 6. It is loam, silt loam, or fine sandy loam.

The C and 2C horizons have hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 2 through 6. The C horizon is stratified sandy loam, loam, or sandy clay loam. The 2C horizon in the fine-earth fraction is stratified loamy sand, sandy loam, or loam.

Craigsville Series

The soils of the Craigsville series are very deep and well drained. They formed in recent alluvial materials weathered from crystalline rocks. They are on flood plains in the Blue Ridge and Piedmont physiographic provinces. Slopes range from 0 to 2 percent.

Craigsville soils are near Codorus, Comus, Suches, and Unison soils but contain more rock fragments than those soils (fig. 12).

Typical pedon of Craigsville cobbly sandy loam about 0.2 mile west of the intersection of VA-637 and VA-638, 0.3 mile southeast of the intersection of VA-637 and VA-634, and 3 miles north of Stanardsville:

Ap—0 to 6 inches, brown (10YR 4/3) cobbly sandy loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many very fine, fine, medium, and coarse roots; common fine discontinuous tubular pores between peds; 32 percent rock fragments; moderately acid; abrupt wavy boundary.
Bw—6 to 22 inches, strong brown (7.5YR 5/6) very gravelly sandy loam; weak fine subangular blocky structure; friable; common very fine, fine, and medium roots; common fine discontinuous tubular pores between peds; 40 percent rock fragments; strongly acid; gradual smooth boundary.
2C—22 to 64 inches, brown (7.5YR 4/4) extremely cobbly loamy sand; single grain; loose; few very fine and fine roots; many fine discontinuous vesicular pores; 65 percent rock fragments; strongly acid.

The solum thickness ranges from 20 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 5 to 60 percent in the A horizon and 35 to 70 percent in the B and C horizons. Reaction in unlimed areas is very strongly acid or strongly acid.

The Ap horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 2 through 4. In wooded areas the A horizon has hue of 7.5YR or 10YR, value of 3, and chroma of 2 or 3. In the fine-earth fraction the Ap and A horizons are sandy loam, loam, or silt loam.

The B horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 4 or 6. It is sandy loam or loam in the fine-earth fraction.

The C horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 3 through 6. It is sandy loam or loamy sand in the fine-earth fraction. Some pedons have thin layers containing as much as 15 percent rock fragments.

Dyke Series

The soils of the Dyke series are very deep and well drained. They formed in alluvial materials weathered from crystalline rocks. They are on alluvial fans and terraces in the Piedmont physiographic province. Slopes range from 2 to 15 percent.

Dyke soils are near Ashe and Elioak soils. The Dyke soils contain more clay than the Ashe soils and have a lower color value throughout than the Elioak soils.

Typical pedon of Dyke clay loam, 2 to 7 percent slopes, severely eroded, about 1 mile east of the intersection of VA-609 and VA-619, 0.9 mile north-northwest of the intersection of U.S. Route 29 and VA-609, and 3.7 miles north of Ruckersville:

Figure 12.—Corn on Craigsville cobbly sandy loam. The rock fragments limit cultivation.

Ap—0 to 8 inches, dark reddish brown (5YR 3/3) clay loam; moderate fine granular structure; friable, sticky, plastic; many very fine, fine, and medium roots; common fine discontinuous tubular pores between peds; moderately acid; abrupt smooth boundary.

Bt1—8 to 29 inches, dark red (2.5YR 3/6) clay; moderate fine subangular blocky structure; firm, very sticky, very plastic; few very fine roots; common fine discontinuous tubular pores between peds; thin continuous clay films on faces of peds and in pores; few fine flakes of mica; strongly acid; gradual smooth boundary.

Bt2—29 to 48 inches, dark red (2.5YR 3/6) clay; moderate fine subangular blocky structure; firm, very sticky, very plastic; few very fine roots; common fine discontinuous tubular pores between peds; thin continuous clay films on faces of peds and in pores; few fine flakes of mica; very strongly acid; gradual smooth boundary.

Bt3—48 to 75 inches, dark red (2.5YR 3/6) clay; weak fine subangular blocky structure; firm, very sticky, very plastic; few very fine roots; common fine discontinuous tubular pores between peds; thin patchy clay films on faces of peds and in pores; few fine flakes of mica; very strongly acid.

The solum is more than 30 inches in thickness. The depth to bedrock is more than 60 inches. Stone lines are below the solum in some pedons. The content of rock fragments ranges from 0 to 35 percent in the solum. In unlimed areas reaction is very strongly acid or strongly

acid in the solum and very strongly acid through moderately acid in the substratum.

The Ap horizon has hue of 2.5YR through 7.5YR, value of 2 or 3, and chroma of 2 through 6.

The Bt horizon has hue of 10R or 2.5YR and chroma of 4 or 6. In the fine-earth fraction it is clay, silty clay loam, or silty clay.

Some pedons have a C horizon that is variable in color and texture. The content of rock fragments ranges from 20 to 60 percent.

The Dyke soils in this survey area are taxadjunct to the Dyke series because they contain more kaolinite than is defined for the series. This difference does not affect the use and management of the soils.

Elioak Series

The soils of the Elioak series are very deep and well drained. They formed in materials weathered from granite, gneiss, phyllite, mica schist, and graywacke sandstone. They are on uplands in the Piedmont physiographic province. Slopes range from 2 to 25 percent.

Elioak soils are near Ashe, Belvoir, Buckhall, Chatuge, Dyke, Glenelg, Hazel, Meadowville, and Unison soils and Udorthents. The Elioak soils contain more clay than the Udorthents or the Ashe, Belvoir, Chatuge, Glenelg, Hazel, or Meadowville soils; are better drained than the Belvoir or Chatuge soils; are redder than the Buckhall or Unison soils; and have a higher color value than the Dyke soils. Udorthents do not have a subsoil.

Typical pedon of Elioak loam, 2 to 7 percent slopes, 1/2 mile north of the intersection of VA-608 and U.S. Route 33, 0.4 mile southeast of the intersection of VA-609 and U.S. Route 33, and 1 mile north of Quinque (fig. 13):

Oi—2 inches to 0, partially decomposed leaves and twigs.

Ap—0 to 6 inches, brown (7.5YR 4/4) loam; weak fine and medium granular structure; friable, slightly sticky, slightly plastic; common very fine, fine, medium, and coarse roots; common fine discontinuous tubular pores between peds; very strongly acid; clear smooth boundary.

Bt1—6 to 26 inches, red (2.5YR 4/8) clay; moderate fine and medium subangular blocky structure; firm, sticky, plastic; few very fine, fine, and medium roots; common fine discontinuous tubular pores between peds; thin continuous clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—26 to 32 inches, red (2.5YR 4/6) clay; moderate fine and medium subangular blocky structure; firm, sticky, plastic; few very fine and fine roots; common fine discontinuous tubular pores between peds; thin continuous clay films on faces of peds; many fine flakes of mica; very strongly acid; clear smooth boundary.

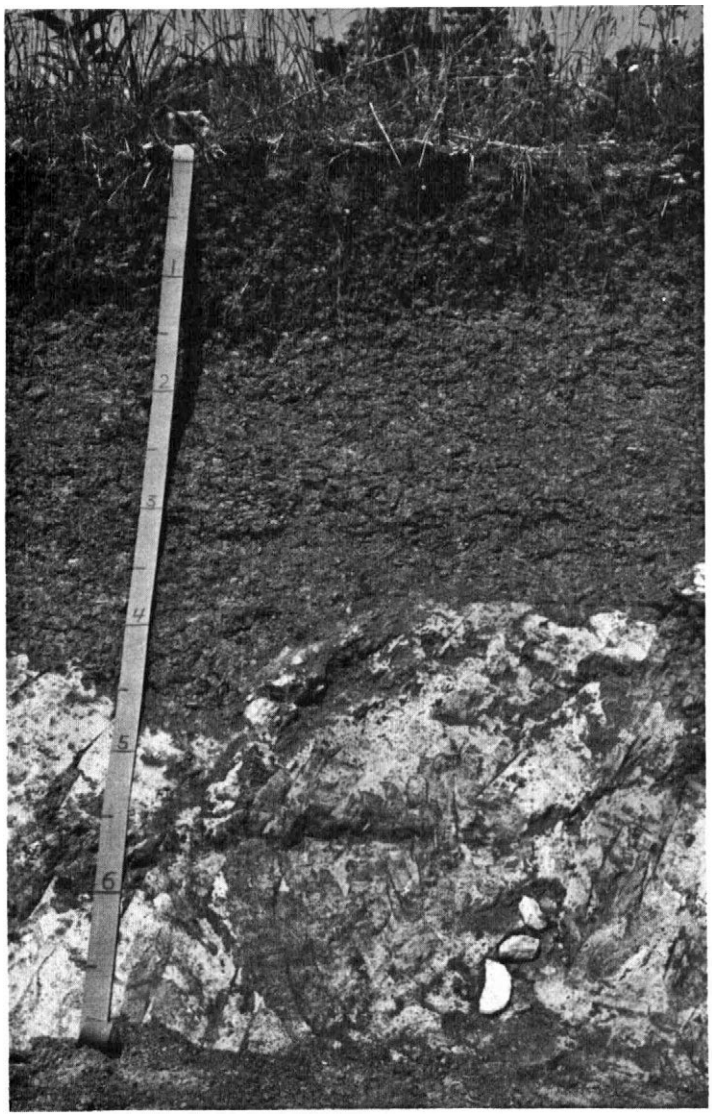


Figure 13.—Typical profile of Elioak loam, 2 to 7 percent slopes. The increments on the marker are in feet. The light-colored area at a depth of about 4 feet is loamy residuum.

Bt3—32 to 49 inches, red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm, sticky, plastic; few very fine and fine roots; common fine discontinuous tubular pores between peds; thin continuous clay films on faces of peds; many fine flakes of mica; very strongly acid; clear smooth boundary.

C—49 to 72 inches, mottled red (2.5YR 4/8), pinkish white (5YR 8/2), strong brown (7.5YR 5/6), and yellowish red (5YR 5/8) fine sandy loam; massive; friable; few very fine and fine roots; common fine discontinuous vesicular pores; few thin clay flows in root channels and pores; very strongly acid.

The solum thickness ranges from 30 to 50 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 20 percent throughout. Reaction in unlimed areas is very strongly acid through moderately acid.

The Ap horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 2 through 4. In wooded areas the A horizon has hue of 5YR through 10YR, value of 3, and chroma of 2 or 3. The Ap and A horizons mainly are fine sandy loam or loam in the fine-earth fraction. The Ap horizon is clay loam in eroded areas.

The B horizon has hue of 10R through 5YR, value of 3 through 5, and chroma of 4 through 8. It is clay or clay loam in the fine-earth fraction.

The C horizon is variegated red, brown, yellow, and white or has hue of 2.5YR through 7.5YR and value and chroma of 4 through 6. The fine-earth fraction is fine sandy loam, loam, or silt loam.

Glenelg Series

The soils of the Glenelg series are very deep and well drained. They formed in materials weathered from mica schist, phyllite, and graywacke sandstone. They are on uplands in the Piedmont physiographic province. Slopes range from 7 to 25 percent.

Glenelg soils are near Elioak and Hazel soils but contain less clay than the Elioak soils and are deeper than the Hazel soils.

Typical pedon of Glenelg loam, 7 to 15 percent slopes, about 1.5 miles west of the intersection of VA-608 and VA-633, 1.5 miles south-southwest of the intersection of VA-609 and U.S. Route 33, and 1.6 miles west of Quinque:

Ap—0 to 5 inches, yellowish brown (10YR 5/4) loam; weak fine and medium granular structure; friable, slightly sticky, slightly plastic; common very fine, fine, medium, and coarse roots; common fine discontinuous tubular pores between peds; common fine flakes of mica; strongly acid; clear smooth boundary.

Bt1—5 to 20 inches, strong brown (7.5YR 5/6) loam; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common fine discontinuous tubular pores between peds; thin patchy clay films on faces of peds; many fine flakes of mica; very strongly acid; clear wavy boundary.

Bt2—20 to 27 inches, strong brown (7.5YR 5/6) loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine and fine roots; common fine discontinuous tubular pores between peds and vesicular pores within peds; thin very patchy clay films on faces of peds; many fine flakes of mica; strongly acid; clear wavy boundary.

C1—27 to 47 inches, mottled yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) loam; massive; friable, slightly sticky, slightly plastic; few very fine and fine roots; common fine discontinuous vesicular pores; 10 percent rock fragments; many fine flakes of mica; strongly acid; abrupt irregular boundary.

C2—47 to 62 inches, light yellowish brown (10YR 6/4) loam; massive; friable, slightly sticky, slightly plastic; common fine discontinuous vesicular pores; 10 percent rock fragments; many fine flakes of mica; strongly acid.

The solum thickness ranges from 18 to 30 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 35 percent in the A and B horizons and 5 to 90 percent in the C horizon. Reaction in unlimed areas is very strongly acid or strongly acid.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. In wooded areas the A horizon has hue of 7.5YR or 10YR, value of 3, and chroma of 1 or 2. The Ap and A horizons are silt loam or loam in the fine-earth fraction.

The B horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 4 through 8. In the fine-earth fraction it is loam, silt loam, or silty clay loam.

The C horizon has hue of 2.5YR through 10YR, value of 4 through 6, and chroma of 2 through 8 or is variegated red, brown, yellow, and black. It is loam or sandy loam in the fine-earth fraction.

Hatboro Series

The soils of the Hatboro series are very deep and poorly drained. They formed in recent alluvial materials weathered from crystalline rocks. They are on flood plains in the Piedmont physiographic province. Slopes range from 0 to 2 percent.

Hatboro soils are near Codorus, Comus, and Suches soils but are wetter than those soils.

Typical pedon of Hatboro loam about 1.3 miles east of the intersection of U.S. Route 33 and VA-609, 1.2 miles southwest of the intersection of VA-609 and VA-619, and 1.6 miles north of Quinque:

Ap—0 to 15 inches, brown (7.5YR 4/4) loam; weak fine granular structure; friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common fine discontinuous tubular pores between peds; common fine flakes of mica; moderately acid; clear smooth boundary.

Bg1—15 to 26 inches, grayish brown (10YR 5/2) clay loam; common medium distinct strong brown (7.5YR 4/6) mottles; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; many fine discontinuous tubular pores between peds and vesicular pores within peds; few fine flakes of mica; moderately acid; abrupt smooth boundary.

Bg2—26 to 40 inches, mottled grayish brown (10YR 5/2), strong brown (7.5YR 4/6), and dark brown (7.5YR 3/2) sandy clay loam; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine and medium roots; many fine discontinuous tubular pores between peds and vesicular pores within peds; few fine flakes of mica; moderately acid; gradual smooth boundary.

2Cg1—40 to 45 inches, light brownish gray (2.5Y 6/2) loamy sand; common fine distinct strong brown (7.5YR 4/6) mottles; single grain; loose; few very fine and fine roots; common fine discontinuous vesicular pores; common fine flakes of mica; moderately acid; clear wavy boundary.

2Cg2—45 to 60 inches, gray (N 5/0) sandy loam; massive; very friable; common fine discontinuous vesicular pores; common fine flakes of mica; moderately acid.

Solum thickness ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 10 percent in the solum. Reaction is very strongly acid through neutral to a depth of about 30 inches and moderately acid or slightly acid below a depth of 30 inches.

The Ap horizon has hue of 7.5YR through 2.5Y, value of 4, and chroma of 2 through 4. In wooded areas the A horizon has hue of 7.5YR or 10YR, value of 3, and chroma of 2 through 4. The Ap and A horizons are silt loam, loam, or sandy loam.

The B horizon is neutral or has hue of 10YR through 5Y, value of 4 through 7, and chroma of 0 through 2. It is sandy clay loam, loam, clay loam, silt loam, or silty clay loam.

The C horizon is similar in color to the Bg horizon and is stratified sediments of all textures.

Hazel Series

The soils of the Hazel series are moderately deep and excessively drained. They formed in materials weathered from mica schist, phyllite, and graywacke sandstone. They are on uplands in the Piedmont physiographic province. Slopes range from 15 to 45 percent.

Hazel soils are near Elioak and Glenelg soils but contain less clay.

Typical pedon of Hazel loam, 15 to 25 percent slopes, about 1.1 miles south of Swift Run Church at the intersection of VA-623 and VA-633 and 1.8 miles southeast of the intersection of VA-604 and VA-633, at Amicus:

Oi—1 inch to 0, partially decomposed leaves and twigs.

A—0 to 3 inches, yellowish brown (10YR 5/4) loam; weak very fine and fine granular structure; very friable, slightly sticky, slightly plastic; many very fine, fine, medium, and coarse roots; few fine discontinuous tubular pores between peds; 10 percent rock fragments; many fine flakes of mica; very strongly acid; clear smooth boundary.

Bw—3 to 14 inches, strong brown (7.5YR 5/6) silt loam; weak very fine and fine subangular blocky structure; friable, slightly sticky, slightly plastic; many very fine, fine, medium, and coarse roots; few fine discontinuous tubular pores between peds; 10 percent rock fragments; many fine flakes of mica; very strongly acid; clear irregular boundary.

C—14 to 27 inches, mottled red (2.5YR 4/6), yellowish brown (10YR 5/6), and black (10YR 2/1) channery silt loam; massive; friable, slightly sticky, slightly plastic; common very fine, fine, medium, and coarse roots; common fine discontinuous vesicular pores; 30 percent rock fragments; few pockets of silty clay loam in rock joints; many fine and medium flakes of mica; very strongly acid; gradual smooth boundary.

Cr—27 to 37 inches, mottled yellowish brown (10YR 5/6), yellowish red (5YR 5/6), and black (10YR 2/1) slightly weathered mica schist that crushes to very channery silt loam under moderate pressure; massive; firm, slightly sticky, slightly plastic; many fine and medium flakes of mica; very strongly acid; abrupt smooth boundary.

R—37 inches, hard mica schist bedrock.

The solum thickness ranges from 14 to 27 inches. The depth to bedrock ranges from 20 to 40 inches. The content of rock fragments ranges from 0 to 50 percent in the A horizon, 5 to 40 percent in the B horizon, and 20 to 50 percent in the C horizon. Reaction in unlimed areas is very strongly acid or strongly acid.

The A horizon has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 2 through 4. The A horizon is loam or silt loam in the fine-earth fraction.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 through 8. In the fine-earth fraction it is fine sandy loam, sandy loam, silt loam, or loam.

The C horizon is variegated red, brown, yellow, and black. In the fine-earth fraction it is loam, fine sandy loam, or silt loam.

Kinkora Series

The soils of the Kinkora series are very deep and poorly drained. They formed in alluvial materials weathered from crystalline rocks. They are in flood basins in the Piedmont physiographic province. Slopes range from 0 to 2 percent.

Kinkora soils are near Codorus, Comus, and Suches soils but are wetter than those soils.

Typical pedon of Kinkora silt loam about 1.1 miles east of the intersection of VA-230 and VA-619, 0.8 mile east-southeast of the intersection of VA-230 and VA-667, and 3 miles northeast of Stanardsville:

Ap—0 to 9 inches, dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable, slightly sticky, slightly plastic; common very fine and fine roots; few fine discontinuous tubular pores; 2 percent coarse fragments; few fine flakes of mica; medium acid; gradual smooth boundary.

Eg—9 to 16 inches, grayish brown (10YR 5/2) silty clay loam; few medium distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine and fine roots; few fine discontinuous tubular pores between peds and vesicular pores within peds; few fine flakes of mica; strongly acid; clear smooth boundary.

Btg1—16 to 29 inches, light brownish gray (10YR 6/2) silty clay loam; common coarse distinct strong brown (7.5YR 5/6) mottles; moderate medium and coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few fine discontinuous tubular pores between peds and vesicular pores within peds; thin patchy clay films on faces of peds; 2 percent coarse fragments; few fine flakes of mica; strongly acid; clear wavy boundary.

Btg2—29 to 39 inches, gray (10YR 6/1) clay; many coarse distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; few fine roots; common fine discontinuous tubular pores between peds and vesicular pores within peds; thin very patchy clay films on faces of peds; 2 percent coarse fragments; common fine flakes of mica; very strongly acid; clear smooth boundary.

2Cg—39 to 60 inches, light gray (10YR 6/1) cobbly sandy clay; massive; firm, sticky, plastic; 25 percent coarse fragments; common fine flakes of mica; strongly acid.

The solum thickness ranges from 24 to 48 inches. The depth to bedrock is more than 60 inches. The depth to unconforming materials is more than 30 inches. The content of coarse fragments ranges from 0 to 10 percent in the solum and 0 to 50 percent in the C horizon. Reaction in unlimed areas is very strongly acid or strongly acid.

The Ap horizon has hue of 10YR through 5Y, value of 4 or 5, and chroma of 1 or 2. The E horizon has hue of 10YR through 5Y, value of 4 or 5, and chroma of 1 or 2. The Ap and E horizons are loam, silt loam, fine sandy loam, or silty clay loam.

The B horizon is neutral or has hue of 10YR through 5Y, value of 5 or 6, and chroma of 0 through 2. It is clay, silty clay, silty clay loam, or clay loam.

The color of the C or 2C horizon is similar to that of the B horizon. The C horizon is silt loam or loam, and the 2C horizon is variable in texture and commonly is stratified.

Lew Series

The soils of the Lew series are very deep and well drained and are in the Blue Ridge physiographic province. They formed in colluvial materials weathered from metabasalts and associated metavolcanic and metasedimentary rocks. They are on alluvial fans, along drainageways, in saddles, and in concave heads of drainageways. Slopes range from 7 to 75 percent.

Lew soils are near Cataska, Catoctin, and Myersville soils. The Lew soils are deeper than the Cataska or Catoctin soils and contain more rock fragments than the Myersville soils.

Typical pedon of Lew very channery loam, in an area of Lew extremely stony loam, 25 to 75 percent slopes, about 2 miles west of the intersection of VA-632 and VA-627 at Mountain Grove Chapel in Bacon Hollow, and 0.7 mile east of the intersection of Skyline Drive and the Greene and Rockingham County lines, at Simmons Gap:

Oi—2 inches to 0, partially decomposed leaves and twigs.

A—0 to 4 inches, very dark grayish brown (10YR 3/2) very channery loam; weak very fine and fine granular structure; very friable, slightly sticky, slightly plastic; many very fine, fine, medium, and coarse roots; many fine discontinuous tubular pores between peds; 45 percent rock fragments; strongly acid; clear smooth boundary.

E—4 to 13 inches, dark yellowish brown (10YR 4/4) very channery silt loam; moderate fine and medium granular structure; very friable, slightly sticky, slightly plastic; many very fine, fine, medium, and coarse roots; many fine discontinuous tubular pores between peds; 45 percent rock fragments; strongly acid; gradual smooth boundary.

Bt1—13 to 33 inches, dark yellowish brown (10YR 4/4) very channery clay loam; moderate very fine and fine subangular blocky structure; friable, slightly sticky, slightly plastic; many very fine, fine, medium, and coarse roots; many fine discontinuous tubular pores between peds; many medium patchy clay films on faces of peds and rock fragments; 45 percent rock fragments; strongly acid; diffuse smooth boundary.

Bt2—33 to 53 inches, yellowish brown (10YR 5/6) very channery clay loam; moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; many fine discontinuous tubular pores between peds; many medium patchy clay films on faces of peds and rock fragments; 50 percent rock fragments; very strongly acid; diffuse smooth boundary.

Bt3—53 to 67 inches, mottled yellowish brown (10YR 5/4) and yellowish red (5YR 4/6) very channery clay loam; moderate fine and medium subangular blocky

structure; friable, slightly sticky, slightly plastic; many fine discontinuous tubular pores; many medium patchy clay films on faces of peds and rock fragments; 55 percent rock fragments; strongly acid; abrupt smooth boundary.

2Bt4—67 to 72 inches, mottled yellowish brown (10YR 5/6) and strong brown (7.5YR 4/6) very channery clay loam; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; common fine discontinuous tubular pores; many medium patchy clay films on faces of peds and rock fragments; 40 percent rock fragments; strongly acid.

The solum thickness is more than 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 5 to 50 percent in the A and E horizons and is more than 35 percent in the B horizon. Reaction in unlimed areas is very strongly acid through moderately acid.

The A horizon has hue of 5YR through 10YR, value of 2 or 3, and chroma of 2. The E horizon has hue of 5YR through 10YR, value of 4, and chroma of 3 or 4. In the fine-earth fraction the A and E horizons are silt loam or loam.

The B horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 4 through 8. It is clay loam or silty clay loam in the fine-earth fraction. Some pedons have a lithologic discontinuity.

Some pedons have a C horizon that has colors similar to those of the B horizon. The C horizon in the fine-earth fraction is sandy loam, loam, or silt loam. It is more than 35 percent rock fragments.

Meadowville Series

The soils of the Meadowville series are very deep and well drained and are in the Piedmont physiographic province. They formed in local alluvium and colluvium weathered from crystalline rocks. They are along small drainageways and on foot slopes. Slopes range from 2 to 7 percent.

Meadowville soils commonly are near Chatuge and Elioak soils. The Meadowville soils are better drained than the Chatuge soils, have less clay in the subsoil than the Elioak soils, and have a lithologic discontinuity which Elioak soils do not have.

Typical pedon of Meadowville fine sandy loam, 2 to 7 percent slopes, 0.4 mile east of the intersection of VA-607 and VA-743, 0.4 mile south-southeast of the intersection of VA-606 and VA-607, and 2 miles south-southwest of Ruckersville:

Ap—0 to 7 inches, dark brown (7.5YR 4/4) fine sandy loam; weak medium granular structure; very friable; many fine and medium roots; common fine discontinuous tubular pores between peds; common fine flakes of mica; very strongly acid; clear wavy boundary.

Bt1—7 to 21 inches, reddish brown (5YR 4/4) clay loam; moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine and medium roots; common fine discontinuous tubular pores between peds; thin very patchy clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt2—21 to 33 inches, yellowish red (5YR 4/6) clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine and medium roots; common fine discontinuous tubular pores between peds; thin very patchy clay films on faces of peds; many fine flakes of mica; strongly acid; abrupt smooth boundary.

2Bt3—33 to 41 inches, yellowish red (5YR 4/6) sandy clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak thick platy structure parting to weak fine subangular blocky; friable, slightly sticky, slightly plastic; few fine roots; common fine discontinuous vesicular pores; thin very patchy clay films on the faces of peds; many fine flakes of mica; strongly acid; gradual smooth boundary.

2C—41 to 72 inches, yellowish red (5YR 5/6) sandy clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; massive; friable, slightly sticky, slightly plastic; few fine roots; common fine discontinuous vesicular pores; many fine and medium flakes of mica; moderately acid.

The solum thickness ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. The content of rock fragments is as much as 10 percent in the control section. Reaction in unlimed areas ranges from very strongly acid through moderately acid.

The Ap horizon has hue of 7.5YR, value of 4 or 5, and chroma of 4 through 8. In wooded areas the A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 through 4. The Ap and A horizons are fine sandy loam, loam, or silt loam.

The B and 2B horizon have hue of 5YR through 10YR, value of 4 or 5, and chroma of 4 through 8. The B horizon is loam, silty clay loam, or clay loam. The 2B horizon is sandy clay loam or sandy clay. Mottles with chroma of 2 or less are at a depth of more than 24 inches in some pedons. The content of flakes of mica are few to many. Rock lines of quartz pebbles are at a depth of 30 to 45 inches in some pedons.

The C horizon has hue of 5YR through 10YR, value of 5 or 6, and chroma of 4 through 8. The C horizon is sandy clay loam, loam, silt loam, or fine sandy loam.

Myersville Series

The soils of the Myersville series are very deep and well drained. They formed in materials weathered from metabasalts and associated metavolcanic and

metasedimentary rocks. They are on uplands in the Blue Ridge physiographic province. Slopes range from 7 to 80 percent.

Myersville soils are near Cataska, Catoctin, and Lew soils. The Myersville soils are deeper than the Cataska or Catoctin soils and contain fewer rock fragments than the Lew soils.

Typical pedon of Myersville channery silt loam, in an area of Myersville and Catoctin very stony silt loams, 7 to 15 percent slopes, about 0.9 mile southeast of the intersection of Skyline Drive and the Greene and Rockingham County lines at Smith Roach Gap, and 2 miles north-northeast of the intersection of VA-632 and VA-627, at Mountain Grove Chapel in Bacon Hollow:

A—0 to 5 inches, dark brown (10YR 3/3) channery silt loam; moderate fine granular structure; very friable, slightly sticky, slightly plastic; many very fine, fine, medium, and coarse roots; many fine discontinuous tubular pores between peds; 20 percent rock fragments; moderately acid; clear wavy boundary.

Bt1—5 to 10 inches, strong brown (7.5YR 4/6) channery silty clay loam; many medium distinct dark yellowish brown (10YR 4/4) mottles; moderate very fine and fine subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; many fine discontinuous tubular pores between peds; common medium patchy clay films on faces of peds and in pores; 20 percent rock fragments; moderately acid; clear wavy boundary.

Bt2—10 to 21 inches, strong brown (7.5YR 4/6) channery silt loam; moderate very fine and fine subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; many fine discontinuous tubular pores between peds; many medium patchy clay films and black coatings on faces of peds and in pores; 20 percent rock fragments; moderately acid; gradual smooth boundary.

Bt3—21 to 30 inches, strong brown (7.5YR 5/6) channery silty clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slighty plastic; few very fine and fine roots; many fine discontinuous tubular pores between peds; many medium patchy clay films and black coatings on faces of peds and in pores; 30 percent rock fragments; strongly acid; clear smooth boundary.

Ct—30 to 44 inches, mottled strong brown (7.5YR 5/8), brownish yellow (10YR 6/6), black (10YR 2/1), and pale olive (5Y 6/3) extremely channery silty clay loam; massive; friable, slightly sticky, slightly plastic; few very fine and fine roots; common fine discontinuous vesicular pores; common thick clay flows in relic rock joints; 70 percent rock fragments; moderately acid; abrupt smooth boundary.

Crt—44 to 72 inches, mottled strong brown (7.5YR 5/8), brownish yellow (10YR 6/6), black (10YR 2/1), and pale olive (5Y 6/3) slightly weathered bedrock that crushes to extremely channery silty clay loam under moderate pressure; massive; very firm, slightly sticky, slightly plastic; common thick clay flows in relic rock joints; 70 percent rock fragments; moderately acid; abrupt smooth boundary.

R—72 inches, hard greenstone bedrock.

The solum thickness ranges from 20 to 40 inches. The depth to the Crt horizon is more than 40 inches, and the depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 35 percent in the A horizon and upper part of the B horizon, 3 to 50 percent in the lower part of the B horizon, and 5 to 75 percent in the C horizon. Reaction in unlimed areas is very strongly acid through moderately acid.

The A horizon has hue of 5YR through 10YR and value and chroma of 2 or 3. In plowed areas the Ap horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 2 through 4. Some pedons have an E horizon with hue of 5YR through 10YR, value of 4 or 5, and chroma of 3 or 4. The A, Ap, and E horizons are silt loam or loam in the fine-earth fraction.

The Bt horizon has hue of 5YR through 10YR, value of 4 through 6, and chroma of 4 through 8. In the fine-earth fraction it is silty clay loam, clay loam, or silt loam.

The Ct and Crt horizons are variegated brown, red, yellow, green, gray, and black. In the fine-earth fraction they are silt loam, clay loam, silty clay loam, or loam.

Parker Series

The soils of the Parker series are deep and very deep and are somewhat excessively drained. They formed in materials weathered from granodiorite, granite, and granite gneiss. They are on uplands in the Blue Ridge physiographic province. Slopes range from 7 to 70 percent.

Parker soils are near Chester and Thurmont soils but contain less clay and more rock fragments.

Typical pedon of Parker very gravelly loam, in an area of Chester and Parker soils, very stony, 7 to 15 percent slopes, about 1.7 miles east of South River Overlook on Skyline Drive, 2 miles northwest of the intersection of VA-642 and VA-643, and 3 miles west of Fletcher:

Oi—2 inches to 0, partially decomposed leaves and twigs.

A—0 to 3 inches, very dark grayish brown (10YR 3/2) very gravelly loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many very fine, fine, medium, and coarse roots; common fine discontinuous tubular pores between peds; 40 percent rock fragments; very strongly acid; clear smooth boundary.

E—3 to 6 inches, dark yellowish brown (10YR 4/4) very gravelly loam; weak fine granular structure; friable,

slightly sticky, slightly plastic; many very fine, fine, medium, and coarse roots; common fine discontinuous tubular pores between peds; 40 percent rock fragments; very strongly acid; clear wavy boundary.

Bw—6 to 25 inches, brownish yellow (10YR 6/6) very gravelly loam; weak fine subangular blocky structure parting to weak fine granular; friable, slightly sticky, slightly plastic; common very fine, fine, medium, and coarse roots; common fine discontinuous tubular pores between peds; 50 percent rock fragments; very strongly acid; clear wavy boundary.

Crt—25 to 60 inches, brownish yellow (10YR 6/6) slightly weathered granodiorite rock that crushes to extremely cobbly sandy loam under moderate pressure; very firm; few thick clay flows in rock joints; 80 percent rock fragments; strongly acid.

The solum thickness ranges from 20 to 40 inches. The depth to bedrock is more than 48 inches. The content of rock fragments ranges from 35 to 70 percent in the solum and 60 to 90 percent in the Crt horizon. Reaction in unlimed areas is very strongly acid or strongly acid.

The A horizon has hue of 7.5YR or 10YR, value of 3, and chroma of 1 or 2. The E horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 3 or 4. The A and E horizons are loam or sandy loam in the fine-earth fraction.

The B horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 3 through 6. It is loam or sandy loam in the fine-earth fraction.

The C horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 3 through 6. It is loam or sandy loam in the fine-earth fraction.

Suches Series

The soils of the Suches series are very deep and well drained. They formed in recent alluvial materials weathered from crystalline rocks. They are on flood plains and alluvial fans in the Piedmont physiographic province. Slopes range from 0 to 2 percent.

Suches soils are near Codorus, Craigsville, Hatboro, and Kinkora soils. The Suches soils are better drained than the Codorus, Hatboro, or Kinkora soils and contain more clay and fewer rock fragments than the Craigsville soils.

Typical pedon of Suches fine sandy loam, in an area of Suches-Codorus complex, about 0.9 mile north-northeast of the intersection of VA-619 and VA-609, 1.8 miles north-northwest of the intersection of VA-609 and U.S. Route 29, and 4.4 miles north of Ruckersville:

Ap—0 to 12 inches, dark brown (7.5YR 4/4) fine sandy loam; weak fine granular structure; very friable; common very fine and fine roots; common fine discontinuous tubular pores between peds; common fine flakes of mica; slightly acid; clear smooth boundary.

Bw1—12 to 17 inches, yellowish brown (10YR 5/6) loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine and fine roots; common fine discontinuous tubular pores between peds; common fine flakes of mica; strongly acid; clear wavy boundary.

Bw2—17 to 27 inches, yellowish brown (10YR 5/4) loam; common medium distinct strong brown (7.5YR 4/6) mottles; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few very fine roots; many fine discontinuous tubular pores between peds; common concretions and black stains on faces of peds; common fine flakes of mica; strongly acid; clear wavy boundary.

Bw3—27 to 32 inches, mottled yellowish brown (10YR 5/4), very pale brown (10YR 7/3), and strong brown (7.5YR 4/6) loam; weak coarse prismatic structure parting to weak fine subangular blocky; friable, slightly sticky, slightly plastic; few very fine roots; common fine tubular pores between peds and vesicular pores within peds; common fine flakes of mica; strongly acid; gradual smooth boundary.

Bw4—32 to 49 inches, mottled yellowish brown (10YR 5/4), very pale brown (10YR 7/4), and strong brown (7.5YR 4/6) fine sandy loam; weak coarse subangular blocky structure; friable; few very fine roots; common fine discontinuous vesicular pores; common fine flakes of mica; strongly acid; gradual smooth boundary.

C—49 to 63 inches, variegated yellowish brown (10YR 5/4), very pale brown (10YR 7/4), and strong brown (7.5YR 4/6) sandy loam; massive; friable; common fine discontinuous vesicular pores; common fine flakes of mica; strongly acid.

The solum thickness ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 15 percent in the solum and from 0 to 25 percent in the C horizon. Reaction in unlimed areas is very strongly acid through moderately acid.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 2 through 4. It is fine sandy loam or loam.

The B horizon has hue of 7.5YR or 10YR, value of 3 through 7, and chroma of 1 through 8, or it is variegated brown, yellow, and red. Mottles with chroma of 2 or less are below a depth of 24 inches in some pedons. The B horizon is fine sandy loam, loam, clay loam, sandy clay loam, or silty clay loam.

The C horizon is neutral or has hue of 7.5YR or 10YR, value of 3 through 7, and chroma of 0 through 8, or it is variegated yellow, brown, gray, and red. In the fine-earth fraction it mainly is loam, sandy clay loam, fine sandy

loam, sandy loam, or loamy sand. Some pedons have strata of silt loam or clay loam.

Thurmont Series

The soils of the Thurmont series are very deep and well drained and are in the Blue Ridge and Piedmont physiographic provinces. They formed in alluvial and colluvial materials weathered from crystalline rocks. They are on dissected alluvial fans and terraces and along drainageways. Slopes range from 7 to 25 percent.

Thurmont soils are near Belvoir, Braddock, Buckhall, Chester, and Parker soils. The Thurmont soils are better drained than the Belvoir soils, contain less clay than the Braddock or Buckhall soils, have a seasonal high water table at a shallower depth than the Chester soils, and contain fewer rock fragments than the Parker soils.

Typical pedon of Thurmont loam, 7 to 15 percent slopes, about 0.8 mile southwest of the intersection of VA-810 and VA-627, 2 miles west-northwest of the intersection of VA-602 and VA-603, and 0.8 mile southwest of Dyke:

Oi—1 inch to 0, partially decomposed leaves and twigs.

Ap—0 to 5 inches, light olive brown (2.5Y 5/4) loam; weak fine granular structure; very friable, slightly sticky, slightly plastic; common very fine, fine, medium, and coarse roots; common fine and medium discontinuous tubular pores between peds; 2 percent rock fragments; strongly acid; clear smooth boundary.

Bt1—5 to 9 inches, strong brown (7.5YR 5/6) loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; many fine and medium discontinuous tubular pores between peds; thin very patchy clay films on faces of peds and in root channels; strongly acid; clear smooth boundary.

Bt2—9 to 22 inches, strong brown (7.5YR 5/8) clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common fine and medium discontinuous tubular pores between peds; thin patchy clay films on faces of peds and in pores; very strongly acid; gradual wavy boundary.

Bt3—22 to 31 inches, strong brown (7.5YR 5/8) clay loam; many medium distinct yellowish brown (10YR 5/4) and yellowish red (5YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few very fine, fine, and medium roots; common fine and medium discontinuous tubular pores between peds; thin patchy clay films on faces of peds and in pores; very strongly acid; abrupt wavy boundary.

C1—31 to 37 inches, mottled strong brown (7.5YR 5/6), yellowish brown (10YR 5/8), black (10YR 2/1), and yellowish red (5YR 5/6) sandy clay loam; massive; friable, slightly sticky, slightly plastic; common fine discontinuous vesicular pores; very strongly acid; abrupt smooth boundary.

C2—37 to 46 inches, mottled light yellowish brown (2.5Y 6/4) and strong brown (7.5YR 5/6) sandy clay loam; massive; friable, slightly sticky, slightly plastic; common fine discontinuous vesicular pores; very strongly acid; abrupt wavy boundary.

C3—46 to 60 inches, mottled strong brown (7.5YR 5/6), yellowish brown (10YR 5/8), yellowish red (5YR 5/6), and black (10YR 2/1) sandy loam; massive; friable; common fine discontinuous vesicular pores; strongly acid.

The solum thickness ranges from 30 to 60 inches. The depth to a lithologic discontinuity ranges from 30 to 80 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 50 percent in the Ap and C horizons and 0 to 35 percent in the Bt horizons. Reaction in unlimed areas is very strongly acid or strongly acid.

The Ap horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 2 through 6. In wooded areas the A horizon has hue of 7.5YR through 2.5Y, value of 3, and chroma of 2 or 3. The Ap and A horizons in the fine-earth fraction are sandy loam, fine sandy loam, or loam.

The B horizon has hue of 5YR or 7.5YR, value of 4 through 6, and chroma of 4 through 8. In the fine-earth fraction it is loam, clay loam, or sandy clay loam.

The C horizon is variable in color and commonly is mottled. It ranges from sandy loam to clay in the fine-earth fraction.

Udorthents

These soils are shallow to very deep and well drained to somewhat poorly drained. They formed in loamy and clayey residuum and unconsolidated sediments. They are on uplands, stream terraces, and flood plains in the Piedmont physiographic province. Slopes range from 0 to 25 percent.

Udorthents are near Braddock, Elioak, and Kinkora soils but do not have the subsoil which is typical of those soils.

Because of the variability of Udorthents, a typical pedon is not given. The depth to bedrock is more than 10 inches. The content of rock fragments ranges from 0 to 75 percent. Reaction is extremely acid through moderately alkaline.

The A horizon has hue of 2.5YR through 2.5Y, value of 4 through 8, and chroma of 3 through 8. It is sandy loam to clay in the fine-earth fraction.

The upper part of the C horizon has hue of 2.5YR through 2.5Y and value and chroma of 3 through 8. It is sandy loam to clay in the fine-earth fraction. The lower part of the C horizon has hue of 2.5YR through 5Y, value

of 3 through 8, and chroma of 1 through 8. It is sand to clay in the fine-earth fraction.

Unison Series

The soils of the Unison series are very deep and well drained. They formed in alluvial and colluvial materials weathered from crystalline rocks. They are on dissected alluvial fans and terraces in the Blue Ridge and Piedmont physiographic provinces. Slopes range from 0 to 15 percent.

Unison soils are near Craigsville and Elioak soils. The Unison soils contain more clay and fewer rock fragments than the Craigsville soils and are not as red as the Elioak soils.

Typical pedon of Unison loam, 0 to 2 percent slopes, about 0.15 mile east of the intersection of VA-230 and VA-667, 0.7 mile east-northeast of the intersection of VA-230 and VA-619, and 3 miles northeast of Stanardsville:

Ap—0 to 9 inches, brown (7.5YR 4/4) loam; moderate fine granular structure; friable, slightly sticky, slightly plastic; few fine roots; common fine discontinuous tubular pores between peds; moderately acid; abrupt smooth boundary.

Bt1—9 to 29 inches, strong brown (7.5YR 4/6) clay; moderate fine and medium subangular blocky structure; firm, sticky, plastic; few fine roots; many fine discontinuous tubular pores between peds; thin patchy clay films on faces of peds; 2 percent rock fragments; strongly acid; gradual smooth boundary.

Bt2—29 to 39 inches, strong brown (7.5YR 4/6) clay; weak fine and medium subangular blocky structure; firm, sticky, plastic; few fine roots; many fine discontinuous tubular pores between peds; thin patchy clay films on faces of peds; 5 percent rock fragments; few fine flakes of mica; strongly acid; clear smooth boundary.

Bt3—39 to 47 inches, strong brown (7.5YR 4/6) clay; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; many fine discontinuous tubular pores between peds; thin patchy clay films on faces of peds; 2 percent rock fragments; few fine flakes of mica; strongly acid; abrupt smooth boundary.

2C—47 to 60 inches, strong brown (7.5YR 4/6) very cobbly clay loam; massive; friable, slightly sticky, slightly plastic; common fine discontinuous vesicular pores; thin patchy clay films on faces of rock fragments; 50 percent rock fragments; strongly acid.

The solum thickness is at least 30 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 35 percent in the solum and 0 to 75 percent in the C horizon. Reaction in unlimed areas is very strongly acid through moderately acid.

The Ap horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 3 through 6. In wooded areas the A horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 3 or 4. In the fine-earth fraction the Ap and A horizons are fine sandy loam, loam, or silt loam.

The B horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 3 through 8. In the fine-earth fraction it is clay, silty clay loam, or clay loam.

The C horizon has hue of 2.5YR through 7.5YR, value of 4 through 8, and chroma of 3 through 6. In the fine-earth fraction it is loam, silt loam, clay loam, or silty clay loam.

Formation of the Soils

This section describes the factors of soil formation as they relate to the soils of Greene County and explains the major processes of soil-horizon development.

Factors of Soil Formation

The five major factors of soil formation are parent material, topography, climate, living organisms, and time. Topography and parent material are modified over time by the active factors, climate and living organisms. Generally, the continuing interaction of all of the factors determines the kind of soil that forms. In some soils, one factor may dominate and determine most of the properties.

Parent Material

Parent material is the unconsolidated material in which a soil forms. Both residual and transported material are in the survey area.

Residual material is material that has weathered in place. Properties of the residual parent material are directly related to the makeup of the underlying bedrock.

Transported material consists of alluvial sediments and colluvial sediments. The alluvial sediments were moved by water and were deposited as mixtures or layers of rock fragments, sand, silt, and clay. They are on flood plains and terraces. Craigsville, Codorus, Comus, Hatboro, and Suches soils are on flood plains formed in recent alluvium. Soils formed in alluvial sediments on terraces are Dyke and Unison soils. Soils formed in colluvial sediments, or sediments that were moved by gravity with water as the lubricant, are on terraces at the base of the mountains, in heads of drainageways, in depressions, and on foot slopes. Examples of these kinds of soils are Belvoir, Braddock, Chatuge, Lew, and Thurmont soils.

Igneous and metamorphic rock are the two primary rock types in the county. Sedimentary rocks are in the extreme southwestern part of the county.

Igneous rock formed from the cooling of molten rock material. Examples of igneous rock in the county are granite, hornblende granite, and diabase.

Metamorphic rock is igneous or sedimentary rock that was altered by heat and pressure. Granite gneiss, mica schist, biotite gneiss, phyllite, and greenstone are examples of metamorphic rock in Greene County.

Igneous and metamorphic rocks are subdivided into acidic and basic rock types. This classification is based on the nature and amount of specific minerals in the rocks. Basic rocks are generally richer in calcium and magnesium than acidic rocks.

Soils formed from the acidic rocks, such as granite, granite gneiss, biotite gneiss, mica schist, and phyllite, are Buckhall and Elioak soils. Catoctin and Myersville soils formed from basic rock material, such as greenstone.

Topography

Topography affects the formation of soils by influencing the rate of infiltration, runoff, soil drainage, and geologic erosion and the soil temperature. Topography can alter the effects of the other soil-forming factors to such a degree that different soils may form from the same parent material. Differences in topography can cause the same parent material to weather at different rates, thus affecting the impact of plants and animals on soil formation.

Physiographically, Greene County is two-thirds Piedmont and one-third Blue Ridge. The elevation of the county ranges from about 410 to 800 feet above sea level in the Piedmont and from about 800 to 3,600 feet above sea level in the Blue Ridge. The gradient of the Piedmont upland is about 40 to 50 feet per mile, and the gradient of the Blue Ridge area is about 350 to 650 feet per mile. Stream gradients in the survey area are generally about 10 to 20 feet per mile. The Piedmont generally consists of medium-size to broad ridgetops and strongly sloping to steep side slopes. The Blue Ridge has broad, dome-shaped to narrow ridgetops and steep and very steep side slopes. The soils in both areas are mostly well drained and have a loamy or clayey subsoil. The gently sloping and strongly sloping areas have medium to rapid runoff and a good rate of infiltration of water. The steep and very steep areas commonly have very rapid surface runoff and poor rate of water infiltration. The steeper soils have less subsoil development than the less sloping soils.

Climate

Climate, to a large extent, determines the rate and degree of weathering of the parent material. It also determines the kind and amount of organism activity and

influeneces the type of weathering, chemical or physical, a parent material undergoes. Chemical weathering of parent material occurs more rapidly in a warm and humid environment, such as Greene County, than in a cold and dry climate, and physical weathering is more pronounced in the colder, dryer climates. Although landscape position and slope slightly modify the influence of climate, their effects do not account for major differences in the soils in this survey area.

The amount of precipitation and the movement of the water through the soil greatly affect the translocation of clays and the movement of minerals out of the zone of biological activity.

The climate of the Piedmont area causes rapid weathering of the parent material and thus promotes the movement of clays and minerals. The Blue Ridge is less conducive to translocation of clays and leaching of minerals because of lower temperatures but is more favorable to continued physical weathering. Weathering, translocation of clays, and leaching of minerals take place most of the year. The relative influence of each on the soil determines the main characteristics of the soil.

Organisms

Plants are the main source of organic matter in the soils. Organic matter decomposes and is incorporated into the soil by the action of micro-organisms and earthworms and, to a lesser degree, by wind-thrown trees and burrowing animals. The content of organic matter is greater in the soils of the Blue Ridge than in the soils of the Piedmont section. The warm, humid environment, the adequate supply of moisture, and the abundance of micro-organisms prevent the accumulation of large amounts of organic matter in the Piedmont.

Earthworms, burrowing animals, and plant roots help to keep the soil aerated. Plant roots also help in parent material formation by penetrating cracks and breaking up the underlying bedrock.

Cultivation, drainage, irrigation, use of new types of vegetation, applications of lime and fertilizer, and use of herbicides and pesticides are some of the ways man has influenced the rate of soil development in the survey area. In most areas of the county, man's influence has caused an increase in erosion.

Time

Time is needed for changes to take place in the parent material. Because of the other factors, however, soils formed from the same type of parent material in the same amount of time may not develop equally. Runoff and erosion are greater on steeper slopes, preventing the development of well expressed soil horizons. Thus, soils on steeper slopes generally are less developed than soils on lesser slopes, even though the parent material is the same. Examples of this are moderately deep Hazel soils on moderately steep and steep side slopes and very deep Elioak soils on gently sloping and strongly sloping ridgetops.

Soils formed in weather-resistant parent materials will not develop as rapidly as will soils in parent materials that are less resistant to weathering. Weakly defined layers are common in soils on flood plains, such as Codorus soils, because of the constant deposition of sediment.

Processes of Soil Horizon Differentiation

Several processes are involved in the formation of the soil horizons. Among these are the accumulation of organic matter, the leaching of soluble salts, the reduction and transfer of iron, the formation of soil structure, and the formation and translocation of clay minerals. These processes are continuous and simultaneous and have been going on for thousands of years.

Organic matter accumulates as plant and animal material decomposes. Organic matter darkens the surface layer and helps to form the A horizon. Replacement of lost organic matter takes a long time. The content of organic matter in the surface layer of the soils in Greene County averages about 2 percent.

Before the development of a distinct subsoil it is believed that some of the lime and soluble salts must be leached to allow the translocation of clay minerals. Some of the factors that affect this leaching are the kinds of salts originally present, the depth to which the soil solution percolates, and the texture of the soil profile.

Well drained and moderately well drained soils in Greene County have a yellowish brown to red subsoil. These colors are caused mainly by thin coatings of iron oxides on sand and silt grains, but in some soils the colors are inherited from the materials in which the soils formed. The structure in these soils is weak to strong, subangular blocky, and the subsoil contains more clay than the surface layer.

A fragipan has developed in the subsoil of poorly drained Belvoir soils. The fragipan is very firm and brittle when moist and very hard when dry. The soil particles are packed so tightly that the bulk density is high and the pore space is low. The genesis of the fragipan is not fully understood. Studies indicate that shrinking and swelling take place in alternating wet and dry periods. This may account for the packing of the soil particles and for the gross polygonal pattern of cracks in the fragipan. Clay, silica, and oxides of aluminum are the most likely cementing agents causing the brittleness and hardness.

The reduction and transfer of iron, called gleying, is associated mainly with the wet, poorly drained soils. Moderately well drained and somewhat poorly drained soils have mottles of red, yellowish red, and yellowish brown. This indicates the segregation of iron due to a

fluctuating water table. In the poorly drained soils, such as Chatuge, Hatboro, and Kinkora soils, the subsoil and underlying material are grayish, which indicates reduction and transfer of iron in solution.

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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.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

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.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

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 slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the

surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A system that retains protective amounts of residue mulch on the surface throughout the year by use of no-tillage, strip tillage, stubble mulching, and other types of noninversion tillage.

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.

Controlled grazing. Postponing grazing or resting grazing land for a prescribed period.

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.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the

surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

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 is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

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.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 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.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

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.
E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.
B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics such as (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 Arabic numeral 2 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.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.5 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.

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.

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 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability the soil may not adequately filter effluent from a waste disposal system.

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
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

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. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the 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 surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

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.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

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 millimeters 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.

Stockpiling. Allowing fall plant growth (usually tall fescue) to accumulate for use as winter pasture.

Stone line. A concentration of coarse fragments in a soil. Generally it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

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.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

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.

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.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data recorded in the period 1949-78 at Charlottesville, Virginia]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	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----	44.6	26.5	35.6	73	5	72	3.18	1.82	4.27	6	6.4
February---	47.1	28.5	37.8	73	7	78	3.07	1.35	4.06	6	6.3
March------	55.9	35.5	45.7	84	18	229	4.01	2.71	5.57	7	4.9
April------	68.2	45.7	57.0	92	28	506	3.15	2.11	4.59	6	0.4
May--------	75.9	54.7	65.3	92	37	782	4.25	2.56	5.32	7	0.0
June-------	82.8	62.6	72.7	97	46	981	3.74	2.07	5.39	6	0.0
July-------	87.0	66.6	76.8	99	57	1,138	4.64	2.61	6.31	7	0.0
August-----	85.6	65.5	75.6	97	54	1,102	4.65	2.46	6.49	7	0.0
September--	79.3	59.3	69.3	96	42	879	3.92	1.85	5.75	6	0.0
October----	68.9	48.9	58.9	87	28	564	4.18	1.54	7.16	5	0.0
November---	57.9	38.9	48.4	80	17	278	3.16	1.78	4.92	5	1.5
December---	46.9	29.8	38.0	71	11	90	3.53	2.18	5.00	6	4.0
Yearly:											
Average--	66.8	47.0	56.9	---	---	---	---	---	---	---	---
Extreme--	---	---	---	107	-2	---	---	---	---	---	---
Total----	---	---	---	---	---	6,698	45.48	25.04	64.83	56	23.1

[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 (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data recorded in the period 1949-78 at Charlottesville, Virginia]

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--	March 25	March 30	April 15
2 years in 10 later than--	March 24	March 28	April 13
5 years in 10 later than--	March 14	March 20	April 3
First freezing temperature in fall:			
1 year in 10 earlier than--	November 18	October 29	October 26
2 years in 10 earlier than--	November 22	November 4	October 29
5 years in 10 earlier than--	December 2	November 10	November 8

TABLE 3.--GROWING SEASON

[Data recorded in the period 1949-78 at Charlottesville, Virginia]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	241	220	195
8 years in 10	246	225	198
5 years in 10	266	232	214
2 years in 10	282	251	230
1 year in 10	283	255	231

TABLE 4.--TEMPERATURE AND PRECIPITATION

[Data recorded in the period 1949-78 at Big Meadows, Virginia]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	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----	35.9	18.0	27.0	60	-7	25	3.34	2.00	4.24	7	11.3
February---	38.1	19.8	29.0	62	-7	25	3.01	1.45	4.58	6	9.9
March------	44.7	25.9	35.3	72	3	81	4.20	2.58	5.18	8	9.7
April------	57.5	36.3	46.9	80	14	248	3.45	1.96	5.17	8	1.8
May--------	65.8	46.0	55.9	81	24	478	4.57	2.59	6.29	9	0.0
June-------	71.7	53.2	62.5	84	37	667	4.77	2.66	5.74	7	0.0
July-------	75.0	57.2	66.1	86	44	801	4.07	2.18	4.74	7	0.0
August-----	74.0	56.2	65.1	84	42	771	5.35	6.23	2.51	7	0.0
September--	68.1	50.6	59.4	84	32	571	4.69	2.49	6.35	6	0.0
October----	58.3	40.4	49.4	77	18	309	5.16	2.13	8.07	6	0.5
November---	47.5	30.4	39.0	69	5	115	4.62	1.80	5.69	6	4.4
December---	38.4	21.5	30.0	62	-3	37	3.63	1.80	5.00	7	7.7
Yearly:											
Average--	56.0	37.9	47.0	---	---	---	---	---	---	---	---
Extreme--	---	---	---	90	-16	---	---	---	---	---	---
Total----	---	---	---	---	---	4,124	50.86	26.15	67.28	87	45.3

[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 (40° F).

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AsC	Ashe sandy loam, 7 to 15 percent slopes	1,070	1.1
AsD	Ashe sandy loam, 15 to 25 percent slopes	4,700	4.8
AsE	Ashe sandy loam, 25 to 75 percent slopes	840	0.9
AvD	Ashe very stony sandy loam, 15 to 25 percent slopes	805	0.8
AvE	Ashe very stony sandy loam, 25 to 75 percent slopes	1,180	1.2
BaB	Belvoir sandy loam, 2 to 7 percent slopes	520	0.5
BcB	Braddock loam, 2 to 7 percent slopes	955	1.0
BcC	Braddock loam, 7 to 15 percent slopes	1,065	1.1
BdD3	Braddock clay loam, 15 to 25 percent slopes, severely eroded	445	0.5
BuC	Buckhall loam, 7 to 15 percent slopes	1,550	1.6
BuD	Buckhall loam, 15 to 25 percent slopes	1,210	1.2
CaE	Cataska very stony silt loam, 25 to 75 percent slopes	315	0.3
CcE	Catoctin-Rock outcrop complex, 25 to 80 percent slopes	1,675	1.7
CgB	Chatuge sandy loam, 1 to 4 percent slopes	1,210	1.2
ChC	Chester loam, 7 to 15 percent slopes	550	0.6
ChD	Chester loam, 15 to 25 percent slopes	670	0.7
CmC	Chester and Parker soils, very stony, 7 to 15 percent slopes	640	0.7
CmD	Chester and Parker soils, very stony, 15 to 25 percent slopes	2,765	2.8
Cn	Codorus silt loam	625	0.6
Cs	Comus fine sandy loam	845	0.9
Cv	Craigsville cobbly sandy loam	1,865	1.9
DkB3	Dyke clay loam, 2 to 7 percent slopes, severely eroded	240	0.2
DkC3	Dyke clay loam, 7 to 15 percent slopes, severely eroded	365	0.4
ElB	Elioak loam, 2 to 7 percent slopes	4,415	4.5
ElC	Elioak loam, 7 to 15 percent slopes	6,210	6.3
EnC3	Elioak clay loam, 7 to 15 percent slopes, severely eroded	10,455	10.7
EnD3	Elioak clay loam, 15 to 25 percent slopes, severely eroded	3,800	3.9
GlC	Glenelg loam, 7 to 15 percent slopes	620	0.6
GlD	Glenelg loam, 15 to 25 percent slopes	755	0.8
Hb	Hatboro loam	1,660	1.7
HzD	Hazel loam, 15 to 25 percent slopes	1,120	1.1
HzE	Hazel loam, 25 to 45 percent slopes	340	0.3
Kn	Kinkora silt loam	990	1.0
LeC	Lew extremely stony loam, 7 to 15 percent slopes	1,180	1.2
LeD	Lew extremely stony loam, 15 to 25 percent slopes	2,155	2.2
LeE	Lew extremely stony loam, 25 to 75 percent slopes	3,825	3.9
MvB	Meadowville fine sandy loam, 2 to 7 percent slopes	3,960	4.0
MxC	Myersville and Catoctin very stony silt loams, 7 to 15 percent slopes	1,120	1.1
MyD	Myersville and Catoctin extremely stony silt loams, 15 to 25 percent slopes	3,205	3.3
MyE	Myersville and Catoctin extremely stony silt loams, 25 to 80 percent slopes	6,550	6.7
PrE	Parker extremely stony loam, 25 to 70 percent slopes	14,225	14.8
Sc	Suches-Codorus complex	1,880	1.9
ThC	Thurmont loam, 7 to 15 percent slopes	665	0.7
ThD	Thurmont loam, 15 to 25 percent slopes	230	0.2
TvD	Thurmont very stony loam, 15 to 25 percent slopes	1,215	1.2
Ud	Udorthents, smoothed	145	0.1
UnA	Unison loam, 0 to 2 percent slopes	190	0.2
UnB	Unison loam, 2 to 7 percent slopes	470	0.5
UnC	Unison loam, 7 to 15 percent slopes	415	0.4
	Total	97,900	100.0

TABLE 6.--PRIME FARMLAND

[Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland]

Map symbol	Soil name
BcB	Braddock loam, 2 to 7 percent slopes
ElB	Elioak loam, 2 to 7 percent slopes
MvB	Meadowville fine sandy loam, 2 to 7 percent slopes
UnA	Unison loam, 0 to 2 percent slopes
UnB	Unison loam, 2 to 7 percent slopes

TABLE 7.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Land capability	Corn	Wheat	Alfalfa hay	Grass-legume hay	Tall fescue	Grass-clover
		Bu	Bu	Tons	Tons	AUM*	AUM*
AsC---------- Ashe	IVe	65	30	1.5	3.0	2.0	4.0
AsD---------- Ashe	VIe	---	---	---	2.0	1.8	3.5
AsE---------- Ashe	VIIe	---	---	---	---	---	---
AvD---------- Ashe	VIs	---	---	---	---	1.5	3.0
AvE---------- Ashe	VIIs	---	---	---	---	---	---
BaB---------- Belvoir	IIIw	80	30	---	2.0	2.5	4.5
BcB---------- Braddock	IIe	130	70	6.0	5.0	6.5	8.0
BcC---------- Braddock	IIIe	120	60	5.0	4.5	4.0	7.0
BdD3---------- Braddock	VIe	60	35	2.0	1.5	2.5	4.5
BuC---------- Buckhall	IIIe	100	50	4.5	3.0	3.5	6.5
BuD---------- Buckhall	IVe	60	35	2.0	2.0	2.8	4.5
CaE---------- Cataska	VIIs	---	---	---	---	---	---
CcE---------- Catoctin-Rock outcrop	VIIs	---	---	---	---	---	---
CgB---------- Chatuge	IVw	50	---	---	---	2.5	2.0
ChC---------- Chester	IIIe	125	60	5.0	3.5	4.0	7.0
ChD---------- Chester	IVe	70	35	3.5	3.0	3.5	5.5
CmC, CmD-------- Chester and Parker	VIs	---	---	---	---	1.5	3.0
Cn---------- Codorus	IIw	120	45	---	3.5	6.0	7.8
Cs---------- Comus	IIw	140	70	---	4.0	5.0	7.5
Cv---------- Craigsville	IIIs	90	45	---	3.0	3.5	6.0
DkB3---------- Dyke	IIIe	120	60	5.0	5.0	4.0	7.0

See footnote at end of table.

TABLE 7.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Wheat	Alfalfa hay	Grass-legume hay	Tall fescue	Grass-clover
		Bu	Bu	Tons	Tons	AUM*	AUM*
DkC3---------- Dyke	IVe	100	50	4.5	4.0	3.5	6.5
ElB---------- Elioak	IIe	135	70	6.0	5.0	6.5	8.0
ElC---------- Elioak	IIIe	125	60	5.0	4.5	4.0	7.0
EnC3---------- Elioak	IVe	80	40	3.0	3.0	4.0	7.0
EnD3---------- Elioak	VIe	---	---	2.0	1.5	2.5	4.5
GlC---------- Glenelg	IIIe	100	50	4.0	3.0	4.0	7.0
GlD---------- Glenelg	IVe	70	35	3.0	2.5	3.0	5.0
Hb---------- Hatboro	IIIw	115	---	---	2.0	4.0	2.0
HzD---------- Hazel	VIe	---	---	---	1.5	1.8	3.7
HzE---------- Hazel	VIIe	---	---	---	---	---	---
Kn---------- Kinkora	IIIw	105	---	---	2.0	4.0	2.0
LeC, LeD, LeE--- Lew	VIIs	---	---	---	---	---	---
MvB---------- Meadowville	IIe	125	55	4.2	4.5	6.0	8.0
MxC---------- Myersville and Catoctin	VIs	---	---	---	---	2.5	4.5
MyD---------- Myersville and Catoctin	VIIs	---	---	---	---	---	---
MyE---------- Myersville and Catoctin	VIIs	---	---	---	---	---	---
PrE---------- Parker	VIIs	---	---	---	---	---	---
Sc---------- Suches-Codorus	IIw	133	50	---	4.4	5.0	8.0
ThC---------- Thurmont	IIIe	115	60	4.0	4.0	4.0	7.0
ThD---------- Thurmont	IVe	85	35	3.5	3.0	3.5	5.5
TvD---------- Thurmont	VIIs	---	---	---	---	1.5	2.5
Ud. Udorthents							

See footnote at end of table.

TABLE 7.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Wheat	Alfalfa hay	Grass-legume hay	Tall fescue	Grass-clover
		Bu	Bu	Tons	Tons	AUM*	AUM*
UnA---------- Unison	I	135	70	6.3	5.5	6.8	8.2
UnB---------- Unison	IIe	130	70	6.0	5.0	6.5	8.0
UnC---------- Unison	IIIe	120	60	5.0	4.7	4.0	7.0

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
AsC---------- Ashe	3o	Slight	Slight	Slight	Slight	Chestnut oak--------	66	Eastern white pine, shortleaf pine, loblolly pine.
						Yellow-poplar-------	78	
						Eastern white pine--	84	
						Northern red oak----	66	
						Shortleaf pine------	66	
						Virginia pine-------	66	
AsD---------- Ashe	3r	Moderate	Moderate	Moderate	Slight	Chestnut oak--------	66	Eastern white pine, shortleaf pine, loblolly pine.
						Yellow-poplar-------	78	
						Eastern white pine--	84	
						Northern red oak----	66	
						Shortleaf pine------	66	
						Virginia pine-------	66	
AsE---------- Ashe	3r	Severe	Severe	Moderate	Slight	Chestnut oak--------	66	Eastern white pine, shortleaf pine, loblolly pine.
						Yellow-poplar-------	78	
						Eastern white pine--	84	
						Northern red oak----	66	
						Shortleaf pine------	66	
						Virginia pine-------	66	
AvD---------- Ashe	3x	Moderate	Moderate	Slight	Slight	Chestnut oak--------	66	Eastern white pine, shortleaf pine.
						Yellow-poplar-------	78	
						Eastern white pine--	84	
						Northern red oak----	66	
						Shortleaf pine------	66	
						Virginia pine-------	66	
AvE---------- Ashe	3x	Severe	Severe	Severe	Slight	Chestnut oak--------	66	Eastern white pine, shortleaf pine.
						Yellow-poplar-------	78	
						Eastern white pine--	84	
						Northern red oak----	66	
						Shortleaf pine------	66	
						Virginia pine-------	66	
BaB---------- Belvoir	3w	Slight	Moderate	Slight	Slight	Red maple----------	65	Loblolly pine, yellow-poplar, American sycamore.
						Sweetgum----------	80	
						Yellow-poplar-------	80	
BcB, BcC---------- Braddock	2c	Slight	Moderate	Slight	Slight	Northern red oak----	80	Yellow-poplar, eastern white pine, loblolly pine, northern red oak.
						Yellow-poplar-------	90	
						Eastern white pine--	95	
						Virginia pine-------	76	
BdD3---------- Braddock	2r	Moderate	Severe	Slight	Slight	Northern red oak----	80	Yellow-poplar, eastern white pine, loblolly pine, northern red oak.
						Yellow-poplar-------	90	
						Eastern white pine--	95	
						Virginia pine-------	76	
BuC---------- Buckhall	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Loblolly pine, eastern white pine, yellow-poplar, northern red oak.
						Yellow-poplar-------	85	
						Virginia pine-------	70	
						White oak----------	70	
BuD---------- Buckhall	3r	Moderate	Severe	Slight	Slight	Northern red oak----	70	Eastern white pine.
						Yellow-poplar-------	85	
						Loblolly pine-------	80	
						Virginia pine-------	70	
						White oak----------	70	
CaE---------- Cataska	5f	Severe	Severe	Severe	Severe	Chestnut oak--------	50	Eastern white pine.
						Eastern white pine--	60	

See footnote at end of table.

TABLE 8.--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	
CcE*: Catoctin	4r	Severe	Severe	Moderate	Slight	Virginia pine Shortleaf pine Northern red oak Yellow-poplar	60 60 60 70	Virginia pine, eastern white pine, black walnut.
Rock outcrop.								
CgB Chatuge	1w	Slight	Severe	Severe	Slight	American sycamore Yellow-poplar Northern red oak	100 96 86	Loblolly pine, yellow-poplar, eastern white pine, American sycamore.
ChC Chester	2o	Slight	Slight	Slight	Slight	Chestnut oak Yellow-poplar Virginia pine Northern red oak	77 86 80 76	Black walnut, yellow-poplar, eastern white pine, northern red oak.
ChD Chester	2r	Moderate	Moderate	Slight	Slight	Chestnut oak Yellow-poplar Virginia pine Northern red oak	77 86 80 76	Black walnut, yellow-poplar, eastern white pine, northern red oak.
CmC*: Chester	2x	Slight	Moderate	Slight	Slight	Black oak Yellow-poplar Virginia pine Shortleaf pine	77 86 80 80	Black walnut, yellow-poplar, eastern white pine.
Parker	3f	Slight	Moderate	Moderate	Slight	Black oak White oak Chestnut oak Yellow-poplar	66 66 66 77	Eastern white pine, Virginia pine, black walnut.
CmD*: Chester	2x	Moderate	Moderate	Slight	Slight	Black oak Yellow-poplar Virginia pine Shortleaf pine	77 86 80 80	Black walnut, yellow-poplar, eastern white pine.
Parker	3x	Moderate	Moderate	Moderate	Slight	Black oak White oak Chestnut oak Yellow-poplar	66 66 66 77	Eastern white pine, Virginia pine, black walnut.
Cn Codorus	1w	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine Black walnut	90 100 100 100	Yellow-poplar, black walnut, eastern white pine, American sycamore, loblolly pine.
Cs Comus	1o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar American sycamore	86 96 96	Eastern white pine, black walnut, yellow-poplar, American sycamore, loblolly pine.
Cv Craigsville	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine Virginia pine	80 95 90 80	Loblolly pine, eastern white pine, yellow-poplar, black walnut, American sycamore.
DkB3, DkC3 Dyke	2c	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Virginia pine Shortleaf pine	85 95 80 80	Yellow-poplar, loblolly pine, northern red oak, black walnut, eastern white pine.

See footnote at end of table.

TABLE 8.--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	
ElB, ElC, EnC3----- Elioak	2c	Slight	Moderate	Slight	Slight	Nortnern red oak----	85	Loblolly pine, yellow-poplar, eastern white pine, northern red oak, black walnut.
						Yellow-poplar-------	90	
						Virginia pine-------	76	
						Shortleaf pine------	76	
EnD3---------- Elioak	2c	Moderate	Severe	Slight	Slight	Northern red oak----	85	Loblolly pine, yellow-poplar, eastern white pine, northern red oak, black walnut.
						Yellow-poplar-------	90	
						Virginia pine-------	76	
						Shortleaf pine------	76	
GlC---------- Glenelg	2o	Slight	Slight	Slight	Slight	Northern red oak----	78	Eastern white pine, black walnut, loblolly pine, yellow-poplar, northern red oak.
						Yellow-poplar-------	87	
						Virginia pine-------	80	
						Shortleaf pine------	80	
GlD---------- Glenelg	2r	Moderate	Moderate	Slight	Slight	Northern red oak----	78	Eastern white pine, black walnut, loblolly pine, yellow-poplar, northern red oak.
						Yellow-poplar-------	87	
						Virginia pine-------	80	
						Shortleaf pine------	80	
Hb---------- Hatboro	4w	Slight	Severe	Slight	Moderate	Red maple----------	60	Eastern white pine, yellow-poplar, loblolly pine, American sycamore.
						American sycamore---	60	
						Yellow-poplar-------	85	
HzD---------- Hazel	4d	Moderate	Moderate	Moderate	Slight	Northern red oak----	60	Loblolly pine, eastern white pine.
						Virginia pine-------	60	
HzE---------- Hazel	4d	Severe	Severe	Moderate	Slight	Northern red oak----	60	Loblolly pine, eastern white pine.
						Virginia pine-------	60	
Kn---------- Kinkora	1w	Slight	Severe	Severe	Slight	Yellow-poplar-------	100	Eastern white pine, yellow-poplar, loblolly pine, American sycamore.
						American sycamore---	95	
LeC---------- Lew	2x	Slight	Moderate	Slight	Slight	Northern red oak----	80	Virginia pine, yellow-poplar, eastern white pine.
						Yellow-poplar-------	90	
						Eastern white pine--	90	
LeD---------- Lew	2x	Slight	Moderate	Slight	Slight	Northern red oak----	80	Virginia pine, yellow-poplar, eastern white pine.
						Yellow-poplar-------	90	
						Eastern white pine--	90	
LeE---------- Lew	2r	Moderate	Severe	Slight	Slight	Northern red oak----	80	Virginia pine, yellow-poplar, eastern white pine.
						Yellow-poplar-------	90	
						Eastern white pine--	90	
MvB---------- Meadowville	2o	Slight	Slight	Slight	Slight	Northern red oak----	76	Loblolly pine, eastern white pine, yellow-poplar, black walnut, northern red oak.
						Yellow-poplar-------	90	
						Virginia pine-------	80	
MxC*: Myersville--------	1o	Slight	Slight	Slight	Slight	Northern red oak----	86	Yellow-poplar, black walnut, eastern white pine.
						Yellow-poplar-------	96	
Catoctin----------	4f	Slight	Slight	Moderate	Slight	Virginia pine-------	60	Virginia pine, eastern white pine, black walnut.
						Shortleaf pine------	60	
						Northern red oak----	60	
						Yellow-poplar-------	70	

See footnote at end of table.

TABLE 8.--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	Wind-throw hazard	Common trees	Site index	
MyD*:								
Myersville	2r	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar	85 95	Yellow-poplar, black walnut, eastern white pine.
Catoctin	4f	Moderate	Moderate	Moderate	Slight	Virginia pine Shortleaf pine Northern red oak Yellow-poplar	60 60 60 70	Virginia pine, eastern white pine, black walnut.
MyE*:								
Myersville	2r	Severe	Severe	Slight	Slight	Northern red oak Yellow-poplar	85 95	Yellow-poplar, black walnut, eastern white pine.
Catoctin	4r	Severe	Severe	Moderate	Slight	Virginia pine Shortleaf pine Northern red oak Yellow-poplar	60 60 60 70	Virginia pine, eastern white pine, black walnut.
PrE Parker	3x	Slight	Moderate	Moderate	Slight	Black oak White oak Chestnut oak Yellow-poplar	70 66 66 77	Eastern white pine, Virginia pine, black walnut.
Sc*:								
Suches	1o	Slight	Slight	Slight	---	Shortleaf pine Eastern white pine Northern red oak Black walnut Yellow-poplar	90 100 90 100 105	Loblolly pine, shortleaf pine, eastern white pine, northern red oak, black walnut, yellow-poplar.
Codorus	1w	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine Black walnut	90 100 100 100	Yellow-poplar, black walnut, eastern white pine, American sycamore, loblolly pine.
ThC Thurmont	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine Shortleaf pine	76 88 88 77	Eastern white pine, yellow-poplar, loblolly pine, black walnut, northern red oak.
ThD Thurmont	2r	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine Shortleaf pine	76 88 88 77	Eastern white pine, yellow-poplar, loblolly pine, black walnut, northern red oak.
TvD Thurmont	2r	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine Shortleaf pine	76 90 90 77	Eastern white pine, yellow-poplar, black walnut.
UnA, UnB, UnC Unison	1o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar Virginia pine	86 96 86	Yellow-poplar, black walnut, eastern white pine, loblolly pine, northern red oak.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AsC---------- Ashe	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: thin layer, slope.
AsD---------- Ashe	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
AsE---------- Ashe	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
AvD---------- Ashe	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: large stones.	Severe: slope.
AvE---------- Ashe	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BaB---------- Belvoir	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
BcB---------- Braddock	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
BcC---------- Braddock	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
BdD3---------- Braddock	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
BuC---------- Buckhall	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
BuD---------- Buckhall	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
CaE---------- Cataska	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: small stones, slope.
CcE*: Catoctin----------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Severe: slope.	Severe: large stones, slope.
Rock outcrop.					
CgB---------- Chatuge	Severe: wetness, flooding.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
ChC---------- Chester	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: large stones, slope.
ChD---------- Chester	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CmC*: Chester	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Slight	Moderate: large stones, slope.
Parker	Severe: small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Severe: small stones.	Severe: small stones.
CmD*: Chester	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: slope.	Severe: slope.
Parker	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: small stones.	Severe: small stones, slope.
Cn Codorus	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: flooding, wetness.
Cs Comus	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Cv Craigsville	Severe: flooding.	Moderate: large stones, flooding.	Severe: large stones, flooding.	Moderate: large stones, flooding.	Severe: large stones, flooding.
DkB3 Dyke	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
DkC3 Dyke	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
ElB Elioak	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: large stones, droughty.
ElC, EnC3 Elioak	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, droughty, slope.
EnD3 Elioak	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
GlC Glenelg	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
GlD Glenelg	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Hb Hatboro	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: flooding, wetness.
HzD Hazel	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
HzE Hazel	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Kn---------- Kinkora	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
LeC---------- Lew	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, small stones.	Severe: small stones, large stones.
LeD---------- Lew	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, small stones.	Severe: small stones, large stones, slope.
LeE---------- Lew	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope, small stones.	Severe: small stones, large stones, slope.
MvB---------- Meadowville	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
MxC*: Myersville----------	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Slight----------	Moderate: large stones, slope.
Catoctin----------	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Slight----------	Moderate: large stones, slope.
MyD*: Myersville----------	Slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Severe: large stones.	Severe: large stones, slope.
Catoctin----------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Moderate: large stones, slope.	Severe: large stones, slope.
MyE*: Myersville----------	Slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Severe: slope, large stones.	Severe: large stones, slope.
Catoctin----------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Severe: slope.	Severe: large stones, slope.
PrE---------- Parker	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.
Sc*: Suches----------	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.
Codorus----------	Severe: flooding, wetness.	Moderate: wetness, flooding.	Severe: flooding, wetness.	Moderate: wetness.	Severe: flooding.
ThC---------- Thurmont	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
ThD---------- Thurmont	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
TvD---------- Thurmont	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope.
Ud. Udorthents					
UnA---------- Unison	Slight----------	Slight----------	Moderate: small stones.	Slight----------	Moderate: large stones.
UnB---------- Unison	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Moderate: large stones.
UnC---------- Unison	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: large stones, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AsC, AsD---------- Ashe	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
AsE---------- Ashe	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
AvD---------- Ashe	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
AvE---------- Ashe	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
BaB---------- Belvoir	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
BcB---------- Braddock	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BcC---------- Braddock	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BdD3---------- Braddock	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BuC---------- Buckhall	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BuD---------- Buckhall	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CaE---------- Cataska	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
CcE*: Catoctin----------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Rock outcrop.										
CgB---------- Chatuge	Poor	Fair	Fair	Good	Good	Good	Fair	Fair	Good	Fair.
ChC---------- Chester	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ChD---------- Chester	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CmC*, CmD*: Chester----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Parker----------	Very poor.	Very poor.	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Cn---------- Codorus	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Cs---------- Comus	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 10.--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
Cv---------- Craigsville	Poor	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
DkB3---------- Dyke	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DkC3---------- Dyke	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ElB---------- Elioak	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ElC, EnC3---------- Elioak	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EnD3---------- Elioak	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GlC---------- Glenelg	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GlD---------- Glenelg	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Hb---------- Hatboro	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
HzD---------- Hazel	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
HzE---------- Hazel	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Kn---------- Kinkora	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
LeC, LeD, LeE------ Lew	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
MvB---------- Meadowville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MxC*, MyD*:										
Myersville--------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Catoctin----------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
MyE*:										
Myersville--------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Catoctin----------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
PrE---------- Parker	Very poor.	Very poor.	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Sc*:										
Suches----------	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Codorus----------	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
ThC---------- Thurmont	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 10.--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
ThD---------- Thurmont	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
TvD---------- Thurmont	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Ud. Udorthents										
UnA, UnB---------- Unison	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
UnC---------- Unison	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition and does not eliminate the need for onsite investigation]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AsC---------- Ashe	Moderate: depth to rock, slope.	Moderate: depth to rock, slope.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Moderate: thin layer, slope.
AsD, AsE, AvD, AvE---------- Ashe	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BaB---------- Belvoir	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness, droughty.
BcB---------- Braddock	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, frost action.	Slight.
BcC---------- Braddock	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
BdD3---------- Braddock	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BuC---------- Buckhall	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
BuD---------- Buckhall	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength.	Severe: slope.
CaE---------- Cataska	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
CcE*: Catoctin--------- Rock outcrop.	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
CgB---------- Chatuge	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Moderate: wetness, flooding.
ChC---------- Chester	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope.
ChD---------- Chester	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CmC*: Chester----------	Moderate: wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Severe: low strength.	Moderate: large stones, slope.
Parker----------	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope, frost action.	Severe: small stones.
CmD*: Chester----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CmD*: Parker	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Cn Codorus	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: flooding, frost action.	Moderate: flooding, wetness.
Cs Comus	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Cv Craigsville	Severe: cutbanks cave, large stones.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: large stones, flooding.
DkB3 Dyke	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
DkC3 Dyke	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
ElB Elioak	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: large stones, droughty.
ElC, EnC3 Elioak	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: large stones, droughty, slope.
EnD3 Elioak	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
GlC Glenelg	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
GlD Glenelg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hb Hatboro	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, frost action.	Severe: flooding, wetness.
HzD, HzE Hazel	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Kn Kinkora	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, frost action.	Severe: wetness.
LeC Lew	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: small stones, large stones.
LeD, LeE Lew	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: small stones, large stones, slope.
MvB Meadowville	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MxC*:						
Myersville	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: large stones, slope.
Catoctin	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, large stones.	Moderate: large stones, slope.
MyD*, MyE*:						
Myersville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength.	Severe: large stones, slope.
Catoctin	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
PrE---------- Parker	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Sc*:						
Suches	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Codorus	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: flooding, frost action.	Severe: flooding.
ThC---------- Thurmont	Moderate: wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
ThD, TvD---------- Thurmont	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ud. Udorthents						
UnA---------- Unison	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Moderate: large stones.
UnB---------- Unison	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Moderate: large stones.
UnC---------- Unison	Moderate: too clayey, slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: large stones, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--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. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition and does not eliminate the need for onsite investigation]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AsC---------- Ashe	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, thin layer.
AsD, AsE, AvD, AvE-- 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, thin layer.
BaB---------- Belvoir	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
BcB---------- Braddock	Moderate: percs slowly.	Severe: seepage.	Severe: seepage, too clayey.	Slight----------	Poor: too clayey, hard to pack.
BcC---------- Braddock	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
BdD3---------- Braddock	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
BuC---------- Buckhall	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
BuD---------- Buckhall	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
CaE---------- Cataska	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
CcE*: Catoctin----------	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, small stones, slope.
Rock outcrop.					
CgB---------- Chatuge	Severe: wetness, flooding.	Severe: wetness, flooding, seepage.	Severe: wetness, flooding, seepage.	Severe: wetness, flooding, seepage.	Poor: wetness.
ChC---------- Chester	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
ChD---------- Chester	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 12.--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
CmC*:					
Chester	Moderate: wetness, percs slowly, slope.	Severe: slope.	Severe: wetness.	Moderate: slope.	Fair: slope.
Parker	Severe: poor filter.	Severe: seepage, slope.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: seepage, small stones.
CmD*:					
Chester	Severe: slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Poor: slope.
Parker	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: seepage, small stones, slope.
Cn Codorus	Severe: flooding, wetness, poor filter.	Severe: flooding, wetness, seepage.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness.
Cs Comus	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Poor: small stones.
Cv Craigsville	Severe: flooding, poor filter.	Severe: seepage, flooding, large stones.	Severe: flooding, seepage, large stones.	Severe: flooding, seepage.	Poor: large stones, seepage.
DkB3 Dyke	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
DkC3 Dyke	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
ElB Elioak	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
ElC, EnC3 Elioak	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
EnD3 Elioak	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
GlC Glenelg	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: small stones.
GlD Glenelg	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Hb Hatboro	Severe: flooding, wetness.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness.	Poor: wetness.

See footnote at end of table.

TABLE 12.--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
HzD, HzE---------- Hazel	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.
Kn---------- Kinkora	Severe: wetness, percs slowly.	Severe: seepage, flooding.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
LeC---------- Lew	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: seepage.	Poor: hard to pack, large stones.
LeD, LeE---------- Lew	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: seepage, slope.	Poor: hard to pack, large stones, slope.
MvB---------- Meadowville	Severe: wetness.	Severe: seepage, wetness.	Severe: depth to rock, seepage, wetness.	Severe: seepage, wetness.	Fair: area reclaim, too clayey.
MxC*: Myersville---------	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey, large stones.	Moderate: slope.	Fair: too clayey, small stones.
Catoctin----------	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones.
MyD*, MyE*: Myersville---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Catoctin----------	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, small stones, slope.
PrE---------- Parker	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: seepage, small stones, slope.
Sc*: Suches----------	Severe: wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Codorus----------	Severe: flooding, wetness, poor filter.	Severe: flooding, wetness, seepage.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness.
ThC---------- Thurmont	Moderate: wetness, percs slowly, slope.	Severe: slope.	Severe: wetness.	Moderate: slope, wetness.	Fair: small stones, slope.
ThD, TvD---------- Thurmont	Severe: slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 12.--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
Ud. Udorthents					
UnA, UnB---------- Unison	Moderate: percs slowly.	Severe: seepage.	Severe: too clayey, seepage.	Slight----------	Poor: too clayey, hard to pack.
UnC---------- Unison	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: too clayey, seepage.	Moderate: slope.	Poor: too clayey, hard to pack.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--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." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition and does not eliminate the need for onsite investigation]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AsC---------- Ashe	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
AsD---------- Ashe	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
AsE---------- Ashe	Poor: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
AvD---------- Ashe	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
AvE---------- Ashe	Poor: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
BaB---------- Belvoir	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
BcB, BcC---------- Braddock	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
BdD3---------- Braddock	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
BuC---------- Buckhall	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
BuD---------- Buckhall	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
CaE---------- Cataska	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CcE*: Catoctin----------	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop.				
CgB---------- Chatuge	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
ChC---------- Chester	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
ChD---------- Chester	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CmC*: Chester----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Parker----------	Fair: area reclaim.	Improbable: small stones.	Probable----------	Poor: small stones, area reclaim.
CmD*: Chester----------	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Parker----------	Fair: area reclaim, slope.	Improbable: small stones.	Probable----------	Poor: small stones, area reclaim, slope.
Cn---------- Codorus	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Cs---------- Comus	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Cv---------- Craigsville	Fair: large stones.	Improbable: large stones.	Improbable: large stones.	Poor: large stones, area reclaim.
DkB3, DkC3---------- Dyke	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, area reclaim.
ElB, ElC, EnC3-------- Elioak	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
EnD3---------- Elioak	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
GlC---------- Glenelg	Fair: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
GlD---------- Glenelg	Fair: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Hb---------- Hatboro	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
HzD---------- Hazel	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
HzE---------- Hazel	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Kn---------- Kinkora	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
LeC---------- Lew	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim.
LeD---------- Lew	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
LeE---------- Lew	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
MvB---------- Meadowville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
MxC*: Myersville----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Catoctin----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
MyD*: Myersville----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Catoctin----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
MyE*: Myersville----------	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Catoctin----------	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
PrE---------- Parker	Poor: slope.	Improbable: small stones.	Probable----------	Poor: small stones, area reclaim, slope.
Sc*: Suches----------	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Codorus----------	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
ThC---------- Thurmont	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
ThD---------- Thurmont	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
TvD---------- Thurmont	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Ud. Udorthents				
UnA, UnB, UnC--------- Unison	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition and does not eliminate the need for onsite investigation]

Soil name and map symbol	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AsC---------- Ashe	Severe: seepage.	Moderate: piping, thin layer.	Severe: no water.	Deep to water	Depth to rock, slope.	Depth to rock, slope.	Depth to rock, slope.
AsD, AsE---------- Ashe	Severe: seepage, slope.	Moderate: piping, thin layer.	Severe: no water.	Deep to water	Depth to rock, slope.	Depth to rock, slope.	Depth to rock, slope.
AvD, AvE---------- Ashe	Severe: seepage, slope.	Moderate: piping, thin layer.	Severe: no water.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope.
BaB---------- Belvoir	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, rooting depth.	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
BcB---------- Braddock	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Favorable------	Favorable.
BcC, BdD3--------- Braddock	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.
BuC, BuD---------- Buckhall	Severe: slope.	Moderate: piping, hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.
CaE---------- Cataska	Severe: depth to rock, slope.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
CcE*: Catoctin---------	Severe: seepage, slope.	Severe: large stones.	Severe: no water.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Rock outcrop.							
CgB---------- Chatuge	Moderate: seepage.	Slight---------	Moderate: slow refill.	Flooding-------	Wetness, flooding.	Wetness, flooding.	Wetness.
ChC, ChD---------- Chester	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope, erodes easily.	Slope, erodes easily.
CmC*, CmD*: Chester----------	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope, erodes easily.	Slope, erodes easily.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
CmC*, CmD*: Parker	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, slope.	Slope	Slope, droughty.
Cn Codorus	Severe: seepage.	Severe: wetness.	Moderate: slow refill.	Flooding, frost action.	Flooding, wetness.	Wetness	Flooding, wetness.
Cs Comus	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Flooding	Favorable	Favorable.
Cv Craigsville	Severe: seepage.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, droughty.	Large stones, too sandy.	Large stones, droughty.
DkB3 Dyke	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
DkC3 Dyke	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
ElB Elioak	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Droughty, slope.	Favorable	Droughty.
ElC, EnC3, EnD3 Elioak	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Droughty, slope.	Slope	Slope, droughty.
GlC, GlD Glenelg	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope	Slope	Slope.
Hb Hatboro	Severe: seepage.	Severe: piping, wetness.	Slight	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
HzD, HzE Hazel	Severe: seepage, slope.	Moderate: large stones.	Severe: no water.	Deep to water	Depth to rock, slope.	Slope, depth to rock.	Large stones, slope, depth to rock.
Kn Kinkora	Severe: seepage.	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.
LeC, LeD, LeE Lew	Severe: slope.	Severe: piping, hard to pack, large stones.	Severe: no water.	Deep to water	Large stones, slope.	Slope, large stones.	Large stones, slope.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
MvB---------- Meadowville	Severe: seepage.	Severe: piping.	Moderate: deep to water, slow refill, depth to rock.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
MxC*: Myersville-------	Severe: slope.	Moderate: thin layer, piping, large stones.	Severe: no water.	Deep to water	Slope----------	Slope, large stones.	Large stones, slope.
Catoctin---------	Severe: seepage, slope.	Moderate: seepage, piping, large stones.	Severe: no water.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
MyD*, MyE*: Myersville-------	Severe: slope.	Moderate: thin layer, piping, large stones.	Severe: no water.	Deep to water	Slope----------	Slope, large stones.	Large stones, slope.
Catoctin---------	Severe: seepage, slope.	Severe: large stones.	Severe: no water.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
PrE---------- Parker	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, slope.	Slope----------	Slope, droughty.
Sc*: Suches----------	Moderate: seepage.	Moderate: piping.	Moderate: deep to water, slow refill.	Flooding-------	Wetness, flooding.	Wetness--------	Favorable.
Codorus----------	Severe: seepage.	Severe: wetness.	Moderate: slow refill.	Flooding, frost action.	Flooding, wetness.	Wetness--------	Flooding, wetness.
ThC, ThD---------- Thurmont	Severe: slope.	Moderate: thin layer, piping.	Moderate: deep to water, slow refill.	Deep to water	Slope----------	Slope----------	Slope.
TvD---------- Thurmont	Severe: slope.	Moderate: thin layer, large stones.	Moderate: deep to water, slow refill.	Deep to water	Slope----------	Slope, large stones.	Large stones, slope.
Ud. Udorthents							
UnA---------- Unison	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Favorable------	Favorable------	Favorable.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
UnB---------- Unison	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Favorable------	Favorable.
UnC---------- Unison	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AsC, AsD, AsE---- Ashe	0-5	Sandy loam-------	SM, SM-SC, ML, CL-ML	A-4	0-15	90-100	85-100	65-95	40-55	<25	NP-7
	5-22	Loam, sandy loam, fine sandy loam.	SM, SM-SC	A-4	5-30	85-100	80-95	60-95	35-49	<25	NP-7
	22-38	Sandy loam-------	SM	A-2, A-4	15-30	75-95	70-95	55-95	30-49	---	NP
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
AvD, AvE--------- Ashe	0-5	Very stony sandy loam.	SM, SM-SC	A-2, A-4	15-35	80-90	75-90	65-90	30-49	<25	NP-7
	5-22	Loam, sandy loam, fine sandy loam.	SM, SM-SC	A-4	5-30	85-100	80-95	60-95	35-49	<25	NP-7
	22-38	Sandy loam-------	SM	A-2, A-4	15-30	75-95	70-95	55-95	30-49	---	NP
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
BaB---------- Belvoir	0-6	Sandy loam-------	ML, SM, CL-ML, SM-SC	A-4	0	90-100	80-100	60-90	25-80	<30	NP-10
	6-28	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6	0	90-100	80-100	75-90	40-80	25-45	7-25
	28-38	Sandy loam, clay loam, loam.	ML, CL, SM, SC	A-2, A-4, A-6	0-5	90-100	80-100	60-90	30-70	<40	NP-20
	38-63	Loam, sandy clay loam, clay.	SM, SC, CL, ML	A-4, A-6	0-10	90-100	80-100	50-90	40-80	<50	NP-30
BcB, BcC--------- Braddock	0-6	Loam-------------	CL, SM, ML, SC	A-2, A-4	0-5	85-100	75-95	50-85	25-65	<30	NP-10
	6-72	Clay loam, gravelly sandy clay, clay.	MH, CH, CL, SC	A-7, A-2	0-15	70-95	70-90	45-90	20-80	42-60	15-33
BdD3---------- Braddock	0-6	Clay loam--------	ML, CL	A-6, A-7	0-10	70-95	70-90	65-90	50-85	35-50	15-25
	6-72	Clay loam, gravelly sandy clay, clay.	MH, CH, CL, SC	A-7, A-2	0-15	70-95	70-90	45-90	20-80	42-60	15-33
BuC, BuD--------- Buckhall	0-9	Loam-------------	CL-ML, CL, SC	A-2, A-4, A-6	0-5	85-100	75-95	60-70	45-60	20-35	5-15
	9-27	Clay loam, clay	CL, CH	A-6, A-7	0-5	95-100	75-95	65-75	55-70	35-50	20-30
	27-62	Sandy loam, sandy clay loam, clay loam.	CL-ML, CL, SM-SC, SC	A-2, A-4, A-6	0-5	85-95	70-85	40-70	25-60	10-35	5-15
CaE---------- Cataska	0-7	Very stony silt loam.	CL-ML, ML, GM, GM-GC	A-4	10-30	45-80	45-75	40-70	40-60	<28	NP-6
	7-17	Slaty silt loam, channery silt loam, very channery silt loam.	GM-GC, GM, GP-GM	A-2, A-1	10-25	15-50	10-45	10-40	10-35	<28	NP-7
	17-36	Weathered bedrock	---	---	---	---	---	---	---	---	---
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--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	
CcE*:											
Catoctin--------	0-5	Extremely stony silt loam.	ML, CL, CL-ML	A-4	20-50	80-90	75-85	70-80	60-70	<30	NP-8
	5-18	Channery silt loam, channery silty clay loam, cobbly silt loam.	SM, SC, CL, GM	A-2, A-4, A-6	0-25	50-80	35-75	30-60	25-60	20-34	2-12
	18-26	Very channery silt loam, extremely channery silt loam.	SM, SC, GC, GM	A-2, A-4, A-1, A-3	10-40	30-75	10-60	9-55	7-50	<28	NP-8
	26	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
CgB---------- Chatuge	0-6	Sandy loam-------	ML, SM, SC, CL	A-4	0	100	95-100	70-95	40-70	<30	NP-10
	6-41	Loam, clay loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0	100	97-100	75-96	43-75	<35	NP-15
	41-65	Gravelly coarse sand, gravelly loamy sand, very gravelly coarse sand.	SM	A-1	5-15	75-90	40-80	30-50	13-20	---	NP
ChC, ChD--------- Chester	0-7	Loam----------	ML, CL	A-4, A-6, A-7	0-10	90-100	90-100	75-90	55-75	33-47	8-12
	7-46	Silty clay loam, silt loam, clay loam.	ML, CL, SM, SC	A-4, A-6, A-7	0-10	85-100	55-100	50-95	40-70	30-50	8-17
	46-62	Loam----------	SM, SC, ML	A-2, A-4, A-7	0-10	80-100	70-100	70-95	30-65	<47	NP-16
CmC*, CmD*:											
Chester---------	0-7	Very stony loam	ML, CL	A-4, A-6, A-7	3-10	80-100	75-90	65-90	55-75	33-47	8-12
	7-46	Silty clay loam, silt loam, clay loam.	ML, CL, SM, SC	A-4, A-6, A-7	0-5	85-100	80-100	70-100	40-80	30-50	8-17
	46-62	Loam, sandy loam	SM, SC, ML	A-2, A-4, A-7	0-5	85-100	80-100	50-95	25-65	<45	NP-16
Parker----------	0-6	Very stony loam	GM, GP-GM	A-1, A-2	5-10	40-60	25-50	15-45	10-30	10-20	2-7
	6-25	Very gravelly loam, cobbly sandy loam, very gravelly sandy loam.	GM, GP-GM, GC	A-1, A-2	5-10	40-60	30-55	20-50	10-35	15-25	2-10
	25-60	Very gravelly sandy loam, very gravelly loam, extremely cobbly sandy loam.	GM, GP, GC	A-1, A-2	5-15	20-40	5-30	3-25	2-20	15-25	2-10
Cn---------- Codorus	0-13	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	80-100	70-100	65-100	55-95	22-35	2-12
	13-43	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	80-100	75-100	65-100	55-85	22-35	2-12
	43-61	Stratified sand to silt.	SM, GM, ML	A-1, A-2, A-4	0	25-100	20-100	20-85	15-65	<35	NP-7

See footnote at end of table.

TABLE 15.--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	
Cs---------- Comus	0-45	Fine sandy loam	ML, SM, CL, SC	A-2, A-4, A-6	0-5	85-100	80-100	55-100	30-90	30-40	6-15
	45-63	Stratified gravelly sandy loam to silty clay loam.	GM, SM, ML, CL	A-1, A-2, A-4, A-6	0-20	55-100	45-100	25-100	15-95	<40	NP-20
Cv---------- Craigsville	0-6	Cobbly sandy loam	ML, SM, CL-ML, SC	A-2, A-4	25-50	80-95	75-95	50-80	25-60	<25	NP-10
	6-22	Gravelly sandy loam, cobbly loam, very gravelly sandy loam.	SM, GM, GC, SC	A-1, A-2, A-4	25-60	50-80	30-65	25-60	15-40	<25	NP-10
	22-64	Very gravelly loamy sand, very gravelly sandy loam, extremely cobbly loamy sand.	GC, GM, GP-GM, GM-GC	A-1, A-2	35-75	35-55	30-50	20-45	10-25	<25	NP-8
DkB3, DkC3------- Dyke	0-8	Clay loam--------	CL	A-6, A-7	0-5	90-100	75-100	70-100	70-90	30-50	15-30
	8-75	Clay, silty clay, silty clay loam.	MH, CH, ML, CL	A-7, A-6	0-15	85-100	75-100	65-90	55-80	35-60	10-30
ElB, ElC--------- Elioak	0-6	Loam-------------	ML, CL, SM	A-4, A-6, A-7	0-10	90-100	80-100	55-100	35-85	30-45	5-20
	6-49	Silty clay loam, clay loam, clay.	CL, CH, MH, ML	A-6, A-7	0-5	90-100	90-100	70-100	50-90	35-58	11-26
	49-72	Silt loam, loam, fine sandy loam.	ML, SM, GM	A-4, A-5, A-2	0-5	65-100	65-100	60-100	30-85	35-50	NP-10
EnC3, EnD3------- Elioak	0-6	Clay loam--------	ML, CL, SM	A-4, A-6, A-7	0-10	90-100	80-100	55-100	35-85	30-45	5-20
	6-49	Silty clay loam, clay loam, clay.	CL, CH, MH, ML	A-6, A-7	0-5	90-100	90-100	70-100	50-90	35-58	11-26
	49-72	Silt loam, loam, fine sandy loam.	ML, SM, GM	A-4, A-5, A-2	0-5	65-100	65-100	60-100	30-85	35-50	NP-10
GlC, GlD--------- Glenelg	0-5	Loam-------------	ML	A-4, A-6	0	90-100	85-100	75-95	50-80	32-40	7-12
	5-27	Channery silt loam, silty clay loam, loam.	GM, ML, SM	A-4, A-6, A-7	0-10	60-100	55-90	50-90	35-85	34-46	9-15
	27-62	Loam, sandy loam, channery loam.	GM, SM, ML	A-1, A-2, A-4	0-50	60-100	15-95	15-90	10-70	<40	NP-6
Hb---------- Hatboro	0-15	Loam-------------	ML, CL, SC, SM	A-4, A-6	0	95-100	90-100	70-100	40-90	22-35	2-12
	15-40	Silt loam, clay loam, sandy clay loam.	ML, CL, CL-ML	A-4, A-6	0	85-100	80-100	70-95	55-85	22-35	2-12
	40-60	Loamy sand, sandy loam.	SM, GM	A-1, A-2	0	50-85	45-80	45-80	15-35	<32	NP-14
HzD, HzE--------- Hazel	0-3	Loam-------------	ML, CL-ML	A-4	0-10	80-100	75-100	65-95	50-80	20-32	2-8
	3-14	Channery fine sandy loam, channery sandy loam, silt loam.	SM, ML, GM	A-2, A-4, A-1	0-30	60-95	50-95	30-95	15-85	20-32	NP-8
	14-37	Channery fine sandy loam, channery loam, channery silt loam.	SM, GM, ML	A-2, A-4, A-1	0-30	60-80	45-70	30-70	20-60	20-32	NP-8
	37	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--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	
Kn----------	0-9	Silt loam--------	ML, CL, SM	A-4, A-6	0	95-100	95-100	65-100	40-90	28-40	5-15
Kinkora	9-39	Silty clay loam, clay loam, clay.	CL, ML, CH, MH	A-6, A-7	0	95-100	95-100	85-100	65-95	35-55	11-33
	39-60	Variable---------	---	---	---	---	---	---	---	---	---
LeC, LeD, LeE----	0-13	Extremely stony loam.	ML, GM, CL, GC	A-2, A-4	5-70	35-85	30-75	28-70	25-60	<28	NP-8
Lew	13-72	Very channery clay loam, very channery silty clay loam.	ML, MH, GM, SM	A-2, A-4, A-6, A-7	15-70	40-90	30-75	28-75	25-70	32-56	8-20
MvB----------	0-7	Fine sandy loam	ML, CL, CL-ML	A-4	0	90-100	75-100	65-95	50-85	18-32	2-10
Meadowville	7-41	Loam, silty clay loam, clay loam.	CL, ML	A-4, A-6, A-7	0	90-100	75-100	65-95	50-85	28-50	8-20
	41-72	Sandy clay loam, sandy clay.	SC, CL, MH, CH	A-2, A-6, A-7	0-5	75-95	75-95	60-85	25-55	30-55	10-24
MxC*:											
Myersville------	0-5	Very stony silt loam.	ML, CL, CL-ML	A-4	5-25	95-100	90-100	80-95	55-85	15-28	NP-10
	5-30	Silty clay loam, clay loam, channery clay loam.	CL	A-6	3-20	75-95	70-95	55-90	50-85	28-38	12-20
	30-44	Silty clay loam, channery silt loam, very channery clay loam.	CL, CL-ML, GM, GC	A-1, A-2, A-3, A-4	3-20	30-85	20-75	12-70	8-65	<28	NP-10
	44-72	Weathered bedrock	---	---	---	---	---	---	---	---	---
Catoctin--------	0-5	Very stony silt loam.	ML, CL, CL-ML	A-4	5-20	80-90	75-85	70-80	60-70	<30	NP-8
	5-18	Channery silt loam, channery silty clay loam, cobbly silt loam.	SM, SC, CL, GM	A-2, A-4, A-6	0-25	50-80	35-75	30-60	25-60	20-34	2-12
	18-26	Very channery silt loam, channery silt loam.	SM, SC, GC, GM	A-2, A-4, A-1, A-3	10-40	30-75	10-60	9-55	7-50	<28	NP-8
	26	Weathered bedrock	---	---	---	---	---	---	---	---	---
MyD*, MyE*:											
Myersville------	0-5	Extremely stony silt loam.	ML, CL, CL-ML	A-4	20-50	95-100	85-95	75-90	55-85	15-28	NP-10
	5-30	Silty clay loam, clay loam, channery clay loam.	CL	A-6	3-20	75-95	70-95	55-90	50-85	28-38	12-20
	30-44	Silty clay loam, channery silt loam, very channery clay loam.	CL, CL-ML, GM, GC	A-1, A-2, A-3, A-4	3-20	30-85	20-75	12-70	8-65	<28	NP-10
	44-72	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--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	
MyD*, MyE*:											
Catoctin--------	0-5	Extremely stony silt loam.	ML, CL, CL-ML	A-4	20-50	80-90	75-85	70-80	60-70	<30	NP-8
	5-18	Channery silt loam, channery silty clay loam, cobbly silt loam.	SM, SC, CL, GM	A-2, A-4, A-6	0-25	50-80	35-75	30-60	25-60	20-34	2-12
	18-26	Very channery silt loam, channery silt loam.	SM, SC, GC, GM	A-2, A-4, A-1, A-3	10-40	30-75	10-60	9-55	7-50	<28	NP-8
	26	Weathered bedrock	---	---	---	---	---	---	---	---	---
PrE-------------- Parker	0-6	Extremely stony loam.	GM, GP-GM	A-1, A-2	10-15	40-60	25-50	15-45	10-30	10-20	2-7
	6-25	Very gravelly loam, cobbly sandy loam, very gravelly sandy loam.	GM, GP-GM, GC	A-1, A-2	5-10	40-60	30-55	20-50	10-35	15-25	2-10
	25-60	Very gravelly sandy loam, very gravelly loam.	GM, GP, GC	A-1, A-2	5-15	20-40	5-30	3-25	2-20	15-25	2-10
Sc*:											
Suches----------	0-12	Fine sandy loam	SM, CL-ML	A-4	0	95-100	95-100	70-100	40-70	<30	NP-7
	12-32	Loam, sandy clay loam, clay loam.	CL-ML, CL	A-4, A-6, A-7	0	95-100	95-100	70-100	55-85	25-50	4-22
	32-63	Fine sandy loam, loam, sandy clay loam.	SM, CL-ML, SC, CL	A-4, A-6, A-7	0	95-100	95-100	70-100	40-70	25-50	4-22
Codorus---------	0-11	Loam----------	ML, CL, CL-ML	A-4, A-6	0	80-100	70-100	65-100	55-95	22-35	2-12
	11-45	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	80-100	75-100	65-100	55-85	22-35	2-12
	45-60	Stratified sand to silt.	SM, GM, ML	A-1, A-2, A-4	0	25-100	20-100	20-85	15-65	<35	NP-7
ThC, ThD--------- Thurmont	0-5	Loam----------	SM, ML, CL, SM-SC	A-2, A-4	0-3	80-100	75-100	55-70	25-65	<30	NP-10
	5-31	Clay loam, loam, gravelly sandy clay loam.	SC, CL	A-2, A-6, A-7	0-5	80-100	70-90	65-80	30-60	30-45	12-20
	31-60	Sandy loam, sandy clay loam, gravelly sandy clay loam.	SC	A-2, A-6, A-7	0-5	75-90	70-90	45-75	30-45	30-45	12-25
TvD-------------- Thurmont	0-5	Very stony loam	SM, ML, CL, SM-SC	A-1, A-2, A-4	5-25	75-95	60-80	40-70	20-55	<30	NP-10
	5-31	Clay loam, loam, gravelly sandy clay loam.	SC, CL	A-2, A-6, A-7, A-4	2-20	75-90	55-75	45-70	20-55	25-45	7-25
	31-60	Sandy loam, sandy clay loam, gravelly sandy clay loam.	SC	A-2, A-6, A-4	2-20	75-90	55-75	35-60	20-40	25-40	7-20
Ud. Udorthents											

See footnote at end of table.

TABLE 15.--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	
UnA, UnB, UnC---- Unison	0-9	Loam----------	CL, ML, CL-ML, SM	A-4, A-6	0-25	75-100	75-100	60-95	50-90	20-38	2-15
	9-47	Clay loam, clay, gravelly silty clay.	CL, CH	A-6, A-7	0-25	75-100	65-100	60-100	55-95	35-65	15-35
	47-60	Cobbly clay loam, silty clay loam, very cobbly clay loam.	CL-ML, CL, ML, GM-GC	A-1, A-2, A-6, A-7	10-45	30-90	25-85	20-85	15-80	20-50	5-20

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
AsC, AsD, AsE----	0-5	10-25	1.35-1.60	2.0-6.0	0.13-0.18	4.5-6.0	Low----------	0.24	2	1-3
Ashe	5-22	10-25	1.35-1.60	2.0-6.0	0.10-0.14	4.5-6.0	Low----------	0.17		
	22-38	5-15	1.45-1.65	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.17		
	38	---	---	---	---	---	----------	----		
AvD, AvE---------	0-5	10-25	1.35-1.60	2.0-6.0	0.10-0.13	4.5-6.0	Low----------	0.17	2	1-3
Ashe	5-22	10-25	1.35-1.60	2.0-6.0	0.10-0.14	4.5-6.0	Low----------	0.17		
	22-38	5-15	1.45-1.65	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.17		
	38	---	---	---	---	---	----------	----		
BaB----------	0-6	7-25	1.30-1.60	0.6-6.0	0.10-0.18	4.5-5.5	Low----------	0.37	4	.5-2
Belvoir	6-28	20-35	1.35-1.65	0.6-2.0	0.13-0.18	4.5-5.5	Moderate-----	0.37		
	28-38	15-30	1.70-1.90	0.06-0.2	0.07-0.11	4.5-5.5	Low----------	0.28		
	38-63	10-45	1.25-1.55	0.06-2.0	0.10-0.15	4.5-5.5	Moderate-----	0.28		
BcB, BcC---------	0-6	10-25	1.20-1.50	0.6-6.0	0.14-0.19	3.6-5.5	Low----------	0.32	4	1-2
Braddock	6-72	35-55	1.20-1.50	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.24		
BdD3---------	0-6	27-40	1.20-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low----------	0.32	3	.5-1
Braddock	6-72	35-55	1.20-1.50	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.24		
BuC, BuD---------	0-9	10-27	1.20-1.50	2.0-6.0	0.16-0.22	4.5-5.5	Low----------	0.32	4	.5-2
Buckhall	9-27	35-60	1.25-1.45	0.6-2.0	0.10-0.14	4.5-5.5	Low----------	0.20		
	27-62	10-40	1.20-1.50	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.24		
CaE----------	0-7	12-22	1.30-1.40	2.0-20	0.10-0.14	4.5-5.5	Low----------	0.15	1	2-3
Cataska	7-17	12-22	1.30-1.45	2.0-20	0.04-0.09	4.5-5.5	Low----------	0.15		
	17-36	---	---	---	---	---	----------	----		
	36	---	---	---	---	---	----------	----		
CcE*:										
Catoctin---------	0-5	5-20	1.20-1.50	2.0-6.0	0.08-0.14	5.1-6.5	Low----------	0.20	1	2-3
	5-18	10-35	1.20-1.50	2.0-6.0	0.08-0.16	5.1-6.5	Low----------	0.24		
	18-26	10-25	1.20-1.50	2.0-6.0	0.04-0.15	5.6-7.3	Low----------	0.24		
	26	---	---	---	---	---	----------	----		
Rock outcrop.										
CgB----------	0-6	5-20	1.10-1.30	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.32	4	1-2
Chatuge	6-41	20-35	1.20-1.40	0.6-2.0	0.15-0.20	4.5-6.0	Moderate-----	0.32		
	41-65	10-20	1.45-1.60	6.0-20	0.03-0.10	4.5-6.0	Low----------	0.28		
ChC, ChD---------	0-7	10-23	1.10-1.30	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.32	4	1-3
Chester	7-46	18-35	1.20-1.50	0.6-2.0	0.10-0.14	4.5-5.5	Low----------	0.43		
	46-62	10-24	1.40-1.60	0.6-2.0	0.08-0.12	4.5-5.5	Low----------	0.49		
CmC*, CmD*:										
Chester---------	0-7	10-23	1.10-1.30	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.32	4	1-3
	7-46	18-35	1.20-1.50	0.6-2.0	0.10-0.14	4.5-5.5	Low----------	0.43		
	46-62	10-24	1.40-1.60	0.6-2.0	0.08-0.12	4.5-5.5	Low----------	0.49		
Parker----------	0-6	10-27	1.20-1.45	2.0-6.0	0.06-0.14	4.5-5.5	Low----------	0.17	5	2-4
	6-25	15-27	1.25-1.45	2.0-6.0	0.10-0.14	4.5-5.5	Low----------	0.20		
	25-60	10-20	1.25-1.45	6.0-20	0.04-0.08	4.5-5.5	Low----------	0.20		
Cn----------	0-13	15-25	1.20-1.40	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.49	4	2-4
Codorus	13-43	18-35	1.20-1.50	0.6-2.0	0.14-0.18	5.1-6.5	Low----------	0.37		
	43-61	5-12	1.20-1.50	2.0-20	0.04-0.08	5.1-6.5	Low----------	0.24		
Cs----------	0-45	5-18	1.20-1.40	0.6-2.0	0.13-0.21	4.5-6.0	Low----------	0.43	3	1-3
Comus	45-63	5-34	1.30-1.60	0.6-6.0	0.07-0.21	4.5-6.0	Low----------	0.28		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
Cv----------	0-6	5-15	1.05-1.20	2.0-20	0.07-0.15	4.5-5.5	Low----------	0.17	3	1-5
Craigsville	6-22	5-15	1.30-1.60	2.0-20	0.06-0.15	4.5-5.5	Low----------	0.17		
	22-64	5-10	1.35-1.55	>6.0	0.04-0.09	4.5-5.5	Low----------	0.17		
DkB3, DkC3-------	0-8	27-40	1.25-1.50	0.6-2.0	0.15-0.20	4.5-5.5	Moderate-----	0.37	3	.1-1
Dyke	8-75	35-70	1.25-1.55	0.6-2.0	0.14-0.19	4.5-5.5	Moderate-----	0.28		
ElB, ElC, EnC3, EnD3----------	0-6	20-40	1.20-1.40	0.6-2.0	0.12-0.24	4.5-6.0	Low----------	0.32	4	.5-2
Elioak	6-49	35-60	1.30-1.55	0.6-2.0	0.08-0.12	4.5-5.5	Moderate-----	0.28		
	49-72	10-27	1.15-1.40	0.6-2.0	0.08-0.12	4.5-5.5	Low----------	0.49		
GlC, GlD---------	0-5	15-25	1.20-1.40	0.6-2.0	0.14-0.24	4.5-5.5	Low----------	0.32	3	1-3
Glenelg	5-27	20-32	1.40-1.60	0.6-2.0	0.10-0.20	4.5-5.5	Low----------	0.43		
	27-62	5-20	1.40-1.60	0.6-2.0	0.10-0.19	4.5-5.5	Low----------	0.49		
Hb----------	0-15	10-20	1.20-1.40	0.6-2.0	0.16-0.22	4.5-7.3	Low----------	0.49	4	1-4
Hatboro	15-40	15-35	1.20-1.40	0.6-2.0	0.16-0.20	4.5-7.3	Low----------	0.32		
	40-60	5-45	1.10-1.60	2.0-6.0	0.04-0.08	5.6-6.5	Low----------	0.20		
HzD, HzE---------	0-3	5-20	1.20-1.50	2.0-6.0	0.14-0.19	4.5-5.5	Low----------	0.32	2	.5-2
Hazel	3-14	10-18	1.20-1.50	2.0-6.0	0.12-0.17	4.5-5.5	Low----------	0.24		
	14-37	10-18	1.30-1.55	2.0-6.0	0.12-0.15	4.5-5.5	Low----------	0.24		
	37	---	---	---	---	---	----------	----		
Kn----------	0-9	15-27	1.25-1.55	0.2-2.0	0.18-0.21	4.5-5.5	Low----------	0.43	4	.5-2
Kinkora	9-39	35-55	1.20-1.50	0.06-0.2	0.15-0.21	4.5-5.0	High---------	0.28		
	39-60	---	---	---	---	---	----------	----		
LeC, LeD, LeE----	0-13	10-25	1.00-1.20	0.6-6.0	0.13-0.15	4.5-6.0	Low----------	0.17	4	1-3
Lew	13-72	28-40	1.20-1.50	0.6-2.0	0.11-0.16	4.5-6.0	Moderate-----	0.17		
MvB----------	0-7	10-27	1.00-1.25	2.0-6.0	0.17-0.20	4.5-6.0	Low----------	0.37	3	2-4
Meadowville	7-41	20-35	1.20-1.50	0.6-6.0	0.14-0.19	4.5-6.0	Moderate-----	0.28		
	41-72	20-50	1.20-1.50	0.6-6.0	0.11-0.17	4.5-6.0	Moderate-----	0.28		
MxC*:										
Myersville------	0-5	5-20	1.20-1.50	2.0-6.0	0.14-0.20	4.5-6.0	Low----------	0.32	4	1-3
	5-30	18-35	1.20-1.50	0.6-2.0	0.14-0.18	4.5-6.0	Low----------	0.32		
	30-44	10-32	1.20-1.50	0.6-2.0	0.08-0.16	4.5-6.0	Low----------	0.32		
	44-72	---	---	---	---	---	----------	----		
Catoctin--------	0-5	5-20	1.20-1.50	2.0-6.0	0.14-0.20	5.1-6.5	Low----------	0.32	2	1-3
	5-18	10-35	1.20-1.50	2.0-6.0	0.08-0.16	5.1-6.5	Low----------	0.24		
	18-26	10-25	1.20-1.50	2.0-6.0	0.04-0.15	5.6-7.3	Low----------	0.24		
	26	---	---	---	---	---	----------	----		
MyD*, MyE*:										
Myersville------	0-5	5-20	1.20-1.50	2.0-6.0	0.11-0.16	4.5-6.0	Low----------	0.32	4	1-3
	5-30	18-35	1.20-1.50	0.6-2.0	0.14-0.18	4.5-6.0	Low----------	0.32		
	30-44	10-32	1.20-1.50	0.6-2.0	0.08-0.16	4.5-6.0	Low----------	0.32		
	44-72	---	---	---	---	---	----------	----		
Catoctin--------	0-5	5-20	1.20-1.50	2.0-6.0	0.08-0.14	5.1-6.5	Low----------	0.20	1	1-3
	5-18	10-35	1.20-1.50	2.0-6.0	0.08-0.16	5.1-6.5	Low----------	0.24		
	18-26	10-25	1.20-1.50	2.0-6.0	0.04-0.15	5.6-7.3	Low----------	0.24		
	26	---	---	---	---	---	----------	----		
PrE----------	0-6	10-27	1.20-1.45	2.0-6.0	0.06-0.14	4.5-5.5	Low----------	0.17	5	2-4
Parker	6-25	15-27	1.25-1.45	2.0-6.0	0.10-0.14	4.5-5.5	Low----------	0.20		
	25-60	10-20	1.25-1.45	6.0-20	0.04-0.08	4.5-5.5	Low----------	0.20		
Sc*:										
Suches----------	0-12	10-25	1.30-1.50	0.6-2.0	0.11-0.18	5.1-6.0	Low----------	0.24	4	2-4
	12-32	18-38	1.45-1.65	0.6-2.0	0.12-0.20	5.1-6.0	Low----------	0.28		
	32-63	8-35	1.55-1.70	0.6-2.0	0.11-0.20	4.5-6.0	Low----------	0.28		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
Sc*:										
Codorus----------	0-11	15-25	1.20-1.40	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.49	4	2-4
	11-45	18-35	1.20-1.50	0.6-2.0	0.14-0.18	5.1-6.5	Low----------	0.37		
	45-60	5-12	1.20-1.50	2.0-20	0.04-0.08	5.1-6.5	Low----------	0.24		
ThC, ThD----------	0-5	10-25	1.20-1.40	2.0-6.0	0.10-0.15	4.5-5.5	Low----------	0.32	4	.5-2
Thurmont	5-31	18-35	1.30-1.50	0.6-2.0	0.13-0.19	4.5-5.5	Low----------	0.20		
	31-60	18-30	1.30-1.50	0.6-2.0	0.07-0.12	4.5-5.5	Low----------	0.20		
TvD----------	0-5	10-25	1.20-1.40	2.0-6.0	0.10-0.15	4.5-5.5	Low----------	0.24	4	.5-2
Thurmont	5-31	18-35	1.30-1.50	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.20		
	31-60	18-30	1.30-1.50	0.6-2.0	0.07-0.12	4.5-5.5	Low----------	0.20		
Ud.										
Udorthents										
UnA, UnB, UnC----	0-9	10-25	1.35-1.65	0.6-6.0	0.14-0.20	4.5-6.0	Low----------	0.32	4	1-3
Unison	9-47	30-70	1.30-1.60	0.6-2.0	0.12-0.18	4.5-6.0	Moderate-----	0.24		
	47-60	30-50	1.30-1.60	0.6-6.0	0.08-0.16	4.5-6.0	Moderate-----	0.28		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
AsC, AsD, AsE, AvD, AvE---------- Ashe	B	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	Low------	High.
BaB---------- Belvoir	C	None--------	---	---	1.0-2.0	Perched	Jan-Apr	>60	---	High-----	High-----	High.
BcB, BcC, BdD3---- Braddock	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
BuC, BuD---------- Buckhall	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
CaE---------- Cataska	D	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	Moderate.
CcE*: Catoctin---------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	High-----	Moderate.
Rock outcrop.												
CgB---------- Chatuge	D	Occasional	Brief-----	Dec-Apr	0-1.0	Apparent	Dec-May	>60	---	High-----	High-----	High.
ChC, ChD---------- Chester	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
CmC*, CmD*: Chester----------	B	None--------	---	---	>5.0	---	---	>60	---	Moderate	Low------	High.
Parker----------	B	None--------	---	---	>6.0	---	---	>48	Hard	Moderate	Low------	High.
Cn---------- Codorus	C	Occasional	Brief-----	Dec-Apr	1.0-2.0	Apparent	Nov-Apr	>60	---	High-----	High-----	Moderate.
Cs---------- Comus	B	Frequent----	Very brief	Feb-May	>6.0	---	---	>60	---	Moderate	Low------	High.
Cv---------- Craigsville	B	Frequent----	Very brief	Nov-May	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
DkB3, DkC3-------- Dyke	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
ElB, ElC, EnC3, EnD3---------- Elioak	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
GlC, GlD---------- Glenelg	B	None--------	---	---	>6.0	---	---	>48	Soft	Moderate	Low------	High.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Hb---------- Hatboro	D	Frequent----	Very brief	Nov-May	0-0.5	Apparent	Oct-May	>60	---	High-----	High-----	Moderate.
HzD, HzE---------- Hazel	C	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	High.
Kn---------- Kinkora	D	Rare--------	---	---	0-0.5	Apparent	Nov-May	>60	---	High-----	High-----	High.
LeC, LeD, LeE----- Lew	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
MvB---------- Meadowville	B	None--------	---	---	3.0-5.0	Apparent	Dec-May	>60	---	Moderate	High-----	High.
MxC*, MyD*, MyE*: Myersville-------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
Catoctin---------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	High-----	Moderate.
PrE---------- Parker	B	None--------	---	---	>6.0	---	---	>48	Hard	Moderate	Low------	High.
Sc*: Suches----------	B	Frequent----	Brief-----	Dec-May	2.5-5.0	Apparent	Dec-May	>60	---	Moderate	High-----	Moderate.
Codorus----------	C	Frequent----	Brief-----	Dec-Apr	1.0-2.0	Apparent	Nov-Apr	>60	---	High-----	High-----	Moderate.
ThC, ThD---------- Thurmont	B	None--------	---	---	4.0-6.0	Apparent	Dec-Mar	>60	---	Moderate	Moderate	High.
TvD---------- Thurmont	B	None--------	---	---	4.0-6.0	Apparent	Jan-Apr	>60	---	Moderate	Moderate	High.
Ud. Udorthents												
UnA, UnB, UnC----- Unison	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Ashe	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Belvoir	Fine-loamy, mixed, mesic Aquic Fragiudults
Braddock	Clayey, mixed, mesic Typic Hapludults
Buckhall	Clayey, mixed, mesic Typic Hapludults
Cataska	Loamy-skeletal, mixed, mesic, shallow Typic Dystrochrepts
Catoctin	Loamy-skeletal, mixed, mesic Ruptic-Alfic Eutrochrepts
Chatuge	Fine-loamy, mixed, mesic Typic Ochraquults
Chester	Fine-loamy, mixed, mesic Typic Hapludults
Codorus	Fine-loamy, mixed, mesic Fluvaquentic Dystrochrepts
Comus	Coarse-loamy, mixed, mesic Fluventic Dystrochrepts
Craigsville	Loamy-skeletal, mixed, mesic Fluventic Dystrochrepts
*Dyke	Clayey, mixed, mesic Typic Rhodudults
Elioak	Clayey, kaolinitic, mesic Typic Hapludults
Glenelg	Fine-loamy, mixed, mesic Typic Hapludults
Hatboro	Fine-loamy, mixed, nonacid, mesic Typic Fluvaquents
Hazel	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Kinkora	Clayey, mixed, mesic Typic Ochraquults
Lew	Loamy-skeletal, mixed, mesic Typic Hapludults
Meadowville	Fine-loamy, mixed, mesic Typic Hapludults
Myersville	Fine-loamy, mixed, mesic Ultic Hapludalfs
Parker	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Suches	Fine-loamy, mixed, mesic Fluventic Dystrochrepts
Thurmont	Fine-loamy, mixed, mesic Typic Hapludults
Udorthents	Udorthents
Unison	Clayey, mixed, mesic Typic Hapludults

*The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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