United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
the West Virginia
Agricultural and Forestry
Experiment Station and
the United States
Department of Agriculture,
Forest Service

Soil Survey of Webster County, West Virginia

How to Use This Soil Survey

General Soil Map

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

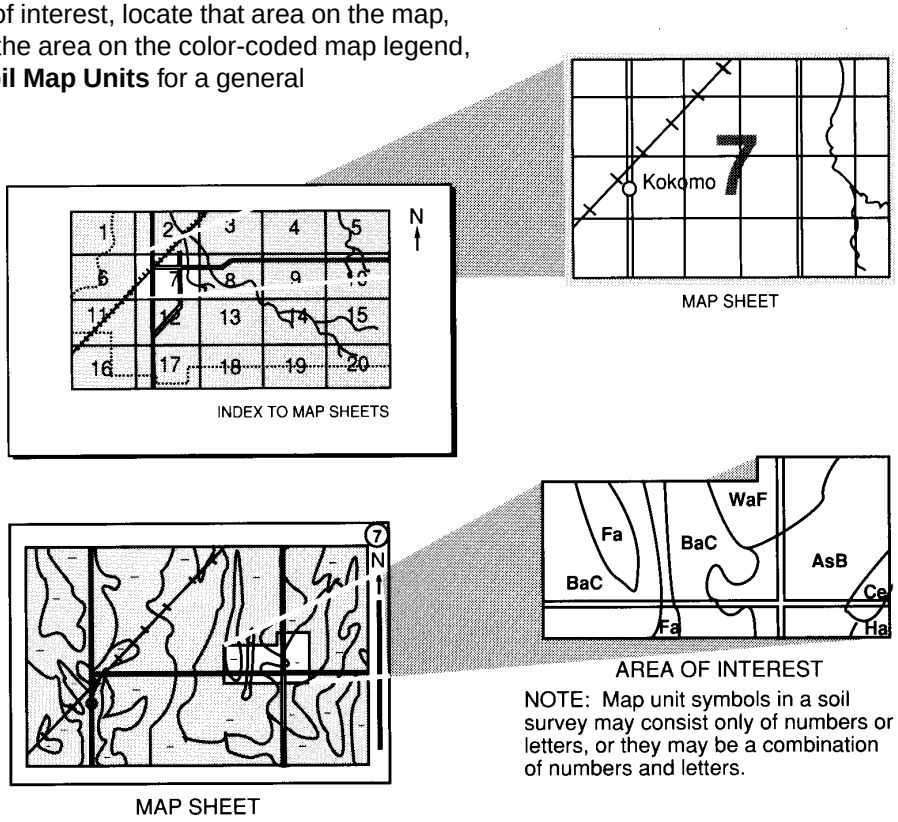
To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

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

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

Locate your area of interest on the map sheet. Note the map units symbols that are in that area. Look at the **Contents**, which lists the map units by symbol and name and shows where each map unit is described.



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

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

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

Major fieldwork for this soil survey was completed in 1991. Soil names and descriptions were approved in 1992. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1992. This survey was made cooperatively by the Natural Resources Conservation Service, the West Virginia Agricultural and Forestry Experiment Station, and the U.S. Department of Agriculture, Forest Service. The survey is part of the technical assistance furnished to the Elk Soil Conservation District.

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

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Cover: A typical landscape in an area of the Pineville-Gilpin-Guyandotte general soil map unit.

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Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

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

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations that affect various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

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

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

William J. Hartman
State Conservationist
Natural Resources Conservation Service

Soil Survey of
Webster County, West Virginia

By Charles H. Delp, Natural Resources Conservation Service

Soils surveyed by Charles H. Delp, Anthony B. Jenkins, Denver P. Amick, James W. Bell, Stephen G. Carpenter, Jennifer J. Brookover, Roy E. Pyle, and Walter George, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
the West Virginia Agricultural and Forestry Experiment Station and
the United States Department of Agriculture, Forest Service

WEBSTER COUNTY is in the central part of West Virginia (fig. 1). It has a total area of nearly 558 square miles, or 356,000 acres, of which 1,205 acres is covered by water.

This soil survey updates the survey of Webster County published in 1920 (USDA 1920). It provides additional information and has larger maps, which show the soils in greater detail.

General Nature of the County

This section gives general information about the county. It describes settlement and population; farming; transportation and industry; physiography, relief, and drainage; geology; and climate.

Settlement and Population

Webster Springs is the county seat. It is located at the confluence of the Elk River and the Back Fork of the Elk River. The population of Webster County in 1989 was 12,245 (Holmes 1989).

Webster County was the last county to be established in West Virginia before the separation from Virginia in 1863 (Holmes 1989). It was formed in 1860 from parts of Nicholas, Braxton, and Randolph Counties. It was named in honor of Daniel Webster, an orator and statesman from New England.

Farming

In 1987, the county had 105 farms and a total of 11,722 acres of farmland (U.S. Department of Commerce 1987). Between 1982 and 1987, the number of farms decreased by 12 and the average size of the farms decreased by 6 acres.

The main agricultural enterprises in the county are raising livestock and producing potatoes and honey.

Transportation and Industry

The main highways in the county are West Virginia Routes 15 and 20 and County Routes 5 and 30. Rail service is also available in the county.

The major industries in the county are lumber and coal mining operations.

Physiography, Relief, and Drainage

The county is in the Eastern Allegheny Plateau and Mountains physiographic region (USDA 1981). The topography includes nearly level bottoms along stream terraces and nearly level to moderately steep ridgetops, but most of the survey area is dominated by very steep, rugged side slopes, which are used for timber production.

The northern half of the county is drained by the Elk River and the Left Fork of the Holly River. The

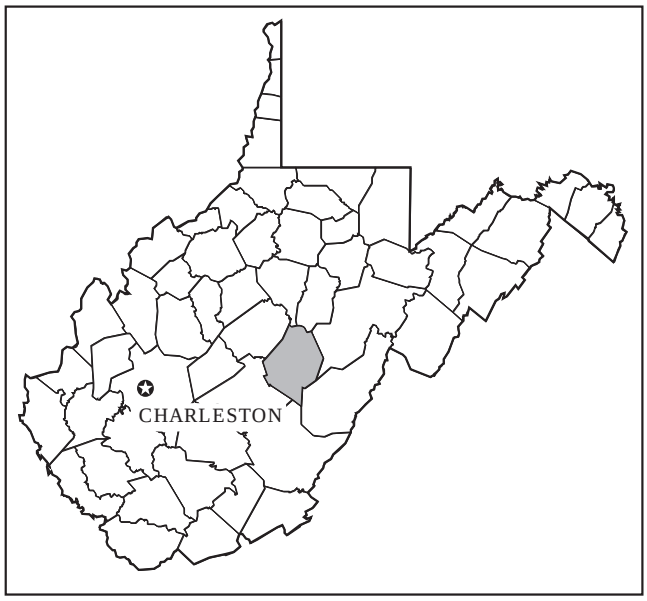

Figure 1.—Location of Webster County in West Virginia.

southern half of the county is drained by the Birch, Cranberry, Gauley, and Williams Rivers.

The lowest elevation in the county is 940 feet above sea level. It is at the point where the Webster-Braxton County line crosses the Elk River, 1 mile east of Centralia. The highest elevation is 4,200 feet above sea level. It is near the point where Webster, Greenbrier, and Pocahontas Counties meet, just south of Dogway Fork on a branch of the Cranberry River (Reger 1920).

Geology

Gordon B. Bayles, geologist, Natural Resources Conservation Service, helped to prepare this section.

The surface rocks in Webster County, with the exception of the Quaternary deposits along river and creek bottoms, are of the Paleozoic era and, more specifically, of the Pennsylvanian and Mississippian periods (Reger 1920). All of the exposed rocks are sedimentary in origin. There is a regional dip to the northwest with little local folding or disturbance.

The northwestern third of the county is characterized by gray sandstones, gray shales, and coal of the Allegheny Formation. This formation is on high ridges. It seldom is incised by drainage, except at the head of streams. Dekalb soils are commonly on the high ridges. Rock outcrop caps the ridgetops in some areas. Lower Kittanning coal is mined commercially in this part of the county. The ridgetops along the northwestern border of the county are capped by the Conemaugh Group. This group is characterized by gray or brown sandstone beds, which sometimes are pebbly, that have intervening deposits of gray or brown shale.

The east-central part of the county is characterized by red and green shales of the Mauch Chunk Group. This group is in the deep valleys along the Elk River. Cateache soils are on side slopes and shoulder slopes, Shouns soils are on side slopes, and Meckesville soils are on foot slopes. This group does not have deposits of mineable coal. Its primary value is for woodland production. Greenbrier Limestone is exposed on the floor of the Elk River in Webster Springs; however, in the rest of the county, the hard, gray limestone is below drainage.

The remainder of the county is characterized by the Pottsville Group and the Kanawha and New River Formations. The Kanawha Formation is characterized by massive beds of gray sandstones that are separated by deposits of sandy or carbonaceous shale and coal. It is on ridges and high shoulder slopes. Gilpin soils are commonly in these areas. Stockton, Peerless, and Eagle coals are a few of the deposits mined commercially in this part of the county. The New River Formation is characterized by massive beds of gray sandstones that are interbedded with dark, sandy shales and coal. It is on side slopes and extends down, in most areas, to the current level of drainage. Pineville and Guyandotte soils are on side slopes, and Laidig soils are on foot slopes. Sewell, Welch, and Fire Creek coals are mined commercially in this part of the survey area.

In Webster County, the soils that formed in Quaternary deposits, including clays, gravels, and sand beds along river and creek bottoms and Pleistocene deposits on river terraces in some of the higher areas, are productive agricultural land.

Climate

Winters are cold and snowy at the higher elevations in the county. They also are frequently cold in the valleys, but intermittent thaws minimize the duration of the snow cover. Summers are fairly warm on mountain slopes and very warm with occasional very hot days in the valleys. Rainfall is evenly distributed during the year, but it is appreciably heavier on the windward, west-facing slopes than in the valleys. The normal annual precipitation is adequate for all crops commonly grown in the county, although temperatures in the summer and the length of the growing season, particularly at the higher elevations, may be inadequate for the crops.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Webster Springs,

West Virginia, in the period 1951 to 1986. 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 35 degrees F and the average daily minimum temperature is 24 degrees. The lowest temperature on record, which occurred on January 21, 1985, is -20 degrees. In summer, the average temperature is 71 degrees and the average daily maximum temperature is 83 degrees. The highest recorded temperature, which occurred on September 3, 1953, is 104 degrees.

Growing degree days are shown in table 1. They are equivalent to “heat units.” During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (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 about 48 inches. Of this, 28 inches, or 58 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 23 inches. The heaviest 1-day rainfall during the period of record was 4.74 inches. Thunderstorms occur on about 44 days each year, and most occur in summer. Periods of heavy rainfall, which can occur throughout the year, and severe thunderstorms in summer can cause flash floods, particularly in narrow valleys.

The average seasonal snowfall is about 44 inches. The greatest snow depth at any one time during the period of record was 18 inches. On the average, 22 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 50 percent of the time possible in summer and 35 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 8 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

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

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

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

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

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

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

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

General Soil Map Units

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

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

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or 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.

Soil Descriptions

1. Pineville-Gilpin-Guyandotte

Gently sloping to very steep, well drained soils on mountainous uplands

These soils are on uplands in the northwestern part of the county. The landscape is characterized by rough, mountainous topography. It is a deeply dissected plateau with narrow ridgetops; narrow, winding valleys; and long, very steep side slopes. Sandstone outcrops and surface stones are common on the ridgetops and side slopes. Slope ranges from 3 to 70 percent.

This map unit makes up about 32 percent of the county. It is about 26 percent Pineville soils, 20 percent Gilpin soils, 11 percent Guyandotte soils, and 43 percent soils of minor extent.

Pineville soils are very deep, well drained, and very steep. They are on side slopes and foot slopes. They formed in acid colluvial material that moved down slope from soils on uplands. Pineville soils are medium textured in the surface layer and the subsoil. They are very dark brown and channery in the surface layer and are yellowish brown and channery and very channery in the subsoil.

Gilpin soils are moderately deep, well drained, and gently sloping to very steep. They are on ridgetops and side slopes. They formed in acid material weathered from interbedded sandstone, siltstone, and shale bedrock. Gilpin soils are medium textured in the surface layer and the subsoil. They are very dark grayish brown in the surface layer and yellowish brown and channery in the subsoil.

Guyandotte soils are very deep, well drained, and very steep. They are on side slopes and in coves. They formed in acid material that moved down slope from soils on uplands. Guyandotte soils are medium textured in the surface layer and the subsoil. They are black and very dark grayish brown and channery in the surface layer and dark yellowish brown and very channery in the subsoil.

Of minor extent in this map unit are the well drained Dekalb, Laidig, Chavies, Pope, and Potomac soils. Dekalb soils are on ridgetops. Laidig soils are on foot slopes. Chavies soils are on high flood plains. Pope and Potomac soils are on low flood plains.

Most of this map unit is wooded. Some areas of minor soils on flood plains have been cleared of trees and are used for hay, pasture, or cultivated crops. Some small areas on the ridgetops and foot slopes have been cleared of trees and are used as pasture or as sites for community development.

Most farms are managed for the production of beef cattle or timber. The bottom land and gently sloping to moderately steep ridgetops are generally suited to hay, pasture, and row crops. Because of the stones on the surface, areas on foot slopes are unsuited to cultivated crops and are difficult to manage for pasture. The hazard of erosion is a major management concern. Conservation tillage in areas used for crops and a rotation grazing system in pastured areas help to control erosion.

The soils in this map unit are suited to trees. Most of the unit is used for timber production. The common tree species are yellow-poplar, scarlet oak, chestnut oak, red oak, red maple, and sugar maple. The slope limits the use of equipment. The hazard of erosion on

logging roads and skid trails is a major management concern. Establishing roads and trails on a gentle grade across the slope helps to control erosion.

The slope and the stones on the surface are limitations affecting community development in areas of all three soils. The depth to bedrock is an additional limitation in areas of the Gilpin soils. The slope, stones on the surface, depth to bedrock, flooding, and slow permeability are limitations in areas of the minor soils.

2. Gilpin-Laidig

Gently sloping to very steep, well drained soils on mountainous uplands and foot slopes

These soils are on rugged uplands and foot slopes in the eastern half of the county. The landscape is characterized by rough, mountainous topography. It is a strongly dissected plateau with broad to narrow, gently sloping to steep ridgetops and steep or very steep side slopes. Sandstone outcrops and stones on the surface are common on the ridgetops, side slopes, and foot slopes. Slope ranges from 3 to 70 percent.

This map unit makes up about 46 percent of the county. It is about 43 percent Gilpin soils, 35 percent Laidig soils, and 22 percent soils of minor extent.

Gilpin soils are moderately deep, well drained, and gently sloping to very steep. They are on ridgetops and side slopes. They formed in acid material weathered from interbedded sandstone, siltstone, and shale bedrock. Gilpin soils are medium textured in the surface layer and the subsoil. They are very dark grayish brown in the surface layer and yellowish brown and channery in the subsoil.

Laidig soils are very deep, well drained, and gently sloping to very steep. They are on side slopes, benches, and foot slopes. They formed in acid material that moved down slope from uplands. Laidig soils are medium textured in the surface layer and the subsoil. They are very dark grayish brown and channery in the surface layer and are yellowish brown and channery and very channery in the subsoil. The lower part of the subsoil is mottled. A firm fragipan is at a depth of about 32 inches.

Of minor extent in this map unit are the Kaymine, Fenwick, Chavies, and Pope soils. Kaymine, Chavies, and Pope soils are well drained. Fenwick soils are moderately well drained. Kaymine and Fenwick soils are on uplands. Chavies soils are on high flood plains. Pope soils are on low flood plains.

Most of this map unit is used as woodland. Some areas on the ridgetops and flood plains have been cleared of trees and are used for cultivated crops, hay, or pasture or as sites for community development.

Most farms are managed for the production of beef cattle or timber. The bottom land and gently sloping to moderately steep ridgetops are generally suited to the production of hay, pasture, and row crops. Because of the stones on the surface, areas on foot slopes generally are unsuited to cultivated crops and are difficult to manage for pasture. The hazard of erosion is a major management concern. Conservation tillage in areas used for crops and a rotation grazing system in pastured areas help to control erosion.

The soils in this map unit are suited to trees and are used for timber production. The common tree species are yellow-poplar, scarlet oak, red oak, chestnut oak, red maple, and sugar maple. The slope limits the use of equipment. The hazard of erosion on logging roads and skid trails is a major management concern. Establishing roads and trails on a gentle grade across the slope helps to control erosion.

The slope and the stones on the surface are limitations affecting community development in areas of the Gilpin and Laidig soils. The depth to bedrock is an additional limitation in areas of the Gilpin soils. Slow permeability is an additional limitation in areas of the Laidig soils. The slope, stones on the surface, depth to bedrock, a seasonal high water table, and flooding are limitations in areas of the minor soils.

3. Gilpin

Gently sloping to very steep, well drained soils on upland plateaus

These soils are on uplands in the southwestern part of the county. The landscape is characterized by low, rolling hills. Slope ranges from 3 to 70 percent.

This map unit makes up about 9 percent of the county. It is about 81 percent Gilpin soils and 19 percent soils of minor extent.

Gilpin soils are moderately deep, well drained, and gently sloping to very steep. They are on ridgetops, benches, and side slopes. They formed in acid material weathered from interbedded sandstone, siltstone, and shale bedrock. Gilpin soils are medium textured in the surface layer and the subsoil. They are very dark grayish brown in the surface layer and yellowish brown and channery in the subsoil.

Of minor extent in this map unit are the Kaymine, Laidig, Cotaco, and Elkins soils. Kaymine and Laidig soils are well drained. Kaymine soils are on uplands. Laidig soils are on foot slopes. Cotaco soils are moderately well drained and are on low stream terraces. Elkins soils are poorly drained and are on flood plains.

Most of this map unit is used as woodland. Some areas have been cleared of trees and are used for cultivated crops, hay, or pasture or as sites for community development.

Most farms in this unit are managed for the

production of beef cattle or timber. The bottom land and gently sloping to moderately steep ridgetops are generally suited to the production of hay, pasture, and row crops. Because of stones on the surface, some areas on foot slopes are unsuited to cultivated crops. They are better suited to hay and pasture.

The soils in this map unit are suited to trees and are used for timber production. The common tree species are yellow-poplar, scarlet oak, red oak, red maple, and sugar maple. The slope limits the use of equipment in many areas. The hazard of erosion on logging roads and skid trails is a major management concern. Establishing roads and trails on a gentle grade across the slope helps to control erosion.

The slope and the depth to bedrock are limitations affecting community development in areas of the Gilpin soils. The slope, stones on the surface, a seasonal high water table, flooding, and slow permeability are limitations in areas of the minor soils.

4. Shouns-Cateache-Meckesville

Gently sloping to very steep, well drained soils on mountainous uplands and foot slopes

These soils are on rugged uplands and foot slopes in the central part of the county. The landscape is characterized by narrow, strongly sloping to steep ridgetops; narrow, winding valleys; and long, steep side slopes. Sandstone outcrops and stones on the surface are common on the ridgetops and side slopes. Slope ranges from 15 to 70 percent.

This map unit makes up about 5 percent of the county. It is about 38 percent Shouns soils, 28 percent Cateache soils, 8 percent Meckesville soils, and 26 percent soils of minor extent.

Shouns soils are very deep, well drained, and very steep. They are on side slopes. They formed in acid material that moved down slope from soils on uplands. Shouns soils are medium textured in the surface layer and the subsoil. They are dark brown in the surface layer and reddish brown and channery in the subsoil.

Cateache soils are moderately deep, well drained, and moderately steep to very steep. They are on ridgetops and side slopes. They formed in material weathered from red interbedded siltstone and shale bedrock. Cateache soils are medium textured in the surface layer and the subsoil. They are dark reddish brown and channery in the surface layer and are reddish brown and channery and very channery in the subsoil.

Meckesville soils are very deep, well drained, and moderately steep and steep. They are on foot slopes and along drainageways. They formed in acid material that moved down slope from soils on uplands. Meckesville soils are medium textured in the surface layer and the subsoil. They are dark brown in the surface layer and are yellowish red and reddish brown and channery in the subsoil. They are mottled in the lower part of the subsoil. A firm fragipan is at a depth of about 36 inches.

Of minor extent in this map unit are the well drained Gilpin, Laidig, Chavies, and Pope soils. Gilpin soils are on ridgetops. Laidig soils are on benches and foot slopes. Chavies soils are on high flood plains. Pope soils are on low flood plains.

Most of this map unit is used as woodland. Areas on flood plains generally have been cleared of trees and are used for cultivated crops, hay, or pasture or as sites for community development. Some small areas on foot slopes have been cleared of trees and are used for pasture or as sites for community development.

Most farms are managed for the production of beef cattle or timber. Because of the slope and the stones on the surface, this map unit generally is unsuited to cultivated crops and hay and is difficult to manage for pasture. Some areas on ridgetops are not stony and are used for cultivated crops.

The soils in this map unit are suited to trees and are used for timber production. The common tree species are yellow-poplar, basswood, magnolia, red oak, hemlock, red maple, and sugar maple. The slope limits the use of equipment. The hazard of erosion on logging roads and skid trails is a major management concern. Establishing roads and trails on a gentle grade across the slope helps to control erosion.

The slope and the stones on the surface are limitations affecting community development in areas of all three soils. The depth to bedrock is an additional limitation in areas of the Cateache soils. A seasonal high water table and moderately slow permeability are additional limitations in areas of the Meckesville soils. The slope, stones on the surface, depth to bedrock, slow permeability, and flooding are limitations in areas of the minor soils.

5. Mandy-Snowdog-Gauley

Gently sloping to very steep, well drained and moderately well drained soils on cool mountainous uplands

These soils are on rugged uplands in the southeastern and eastern parts of the county. The landscape is characterized by rough, mountainous topography. It is a strongly dissected high plateau with broad, gently sloping to strongly sloping ridgetops and steep and very steep side slopes. Sandstone outcrops and stones on the surface are common on the ridgetops and side slopes. Slope ranges from 3 to 70 percent.

This map unit makes up about 8 percent of the county. It is about 62 percent Mandy soils, 20 percent Snowdog soils, 11 percent Gauley soils, and 7 percent soils of minor extent.

Mandy soils are moderately deep, well drained, and gently sloping to very steep. They are on ridgetops and side slopes. They formed in acid material weathered from interbedded sandstone, siltstone, and shale bedrock. Mandy soils are medium textured in the surface layer and the subsoil. They are dark brown and channery in the surface layer and are dark yellowish brown and yellowish brown and channery and very channery in the subsoil.

Snowdog soils are very deep, moderately well drained, and moderately steep or steep. They are on foot slopes and benches and along drainageways. They formed in acid material that moved down slope from soils on uplands. Snowdog soils are medium textured in the surface layer and are medium or moderately coarse textured in the subsoil. They are very dark brown and channery in the surface layer and are dark yellowish brown and yellowish brown and channery and very channery in the subsoil. They are mottled in the lower part of the subsoil. A very firm fragipan is at a depth of about 24 inches.

Gauley soils are moderately deep, well drained, and gently sloping to steep. They are on ridgetops and shoulder slopes. They formed in material weathered from acid sandstone bedrock under red spruce and hemlock vegetation. Gauley soils are moderately coarse textured in the surface layer, coarse textured in the next layer, and moderately coarse textured in the subsoil. They are black and extremely channery in the surface layer, grayish brown and very channery in the next layer, and dark brown and channery and very channery in the subsoil.

Of minor extent in this map unit are the moderately well drained Simoda and Cotaco soils and the well drained Cateache, Chavies, Craigsville, Pope, Potomac, and Shouns soils. Simoda soils are on ridgetops. Cotaco soils are on terraces. Cateache and Shouns soils are on the lower side slopes and foot slopes. Chavies soils are on high flood plains. Craigsville, Pope, and Potomac soils are on low flood plains.

Most of this map unit is within the Monongahela National Forest. It is used for timber production, recreation, and wildlife habitat. A few small areas on Point Mountain have been cleared of trees and are used as pasture or as sites for community development.

The soils in this map unit are suited to trees and are used for timber production. The tree species are black cherry, red spruce, eastern hemlock, American beech, yellow birch, red maple, and red oak. The slope and stones and boulders on the surface limit the use of equipment. The hazard of erosion on logging roads and skid trails is a major management concern. Establishing roads and trails on a gentle grade across the slope helps to control erosion.

The slope and the stones and boulders on the surface are limitations affecting community development in areas of all three soils. The depth to bedrock is an additional limitation in areas of the Mandy and Gauley soils. A seasonal high water table and slow or moderately slow permeability are additional limitations in areas of the Snowdog soils. The slope, stones on the surface, depth to bedrock, a seasonal high water table, slow or rapid permeability, and flooding are limitations in areas of the minor soils.

Detailed Soil Map Units

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

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. 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 soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties 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, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit 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, 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, slope, stoniness, salinity, 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, Gilpin silt loam, 3 to 15 percent slopes, very stony, is a phase of the Gilpin series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes or associations.

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

in all areas. Pope-Potomac complex, very cobbly, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Pineville-Gilpin-Guyandotte association, very steep, extremely stony, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other 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 or miscellaneous areas.

Soil Descriptions

At—Atkins loam

This soil is nearly level and poorly drained. It is on flood plains throughout the county. It is subject to occasional flooding. Slope ranges from 0 to 3 percent.

Typically, the surface layer is dark grayish brown loam about 7 inches thick. It has brown mottles. The subsoil extends to a depth of about 48 inches. The upper 9 inches is grayish brown loam that has brown mottles. The lower 32 inches is gray loam that has strong brown mottles. The substratum extends to a depth of about 65 inches. The upper 11 inches is gray silt loam that has strong brown mottles. The lower 6 inches is gray silty clay loam that has strong brown mottles.

Included with this soil in mapping are a few small areas of the somewhat excessively drained Potomac soils, the well drained Chavies and Pope soils, the moderately well drained Cotaco and Philo soils, and the poorly drained Elkins soils. Also included are a few small areas of soils that are subject to ponding and areas of soils that are subject to rare flooding. Included soils make up about 15 percent of the unit.

The available water capacity is high in the Atkins soil. Permeability is slow to moderate. Runoff is slow to medium. Natural fertility is medium. A seasonal high water table near the surface restricts the root zone of many plants. Reaction is very strongly acid or strongly acid, unless the soil has been limed. Depth to bedrock is more than 60 inches.

Most areas of this soil are used for hay or pasture. A few are used as woodland.

If drained, this soil is suited to cultivated crops, hay, and pasture. In some areas suitable drainage outlets are not available. If the soil is cultivated, applying a system of conservation tillage, including hay in the conservation cropping sequence, delaying tillage until the soil is reasonably dry, and returning crop residue to the soil help to maintain fertility and tilth. In places crops are subject to damage caused by flooding. Proper stocking rates that help to maintain desirable grasses and legumes, a rotation grazing system, and deferment of grazing until the soil is reasonably firm are the major management needs in pastured areas.

The potential productivity is moderately high for trees that can withstand wetness, but only a small acreage is wooded. Tree species include yellow birch, red maple, hemlock, and yellow-poplar. Seedling mortality and plant competition are management concerns. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The wetness and the flooding are severe limitations affecting recreational development. The flooding, the wetness, and the slow permeability are the main limitations on sites for dwellings and septic tank absorption fields. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation. This soil generally is not suitable as a site for dwellings and septic tank absorption fields unless it is protected by a flood-control structure. A suitable alternative site should be selected.

The capability subclass is IIIw. The woodland ordination symbol is 5W.

CaE—Cateache channery silt loam, 15 to 35 percent slopes, extremely stony

This soil is moderately deep, moderately steep and steep, and well drained. It is on side slopes and benches on mountains, mainly in the central part of the county. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the soil.

Typically, the surface layer is dark reddish brown channery silt loam about 4 inches thick. The subsoil extends to a depth of about 31 inches. The upper 5 inches is dark reddish brown channery silt loam. The next 16 inches is reddish brown channery silt loam. The lower 6 inches is reddish brown very channery silt

loam. Reddish brown and reddish gray, fractured siltstone bedrock is at a depth of about 31 inches.

Included with this soil in mapping are a few small areas of the well drained Gilpin, Laidig, and Shouns soils and the moderately well drained Meckesville soils. Also included are a few small areas where less than 3 percent or more than 15 percent of the surface is covered with stones and areas where the slopes are less than 15 percent or more than 35 percent. Inclusions make up about 15 percent of the unit.

The available water capacity is moderate in the Cateache soil. Permeability is moderate in the subsoil. Runoff is rapid or very rapid. Natural fertility is medium. Reaction is very strongly acid to moderately acid, unless the soil has been limed. Depth to bedrock ranges from 20 to 40 inches.

Most areas of this soil are used as woodland. A few have been cleared of trees and are used as pasture or as sites for community development.

Because of the stones, this soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The slope and the stones limit the use of farm machinery. The very severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition. Seedling mortality on south aspects is a management concern. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate.

Slippage is a severe limitation affecting the operability of equipment and the construction of haul roads and skid roads on this soil. The slope and the slippage are severe limitations affecting the location of log landings. Building haul roads and skid roads in the included areas of less sloping soils helps to overcome the slope. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings during wet periods unless the surface is strengthened by adding gravel. The hazard of erosion is moderate. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings with grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are yellow-poplar, basswood, sugar maple, red oak, hickory, red maple, American beech, white oak, scarlet oak, and black birch. The dominant plant communities in the understory are sugar maple, American beech, and yellow-poplar, and those in the ground cover are ramps, clintonia, and ferns.

The slope and the stones are severe limitations affecting recreational development. The 15 to 25 percent slope is a moderate limitation on hiking trails. Trails can be built on the soil, but a surface drainage system is needed to help control erosion.

The slope, the depth to bedrock, and the slippage are the main limitations on sites for dwellings and septic tank absorption fields. In places the bedrock hinders excavation, even though it generally is rippable. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation. This soil generally is not suited to most urban uses. A suitable alternative site should be selected.

The capability subclass is VIIs. The woodland ordination symbol is 4R.

CeF—Cedarcreek very channery loam, very steep, extremely stony

This soil is very deep and well drained. It generally is on mountain side slopes that have been disturbed by contour surface mine operations. A few areas on ridgetops have been mined using mountaintop removal methods. The soil is in areas throughout the county. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the soil. Slope ranges from 35 to 70 percent.

Typically, the surface layer is dark brown very channery loam about 4 inches thick. It has black mottles. The substratum extends to a depth of more than 65 inches. The upper 40 inches is dark grayish brown very channery loam that has black and yellowish brown mottles. The next 21 inches is dark grayish brown extremely channery loam that has black and yellowish brown mottles. All of the mottles are lithochromic.

Included with this soil in mapping are a few small areas of the somewhat excessively drained Itmann soils, the well drained Gilpin, Kaymine, and Laidig soils, and well drained Udorthents. Also included are a few small wet areas on benches, areas of surface mined soils having vertical highwalls that range from

20 to 80 feet or more in height, and small areas of rubble land on outslopes. Inclusions make up about 20 percent of the unit.

The available water capacity is low to high in the Cedarcreek soil. Permeability is moderate or moderately rapid in the substratum. Runoff is very rapid in backfilled areas and on outslopes. Natural fertility is low. Depth to bedrock is more than 60 inches. Reaction is extremely acid to strongly acid, unless the soil has been limed. It may be higher in the surface layer in reclaimed areas because the soil has been limed.

Most areas of this soil are used as wildlife habitat. Reclaimed areas have been seeded to sericea lespedeza, fescue, birdsfoot trefoil, or black locust. Many areas are reverting to woodland.

Because of the stones, this soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The stones and the slope limit the use of farm machinery. If the soil is pastured, the very severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil, but only a small acreage is wooded. The soil is suited to coniferous and deciduous trees. Planted tree species commonly include black locust and eastern white pine. Species that naturally invade this soil include red maple, sassafras, sweet birch, cucumbertree, and hemlock. In most areas the trees are not large enough to harvest. Seedling mortality and plant competition are management concerns. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The slope and the stones and boulders are the main limitations on sites for dwellings and septic tank absorption fields. Onsite investigation is necessary to determine if the limitations that affect urban uses can be overcome. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is VIIs. The woodland ordination symbol is 4R.

Ch—Chavies fine sandy loam

This soil is nearly level and well drained. It is on high flood plains along the larger streams in the county. It is subject to rare flooding. Slope ranges from 0 to 3 percent.

Typically, the surface layer is dark brown fine sandy loam about 6 inches thick. The subsoil extends to a depth of about 42 inches. The upper 4 inches is dark brown fine sandy loam. The lower 32 inches is dark brown fine sandy loam. The substratum extends to a depth of about 65 inches. The upper 16 inches is dark brown fine sandy loam. The lower 7 inches is dark yellowish brown loamy sand.

Included with this soil in mapping are a few small areas of the somewhat excessively drained Potomac soils and the well drained Craigsville, Laidig, and Pope soils. Also included are a few small areas of soils that are moderately well drained. Included soils make up about 15 percent of the unit.

The available water capacity is moderate or high in the Chavies soil. Permeability is moderately rapid. Runoff is slow or medium. Natural fertility is medium. Reaction is very strongly acid or strongly acid, unless the soil has been limed. Depth to bedrock is more than 60 inches.

Most areas of this soil are used for cultivated crops, hay, or pasture (fig. 2) or as sites for community development. A few are used as woodland.

This soil is well suited to cultivated crops, hay, and pasture. Applying a system of conservation tillage, including hay in the conservation cropping sequence, and returning crop residue to the soil help to maintain fertility and tilth. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil, but only a small acreage is wooded. Tree species include yellow-poplar, red oak, American beech, mountain magnolia, cucumbertree, and sassafras. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

Some areas of this soil are used as log landings. The formation of ruts is a severe limitation unless the surface is strengthened by adding gravel. Leaving wide filter strips beside streams and seeding landings when they are no longer being used help to control erosion and sedimentation.

The flooding is a severe limitation in camping areas.

Figure 2.—Pasture in an area of Chavies fine sandy loam.

No major limitations affect the development of picnic areas, playgrounds, or hiking trails.

The flooding is the main limitation on sites for dwellings and septic tank absorption fields. This soil generally is not suitable as a site for dwellings unless it is protected by a flood-control structure. A suitable alternative site should be selected. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability classification is I. The woodland ordination symbol is 4A.

CoB—Cotaco silt loam, 3 to 8 percent slopes

This soil is very deep, gently sloping, and moderately well drained. It is on low stream terraces, mainly along the tributaries of the Gauley River, and at the headwaters of Birch River and Laurel Creek in Glade District near Cowen.

Typically, the surface layer is dark brown silt loam about 5 inches thick. The subsoil extends to a depth of about 50 inches. The upper 11 inches is yellowish brown silt loam. The next 7 inches is yellowish brown silt loam that has gray and strong brown mottles. The next 8 inches is light yellowish brown silt loam that has gray and strong brown mottles. The next 13 inches is gray silt loam that has light yellowish brown and strong brown mottles. The lower 6 inches is gray loam that has strong brown and light yellowish brown mottles. The substratum to a depth of about 65 inches is gray loam that has strong brown and light yellowish brown mottles.

Included with this soil in mapping are a few small areas of the well drained Chavies, Craigsville, Gilpin,

and Pope soils, the moderately well drained Philo soils, and the poorly drained Atkins and Elkins soils. Also included are a few small areas of slowly permeable soils that have silty clay loam or silty clay in the subsoil and substratum and areas where the soils are nearly level. Included soils make up about 30 percent of the unit.

The available water capacity is moderate or high in the Cotaco soil. Permeability is moderate in the subsoil. Runoff is medium. Natural fertility is medium. A seasonal high water table is at a depth of about 1.5 to 2.5 feet. It restricts the rooting depth of some plants. Reaction is very strongly acid or strongly acid, unless the soil has been limed. Depth to bedrock is more than 60 inches.

Most areas of this soil are used for hay or pasture or as sites for community development. A few are used as woodland.

This soil is suited to cultivated crops, hay, and pasture. The hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. If the soil is cultivated, applying a system of conservation tillage, including hay in the conservation cropping sequence, and returning crop residue to the soil help to control erosion and maintain fertility and tilth. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil, but only a small acreage is wooded. Tree species include yellow-poplar, yellow birch, American beech, and cucumbertree. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

Some areas of this soil are used as log landings. The formation of ruts is a severe limitation unless the surface is strengthened by adding gravel. Leaving wide filter strips beside streams and seeding landings when they are no longer being used help to control erosion and sedimentation.

The wetness is a severe limitation affecting recreational development. It is the main limitation on sites for dwellings and septic tank absorption fields. Sealing foundation walls, installing foundation drains, backfilling with porous material, and installing diversions that intercept water from the higher areas help to keep basements dry. Constructing septic tank absorption fields on the contour, installing larger than normal absorption fields, and installing diversions to intercept water from the higher areas improve the capacity of the absorption field to absorb effluent. If the vegetative cover is removed, establishing plant cover in unprotected areas and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is IIe. The woodland ordination symbol is 5A.

Cr—Craigsville gravelly loam, 0 to 5 percent slopes

This soil is very deep, nearly level, and well drained. It is on high bottom land and alluvial fans at the mouth of hollows throughout the county. It is subject to rare flooding.

Typically, the surface layer is dark brown gravelly loam about 5 inches thick. The subsoil extends to a depth of about 39 inches. The upper 19 inches is dark yellowish brown very gravelly loam. The lower 15 inches is dark yellowish brown very gravelly sandy loam. The substratum extends to a depth of about 65 inches. The upper 14 inches is dark yellowish brown gravelly sandy loam. The lower 12 inches is dark yellowish brown very gravelly loamy sand.

Included with this soil in mapping are a few small areas of the somewhat excessively drained Potomac soils, the well drained Chavies and Pope soils, the moderately well drained Philo soils, and the poorly drained Atkins soils. Also included are a few small areas of soils that are moderately acid and areas of soils that have boulders on the surface. Included soils make up about 15 percent of the unit.

The available water capacity is low to high in the Craigsville soil. Permeability is moderately rapid and rapid in the subsoil. Runoff is slow or medium. Natural fertility is medium. Reaction is very strongly acid or strongly acid, unless the soil has been limed. Depth to bedrock is more than 60 inches.

Most areas of this soil are used as woodland. A few have been cleared of trees and are used for hay or pasture or as sites for community development.

This soil is suited to cultivated crops, hay, and pasture. Droughtiness during dry periods and overgrazing in pastured areas are the major management concerns. If the soil is cultivated, applying a system of conservation tillage, including hay in the conservation cropping sequence, and returning crop residue to the soil help to improve the water-holding capacity and maintain fertility and tilth. Proper stocking rates that help to maintain desirable grasses and legumes, a rotation grazing system, and deferment of grazing during dry periods are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil. Seedling mortality and plant competition are management concerns. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

No major limitations affect the operability of equipment or logging operations. Management practices that help to control erosion and sedimentation include installing dips, ditches, water bars, and culverts; leaving wide filter strips beside streams; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are yellow-poplar, yellow birch, hemlock, red oak, cherry, red maple, and American beech. The dominant plant communities in the understory are devils-walkingstick, yellow-poplar, rhododendron, American beech, red maple, and yellow birch, and those in the ground cover are orchardgrass, shield fern, and greenbrier.

The flooding and the stones are severe limitations in camp areas and on sites for playgrounds. The stoniness is a limitation in picnic areas. No major limitations affect the construction of hiking trails.

The flooding is the main limitation on sites for dwellings. The moderately rapid or rapid permeability is the main limitation on sites for septic tank absorption fields. This soil is poorly suited to dwellings unless it is protected from flooding. A suitable alternative site should be selected. Constructing septic tank absorption fields in areas of less permeable soils helps to overcome the rapid permeability. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is IIs. The woodland ordination symbol is 4A.

DkC—Dekalb channery sandy loam, 3 to 15 percent slopes, extremely stony

This soil is moderately deep, gently sloping to strongly sloping, and well drained. It is on ridgetops, mainly in the western half of the county. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the soil.

Typically, the surface layer is very dark gray channery sandy loam about 2 inches thick. The subsoil extends to a depth of about 24 inches. The upper 3 inches is dark brown channery sandy loam. The next 8 inches is yellowish brown channery sandy loam. The lower 11 inches is yellowish brown very channery sandy loam. The substratum is yellowish brown extremely channery sandy loam. Sandstone bedrock is at a depth of about 34 inches.

Included with this soil in mapping are a few small areas of the well drained Gilpin, Laidig, and Pineville soils and the moderately well drained Fenwick soils. Also included are a few small areas of soils that are less than 20 inches deep over bedrock, areas where less than 3 percent or more than 15 percent of the surface is covered with stones, and areas of soils that have slopes of more than 15 percent. Inclusions make up about 15 percent of the unit.

The available water capacity is very low to moderate in the Dekalb soil. Permeability is rapid in the subsoil. Runoff is medium or rapid. Natural fertility is low. Reaction is extremely acid or strongly acid, unless the soil has been limed. Depth to bedrock ranges from 20 to 40 inches.

Most areas of this soil are used as woodland. A few have been cleared of trees and are used for hay or pasture or as sites for community development.

Because of the stones, this soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The stones limit the use of farm machinery. The severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. Proper stocking rates that help to maintain desirable grasses and legumes, a rotation grazing system, and deferment of grazing during dry periods are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil. Seedling mortality and plant competition are management concerns. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The stones and the depth to bedrock are limitations affecting the construction of haul roads and skid roads on this soil, especially where cutting and filling are needed. The stones, the depth to bedrock, and the slope are limitations affecting the location of log landings. Building haul roads, skid roads, and log

landings in the included areas of soils that are not so stony or less sloping helps to overcome the stoniness and the slope. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are chestnut oak, scarlet oak, red maple, and red oak. The dominant plant communities in the understory are red maple, sourwood, sassafras, and mountain laurel, and those in the ground cover are greenbrier, fern, and teaberry.

The slope and the stones are severe limitations on sites for playgrounds. The stoniness is a severe limitation in camp areas and picnic areas and a moderate limitation on hiking trails. Trails can be built on this soil, but the stones can hinder construction.

The depth to bedrock is the main limitation on sites for dwellings. Designing dwellings that can be built on the bedrock and adding suitable fill material help to overcome the depth to bedrock. The depth to bedrock and the rapid permeability are the main limitations on sites for septic tank absorption fields. Constructing the absorption field in areas of deeper soils or less permeable soils, constructing the absorption field on the contour, and installing a larger than normal absorption field help to overcome the depth to bedrock and the rapid permeability. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is VIIs. The woodland ordination symbol is 4A.

DrF—Dekalb-Rock outcrop complex, 35 to 70 percent slopes, extremely stony

This map unit occurs as areas of a very steep, moderately deep, well drained Dekalb soil intermingled with areas of Rock outcrop. It is on narrow ridgetops and shoulder slopes, mainly in the western half of the county. The Dekalb soil and the Rock outcrop occur as areas so intermingled that it was not practical to map them separately. The unit is about 60 percent Dekalb soil and 15 percent Rock outcrop. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the unit.

Typically, the surface layer of the Dekalb soil is very dark gray channery sandy loam about 2 inches thick. The subsoil extends to a depth of about 24 inches. The upper 3 inches is dark brown channery sandy loam. The next 8 inches is yellowish brown channery sandy loam. The lower 11 inches is yellowish brown very channery sandy loam. The substratum is yellowish brown extremely channery sandy loam. Sandstone bedrock is at a depth of about 34 inches.

The Rock outcrop consists of vertical or nearly vertical exposures of hard sandstone bedrock. The exposures are 3 to 50 feet or more high.

Included in this unit in mapping are a few small areas of the well drained Gilpin, Guyandotte, and Pineville soils. Also included are a few small areas of soils that are less than 20 inches deep over bedrock, areas where less than 3 percent or more than 15 percent of the surface is covered with stones, and areas of soils that have slopes of less than 35 percent. Inclusions make up about 25 percent of the unit.

The available water capacity is very low to moderate in the Dekalb soil. Permeability is rapid in the subsoil. Runoff is very rapid. Natural fertility is low. Reaction is extremely acid to strongly acid, unless the soil has been limed. Depth to bedrock ranges from 20 to 40 inches.

All areas of the Dekalb soil are used as woodland. The areas of Rock outcrop generally are barren.

This unit is not suited to cultivated crops, hay, or pasture. The slope, the stones, and the Rock outcrop limit the use of farm machinery. The very severe hazard of erosion in unprotected areas is a major management concern.

The potential productivity for trees is moderately high on the Dekalb soil. Seedling mortality and plant competition are management concerns. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The slope is a severe limitation affecting the operability of equipment and the construction of haul roads, skid roads, and log landings on this unit. Building haul roads and skid roads in the included areas of less sloping soils helps to overcome the slope. The hazard of erosion is severe. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being used. Conventional skidder logging techniques are not recommended on slopes of more than 55 percent. Specialized

equipment or management techniques, such as cable yarding, are needed when timber is harvested in these areas.

The dominant plant communities in the overstory in this unit are chestnut oak, scarlet oak, red maple, white oak, and hickory. The dominant plant communities in the understory are red maple, sassafras, mountain laurel, and huckleberry, and those in the ground cover are greenbrier, ferns, and teaberry.

The slope, the stones, and the Rock outcrop are severe limitations affecting recreational development. This Dekalb soil is not suited to urban uses because of the slope, the depth to bedrock, and the rapid permeability.

The capability subclass is VIIs. The woodland ordination symbol is 4R in areas of the Dekalb soil.

Ek—Elkins silt loam

This soil is very deep, nearly level, and poorly drained. It is on flood plains, mainly in the southwestern part of the county. It is subject to occasional flooding. Slope ranges from 0 to 3 percent.

Typically, the surface layer is very dark brown silt loam about 7 inches thick. The subsoil extends to a depth of about 27 inches. It is dark gray silt loam that has strong brown mottles. The substratum extends to a depth of about 65 inches. The upper 20 inches is gray silt loam that has strong brown and reddish yellow mottles. The lower 18 inches is gray silt loam.

Included with this soil in mapping are a few small areas of the well drained Pope soils, the moderately well drained Cotaco and Philo soils, and the poorly drained Atkins soils. Also included are a few small areas of soils that are moderately well drained, areas of soils that are subject to ponding, and areas of soils that are subject to rare flooding. Included soils make up about 20 percent of the unit.

The available water capacity is high in the Elkins soil. Permeability is slow in the subsoil. Runoff is slow. Natural fertility is medium. A seasonal high water table near the surface restricts the rooting depth of many plants. Reaction is extremely acid or very strongly acid, unless the soil has been limed. Depth to bedrock is more than 60 inches.

Most areas of this soil are used for hay or pasture or as sites for community development. A few are used as woodland.

The wetness is a limitation affecting cultivated crops, hay, and pasture. In places diversions help to intercept runoff from the higher areas. Applying a system of conservation tillage, including hay in the conservation cropping sequence, delaying tillage until the soil is reasonably dry, and returning crop residue to the soil help to maintain fertility and tilth. In some areas used for cultivated crops, the flooding is a hazard. Proper stocking rates that help to maintain desirable grasses and legumes, water-tolerant plants, a rotation grazing system, and deferment of grazing until the soil is reasonably firm are the major management needs in pastured areas.

The potential productivity of this soil is moderately high for trees that can withstand wetness, but only a small acreage is wooded. Tree species include American sycamore and yellow birch. Seedling mortality and plant competition are management concerns. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The flooding and the wetness are severe limitations affecting recreational development. The flooding, the wetness, and the slow permeability are the main limitations on sites for dwellings and septic tank absorption fields. This soil is poorly suited to dwellings and septic tank absorption fields unless it is protected from flooding. A suitable alternative site should be selected. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is IIIw. The woodland ordination symbol is 5W.

FeC—Fenwick loam, 3 to 15 percent slopes, very stony

This soil is moderately deep, gently sloping to strongly sloping, and moderately well drained. It is on broad ridgetops, mainly in the southern part of the county, between the Cranberry and Gauley Rivers. Stones that are 10 to 24 inches in diameter cover 1 to 3 percent of the surface of the soil.

Typically, the surface layer is very dark brown loam about 2 inches thick. The subsoil extends to a depth of about 34 inches. The upper 6 inches is dark yellowish brown loam. The next 7 inches is yellowish brown loam. The next 5 inches is brownish yellow loam. The lower 16 inches is brownish yellow loam that has light brownish gray, light yellowish brown, and strong brown mottles. Sandstone bedrock is at a depth of about 34 inches.

Included with this soil in mapping are a few small areas of the well drained Dekalb and Gilpin soils. Also included are a few small areas of soils that are more than 40 inches deep over bedrock; areas of soils that have a clayey subsoil or a dense, brittle layer in the subsoil; areas of soils that are not stony; and areas of soils that are somewhat poorly drained or poorly drained. Included soils make up about 20 percent of the unit.

The available water capacity is moderate in the Fenwick soil. Permeability is moderate in the subsoil. Runoff is medium or rapid. Natural fertility is low or medium. A seasonal high water table is at a depth of about 1.5 to 2.5 feet. Reaction is very strongly acid or strongly acid, unless the soil has been limed. Depth to bedrock ranges from 20 to 40 inches.

Most areas of this soil are used as woodland. A few have been cleared of trees and are used for hay or pasture.

This soil is not suited to cultivated crops or hay, but it is suited to pasture. The stones limit the use of farm machinery. The severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

Low strength and the depth to bedrock are limitations affecting the construction of haul roads and skid roads on this soil, especially where cutting and filling are needed. The depth to bedrock, the low strength, and the slope are limitations affecting the location of log landings. Building haul roads, skid roads, and log landings in the included areas of soils that are better drained, more than 40 inches deep over bedrock, or less sloping helps to overcome these limitations. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are chestnut oak, red oak, sugar maple, and American beech. The dominant plant communities in the understory are sugar maple, striped maple, cucumbertree, American chestnut, and American beech, and those in the ground cover are greenbrier and blackberry.

The stoniness is a severe limitation on sites for playgrounds. The slope, the wetness, and the stones are limitations in camp areas and picnic areas and on hiking trails.

The depth to bedrock and the wetness are the main limitations on sites for dwellings. The depth to bedrock, the wetness, and the slow permeability are the main limitations on sites for septic tank absorption fields. Designing dwellings that can be built on the bedrock and adding suitable fill material help to overcome the depth to bedrock. Sealing foundation walls, installing foundation drains, backfilling with porous material, and installing diversions that intercept water from the higher areas help to keep basements dry. Constructing the absorption field in the included areas of the deeper soils, constructing the absorption field on the contour, installing a larger than normal absorption field, and installing diversions to intercept water from the higher areas improve the capacity of the field to absorb effluent. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is VIs. The woodland ordination symbol is 4A.

GaC—Gauley extremely channery sandy loam, 3 to 15 percent slopes, rubbly

This soil is moderately deep, gently sloping to strongly sloping, and well drained. It is on broad ridgetops in the southeastern part of the county. It generally is at elevations of more than 3,400 feet. Stones that are 10 to 24 inches in diameter cover 15 to 75 percent of the surface of the soil.

Typically, the surface layer is black extremely channery sandy loam about 4 inches thick. The subsoil extends to a depth of about 28 inches. The upper 10 inches is dark brown and grayish brown very channery loamy sand. The next 5 inches is dark brown channery sandy loam. The lower 9 inches is dark brown very channery sandy loam. Sandstone bedrock is at a depth of about 28 inches.

Included with this soil in mapping are a few small areas of the well drained Mandy soils and the moderately well drained Simoda and Snowdog soils. Also included are a few small areas of soils that are less than 20 inches deep over bedrock, areas where less than 15 percent or more than 75 percent of the

surface is covered with stones and boulders, and areas of soils that have slopes of more than 15 percent. Inclusions make up about 15 percent of the unit.

The available water capacity is very low to moderate in the Gauley soil. Permeability is moderately rapid in the subsoil. Runoff is medium or rapid. Natural fertility is low. Reaction is extremely acid or very strongly acid, unless the soil has been limed. Depth to bedrock ranges from 20 to 40 inches.

All areas of this soil are used as woodland. Most are in the Monongahela National Forest. The soil has low potential for any development other than woodland.

This soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The stones and boulders limit the use of farm machinery. The severe hazard of erosion in unprotected areas is a major management concern.

The potential productivity is high for trees on this soil. Seedling mortality, the windthrow hazard, and plant competition are management concerns. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate. Carefully thinning stands and not damaging the surficial root system help to prevent windthrow. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The stones and boulders severely limit the operability of equipment and the construction of haul roads, skid roads, and log landings on this soil. Building haul roads, skid roads, and log landings in the included areas of soils that are not so stony helps to overcome this limitation. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are red spruce, yellow birch, red maple, black cherry, hemlock, and American beech. The dominant plant communities in the understory are red spruce, hemlock, American beech, red maple, and yellow birch, and those in the ground cover are fern, red spruce, and wood sorrel.

The stones and boulders are severe limitations affecting recreational development. The depth to bedrock and the stones and boulders are the main limitations on sites for dwellings and septic tank absorption fields. In areas where stones and boulders cover 50 percent or more of the surface, excavating and disposing of large fragments is difficult. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation. Because most of the acreage of the soil is in the Monongahela National Forest, the soil has limited potential for urban development.

The capability subclass is VIIs. The woodland ordination symbol is 6X.

GaE—Gauley extremely channery sandy loam, 15 to 35 percent slopes, rubbly

This soil is moderately steep and steep and is well drained. It is on shoulder slopes in the southeastern part of the county. It generally is at elevations of more than 3,400 feet. Stones that are 10 to 24 inches in diameter cover 15 to 75 percent of the surface of the soil.

Typically, the surface layer is black extremely channery sandy loam about 4 inches thick. The subsoil extends to a depth of about 28 inches. The upper 10 inches is dark brown and grayish brown very channery loamy sand. The next 5 inches is dark brown channery sandy loam. The lower 9 inches is dark brown very channery sandy loam. Sandstone bedrock is at a depth of about 28 inches.

Included with this soil in mapping are a few small areas of the well drained Mandy soils and the moderately well drained Simoda and Snowdog soils. Also included are a few small areas of soils that are more than 40 inches deep over bedrock, areas where less than 15 percent or more than 75 percent of the surface is covered with stones and boulders, and areas where the slopes are less than 15 percent or more than 35 percent. Inclusions make up about 20 percent of the unit.

The available water capacity is very low to moderate in the Gauley soil. Permeability is moderately rapid. Runoff is rapid or very rapid. Natural fertility is low. Reaction is extremely acid or very strongly acid, unless the soil has been limed. Depth to bedrock ranges from 20 to 40 inches.

All areas of this soil are used as woodland. Most are in the Monongahela National Forest. The soil has low potential for any development other than woodland.

This soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The stones and boulders limit the use of farm machinery. The very

severe hazard of erosion in unprotected areas is a major management concern.

The potential productivity for trees is high on this soil. Seedling mortality, the windthrow hazard, and plant competition are management concerns. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate. Carefully thinning stands and not damaging the surficial root system help to prevent windthrow. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The stones and boulders severely limit the operability of equipment and the construction of haul roads and skid roads on this soil. The stones and boulders and the slope are severe limitations affecting the location of log landings. Building haul roads, skid roads, and log landings in the included areas of soils that are not so stony or less sloping helps to overcome the stoniness and the slope. The hazard of erosion is moderate. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are red spruce, yellow birch, red maple, black cherry, hemlock, and American beech. The dominant plant communities in the understory are red spruce, hemlock, American beech, red maple, and yellow birch, and those in the ground cover are fern and wood sorrel.

The slope and the stones and boulders are severe limitations affecting recreational development. The depth to bedrock, the slope, and the stones and boulders are the main limitations on sites for dwellings and septic tank absorption fields. In areas where stones and boulders cover 50 percent or more of the surface, excavating and disposing of large fragments is difficult. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation. Because most of the acreage of this soil is in the Monongahela National Forest, the soil has no potential for urban development.

The capability subclass is VIIs. The woodland ordination symbol is 6R.

GbB—Gilpin silt loam, 3 to 8 percent slopes

This soil is moderately deep, gently sloping, and well drained. It is on ridgetops and summits of the lower slopes throughout the county.

Typically, the surface layer is very dark grayish brown silt loam about 4 inches thick. The subsoil is yellowish brown channery silt loam about 22 inches thick. The substratum is yellowish brown channery silt loam about 10 inches thick. Sandstone bedrock is at a depth of about 36 inches.

Included with this soil in mapping are a few small areas of the moderately well drained Cotaco and Fenwick soils. Also included are a few small areas of soils that have a silty clay subsoil, areas of soils that are similar to the Gilpin soil but are coarser textured in the subsoil, and areas where more than 75 percent of the original topsoil has been removed by erosion. Inclusions make up about 20 percent of the unit.

The available water capacity is moderate in the Gilpin soil. Permeability is moderate in the subsoil. Runoff is medium. Natural fertility is medium. Reaction is extremely acid to strongly acid, unless the soil has been limed. Depth to bedrock ranges from 20 to 40 inches.

Most areas of this soil are used for cultivated crops, hay, or pasture or as sites for community development. A few are used as woodland.

This soil is suited to cultivated crops, hay, and pasture. The hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. If the soil is cultivated, applying a system of conservation tillage, including hay in the conservation cropping sequence, and returning crop residue to the soil help to control erosion and maintain fertility and tilth. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil, but only a small acreage is wooded. Tree species include red oak, scarlet oak, chestnut oak, white oak, black cherry, and hickory. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

Some areas of this soil are used as log landings. The formation of ruts is a severe limitation unless the surface is strengthened by adding gravel. Leaving

wide filter strips beside streams and seeding grasses and legumes on landings when they are no longer being used help to control erosion and sedimentation.

The slope is a severe limitation on sites for playgrounds. No major limitations affect the development of camp areas, picnic areas, or hiking trails.

The depth to bedrock is the main limitation on sites for dwellings and septic tank absorption fields. In places the bedrock hinders excavation, even though it generally is rippable. Designing dwellings that can be built on the bedrock and adding suitable fill material help to overcome the depth to bedrock. Constructing the absorption field in areas of deeper soils, constructing the absorption field on the contour, and installing a larger than normal absorption field help to overcome the depth to bedrock. Installing diversions to intercept water from the higher areas improves the capacity of the absorption field to absorb effluent. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is IIe. The woodland ordination symbol is 4A.

GbC—Gilpin silt loam, 8 to 15 percent slopes

This soil is moderately deep, strongly sloping, and well drained. It is on ridgetops, benches, and summits of the lower slopes throughout the county.

Typically, the surface layer is very dark grayish brown silt loam about 4 inches thick. The subsoil is yellowish brown channery silt loam about 22 inches thick. The substratum is yellowish brown channery silt loam about 10 inches thick. Sandstone bedrock is at a depth of about 36 inches.

Included with this soil in mapping are a few small areas of the well drained Laidig soils and the moderately well drained Fenwick soils. Also included are a few small areas of soils that have a silty clay subsoil, areas of soils that are similar to the Gilpin soil but are coarser textured in the subsoil, areas of soils that are more than 40 inches deep over bedrock, areas where more than 75 percent of the original topsoil has been removed by erosion, areas where 1 to 3 percent of the surface is covered with stones, and areas of soils that have slopes of less than 8 percent. Inclusions make up about 20 percent of the unit.

The available water capacity is moderate in the Gilpin soil. Permeability is moderate. Runoff is rapid. Natural fertility is medium. Reaction is extremely acid to strongly acid, unless the soil is limed. Depth to bedrock ranges from 20 to 40 inches.

This soil is dominantly used for cultivated crops, hay, or pasture or as sites for community development. A significant acreage is used as woodland.

This soil is suited to cultivated crops, hay, and pasture. The severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. If the soil is cultivated, applying a system of conservation tillage, including hay in the conservation cropping sequence, and returning crop residue to the soil help to control erosion and maintain fertility and tilth. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

Low strength and the depth to bedrock are limitations affecting the construction of haul roads and skid roads on this soil. The low strength, the depth to bedrock, and the slope are limitations affecting the location of log landings. Building haul roads, skid roads, and log landings in the included areas of the less sloping soils helps to overcome the slope. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are red oak, scarlet oak, hickory, chestnut oak, white oak, and black gum. The dominant plant communities in the understory are greenbrier, dogwood, and black gum. The dominant plant community in the ground cover is greenbrier.

The slope is a severe limitation on sites for playgrounds. It also limits the development of camp areas and picnic areas. No major limitations affect the development of hiking trails.

The depth to bedrock is the main limitation on sites for dwellings and septic tank absorption fields. In places the bedrock hinders excavation, even though it generally is rippable. Designing dwellings that can be built on the bedrock and adding suitable fill material help to overcome the depth to bedrock. Constructing the absorption field in areas of deeper soils,

constructing the absorption field on the contour, and installing a larger than normal absorption field help to overcome the depth to bedrock. Installing diversions to intercept water from the higher areas improves the capacity of the absorption field to absorb effluent. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is IIIe. The woodland ordination symbol is 4A.

GbD—Gilpin silt loam, 15 to 25 percent slopes

This soil is moderately deep, moderately steep, and well drained. It is on ridgetops, hillsides, and benches throughout the county.

Typically, the surface layer is very dark grayish brown silt loam about 4 inches thick. The subsoil is yellowish brown channery silt loam about 22 inches thick. The substratum is yellowish brown channery silt loam about 10 inches thick. Sandstone bedrock is at a depth of about 36 inches.

Included with this soil in mapping are a few small areas of the well drained Laidig soils. Also included are a few small areas of soils that are moderately well drained, areas of soils that have a silty clay subsoil, areas of soils that are similar to the Gilpin soil but are coarser textured in the subsoil, areas of soils that are more than 40 inches deep over bedrock, areas where more than 75 percent of the original topsoil has been removed by erosion, areas where 1 to 3 percent of the surface is covered with stones, and areas of soils that have slopes of less than 15 percent. Inclusions make up about 20 percent of the unit.

The available water capacity is moderate in the Gilpin soil. Permeability is moderate in the subsoil. Runoff is rapid. Natural fertility is medium. Reaction is extremely acid to strongly acid, unless the soil has been limed. Depth to bedrock ranges from 20 to 40 inches.

This soil is dominantly used for hay or pasture or as sites for community development. A significant acreage is used as woodland.

This soil has limited suitability for cultivated crops. It is better suited to hay or pasture. The severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. If the soil is cultivated, applying a system of conservation tillage, including hay in the conservation cropping sequence, and returning crop residue to the soil help to control erosion and maintain fertility and tilth. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition. Seedling mortality on south aspects is a management concern. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate.

The slope is a limitation affecting the operability of equipment on this soil. The slope, low strength, and the depth to bedrock are limitations affecting the construction of haul roads and skid roads. The slope is a severe limitation affecting the location of log landings. Building haul roads, skid roads, and log landings in the included areas of the less sloping or deeper soils helps to overcome the slope and the depth to bedrock. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. The hazard of erosion is moderate. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are red oak, scarlet oak, white oak, hickory, and American beech. The dominant plant communities in the understory are red maple and sassafras. The dominant plant community in the ground cover is ground pine.

The slope is a severe limitation in camp areas and picnic areas and on sites for playgrounds. It is a moderate limitation on hiking trails. Trails can be built on this soil, but a surface drainage system is needed to help control erosion.

The slope is the main limitation on sites for dwellings. The depth to bedrock and the slope are the main limitations on sites for septic tank absorption fields. Because of the slope, sites for roads, dwellings, and other structures need additional grading and lawns are difficult to establish and maintain. Selecting the included areas of less sloping soils for development and designing dwellings so that they conform to the natural slope of the land help to

overcome the slope. In places the bedrock hinders excavation, even though it is rippable. Designing dwellings that can be built on the bedrock and adding suitable fill material help to overcome the depth to bedrock. Constructing absorption fields in areas of deeper and less sloping soils, constructing the absorption field on the contour, and installing a larger than normal absorption field help to overcome the depth to bedrock and the slope. Installing diversions to intercept water from the higher areas improves the capacity of the absorption field to absorb effluent. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is IVe. The woodland ordination symbol is 4R.

GbE—Gilpin silt loam, 25 to 35 percent slopes

This soil is moderately deep, steep, and well drained. It is on hillsides, benches, and narrow ridgetops throughout the county.

Typically, the surface layer is very dark grayish brown silt loam about 3 inches thick. The subsoil is yellowish brown channery silt loam about 23 inches thick. The substratum is yellowish brown channery silt loam about 10 inches thick. Sandstone bedrock is at a depth of about 36 inches.

Included with this soil in mapping are a few small areas of the well drained Laidig soils. Also included are a few small areas of soils that are moderately well drained, areas of soils that have a silty clay subsoil, areas of soils that are similar to the Gilpin soil but are coarser textured in the subsoil, areas of soils that are more than 40 inches deep over bedrock, areas where more than 75 percent of the original topsoil has been removed by erosion, areas where 1 to 3 percent of the surface is covered with stones, and areas of soils that have slopes of less than 25 percent. Inclusions make up about 20 percent of the unit.

The available water capacity is moderate in the Gilpin soil. Permeability is moderate in the subsoil. Runoff is very rapid. Natural fertility is medium. Reaction is extremely acid to strongly acid, unless the soil has been limed. Depth to bedrock ranges from 20 to 40 inches.

This soil is dominantly used as pasture. A significant acreage is used as woodland.

This soil is not suited to cultivated crops or hay, but it is suited to pasture. The very severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition. Seedling mortality on south aspects is a management concern. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate.

The slope is a limitation affecting the operability of equipment on this soil. The slope, low strength, and the depth to bedrock are limitations affecting the construction of haul roads and skid roads. The slope is a severe limitation affecting the location of log landings. Building haul roads, skid roads, and log landings in the included areas of the less sloping or the deeper soils helps to overcome the slope and the depth to bedrock. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. The hazard of erosion is moderate. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are red oak, white oak, chestnut oak, hickory, American beech, and yellow-poplar. The dominant plant communities in the understory are sassafras and red maple. The dominant plant community in the ground cover is greenbrier.

The slope is a severe limitation affecting recreational development. It is the main limitation on sites for dwellings. The depth to bedrock and the slope are the main limitations on sites for septic tank absorption fields. In places the bedrock hinders excavation, even though it generally is rippable. This soil generally is not suited to most urban uses. A suitable alternative site should be selected. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is VIe. The woodland ordination symbol is 4R.

GbF—Gilpin silt loam, 35 to 70 percent slopes

This soil is moderately deep, very steep, and well drained. It is on hillsides and narrow ridgetops in the southwestern part of the county.

Typically, the surface layer is very dark grayish brown silt loam about 2 inches thick. The subsoil is yellowish brown channery silt loam about 24 inches thick. The substratum is yellowish brown channery silt loam about 10 inches thick. Sandstone bedrock is at a depth of about 36 inches.

Included with this soil in mapping are a few small areas of the well drained Dekalb, Guyandotte, Laidig, and Pineville soils. Also included are a few small areas of soils that have a silty clay subsoil, areas of soils that are similar to the Gilpin soil but are coarser textured in the subsoil, areas where more than 75 percent of the original topsoil has been removed by erosion, areas of soils that are more than 40 inches deep over bedrock, areas of rock outcrop, areas where 1 to 3 percent of the surface is covered with stones, and areas of soils that have slopes of less than 35 percent. Inclusions make up about 20 percent of the unit.

The available water capacity is moderate in the Gilpin soil. Permeability is moderate in the subsoil. Runoff is very rapid. Natural fertility is medium. Reaction is extremely acid to strongly acid, unless the soil has been limed. Depth to bedrock ranges from 20 to 40 inches.

Most areas of this soil are used as woodland. A few have been cleared of trees and are used as pasture.

This soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The very severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition. Seedling mortality on south aspects is a management concern. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate.

The slope is a severe limitation affecting the operability of equipment and the construction of haul roads, skid roads, and log landings on this soil. Building haul roads, skid roads, and log landings in the included areas of the less sloping soils helps to overcome the slope. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. The hazard of erosion is severe. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being used. Conventional logging techniques are not recommended on slopes of more than 55 percent. Specialized equipment or management techniques, such as cable yarding, are needed when timber is harvested in these areas.

The dominant plant communities in the overstory on this soil are red oak, white oak, scarlet oak, chestnut oak, hickory, yellow-poplar, red maple, and American beech. The dominant plant communities in the understory are red maple and sassafras, and those in the ground cover are greenbrier, ferns, and ground pine.

The slope is a severe limitation affecting recreational development. It is the main limitation on sites for dwellings. The depth to bedrock and the slope are the main limitations on sites for septic tank absorption fields. In places the bedrock hinders excavation, even though it generally is rippable. This soil generally is not suited to most urban uses. A suitable alternative site should be selected. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is VIIe. The woodland ordination symbol is 4R.

GcC—Gilpin silt loam, 3 to 15 percent slopes, very stony

This soil is moderately deep, gently sloping to strongly sloping, and well drained. It is on ridgetops and benches throughout the county. Stones that are 10 to 24 inches in diameter cover 1 to 3 percent of the surface of the soil.

Typically, the surface layer is very dark grayish brown silt loam about 4 inches thick. The subsoil is yellowish brown channery silt loam about 22 inches thick. The substratum is yellowish brown channery silt loam about 10 inches thick. Sandstone bedrock is at a depth of about 36 inches.

Included with this soil in mapping are a few small areas of the well drained Dekalb and Laidig soils and

the moderately well drained Fenwick soils. Also included are a few small areas of soils that have a silty clay subsoil, areas of soils that are similar to the Gilpin soil but are coarser textured in the subsoil, areas of soils that are more than 40 inches deep over bedrock, and areas where less than 1 percent or more than 3 percent of the surface is covered with stones. Inclusions make up about 20 percent of the unit.

The available water capacity is moderate in the Gilpin soil. Permeability is moderate in the subsoil. Runoff is medium or rapid. Natural fertility is medium. Reaction is extremely acid to strongly acid, unless the soil has been limed. Depth to bedrock ranges from 20 to 40 inches.

Most areas of this soil are used as woodland. A few have been cleared of trees and are used for hay or pasture or as sites for community development.

This soil is not suited to cultivated crops or hay, but it is suited to pasture. The stones limit the use of farm machinery. The severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

Low strength and the depth to bedrock are limitations affecting the construction of haul roads and skid roads on this soil. The depth to bedrock, the low strength, and the slope are limitations affecting the location of log landings. Building haul roads, skid roads, and log landings in the included areas of the less sloping or the deeper soils helps to overcome the slope and the depth to bedrock. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are red oak, black cherry, American beech, sugar maple, and yellow-poplar. The dominant plant communities in the understory are American beech, sugar maple, and red maple, and those in the ground cover are ferns and greenbrier.

The stoniness is a severe limitation in camp areas and picnic areas and on sites for playgrounds. It is a moderate limitation on hiking trails. Trails can be built, but the stones hinder construction in places.

The depth to bedrock is the main limitation on sites for dwellings and septic tank absorption fields. In places the bedrock hinders construction, even though it generally is rippable. Designing dwellings that can be built on the bedrock and adding suitable fill material help to overcome the depth to bedrock. Constructing the absorption field in areas of deeper soils, constructing the absorption field on the contour, and installing a larger than normal absorption field help to overcome the depth to bedrock. Installing diversions to intercept water from the higher areas improves the capacity of the absorption field to absorb effluent. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is VIs. The woodland ordination symbol is 4A.

GcF—Gilpin silt loam, 35 to 70 percent slopes, very stony

This soil is moderately deep, very steep, and well drained. It is on hillsides and narrow ridgetops throughout the county. Stones that are 10 to 24 inches in diameter cover 1 to 3 percent of the surface of the soil.

Typically, the surface layer is very dark grayish brown silt loam about 2 inches thick. The subsoil is yellowish brown channery silt loam about 24 inches thick. The substratum is yellowish brown channery silt loam about 10 inches thick. Sandstone bedrock is at a depth of about 36 inches.

Included with this soil in mapping are a few small areas of the well drained Dekalb, Guyandotte, Laidig, and Pineville soils. Also included are a few small areas of soils that have a silty clay subsoil, areas of soils that are similar to the Gilpin soil but are coarser textured in the subsoil, areas of soils that are more than 40 inches deep over bedrock, areas of rock outcrop, areas where less than 1 percent or more than 3 percent of the surface is covered with stones, and areas of soils that have slopes of less than 35 percent. Inclusions make up about 20 percent of the unit.

The available water capacity is moderate in the Gilpin soil. Permeability is moderate in the subsoil. Runoff is very rapid. Natural fertility is medium. Reaction is extremely acid to strongly acid, unless the soil has been limed. Depth to bedrock ranges from 20 to 40 inches.

Most areas of this soil are used as woodland. A few have been cleared of trees and are used as pasture.

This soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The slope and the stones limit the use of farm machinery. The very severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition. Seedling mortality on south aspects is a management concern. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate.

The slope is a severe limitation affecting the operability of equipment and the construction of haul roads, skid roads, and log landings on this soil. Building haul roads, skid roads, and log landings in the included areas of the less sloping soils helps to overcome the slope. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. The hazard of erosion is severe. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being used. Conventional skidder logging techniques are not recommended on slopes of more than 55 percent. Specialized equipment or management techniques, such as cable yarding, are needed when timber is harvested in these areas.

The dominant plant communities in the overstory on this soil are red oak, chestnut oak, red maple, hickory, American beech, yellow-poplar, and white oak. The dominant plant communities in the understory are sassafras, black birch, dogwood, and red maple. The dominant plant community in the ground cover is greenbrier.

The slope and the stones are severe limitations affecting recreational development. The slope and the depth to bedrock are the main limitations on sites for dwellings and septic tank absorption fields. In places the bedrock hinders construction, even though it generally is rippable. This soil generally is not suited to most urban uses. A suitable alternative site should be selected. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is VIIs. The woodland ordination symbol is 4R.

GdE—Gilpin-Dekalb complex, 15 to 35 percent slopes, extremely stony

This map unit consists of moderately deep, moderately steep and steep, well drained soils on ridgetops and shoulder slopes throughout the county. The soils occur as areas so intermingled that it was not practical to map them separately. The unit is about 55 percent Gilpin soil and 35 percent Dekalb soil. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the unit.

Typically, the surface layer of the Gilpin soil is very dark grayish brown silt loam about 3 inches thick. The subsoil is yellowish brown channery silt loam about 23 inches thick. The substratum is yellowish brown channery silt loam about 10 inches thick. Sandstone bedrock is at a depth of about 36 inches.

Typically, the surface layer of the Dekalb soil is very dark gray channery sandy loam about 2 inches thick. The subsoil extends to a depth of about 26 inches. The upper 3 inches is dark brown channery sandy loam. The next 8 inches is yellowish brown channery sandy loam. The lower 11 inches is yellowish brown very channery sandy loam. The substratum is yellowish brown extremely channery sandy loam about 10 inches thick. Sandstone bedrock is at a depth of about 34 inches.

Included with these soils in mapping are a few small areas of the well drained Guyandotte, Laidig, and Pineville soils. Also included are a few small areas of soils that are less than 20 inches or more than 40 inches deep over bedrock, areas of soils that are similar to the Gilpin soil but are coarser textured in the subsoil, areas of rock outcrop, areas where less than 3 percent or more than 15 percent of the surface is covered with stones, and areas where the slopes are less than 15 percent or more than 35 percent. Inclusions make up about 10 percent of the unit.

The available water capacity is moderate in the Gilpin soil and very low to moderate in the Dekalb soil. Permeability is moderate in the subsoil of the Gilpin soil and rapid in the subsoil of the Dekalb soil. Runoff is rapid or very rapid on both soils. Natural fertility is medium in the Gilpin soil and low in the Dekalb soil.

Reaction is extremely acid to strongly acid in both soils, unless the soils have been limed. Depth to bedrock ranges from 20 to 40 inches.

Most areas of these soils are used as woodland. A few have been cleared of trees and are used as pasture.

These soils are not suited to cultivated crops or hay and are difficult to manage for pasture. The slope and the stones limit the use of farm machinery. The very severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on both soils. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition. Seedling mortality is a management concern on the Dekalb soil and on the south aspects of the Gilpin soil. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate.

The slope is a limitation affecting the operability of equipment on these soils. The slope, the stones, the depth to bedrock, and low strength of the Gilpin soil are limitations affecting the construction of haul roads and skid roads. The slope is a severe limitation affecting the location of log landings. Building haul roads, skid roads, and log landings in the included areas of the less sloping or deeper soils helps to overcome the slope and the depth to bedrock. Rock outcrop hinders construction in some areas. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings located in areas of the Gilpin soil unless the surface is strengthened by adding gravel. The hazard of erosion is moderate. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on the Gilpin soil are red oak, red maple, sugar maple, scarlet oak, yellow-poplar, black cherry, white ash, and American beech. The dominant plant communities in the understory are red maple, red oak, American beech, and sassafras, and those in the ground cover are greenbrier and ferns. The dominant plant communities in the overstory on the Dekalb soil are chestnut oak, scarlet oak, red maple, and red oak. The dominant plant communities in the understory are red maple, sourwood, sassafras, and mountain laurel, and those in the ground cover are greenbrier, ferns, and teaberry.

The slope and the stones are severe limitations affecting recreational development. The 15 to 25 percent slope is a moderate limitation on hiking trails. Trails can be built on these soils, but a surface drainage system is needed to help control erosion.

The slope and the depth to bedrock are the main limitations on sites for dwellings and septic tank absorption fields. The rapid permeability in the Dekalb soil is an additional limitation on sites for septic tank absorption fields. In places the bedrock underlying the Gilpin soil hinders excavation, even though it generally is rippable. These soils generally are not suited to most urban uses. A suitable alternative site should be selected. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is VIIs. The woodland ordination symbol is 4R.

GLF—Gilpin-Laidig association, very steep, extremely stony

This map unit consists of well drained soils on mountain side slopes and benches, mainly in the eastern part of the county. It is about 45 percent Gilpin and similar soils and 35 percent Laidig and similar soils. Typically, the Gilpin soil is on convex, upper and middle side slopes, and the Laidig soil is on the less sloping side slopes, on benches, and in coves. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the unit. Slope ranges from 45 to 55 percent in areas of the Gilpin soil and from 35 to 45 percent in areas of the Laidig soil.

Typically, the surface layer of the Gilpin soil is very dark grayish brown silt loam about 2 inches thick. The subsoil is yellowish brown channery silt loam about 24 inches thick. The substratum is yellowish brown channery silt loam about 10 inches thick. Sandstone bedrock is at a depth of about 36 inches.

Typically, the surface layer of the Laidig soil is very dark grayish brown channery silt loam about 4 inches thick. The subsoil extends to a depth of about 60 inches. The upper 8 inches is dark yellowish brown channery silt loam. The next 8 inches is yellowish brown channery silt loam. The next 12 inches is yellowish brown channery loam that has yellowish

brown and strong brown mottles. The next 19 inches is yellowish brown very channery loam that has light gray and strong brown mottles. The lower 9 inches is yellowish brown and strong brown very channery loam that has pinkish gray mottles. The substratum is strong brown very channery sandy clay loam about 5 inches thick. It has yellowish brown mottles.

Included with these soils in mapping are the well drained Cateache and Dekalb soils on ridgetops and shoulder slopes and the well drained Guyandotte, Meckesville, Pineville, and Shouns soils in the upper coves, in drainageways, and on benches and foot slopes. Also included are small areas of rock outcrop on ridgetops and side slopes, small areas in drainageways and coves where stones and boulders cover more than 15 percent of the surface, small areas of soils on benches and foot slopes that have slopes of less than 35 percent, and small areas of soils on shoulder slopes and side slopes that are 40 to 60 inches deep over bedrock. Inclusions make up about 20 percent of the unit.

The available water capacity is moderate in the Gilpin soil and low or moderate in the Laidig soil. Permeability is moderate in the Gilpin soil and is slow and moderately slow in the firm layers of the Laidig soil. Runoff is very rapid on both soils. Natural fertility is medium in the Gilpin soil and low in the Laidig soil. The Laidig soil has a seasonal high water table at a depth of about 2.5 to 4.0 feet. Reaction is extremely acid to strongly acid in the Gilpin soil and extremely acid or very strongly acid in the Laidig soil, unless the soils have been limed. Depth to bedrock is 20 to 40 inches in the Gilpin soil and is more than 60 inches in the Laidig soil.

Most areas of these soils are used as woodland. A few have been cleared of trees and are used as pasture.

These soils are not suited to cultivated crops or hay and are difficult to manage for pasture. The slope and the stones limit the use of farm machinery. The very severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on these soils. Plant competition is a management concern on the Gilpin soil. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition. Seedling mortality is a management concern on south aspects of the Gilpin soil. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate.

The slope is a severe limitation affecting the operability of equipment and the construction of haul roads, skid roads, and log landings on these soils. Building haul roads, skid roads, and log landings in the included areas of the less sloping soils helps to overcome the slope. Rock outcrop hinders construction in some areas. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. The hazard of erosion is severe. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; leaving wide filter strips beside streams; and seeding roads and landings to grasses and legumes when they are no longer being used. Conventional skidder logging techniques are not recommended on slopes of more than 55 percent. Specialized equipment or management techniques, such as cable yarding, are needed when timber is harvested in these areas.

The dominant plant communities in the overstory on the Gilpin soil are white oak, red oak, chestnut oak, hickory, and American beech. The dominant plant communities in the understory are American beech, witchhazel, red maple, sassafras, striped maple, sweet birch, and mountain laurel, and those in the ground cover are greenbrier and ferns. The dominant plant communities in the overstory on the Laidig soil are red oak, yellow-poplar, sugar maple, and white oak. The dominant plant communities in the understory are American beech, red maple, striped maple, and rhododendron, and those in the ground cover are stinging nettles and ramps.

The slope and the stones are severe limitations affecting recreational development. The slope, the depth to bedrock, and the wetness are the main limitations on sites for dwellings and septic tank absorption fields. In places the bedrock underlying the Gilpin soil hinders excavation, even though it generally is rippable. These soils generally are not suited to most urban uses. A suitable alternative site should be selected. If the vegetative cover is removed, establishing a protective plant cover in unprotected areas and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is VIIs. The woodland ordination symbol is 4R.

ItF—Itmann channery loam, very steep

This soil is very deep and somewhat excessively drained. It formed mostly in coal and high-carbon shale. It generally is in valley fills and on the steep and very steep side slopes close to active mining operations in the communities of Bolair and Erbacon. Most areas of this soil have been covered with 12 to 20 inches of natural soil material during reclamation. Slope ranges from 8 to 70 percent but is dominantly 35 to 70 percent.

Typically, the surface layer is dark yellowish brown channery loam about 14 inches thick. The substratum extends to a depth of more than 65 inches. The upper 41 inches is black extremely channery sandy loam. The next 10 inches is black very channery sandy loam. Carbolith fragments make up more than 50 percent of the total content of rock fragments.

Included with this soil in mapping are a few small areas of the well drained Cedarcreek, Gilpin, Kaymine, and Laidig soils and well drained Udorthents. Also included are a few small areas of soils that are less than 20 inches deep over bedrock, areas that have not been covered with natural soil material, areas that have more than 20 inches of natural soil material covering the surface, and areas where 15 to 75 percent of the surface is covered with stones and boulders. Inclusions make up about 20 percent of the unit.

The available water capacity is low or moderate in the Itmann soil. Permeability is moderately rapid and rapid in the substratum. Runoff is very rapid. Natural fertility is very low. Reaction is extremely acid to strongly acid, unless the soil has been limed. Depth to bedrock is more than 60 inches.

Most areas of this soil are used as wildlife habitat. Reclaimed areas have been seeded to sericea lespedeza, fescue, birdsfoot trefoil, white pine, and scotch pine. The soil is not suited to cultivated crops, hay, or pasture.

The potential productivity for trees is low on this soil. American sycamore, birch, and yellow-poplar are naturally invading some areas of the soil. None of the trees in the unit are large enough to be harvested. Seedling mortality is a management concern. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate. The growth of native trees and planted seedlings is slow because of the low fertility level.

The slope and differential settling are the main limitations on sites for dwellings and septic tank absorption fields. Onsite investigation is necessary to determine if the limitations that affect urban uses can be overcome. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is VIIs. This soil has not been assigned a woodland ordination symbol.

KaF—Kaymine very channery silt loam, very steep, extremely stony

This soil is very deep and well drained. It generally is on mountain side slopes and foot slopes that have been disturbed by contour surface mine operations. A few areas on ridgetops have been mined using mountaintop removal methods. The soil is in areas throughout the county. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the soil. Slope ranges from 3 to 80 percent but is dominantly 35 to 70 percent.

Typically, the surface layer is dark grayish brown very channery silt loam about 7 inches thick. The substratum extends to a depth of more than 65 inches. The upper 17 inches is brown very channery silt loam. The next 12 inches is yellowish brown very channery silt loam that has brown lithochromic mottles. The next 29 inches is dark grayish brown extremely channery silt loam.

Included with this soil in mapping are a few small areas of the somewhat excessively drained Itmann soils, the well drained Gilpin, Laidig, and Pineville soils, and well drained Udorthents. Also included are a few small areas of soils that are shallow, moderately deep, or deep; areas of surface mined soils having vertical highwalls that are 20 to 80 feet or more in height; small areas of rubble land on outslopes; and areas of soils that have slopes of less than 35 percent or more than 75 percent. Inclusions make up about 25 percent of the unit.

The available water capacity is low to high in the Kaymine soil. Permeability is moderate and moderately rapid in the substratum. Runoff is very rapid. Natural fertility is medium or high. Reaction is moderately acid to neutral. Depth to bedrock is more than 60 inches.

Most areas of this soil are used as wildlife habitat. Reclaimed areas have been seeded to sericea lespedeza, fescue, birdsfoot trefoil, or black locust. Many areas are reverting to woodland.

Because of the stones, this soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The slope and the stones limit the use of farm machinery. If the soil is pastured, the very severe hazard of erosion in unprotected areas and

overgrazing in pastured areas are the major management concerns. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil, but only a small acreage is wooded. The soil is suited to both coniferous and deciduous trees. Planted tree species commonly include black locust and eastern white pine. Species that naturally invade this soil include red maple, sassafras, sweet birch, cucumbertree, and hemlock. Seedling mortality and plant competition are management concerns. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The slope and the stones and boulders are the main limitations on sites for dwellings and septic tank absorption fields. Onsite investigation is necessary to determine if the limitations that affect urban uses can be overcome. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is VIIs. The woodland ordination symbol is 4R.

LaC—Laidig channery silt loam, 8 to 15 percent slopes

This soil is very deep, strongly sloping, and well drained. It is on foot slopes and along drainageways, mainly in the southwestern part of the county.

Typically, the surface layer is very dark grayish brown channery silt loam about 4 inches thick. The subsoil extends to a depth of about 60 inches. The upper 8 inches is dark yellowish brown channery silt loam. The next 8 inches is yellowish brown channery silt loam. The next 12 inches is yellowish brown channery loam that has yellowish brown and strong brown mottles. The next 19 inches is yellowish brown very channery loam that has light gray and strong brown mottles. The lower 9 inches is yellowish brown and strong brown very channery loam that has pinkish gray mottles. The substratum is strong brown very channery sandy clay loam about 5 inches thick. It has yellowish brown mottles.

Included with this soil in mapping are a few small areas of the well drained Gilpin soils and the moderately well drained Cotaco soils. Also included are a few small areas of poorly drained soils, areas of soils that do not have a channery surface layer, areas where 1 to 3 percent of the surface is covered with stones, and areas of soils that have slopes of less than 8 percent or more than 15 percent. Inclusions make up about 25 percent of the unit.

The available water capacity is low or moderate in the Laidig soil. Permeability is slow and moderately slow in the firm layers of the subsoil. Runoff is rapid. Natural fertility is low. A seasonal high water table is at a depth of about 2.5 to 4.0 feet. Reaction is extremely acid or very strongly acid, unless the soil has been limed. Depth to bedrock is more than 60 inches.

Most areas of this soil are used for hay or pasture or as sites for community development. A few are used as woodland.

This soil is suited to cultivated crops, hay, and pasture. The severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. If the soil is cultivated, applying a system of conservation tillage, including hay in the conservation cropping sequence, and returning crop residue to the soil help to control erosion and maintain fertility and tilth. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil, but only a small acreage is wooded. Tree species include yellow-poplar, red oak, white oak, and American beech. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The slope and low strength are limitations affecting the location of log landings. Locating log landings in the included areas of less sloping soils helps to overcome the slope. The formation of ruts is a severe limitation during wet periods unless the surface is strengthened by adding gravel. Leaving wide filter strips beside streams and seeding log landings with grasses and legumes when they are no longer being used help to control erosion and sedimentation.

The slope is a severe limitation on sites for playgrounds. The slope and the slow permeability in the subsoil are limitations in camp areas and picnic areas. Hiking trails can be built on this soil, but a surface drainage system is needed to help control erosion.

The slope and the wetness are the main limitations on sites for dwellings. The slow permeability and the wetness are the main limitations on sites for septic tank absorption fields. Because of the slope, sites for roads, dwellings, and other structures require additional grading. Selecting included areas of less sloping soils for development and designing dwellings so that they conform to the natural slope of the land help to overcome the slope. Sealing foundation walls, installing foundation drains, backfilling with porous materials, and installing diversions that intercept water from the higher areas help to keep basements dry. Constructing the septic tank absorption field on the contour, installing a larger than normal absorption field, and installing diversions that intercept water from the higher areas improve the capacity of the absorption field to absorb effluent. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is IIIe. The woodland ordination symbol is 4A.

LaD—Laidig channery silt loam, 15 to 25 percent slopes

This soil is very deep, moderately steep, and well drained. It is on foot slopes and along drainageways, mainly in the southwestern part of the county.

Typically, the surface layer is very dark grayish brown channery silt loam about 4 inches thick. The subsoil extends to a depth of about 60 inches. The upper 8 inches is dark yellowish brown channery silt loam. The next 8 inches is yellowish brown channery silt loam. The next 12 inches is yellowish brown channery loam that has yellowish brown and strong brown mottles. The next 19 inches is yellowish brown very channery loam that has light gray and strong brown mottles. The lower 9 inches is yellowish brown and strong brown very channery loam that has pinkish gray mottles. The substratum is strong brown very channery sandy clay loam about 5 inches thick. It has yellowish brown mottles.

Included with this soil in mapping are a few small areas of the well drained Gilpin and Pineville soils, well drained Udorthents, and the moderately well drained Cotaco soils. Also included are a few small areas of poorly drained soils, areas of soils that do not have a channery surface layer, areas where 1 to 3 percent of the surface is covered with stones, and areas where the slopes are less than 15 percent or more than 25 percent. Inclusions make up about 25 percent of the unit.

The available water capacity is low or moderate in the Laidig soil. Permeability is slow and moderately slow in the firm layers of the subsoil. Runoff is rapid. Natural fertility is low. A seasonal high water table is at a depth of about 2.5 to 4.0 feet. Reaction is extremely acid or very strongly acid, unless the soil has been limed. Depth to bedrock is more than 60 inches.

Most areas of this soil are used for hay or pasture or as sites for community development. A few are used as woodland.

This soil has limited suitability for cultivated crops. It is better suited to hay and pasture. The severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. If the soil is cultivated, applying a system of conservation tillage, including hay in the conservation cropping sequence, growing crops in contour strips, and returning crop residue to the soil help to control erosion and maintain fertility and tilth. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil, but only a small acreage is wooded. Tree species include yellow-poplar, red oak, white oak, and American beech. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The slope is a severe limitation affecting the location of log landings. Locating log landings in the included areas of less sloping soils helps to overcome the slope. The formation of ruts is a severe limitation during wet periods unless the surface is strengthened by adding gravel. Leaving wide filter strips beside streams and seeding log landings with grasses and legumes when they are no longer being used help to control erosion and sedimentation.

The slope is a severe limitation in camp areas and picnic areas and on playgrounds. Hiking trails can be built on this soil, but a surface drainage system is needed to help control erosion.

The slope is the main limitation on sites for dwellings. The slope, the slow permeability, and the wetness are the main limitations on sites for septic tank absorption fields. Because of the slope, sites for roads, dwellings, and other structures require additional grading. Selecting the included areas of less sloping soils for development and designing dwellings so that they conform to the natural slope of the land help to overcome the slope. Sealing foundation walls, installing foundation drains, backfilling with porous

materials, and installing diversions that intercept water from the higher areas help to keep basements dry. Constructing septic tank absorption fields in the included areas of less sloping soils, installing a larger than normal absorption field, constructing the absorption area on the contour, and installing diversions that intercept water from the higher areas improve the capacity of the absorption field to absorb effluent. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is IVe. The woodland ordination symbol is 4R.

LdC—Laidig channery silt loam, 3 to 15 percent slopes, extremely stony

This soil is very deep, gently sloping to strongly sloping, and well drained. It is on foot slopes, along drainageways, on benches, and in coves throughout the county. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the soil.

Typically, the surface layer is very dark grayish brown channery silt loam about 4 inches thick. The subsoil extends to a depth of about 60 inches. The upper 8 inches is dark yellowish brown channery silt loam. The next 8 inches is yellowish brown channery silt loam. The next 12 inches is yellowish brown channery loam that has yellowish brown and strong brown mottles. The next 19 inches is yellowish brown very channery loam that has light gray and strong brown mottles. The lower 9 inches is yellowish brown and strong brown very channery loam that has pinkish gray mottles. The substratum is strong brown very channery sandy clay loam about 5 inches thick. It has yellowish brown mottles.

Included with this soil in mapping are a few small areas of the well drained Gilpin and Pineville soils, well drained Udorthents, and the moderately well drained Cotaco soils. Also included are a few small areas where less than 3 percent or more than 15 percent of the surface is covered with stones and areas of soils that have slopes of more than 15 percent. Inclusions make up about 20 percent of the unit.

The available water capacity is low or moderate in the Laidig soil. Permeability is slow and moderately slow in the firm layers of the subsoil. Runoff is medium or rapid. Natural fertility is low. A seasonal high water table is at a depth of about 2.5 to 4.0 feet. Reaction is extremely acid or very strongly acid, unless the soil has been limed. Depth to bedrock is more than 60 inches.

Most areas of this soil are used as woodland. A few have been cleared of trees and are used for hay or pasture or as sites for community development.

Because of the stones, this soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The stones limit the use of farm machinery. The severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil. The stones and low strength are limitations affecting the construction of haul roads and skid roads. Building haul roads and skid roads in the included areas of soils that are not so stony helps to overcome the stoniness. The stones, the low strength, and the slope are limitations affecting the location of log landings. Building log landings in the included areas of soils that are not so stony and are less sloping helps to overcome the stoniness and the slope. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; leaving wide filter strips beside streams; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are red oak, sugar maple, American beech, and yellow-poplar. The dominant plant communities in the understory are sugar maple and American beech. The dominant plant community in the ground cover is ferns.

The stoniness is a severe limitation affecting recreational development. Hiking trails can be built on this soil, but a surface drainage system is needed to help control erosion.

The slope and the wetness are the main limitations on sites for dwellings. The slow permeability and the wetness are the main limitations on sites for septic tank absorption fields. Because of the slope, sites for roads, dwellings, and other structures require additional grading. Selecting the included areas of less sloping soils for development and designing dwellings so that they conform to the natural slope of the land help to overcome the slope. Sealing foundation walls, installing foundation drains, backfilling with porous materials, and installing diversions that intercept water

from the higher areas help to keep basements dry. Constructing the septic tank absorption field on the contour, installing a larger than normal absorption field, and installing diversions to intercept water from the higher areas improve the capacity of the absorption field to absorb effluent. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is VIIs. The woodland ordination symbol is 4A.

LdE—Laidig channery silt loam, 15 to 35 percent slopes, extremely stony

This soil is very deep, moderately steep and steep, and well drained. It is on foot slopes, along drainageways, and on benches throughout the county. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the soil.

Typically, the surface layer is very dark grayish brown channery silt loam about 4 inches thick. The subsoil extends to a depth of about 60 inches. The upper 8 inches is dark yellowish brown channery silt loam. The next 8 inches is yellowish brown channery silt loam. The next 12 inches is yellowish brown channery loam that has yellowish brown and strong brown mottles. The next 19 inches is yellowish brown very channery loam that has light gray and strong brown mottles. The lower 9 inches is yellowish brown and strong brown very channery loam that has pinkish gray mottles. The substratum is strong brown very channery sandy clay loam about 5 inches thick. It has yellowish brown mottles.

Included with this soil in mapping are a few small areas of the well drained Dekalb, Gilpin, Guyandotte, and Pineville soils and well drained Udorthents. Also included are a few small areas of moderately well drained soils, areas where less than 3 percent or more than 15 percent of the surface is covered with stones, and areas where the slopes are less than 15 percent or more than 35 percent. Inclusions make up about 20 percent of the unit.

The available water capacity is low or moderate in the Laidig soil. Permeability is slow and moderately slow in the firm layers of the subsoil. Runoff is rapid or very rapid. Natural fertility is low. A seasonal high water table is at a depth of about 2.5 to 4.0 feet. Reaction is extremely acid or very strongly acid, unless the soil has been limed. Depth to bedrock is more than 60 inches.

Most areas of this soil are used as woodland. A few have been cleared of trees and are used as pasture or as sites for community development.

Because of the stones, this soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The slope and the stones limit the use of farm machinery. The very severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil. The slope is a limitation affecting the operability of equipment and the location of log landings. The slope, the stones, and low strength are limitations affecting the construction of haul roads and skid roads. Building haul roads and skid roads in the included areas of less sloping soils helps to overcome the slope. Building haul roads and skid roads in the included areas of soils that are not so stony helps to overcome the stoniness. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. The hazard of erosion is moderate. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; leaving wide filter strips beside streams; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are red oak, white oak, yellow-poplar, American beech, and sugar maple. The dominant plant communities in the understory are sugar maple, American beech, and rhododendron. The dominant plant community in the ground cover is ferns.

The slope and the stones are severe limitations affecting recreational development. The 15 to 25 percent slope is a moderate limitation on hiking trails. Trails can be built on this soil, but a surface drainage system is needed to help control erosion.

The slope is the main limitation on sites for dwellings. The slope, the slow permeability, and the wetness are the main limitations on sites for septic tank absorption fields. This soil generally is not suited to most urban uses. A suitable alternative site should be selected. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is VIIs. The woodland ordination symbol is 4R.

LgE—Laidig channery silt loam, 8 to 35 percent slopes, rubbly

This soil is very deep, strongly sloping to steep, and well drained. It is on foot slopes, along drainageways, on benches, and on head slopes near mountaintops, mainly in the eastern half of the county. Stones that are 10 to 24 inches in diameter cover 15 to 75 percent of the surface of the soil.

Typically, the surface layer is very dark grayish brown channery silt loam about 4 inches thick. The subsoil extends to a depth of about 60 inches. The upper 8 inches is dark yellowish brown channery silt loam. The next 8 inches is yellowish brown channery silt loam. The next 12 inches is yellowish brown channery loam that has yellowish brown and strong brown mottles. The next 19 inches is yellowish brown very channery loam that has light gray and strong brown mottles. The lower 9 inches is yellowish brown and strong brown very channery loam that has pinkish gray mottles. The substratum is strong brown very channery sandy clay loam about 5 inches thick. It has yellowish brown mottles.

Included with this soil in mapping are a few small areas of the well drained Craigsville, Gilpin, Guyandotte, Mandy, and Pineville soils and well drained Udorthents. Also included are a few small areas of moderately well drained to poorly drained soils, areas having seeps and springs, areas of soils where the content of rock fragments in the control section is more than 35 percent, areas where less than 15 percent of the surface is covered with stones and boulders, and areas of soils that have slopes of less than 8 percent. Inclusions make up about 25 percent of the unit.

The available water capacity is low or moderate in the Laidig soil. Permeability is slow and moderately slow in the firm layers of the subsoil. Runoff is rapid or very rapid. Natural fertility is low. A seasonal high water table is at a depth of about 2.5 to 4.0 feet. Reaction is extremely acid or very strongly acid, unless the soil has been limed. Depth to bedrock is more than 60 inches.

All areas of this soil are used as woodland. The soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The slope and the stones and boulders limit the use of farm machinery. The very severe hazard of erosion in unprotected areas is a major management concern.

The potential productivity for trees is moderately high on this soil. Seedling mortality and plant competition are management concerns. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The slope and the stones and boulders are limitations affecting the operability of equipment and the location of log landings on this soil. Building log landings in the included areas of soils that are not so stony and are less sloping helps to overcome these limitations. The stones and boulders are severe limitations affecting the construction of haul roads and skid roads. Building haul roads and skid roads in the included areas of soils that are not so stony helps to overcome the stoniness. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. The hazard of erosion is moderate. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; leaving wide filter strips beside streams; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are yellow-poplar, basswood, red oak, sugar maple, hemlock, and sweet birch. The dominant plant communities in the understory are rhododendron, American beech, and sweet birch, and those in the ground cover are ferns and nettles.

The slope and the stones and boulders are severe limitations affecting recreational development. They are also the main limitations on sites for dwellings. The wetness, the slow permeability, the slope, and the stones and boulders are the main limitations on sites for septic tank absorption fields. In areas where stones and boulders cover 50 percent or more of the surface, excavating and disposing of large fragments is difficult. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation. This soil generally is not suited to most urban uses. A suitable alternative site should be selected.

The capability subclass is VIIs. The woodland ordination symbol is 4R.

MaC—Mandy channery silt loam, 3 to 15 percent slopes, extremely stony

This soil is gently sloping to strongly sloping and is well drained. It is on ridgetops in the southeastern and

eastern parts of the county. It generally is at elevations of more than 3,400 feet. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the soil.

Typically, the surface layer is dark brown channery silt loam about 2 inches thick. The subsoil extends to a depth of about 24 inches. The upper 5 inches is dark yellowish brown channery silt loam. The lower 17 inches is yellowish brown very channery silt loam. The substratum is yellowish brown extremely channery silt loam about 10 inches thick. Weathered siltstone bedrock is at a depth of about 34 inches.

Included with this soil in mapping are a few small areas of the well drained Gauley soils and the moderately well drained Simoda and Snowdog soils. Also included are a few small areas of soils where the content of rock fragments in the control section is less than 35 percent and areas where less than 3 percent of the surface is covered with stones. Inclusions make up about 20 percent of the unit.

The available water capacity is very low or low in the Mandy soil. Permeability is moderate. Runoff is medium or rapid. Natural fertility is low. Reaction is extremely acid or very strongly acid, unless the soil has been limed. Depth to bedrock ranges from 20 to 40 inches.

Most areas of this soil are used as woodland. They are in the Monongahela National Forest. The soil has low potential for any development other than woodland.

Because of the stones, this soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The stones limit the use of farm machinery. The severe hazard of erosion in unprotected areas is a major management concern.

The potential productivity for trees is moderately high on this soil. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The stones and the depth to bedrock are limitations affecting the construction of haul roads and skid roads on this soil. The stones, the depth to bedrock, and the slope are limitations affecting the location of log landings. Building haul roads and skid roads in the included areas of soils that are not so stony and are less sloping helps to overcome the stoniness and the slope. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are American beech, yellow birch, black cherry, red maple, sugar maple, mountain magnolia, cucumbertree magnolia, and hemlock. The dominant plant communities in the understory are American beech, striped maple, red maple, fire cherry, yellow birch, and sugar maple, and those in the ground cover are greenbrier, ferns, and clubmoss.

The stoniness is a severe limitation in camp areas and picnic areas and on playgrounds. Hiking trails can be built on this soil, but a surface drainage system is needed to help control erosion.

The depth to bedrock and the slope are the main limitations on sites for dwellings and septic tank absorption fields. In places the bedrock hinders excavation, even though it generally is rippable. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation. Because this soil is located in the Monongahela National Forest, the potential for urban development is limited.

The capability subclass is VIIs. The woodland ordination symbol is 4A.

MaE—Mandy channery silt loam, 15 to 35 percent slopes, extremely stony

This soil is moderately deep, moderately steep and steep, and well drained. It is on ridgetops and side slopes in the southeastern and eastern parts of the county. It generally is at elevations of more than 3,400 feet. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the soil.

Typically, the surface layer is dark brown channery silt loam about 2 inches thick. The subsoil extends to a depth of about 24 inches. The upper 5 inches is dark yellowish brown channery silt loam. The lower 17 inches is yellowish brown very channery silt loam. The substratum is yellowish brown extremely channery silt loam about 10 inches thick. Weathered siltstone bedrock is at a depth of about 34 inches.

Included with this soil in mapping are a few small areas of the well drained Gauley and Laidig soils and the moderately well drained Snowdog soils. Also included are a few small areas of soils that are more than 40 inches deep over bedrock, areas of soils where the content of rock fragments in the control section is less than 35 percent, areas where less than 3 percent of the surface is covered with stones, and areas where the slopes are less than 15 percent or

more than 35 percent. Inclusions make up about 20 percent of the unit.

The available water capacity is very low or low in the Mandy soil. Permeability is moderate. Runoff is rapid or very rapid. Natural fertility is low. Reaction is extremely acid or very strongly acid, unless the soil has been limed. Depth to bedrock ranges from 20 to 40 inches.

Most areas of this soil are used as woodland. They are in the Monongahela National Forest. The soil has low potential for any development other than woodland.

Because of the stones, this soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The slope and the stones limit the use of farm machinery. The very severe hazard of erosion is a major management concern in unprotected areas.

The potential productivity for trees is moderately high on this soil. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The slope is a limitation affecting the operability of equipment and the location of log landings on this soil. The slope, the stones, and the depth to bedrock are limitations affecting the construction of haul roads and skid roads. Building haul roads, skid roads, and log landings in the included areas of soils that are not so stony and are less sloping helps to overcome the stoniness and the slope. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. The hazard of erosion is moderate. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are American beech, yellow birch, black cherry, red maple, sugar maple, mountain magnolia, cucumbertree magnolia, and hemlock. The dominant plant communities in the understory are American beech, striped maple, red maple, fire cherry, yellow birch, and sugar maple, and those in the ground cover are greenbrier, ferns, and clubmoss.

The slope and the stones are severe limitations affecting recreational development. The 15 to 25 percent slope is a moderate limitation on hiking trails. Trails can be built on this soil, but a surface drainage system is needed to help control erosion.

The slope and the depth to bedrock are the main limitations on sites for dwellings and septic tank absorption fields. In places the bedrock hinders excavation, even though it generally is rippable. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation. Because this soil is located in the Monongahela National Forest, the potential for urban development is limited.

The capability subclass is VIIs. The woodland ordination symbol is 4R.

MaF—Mandy channery silt loam, 35 to 55 percent slopes, extremely stony

This soil is moderately deep, very steep, and well drained. It is on side slopes and benches in the southeastern and eastern parts of the county. It generally is at elevations of more than 3,400 feet. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the soil.

Typically, the surface layer is dark brown channery silt loam about 2 inches thick. The subsoil extends to a depth of about 24 inches. The upper 5 inches is dark yellowish brown channery silt loam. The lower 17 inches is yellowish brown very channery silt loam. The substratum is yellowish brown extremely channery silt loam about 10 inches thick. Weathered siltstone bedrock is at a depth of about 34 inches.

Included with this soil in mapping are a few small areas of the well drained Gauley and Laidig soils and the moderately well drained Snowdog soils. Also included are a few small areas of soils that are more than 40 inches deep over bedrock, areas of soils where the content of rock fragments in the control section is less than 35 percent, areas where less than 3 percent of the surface is covered with stones, and areas of soils that have slopes of less than 35 percent or more than 55 percent. Inclusions make up about 25 percent of the unit.

The available water capacity is very low or low in the Mandy soil. Permeability is moderate in the subsoil. Runoff is very rapid. Natural fertility is low. Reaction is extremely acid or very strongly acid, unless the soil has been limed. Depth to bedrock ranges from 20 to 40 inches.

Most areas of this soil are used as woodland. They are in the Monongahela National Forest. The soil has low potential for any development other than woodland.

Because of the stones, this soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The slope and the stones limit the use of farm

machinery. The very severe hazard of erosion in unprotected areas is a major management concern.

The potential productivity for trees is moderately high on this soil. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The slope is a severe limitation affecting the operability of equipment and the construction of haul roads, skid roads, and log landings on this soil. Building haul roads and skid roads in the included areas of the less sloping soils helps to overcome the slope. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. The hazard of erosion is severe. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are American beech, yellow birch, black cherry, red maple, sugar maple, mountain magnolia, cucumbertree magnolia, and hemlock. The dominant plant communities in the understory are American beech, striped maple, red maple, fire cherry, yellow birch, and sugar maple, and those in the ground cover are greenbrier, ferns, and clubmoss.

The slope and the stones are severe limitations affecting recreational development. The slope and the depth to bedrock are the main limitations on sites for dwellings and septic tank absorption fields. In places the bedrock hinders excavation, even though it generally is rippable. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation. Because this soil is located in the Monongahela National Forest, the potential for urban development is limited.

The capability subclass is VIIs. The woodland ordination symbol is 4R.

MaG—Mandy channery silt loam, 55 to 70 percent slopes, extremely stony

This soil is moderately deep, very steep, and well drained. It is on side slopes in the southeastern and eastern parts of the county. It generally is at elevations of more than 3,400 feet. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the soil.

Typically, the surface layer is dark brown channery silt loam about 2 inches thick. The subsoil extends to a depth of about 24 inches. The upper 5 inches is dark yellowish brown channery silt loam. The lower 17 inches is yellowish brown very channery silt loam. The substratum is yellowish brown extremely channery silt loam about 10 inches thick. Weathered siltstone bedrock is at a depth of about 34 inches.

Included with this soil in mapping are a few small areas of soils that are more than 40 inches deep over bedrock, areas of soils where the content of rock fragments in the control section is less than 35 percent, areas where less than 3 percent of the surface is covered with stones, and areas of soils that have slopes of less than 55 percent. Inclusions make up about 15 percent of the unit.

The available water capacity is very low or low in the Mandy soil. Permeability is moderate in the subsoil. Runoff is very rapid. Natural fertility is low. Reaction is extremely acid or very strongly acid, unless the soil has been limed. Depth to bedrock ranges from 20 to 40 inches.

All areas of this soil are used as woodland. They are in the Monongahela National Forest. The soil has low potential for any development other than woodland.

Because of the stones, this soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The slope and the stones limit the use of farm machinery. The very severe hazard of erosion in unprotected areas is a major management concern.

The potential productivity for trees is moderately high on this soil. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The slope is a severe limitation affecting the operability of equipment and the construction of haul roads, skid roads, and log landings on this soil. Building haul roads and skid roads in the included areas of the less sloping soils helps to overcome the slope. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. The hazard of erosion is severe. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being

used. Conventional skidder logging techniques are not recommended on slopes of more than 55 percent. Specialized equipment or management techniques, such as cable yarding, are needed when timber is harvested in these areas.

The dominant plant communities in the overstory on this soil are American beech, yellow birch, black cherry, red maple, sugar maple, mountain magnolia, cucumbertree magnolia, and hemlock. The dominant plant communities in the understory are American beech, striped maple, red maple, fire cherry, yellow birch, and sugar maple, and those in the ground cover are greenbrier, ferns, and clubmoss.

The slope and the stones are severe limitations affecting recreational development. The slope and the depth to bedrock are the main limitations on sites for dwellings and septic tank absorption fields. In places the bedrock hinders excavation, even though it generally is rippable. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation. Because this soil is located in the Monongahela National Forest, the potential for urban development is limited.

The capability subclass is VIIs. The woodland ordination symbol is 4R.

MkE—Meckesville silt loam, 15 to 35 percent slopes, extremely stony

This soil is very deep, moderately steep and steep, and well drained. It is on foot slopes and benches in the central part of the county. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the soil.

Typically, the surface layer is dark brown silt loam about 3 inches thick. The subsoil extends to a depth of about 65 inches. The upper 12 inches is reddish brown silt loam. The next 14 inches is yellowish red silt loam. The next 7 inches is yellowish red channery silt loam. The lower 29 inches is reddish brown channery loam that has reddish gray and strong brown mottles.

Included with this soil in mapping are a few small areas of the well drained Cateache, Laidig, and Shouns soils. Also included are a few small areas where less than 3 percent of the surface is covered with stones and areas of soils that have slopes of less than 15 percent. Inclusions make up about 15 percent of the unit.

The available water capacity is moderate in the Meckesville soil. Permeability is moderately slow in the lower, firm part of the subsoil. Runoff is rapid or very rapid. Natural fertility is medium. A seasonal high water table is at a depth of about 2.5 to 4.0 feet. Reaction is very strongly acid or strongly acid, unless the soil has been limed. Depth to bedrock is more than 60 inches.

Most areas of this soil are used as woodland. A few have been cleared of trees and are used for hay or pasture.

Because of the stones, this soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The slope and the stones limit the use of farm machinery. The very severe hazard of erosion in unprotected areas is a major management concern.

The potential productivity for trees is moderately high on this soil. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The slope is a limitation affecting the operability of equipment and the location of log landings on this soil. The slope, the stones, and low strength are limitations affecting the construction of haul roads and skid roads. Building haul roads, skid roads, and log landings in the included areas of soils that are not so stony and are less sloping helps to overcome the stoniness and the slope. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. The hazard of erosion is moderate. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; leaving wide filter strips beside streams; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are yellow-poplar, American beech, black birch, sugar maple, and red oak. The dominant plant communities in the understory are fire cherry, dogwood, yellow-poplar, and American beech, and those in the ground cover are Boston fern, trout lily, witchhazel, and blue beech.

The slope and the stones are severe limitations affecting recreational development. The 15 to 25 percent slope is a moderate limitation on hiking trails. Trails can be built on this soil, but a surface drainage system is needed to help control erosion.

The slope is the main limitation on sites for dwellings. The slope, the wetness, and the moderately slow permeability are the main limitations on sites for septic tank absorption fields. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation. This soil generally is not

suited to most urban uses. A suitable alternative site should be selected.

The capability subclass is VIIs. The woodland ordination symbol is 5R.

Pe—Philo-Pope complex

This map unit consists of very deep, nearly level, well drained and moderately well drained soils on narrow flood plains along low gradient streams. It is mostly in the western part of the county. It is subject to occasional flooding. Slope ranges from 0 to 3 percent. The unit is about 50 percent Philo soil and 35 percent Pope soil. The soils occur as areas so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Philo soil is very dark grayish brown loam about 9 inches thick. The subsoil extends to a depth of about 30 inches. The upper 9 inches is dark yellowish brown loam. The lower 12 inches is dark yellowish brown loam that has grayish brown and strong brown mottles. The substratum extends to a depth of about 65 inches. The upper 6 inches is dark brown sandy loam that has yellowish red and grayish brown mottles. The lower 29 inches is dark yellowish brown very gravelly sandy loam that has grayish brown and strong brown mottles.

Typically, the surface layer of the Pope soil is dark grayish brown loam about 4 inches thick. The subsoil extends to a depth of about 47 inches. The upper 11 inches is dark yellowish brown loam. The lower 32 inches is dark yellowish brown fine sandy loam. The substratum is dark yellowish brown fine sandy loam about 18 inches thick.

Included with these soils in mapping are a few small areas of the somewhat excessively drained Potomac soils, the well drained Chavies and Craigsville soils, the moderately well drained Cotaco soils, and the poorly drained Atkins and Elkins soils. Also included are a few small areas of soils that have a thin surface layer. Inclusions make up about 15 percent of the unit.

The available water capacity is moderate or high in the Philo and Pope soils. Permeability is moderate in the subsoil of the Philo soil and moderate and moderately rapid in the subsoil of the Pope soil. Runoff is slow on both soils. Natural fertility is medium. The Philo soil has a seasonal high water table at a depth of about 1.5 to 3.0 feet. The water table restricts the rooting depth of some plants. Reaction is very strongly acid to moderately acid in the Philo soil and extremely acid to strongly acid in the Pope soil. Depth to bedrock is more than 60 inches in both soils.

Most areas of these soils are used for cultivated crops, hay, or pasture or as sites for community development. A few are used as woodland.

These soils are suited to cultivated crops, hay, and pasture. Applying a system of conservation tillage, including hay in the conservation cropping sequence, and returning crop residue to the soils help to maintain fertility and tilth in cultivated areas. In places crops are subject to damage caused by flooding. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity is moderately high or high for trees on these soils, but only a small acreage is wooded. Tree species include American beech, sugar maple, yellow birch, and black cherry. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

Some areas of these soils are used as log landings. The formation of ruts is a severe limitation unless the surface is strengthened by adding gravel. Leaving wide filter strips beside streams and seeding grasses and legumes on landings when they are no longer being used help to control erosion and sedimentation.

The flooding is a severe limitation in camp areas on these soils. The wetness limits the development of picnic areas on the Philo soil. The flooding and the wetness limit the development of playgrounds on both soils. No major limitations affect the development of hiking trails.

The flooding is the main limitation of these soils on sites for dwellings and septic tank absorption fields. The wetness is an additional limitation on the Philo soil. If the vegetative cover is removed from either soil, establishing a protective plant cover in unprotected areas and installing a surface drainage system help to control erosion and sedimentation. The soils are poorly suited to dwellings and septic tank absorption fields unless they are protected from flooding. A suitable alternative site should be selected.

The capability subclass is IIw. The woodland ordination symbol is 5A in areas of the Philo soil and 4A in areas of the Pope soil.

PgG—Pineville-Gilpin complex, 55 to 70 percent slopes, extremely stony

This map unit consists of very deep and moderately deep, very steep, well drained soils on mountain side slopes in the Monongahela National Forest, mainly along the Cranberry and Williams Rivers. The soils

occur as areas so intermingled that it was not practical to map them separately. The unit is about 40 percent Pineville soil and 35 percent Gilpin soil. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the unit.

Typically, the surface layer of the Pineville soil is very dark brown channery loam about 5 inches thick. The subsoil extends to a depth of about 50 inches. The upper 31 inches is yellowish brown channery loam. The lower 14 inches is yellowish brown very channery loam. The substratum is yellowish brown very channery loam about 15 inches thick.

Typically, the surface layer of the Gilpin soil is very dark grayish brown silt loam about 2 inches thick. The subsoil extends to a depth of about 26 inches. It is yellowish brown channery silt loam. The substratum is yellowish brown channery silt loam about 10 inches thick. Sandstone bedrock is at a depth of about 36 inches.

Included with these soils in mapping are a few small areas of the well drained Dekalb and Laidig soils. Also included are a few small areas of soils where more than 15 percent of the surface is covered with stones and boulders, areas of soils that are 40 to 60 inches deep over bedrock, and areas of soils that have slopes of less than 55 percent. Inclusions make up about 25 percent of the unit.

The available water capacity is moderate or high in the Pineville soil and moderate in the Gilpin soil. Permeability is moderate in the subsoil of both soils. Runoff is very rapid. Natural fertility is medium. Reaction is very strongly acid or strongly acid in the Pineville soil and extremely acid to strongly acid in the Gilpin soil. Depth to bedrock is more than 60 inches in the Pineville soil and ranges from 20 to 40 inches in the Gilpin soil.

All areas of these soils are used as woodland. They are in the Monongahela National Forest. The soils have low potential for any development other than woodland.

These soils are not suited to cultivated crops or hay and are difficult to manage for pasture. The slope and the stones limit the use of farm machinery. The very severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity is moderately high for trees on these soils. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition. Seedling mortality is a management concern on south aspects. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate.

The slope is a severe limitation affecting the operability of equipment and the construction of haul roads, skid roads, and log landings on these soils. Building haul roads, skid roads, and log landings in the included areas of the less sloping soils helps to overcome the slope. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. The hazard of erosion is severe. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; leaving wide filter strips beside streams; and seeding roads and landings to grasses and legumes when they are no longer being used. Conventional skidder logging techniques are not recommended on slopes of more than 55 percent. Specialized equipment or management techniques, such as cable yarding, are needed when timber is harvested in these areas.

The dominant plant communities in the overstory on the Pineville soil are red oak, yellow-poplar, American beech, white oak, and sugar maple. The dominant plant communities in the understory are American beech, red maple, sweet birch, dogwood, and serviceberry, and those in the ground cover are ferns and greenbrier. The dominant plant communities in the overstory on the Gilpin soil are red oak, hickory, scarlet oak, chestnut oak, white oak, and American beech. The dominant plant communities in the understory are American beech, red maple, sassafras, mountain laurel, dogwood, and serviceberry, and those in the ground cover are ferns and greenbrier.

The slope and the stones are severe limitations affecting recreational development. The slope is the main limitation on sites for dwellings and septic tank absorption fields. The depth to bedrock is an additional limitation on the Gilpin soil. In places the bedrock underlying the Gilpin soil hinders excavation, even though it generally is rippable. If the vegetative cover is removed from either soil, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation. Because these soils are located in the Monongahela National Forest, the potential for urban development is limited.

The capability subclass is VIIs. The woodland

ordination symbol is 5R in areas of the Pineville soil and 4R in areas of the Gilpin soil.

PLF—Pineville-Gilpin-Guyandotte association, very steep, extremely stony

This map unit consists of very deep and moderately deep, well drained soils on mountain side slopes in the western half of the county. Slopes are long, and the landscape is deeply dissected by numerous drainageways. The unit is about 35 percent Pineville and similar soils, 25 percent Gilpin and similar soils, and 15 percent Guyandotte and similar soils. Typically, the Pineville soil is on middle and lower side slopes and in south-facing coves; the Gilpin soil is on convex, upper and middle side slopes; and the Guyandotte soil is in north-facing coves and on the upper and middle, north-facing side slopes. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the unit. Slope generally ranges from 35 to 70 percent.

Typically, the surface layer of the Pineville soil is very dark brown channery loam about 5 inches thick. The subsoil extends to a depth of about 50 inches. The upper 31 inches is yellowish brown channery loam. The lower 14 inches is yellowish brown very channery loam. The substratum is yellowish brown very channery loam about 15 inches thick.

Typically, the surface layer of the Gilpin soil is very dark grayish brown silt loam about 2 inches thick. The subsoil is yellowish brown channery silt loam about 24 inches thick. The substratum is yellowish brown channery silt loam about 10 inches thick. Sandstone bedrock is at a depth of about 36 inches.

Typically, the surface layer of the Guyandotte soil is black and very dark grayish brown channery silt loam about 19 inches thick. The subsoil is dark yellowish brown very channery silt loam about 36 inches thick. The substratum is dark yellowish brown extremely channery loam about 10 inches thick.

Included with these soils in mapping are the well drained Laidig soils on foot slopes and the lower side slopes; the well drained Dekalb soils on ridgetops, shoulder slopes, and nose slopes; and the well drained Craigsville soils and the somewhat excessively drained Potomac soils at the mouth of hollows and on narrow flood plains. Also included are small areas of rock outcrop on ridgetops and side slopes, areas of soils on ridgetops where the slopes are less than 35 percent, small areas of soils that are 40 to 60 inches deep over bedrock on shoulder slopes and side slopes, and small areas in coves and drainageways and below rock outcrops where more than 15 percent of the surface is covered with stones and boulders. Inclusions make up about 25 of the unit.

The available water capacity is moderate or high in the Pineville soil, moderate in the Gilpin soil, and low to high in the Guyandotte soil. Permeability is moderate in the subsoil of the Pineville and Gilpin soils and moderate and moderately rapid in the subsoil of the Guyandotte soil. Runoff is very rapid on all three soils. Natural fertility is medium. Unless the soils have been limed, the Pineville soil is very strongly acid or strongly acid, the Gilpin soil is extremely acid to strongly acid, and the Guyandotte soil is very strongly acid to neutral in the surface layer and very strongly acid to moderately acid in the subsoil and substratum. The depth to bedrock is more than 60 inches in the Pineville and Guyandotte soils and is 20 to 40 inches in the Gilpin soil.

Most areas of these soils are used as woodland. A few have been cleared of trees and are used as pasture.

These soils are not suited to cultivated crops or hay and are difficult to manage for pasture. The slope and the stones limit the use of farm machinery. The very severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity is moderately high for trees on these soils. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition. Seedling mortality is a management concern on the Guyandotte soil and on south aspects of the Pineville and Gilpin soils. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate.

The slope is a severe limitation affecting the operability of equipment and the construction of haul roads, skid roads, and log landings on these soils. Building haul roads and skid roads in the included areas of the less sloping soils helps to overcome the slope. Rock outcrop hinders construction in some areas. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the

surface is strengthened by adding gravel. The hazard of erosion is severe. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; leaving wide filter strips beside streams; and seeding roads and landings to grasses and legumes when they are no longer being used. Conventional skidder logging techniques are not recommended on slopes of more than 55 percent. Specialized equipment or management techniques, such as cable yarding, are needed when timber is harvested in these areas.

The dominant plant communities in the overstory on the Pineville soil are red oak, yellow-poplar, American beech, black oak, white oak, and sugar maple. The dominant plant communities in the understory are American beech, red maple, sweet birch, dogwood, and serviceberry, and those in the ground cover are ferns, greenbrier, mayapple, bloodroot, trillium, and spikenard. The dominant plant communities in the overstory on the Gilpin soil are red oak, hickory, scarlet oak, chestnut oak, white oak, and American beech. The dominant plant communities in the understory are American beech, red maple, sassafras, mountain laurel, dogwood, and serviceberry, and those in the ground cover are ferns, greenbrier, false Solomons seal, clintonia, white baneberry, and sarsaparilla. The dominant plant communities in the overstory on the Guyandotte soil are red oak, yellow-poplar, basswood, cucumbertree, sugar maple, black locust, black cherry, and white ash. The dominant plant communities in the understory are sugar maple, American beech, sweet birch, and dogwood, and those in the ground cover are ferns, blue cohosh, stinging nettles, ginseng, Dutchmans breeches, bloodroot, trillium, and spikenard.

The slope and the stones are severe limitations affecting recreational development. The slope is the main limitation on sites for dwellings and septic tank absorption fields. The depth to bedrock is an additional limitation on the Gilpin soil. In places the bedrock hinders excavation, even though it generally is rippable. If the vegetative cover is removed from these soils, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation. The soils generally are not suited to most urban uses. A suitable alternative site should be selected.

The capability subclass is VIIs. The woodland ordination symbol is 5R in areas of the Pineville and Guyandotte soils and 4R in areas of the Gilpin soil.

Po—Pope loam

This soil is very deep, nearly level, and well drained. It is on flood plains along high gradient streams throughout the county. It is subject to occasional flooding. Slope ranges from 0 to 3 percent.

Typically, the surface layer is dark grayish brown loam about 4 inches thick. The subsoil extends to a depth of about 47 inches. The upper 11 inches is dark yellowish brown loam. The lower 32 inches is dark yellowish brown fine sandy loam. The substratum is dark yellowish brown fine sandy loam about 18 inches thick.

Included with this soil in mapping are a few small areas of the somewhat excessively drained Potomac soils, the well drained Chavies soils, the moderately well drained Philo soils, and the poorly drained Atkins soils. Also included are a few small areas of sand and gravel bars immediately adjacent to the streams. Inclusions make up about 15 percent of the unit.

The available water capacity is moderate or high in the Pope soil. Permeability is moderate and moderately rapid in the subsoil. Runoff is slow. Natural fertility is medium. Reaction is extremely acid to strongly acid, unless the soil has been limed. Depth to bedrock is more than 60 inches.

Most areas of this soil are used as woodland. Some are used for cultivated crops, hay, or pasture or as sites for community development.

This soil is suited to cultivated crops, hay, and pasture. If the soil is cultivated, applying a system of conservation tillage, including hay in the conservation cropping sequence, and returning crop residue to the soil help to improve the water-holding capacity and maintain fertility and tilth. In places crops are subject to damage caused by flooding. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity for trees is moderately high on this soil. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

The flooding is a hazard affecting the operability of equipment on this soil. Low strength and the flooding are limitations affecting the construction of haul roads, skid roads, and log landings. Building haul roads, skid roads, and log landings in the included areas that are only rarely flooded minimizes the damage caused by flooding. The formation of ruts is a severe limitation on

haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. Management practices that help to control erosion and sedimentation include leaving wide filter strips beside streams and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are yellow-poplar, white oak, red oak, American beech, and black cherry. The dominant plant communities in the understory are American beech, rhododendron, sweet birch, and sugar maple. The dominant plant community in the ground cover is ferns.

The flooding is a hazard in camp areas. It also limits the development of playgrounds. No major limitations affect the development of picnic areas or hiking trails.

The flooding is the main limitation on sites for dwellings and septic tank absorption fields. This soil is poorly suited to dwellings and septic tank absorption fields unless it is protected from flooding. A suitable alternative site should be selected. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

The capability subclass is IIw. The woodland ordination symbol is 4A.

Pp—Pope-Potomac complex, very cobbly

This map unit consists of very deep, nearly level, well drained and somewhat excessively drained soils on narrow flood plains along high gradient streams throughout the county (fig. 3). It is subject to occasional flooding. Slope ranges from 0 to 3 percent. The soils occur as areas so intermingled that it was not practical to map them separately. The unit is about 45 percent Pope soil and 45 percent Potomac soil. Cobbles that are 3 to 10 inches in diameter cover 1 to 3 percent of the surface of the unit.

Typically, the surface layer of the Pope soil is dark grayish brown loam about 4 inches thick. The subsoil extends to a depth of about 47 inches. The upper 11 inches is dark yellowish brown loam. The lower 32 inches is dark yellowish brown fine sandy loam. The substratum is dark yellowish brown fine sandy loam about 28 inches thick.

Typically, the surface layer of the Potomac soil is very dark grayish brown and dark brown gravelly sandy loam about 9 inches thick. The substratum extends to a depth of about 65 inches. The upper 17 inches is dark yellowish brown very gravelly loamy sand. The next 11 inches is dark yellowish brown very gravelly loamy sand. The lower 28 inches is dark yellowish brown extremely cobbly loamy coarse sand.

Included with these soils in mapping are a few small areas of the well drained Chavies and Craigsville soils, the moderately well drained Cotaco and Philo soils, and the poorly drained Atkins and Elkins soils. Also included are a few small areas of sand and gravel bars immediately adjacent to the stream channels. Inclusions make up about 10 percent of the unit.

The available water capacity is moderate or high in the Pope soil and very low or low in the Potomac soil. Permeability is moderate and moderately rapid in the subsoil of the Pope soil and rapid and very rapid in the substratum of the Potomac soil. Runoff is slow on both soils. Natural fertility is medium in the Pope soil and low in the Potomac soil. Unless the soils have been limed, reaction is extremely acid to strongly acid in the Pope soil and very strongly acid in the Potomac soil. Depth to bedrock is more than 60 inches in both soils.

Most areas of these soils are used as woodland. A few have been cleared of trees and are used for hay or pasture or as sites for community development.

These soils are not suited to cultivated crops and hay. They are better suited to pasture. The rock fragments in the surface layer of the Potomac soil limit the use of farm machinery. Droughtiness during dry periods and overgrazing in pastured areas are the major management concerns. In places crops are subject to damage caused by flooding. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity is moderately high for trees on these soils. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition. Seedling mortality is a management concern on the Potomac soil. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner so that full advantage is taken of spring rains reduce the seedling mortality rate.

The flooding is a hazard affecting the operability of equipment and the construction of haul roads, skid roads, and log landings on these soils. Low strength is an additional limitation on the Pope soil. Building haul roads, skid roads, and log landings in the included areas of soils that are only rarely flooded helps to overcome the flooding. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. Management practices that help to control

Figure 3.—Potomac soils along the Elk River in an area of Pope-Potomac complex, very cobbly.

erosion and sedimentation include leaving wide filter strips beside streams and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on the Pope soil are red oak, sugar maple, yellow-poplar, and white oak. The dominant plant communities in the understory are rhododendron, hemlock, and birch. The dominant plant community in the ground cover is ferns. The dominant plant communities in the overstory on the Potomac soil are black birch, yellow birch, magnolia, hemlock, red oak, and sugar maple. The dominant plant communities in the understory are rhododendron, hemlock, and birch. The dominant plant community in the ground cover is ferns.

The flooding is a severe limitation in camp areas. No major limitations affect the development of picnic areas on the Pope soil, but the stones limit

development of picnic areas on the Potomac soil. The flooding is a limitation on sites for playgrounds on the Pope soil, and the stoniness is a severe limitation on sites for playgrounds on the Potomac soil. No major limitations affect the development of hiking trails on either soil.

The flooding is the main limitation of both soils on sites for dwellings and septic tank absorption fields. The moderately rapid permeability in the Potomac soil is an additional limitation on sites for septic tank absorption fields. If the vegetative cover is removed on either soil, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation. The soils are poorly suited to dwellings and septic tank absorption fields unless they are protected from flooding. A suitable alternative site should be selected.

The capability subclass is Vs. The woodland ordination symbol is 4A in areas of the Pope soil and 4F in areas of the Potomac soil.

ScF—Shouns-Cateache complex, 35 to 70 percent slopes, extremely stony

This map unit consists of very deep and moderately deep, very steep, well drained soils on the lower side slopes. It is mostly in the central part of the county. It is about 53 percent Shouns soil and 37 percent Cateache soil. The soils occur as areas so intermingled that it was not practical to map them separately. Stones that are 10 to 24 inches in diameter cover 3 to 15 percent of the surface of the unit.

Typically, the surface layer of the Shouns soil is dark brown silt loam about 4 inches thick. The subsoil extends to a depth of about 45 inches. The upper 4 inches is dark brown silt loam. The lower 37 inches is reddish brown channery silt loam. The substratum is reddish brown channery silt loam about 20 inches thick.

Typically, the surface layer of the Cateache soil is dark reddish brown channery silt loam about 4 inches thick. The subsoil extends to a depth of about 31 inches. The upper 5 inches is dark reddish brown channery silt loam. The next 16 inches is reddish brown channery silt loam. The lower 6 inches is reddish brown very channery silt loam. Reddish brown and reddish gray, fractured siltstone bedrock is at a depth of about 31 inches.

Included with these soils in mapping are a few small areas of the well drained Gilpin and Laidig soils and the moderately well drained Meckesville soils. Also included are a few small areas of rock outcrop, areas where less than 3 percent or more than 15 percent of the surface is covered with stones, and areas of soils that have slopes of less than 35 percent. Inclusions make up about 10 percent of the unit.

The available water capacity is moderate in the Cateache soil and moderate or high in the Shouns soil. Permeability is moderate in the subsoil of both soils. Runoff is very rapid. Natural fertility is medium. Reaction is very strongly acid or strongly acid in the Shouns soil and very strongly acid to moderately acid in the Cateache soil. Depth to bedrock is more than 60 inches in the Shouns soil and is 20 to 40 inches in the Cateache soil.

Most areas of these soils are used as woodland. A few have been cleared of trees and are used as pasture.

These soils are not suited to cultivated crops or hay and are difficult to manage for pasture. The slope and the stones limit the use of farm machinery. The very severe hazard of erosion in unprotected areas and overgrazing in pastured areas are the major management concerns. Proper stocking rates that help to maintain desirable grasses and legumes and a rotation grazing system are the major management needs in pastured areas.

The potential productivity is moderately high or high for trees on these soils. Plant competition is a management concern. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition. Seedling mortality is a management concern on south aspects. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate.

Slippage is a severe limitation affecting the operability of equipment and the construction of haul roads and skid roads on these soils. The slope and the slippage is a severe limitation affecting the location of log landings. Building haul roads and skid roads in the included areas of the less sloping soils helps to overcome the slope. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. The hazard of erosion is severe. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; leaving wide filter strips beside streams; and seeding roads and landings to grasses and legumes when they are no longer being used. Conventional skidder logging techniques are not recommended on slopes of more than 55 percent. Specialized equipment or

management techniques, such as cable yarding, are needed when timber is harvested in these areas.

The dominant plant communities in the overstory on the Shouns soil are American beech, yellow-poplar, hickory, and sugar maple. The dominant plant communities in the understory are red maple, hemlock, American beech, dogwood, and sugar maple, and those in the ground cover are ferns and chickweed. The dominant plant communities in the overstory on the Cateache soil are yellow-poplar, basswood, sugar maple, red oak, hickory, red maple, American beech, white oak, scarlet oak, and black birch. The dominant plant communities in the understory are sugar maple, American beech, and yellow-poplar, and those in the ground cover are ramps, clintonia, and ferns.

The slope and the stones are severe limitations affecting recreational development. The slope is the main limitation of these soils on sites for dwellings and septic tank absorption fields. The depth to bedrock and the slippage are additional limitations in areas of the Cateache soil. In places the bedrock underlying the Cateache soil hinders excavation, even though it generally is rippable. If the vegetative cover is removed on either soil, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation. The soils generally are not suited to most urban uses. A suitable alternative site should be selected.

The capability subclass is VIIs. The woodland ordination symbol is 4R.

SmC—Simoda silt loam, 3 to 15 percent slopes, very stony

This soil is deep, gently sloping to strongly sloping, and moderately well drained. It is on ridgetops in the southeastern part of the county. It generally is at elevations of more than 3,400 feet. Stones that are 10 to 24 inches in diameter cover 1 to 3 percent of the surface of the soil.

Typically, the surface layer is very dark grayish brown silt loam about 3 inches thick. The subsoil extends to a depth of about 48 inches. The upper 9 inches is yellowish brown silt loam. The next 6 inches is dark yellowish brown silt loam. The next 6 inches is yellowish brown channery silt loam that has light brownish gray and strong brown mottles. The lower 25 inches is yellowish brown channery loam that has gray and strong brown mottles. Sandstone bedrock is at a depth of about 48 inches.

Included with this soil in mapping are a few small areas of the well drained Gauley and Mandy soils and the moderately well drained Snowdog soils. Also included are a few small areas of soils that are less than 40 inches deep over bedrock, areas of soils that do not have stones on the surface, and areas of somewhat poorly drained or poorly drained soils. Inclusions make up about 25 percent of the unit.

The available water capacity is low or moderate in the Simoda soil. Permeability is slow in the lower, firm part of the subsoil. Runoff is medium or rapid. Natural fertility is medium. A seasonal high water table is at a depth of about 1.5 to 2.5 feet. Reaction is extremely acid or very strongly acid, unless the soil has been limed. Depth to bedrock ranges from 40 to 60 inches.

Most areas of this soil are used as woodland. They are in the Monongahela National Forest. The soil has low potential for any development other than woodland.

This soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The stones limit the use of farm machinery. The severe hazard of erosion in unprotected areas is a major management concern.

The potential productivity is moderate for trees on this soil. Seedling mortality, the windthrow hazard, and plant competition are management concerns. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate. Carefully thinning stands and not damaging the surficial root system help to prevent windthrow. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition.

Low strength is a limitation affecting the construction of haul roads and skid roads on this soil. The low strength and the slope are limitations affecting the location of log landings. Building haul roads and skid roads in the included areas of the less sloping soils helps to overcome the slope. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are black cherry, American beech, yellow birch, red maple, sugar maple, red spruce, mountain magnolia, hemlock, cucumbertree magnolia, and white ash. The dominant plant communities in the understory are striped maple, American beech, red maple, sugar maple, red spruce, black cherry, yellow

birch, and hemlock, and those in the ground cover are ferns, greenbrier, club moss, and sedges.

The stones and the slope are severe limitations on sites for playgrounds. They also limit the development of camp areas and picnic areas. The wetness is a limitation affecting the development of hiking trails.

The wetness is the main limitation on sites for dwellings and septic tank absorption fields. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation. Because the soil is located in the Monongahela National Forest, the potential for urban development is limited.

The capability subclass is VIIs. The woodland ordination symbol is 3A.

SwE—Snowdog channery loam, 15 to 35 percent slopes, rubbly

This soil is moderately steep and steep and is moderately well drained. It is on foot slopes, along drainageways, on benches, and on head slopes near mountaintops in the southeastern part of the county. It generally is at elevations of more than 3,400 feet. Stones that are 10 to 24 inches in diameter cover 15 to 75 percent of the surface of the soil.

Typically, the surface layer is very dark brown channery loam about 3 inches thick. The subsoil extends to a depth of about 51 inches. The upper 21 inches is dark yellowish brown channery loam. The next 9 inches is yellowish brown channery sandy loam that has light brownish gray and brown mottles. The lower 18 inches is yellowish brown very channery sandy loam that has light brownish gray and brown mottles. The substratum is yellowish brown very channery sandy loam about 14 inches thick.

Included with this soil in mapping are a few small areas of the well drained Gauley and Mandy soils and the moderately well drained Simoda soils. Also included are a few small areas of somewhat poorly drained or poorly drained soils, areas where less than 15 percent or more than 75 percent of the surface is covered with stones and boulders, and areas where the slopes are less than 15 percent or more than 35 percent. Inclusions make up about 20 percent of the unit.

The available water capacity is low or moderate in the Snowdog soil. Permeability is slow and moderately slow in the firm layers of the subsoil. Runoff is rapid or very rapid. Natural fertility is medium. A seasonal high water table is at a depth of about 1.5 to 2.5 feet. Reaction is extremely acid to strongly acid, unless the soil has been limed. Depth to bedrock is more than 60 inches.

Most areas of this soil are used as woodland. They are in the Monongahela National Forest. The soil has low potential for any development other than woodland.

This soil is not suited to cultivated crops or hay and is difficult to manage for pasture. The slope and the stones and boulders limit the use of farm machinery. The very severe hazard of erosion in unprotected areas is a major management concern.

The potential productivity for trees is moderately high on this soil. The windthrow hazard and plant competition are management concerns. Carefully thinning stands and not damaging the surficial root system help to prevent windthrow. Intensive management is needed to keep undesirable plants from competing with native plants and planted seedlings. Site preparation following harvest and the establishment of new forest cover as soon as possible help to control plant competition. Seedling mortality on south aspects is a management concern. Planting healthy seedlings that have a well developed root system and planting the seedlings in a timely manner in order to benefit from spring rains reduce the seedling mortality rate.

The slope and the stones and boulders are limitations affecting the operability of equipment and the location of log landings on this soil. The stones and boulders are severe limitations affecting the construction of haul roads and skid roads. Building haul roads, skid roads, and log landings in the included areas of soils that are less sloping and are not so stony helps to overcome these limitations. The formation of ruts is a severe limitation on haul roads, skid roads, and log landings unless the surface is strengthened by adding gravel. The hazard of erosion is moderate. Management practices that help to control erosion and sedimentation include constructing haul roads and skid roads on a gentle grade across the slope; installing dips, ditches, water bars, and culverts; leaving wide filter strips beside streams; and seeding roads and landings to grasses and legumes when they are no longer being used.

The dominant plant communities in the overstory on this soil are red spruce, black cherry, yellow birch, red maple, American beech, and hemlock. The dominant plant communities in the understory are black cherry, American beech, striped maple, and hemlock. The dominant plant community in the ground cover is ferns.

The slope and the stones and boulders are severe limitations affecting recreational development. The slope and the wetness are the main limitations on sites for dwellings and septic tank absorption fields. The slow permeability is an additional limitation on

Figure 4.—An area of Udorthents, smoothed, in the foreground. Pineville-Gilpin-Guyandotte association, very steep, extremely stony, is in the background.

sites for septic tank absorption fields. In areas where stones and boulders cover 50 percent or more of the surface, excavating and disposing of large rock fragments is difficult. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation. Because this soil is located in the Monongahela National Forest, the potential for urban development is limited.

The capability subclass is VIIs. The woodland ordination symbol is 4R.

Ud—Udorthents, smoothed

These nearly level to very steep, well drained soils are mostly in areas that have been disturbed during road construction or by earthmoving activities associated with mining (fig. 4). They are in areas throughout the county. Slope ranges from 0 to 70 percent.

In a representative profile, the surface layer is dark brown silt loam about 5 inches thick. The substratum extends to a depth of more than 65 inches. The upper 17 inches is brown, dark grayish brown, and strong brown loam. The next 13 inches is brown, yellowish brown, and strong brown loam. The lower 30 inches is brown and brownish yellow loam.

Included with these soils in mapping are a few small areas of the well drained Cedarcreek, Gilpin, Itmann, Kaymine, Laidig, and Pineville soils. Also included are a few small areas that are covered with concrete or asphalt. Inclusions make up about 20 percent of the unit.

Estimating the physical and chemical properties of

these soils is impractical because of the disturbed nature and high variability of the soils. Most fill areas are more than 60 inches deep over bedrock. Runoff ranges from slow in nearly level areas to very rapid in very steep areas. Natural fertility generally is low.

These soils are not used for cultivated crops, hay, pasture, or woodland. Some areas have been seeded to sericea lespedeza, orchardgrass, or fescue to help control erosion and sedimentation. Yellow-poplar, sycamore, and birch are naturally invading the unit.

Because of the extreme variability of the soils, an onsite investigation is necessary to determine the limitations affecting any proposed use. If the vegetative cover is removed, establishing a protective plant cover and installing a surface drainage system help to control erosion and sedimentation.

This unit has not been assigned a capability subclass or a woodland ordination symbol.

Prime Farmland

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

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forest land, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 6,145 acres in the survey area, or 1.7 percent of the total acreage, meets the soil requirements for prime farmland. Most areas of this land are along the larger streams in the southwestern part of the county.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "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 to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis 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 recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

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

Richard Heaslip, state resource conservationist, Natural Resources Conservation Service, helped to prepare this section.

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed for each soil and the system of land capability classification used by the Natural Resources Conservation Service is explained.

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

Although individual soils or groups of soils require different kinds of management, some general principles apply throughout the county to all of the soils suitable for crops and pasture.

Most of the soils in Webster County have a moderate or low supply of basic plant nutrients, making the application of lime and fertilizer necessary for optimum crop production. The amounts to be applied depend on the type of soil, the cropping history, the type of crop grown, the yield desired, and tests and analysis of the individual soils.

The organic matter content is low in most of the soils in the county. Increasing it generally is not feasible. Maintaining the organic matter content at the current level is important. Applying manure, returning crop residue to the soil, and growing sod crops, cover crops, and green manure crops help to maintain the content of organic matter.

Tillage tends to break down the structure of the surface layer and should be kept to the minimum necessary to prepare the seedbed and control weeds. In some soils, frequent tillage also causes the formation of a firm, dense layer immediately below the plow layer. This dense layer restricts permeability and the penetration of roots. Maintaining the organic matter content of the plow layer helps to maintain the structure of the soil.

Surface runoff and erosion are management concerns in cultivated areas in spring and early summer and following harvest. All of the gently sloping and steeper soils that are cultivated are subject to erosion and thus require a cropping system that helps to control erosion. The main management needs are using proper crop rotations, applying minimum tillage,

no-till planting, leaving crop residue on the surface, growing cover crops and green manure crops, and applying lime and fertilizer. Other major erosion-control measures are contour cultivation, contour stripcropping, diversions, and grassed waterways. The effectiveness of a particular combination of these measures differs from one soil to another, and different combinations can be equally effective on the same soil.

A cover of pasture plants helps to control erosion in most areas. A high level of pasture management, including fertilization, controlled grazing, water management, and careful selection of pasture mixtures, is needed to provide enough plant cover to prevent erosion. Grazing is controlled by rotating the livestock from one field to another and allowing for regrowth of the pasture plants. Some soils can support plant mixtures that require less intensive management than others to maintain good ground cover and forage for grazing. Controlled grazing and optimum applications of lime and fertilizer are needed in these areas.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification also is shown in the table.

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

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

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

Crops other than those shown in table 6 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 Natural Resources 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 criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit (USDA 1961). Only class and subclass are used in this survey.

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

Class I soils have few limitations that restrict their use.

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

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

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

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

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

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

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

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e,*

w, s, or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the 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, rangeland, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of the map units in this survey area is given in the section “Detailed Soil Map Units” and in the yields table.

Woodland Management and Productivity

Lewis Rowan, state staff forester, Natural Resources Conservation Service, and Mayford Lake, service forester, West Virginia Department of Natural Resources, helped to prepare this section.

About 320,700 acres, or 90 percent of the total acreage in the county, is used as woodland (DiGiovanni 1990). The size of the woodland tracts ranges from small farm woodlots to several thousand acre areas owned by corporations.

The common forest types, or natural association of tree species, are oak-hickory and maple-beech-birch. The oak-hickory types make up about 65 percent of the wooded areas, and the maple-beech-birch types make up about 35 percent (DiGiovanni 1990).

Woodland plays an important part in the economy of the county (fig. 5). Eight sawmills in the county are operated on a full-time basis, and several smaller sawmills are operated on a part-time basis (West Virginia Department of Agriculture 1988). Green lumber, posts and rails, board fences, wood siding, and paneling are some of the products. Nearly all of the higher grades of lumber are shipped to states in the south or overseas to be manufactured into fine furniture.

For the past 10 to 15 years, reclaimed strip mines in some areas have been planted to mostly white pine and Norway spruce.

The aspect of the soils affects woodland management and productivity. North aspects are those that face in any compass direction from 315 degrees to 135 degrees. South aspects are those that face in any compass direction from 135 degrees to 315 degrees. A soil with north aspect generally is more moist than the same soil with south aspect and commonly has a productivity rating that is one number better than that for the same soil with south aspect. Aspect also affects the occurrence of tree species and the degree of management concerns.

The detailed soil map unit descriptions identify the dominant land use conditions. Where woodland is the dominant land use, plant species are identified for the overstory, understory, and ground cover. Where woodland is not the dominant land use, only the typical tree species in the unit are identified.

Tables 8 and 9 can be used by woodland owners or forest managers when planning the use of soils for wood crops.

In table 8, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid roads, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities. The proper construction and maintenance of roads, landings, and fire lanes help to control erosion.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent. Special planting stock and special site preparation, such as bedding,

Figure 5.—A young stand of yellow-poplar in an area of Chavies fine sandy loam.

furrowing, or surface drainage, reduce the seedling mortality rate.

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are depth to the water table and available water capacity. A rating of *slight* indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of *moderate* indicates that competition may delay the natural establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of *severe* indicates that competition can be expected to prevent natural regeneration unless precautionary measures are applied. Adequate site preparation before planting helps to control plant competition.

Haul roads and skid roads ratings refer to the soil properties that affect construction, trafficability, and maintenance of roads. Slope, soil stability, wetness, rockiness, stoniness, soil strength, soil texture, depth to hard bedrock, and flooding should be considered when selecting routes. A rating of *slight* indicates no serious limitations affect construction, maintenance, season of use, or the return of the soil to forest

production. A rating of *moderate* indicates some limitations affect construction. These limitations can be overcome by applying routine construction techniques. Construction and maintenance costs are higher in these areas than in areas that have only slight limitations. Returning the soils to forest production generally is more difficult. The season of use is somewhat limited in places. A rating of *severe* indicates that one or more limitations require the application of special or expensive construction techniques. Construction and maintenance costs are high, or the season of use is severely limited in places. Returning the disturbed soils to forest production is difficult or impossible. Planning routes so that the least amount of soil is disturbed during construction, building the roads on a gentle grade across the slope, providing for adequate disposal of surface water, and surfacing the roads with durable material help to overcome the limitations.

Log landings are areas where logs are assembled and loaded for transport. Areas that require little or no surface preparation or cutting and filling are the best sites for log landings. Wetness, flooding, rockiness, stoniness, rock fragments in the soil, depth to hard bedrock, soil strength, soil texture, slope, and soil stability should be considered when selecting the sites. A rating of *slight* indicates that no serious limitations affect the construction, season of use, or the return of the soil to forest production. A rating of *moderate* indicates that some limitations affect construction. These limitations can be overcome by applying proper construction techniques. Areas rated moderate generally are more difficult to return to forest production than those rated slight. A rating of *severe* indicates that some limitations require the application of special or expensive construction techniques. Construction and maintenance costs are high, or the season of use is very limited. Areas rated severe are very difficult or impossible to return to forest production. Installing diversion ditches, grading the soil so that it has a more desirable slope, and surfacing the landing with durable material help to overcome the limitations.

Operability of equipment in logging areas ratings refer to the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, slippage, soil wetness, rock outcrops, stones on the surface, texture of the surface layer, and flooding. A rating of *slight* indicates that the use of equipment generally is not restricted either in kind of equipment that can be used or time of year because of soil factors. If soil wetness is a factor, the use of equipment can be restricted for a period not to exceed 3 months. A rating of *moderate* indicates that the use of equipment is moderately restricted because of one or more soil factors. If soil wetness is a factor, the use of equipment is restricted for a period of 3 to 6 months. A rating of *severe* indicates that the use of equipment is severely restricted either in kind of equipment or season of use. If soil wetness is a factor, the use of equipment is restricted for a period of more than 6 months. Using the best suited equipment and operating the equipment only when the soil is dry or frozen help to overcome the equipment limitation.

Table 9 lists the ordination symbol, which shows the potential productivity of merchantable or common trees, for those soils in the county that are suitable for wood crops. It also lists the site index and average annual growth. 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 an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The larger the number, the greater the potential productivity. The number 1 indicates low potential productivity; 2 or 3, moderate; 4 or 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 or more, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; *F*, a high content of rock fragments in the soil; and *N*, snowpack. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more that one limitation, the priority is as follows: R, X, W, T, D, C, S, F, and N.

Site index is the average height, in feet, that dominant and codominant trees of a given species attain in 50 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.

Average annual growth per acre of some of the common trees is expressed as cubic feet, board feet, or cords. It varies with stand vigor and other factors and is equal to the total volume growth at rotation divided by the rotation age. Yield data are calculated on the basis of site indices of natural stands at age 50 using the International 1/4 Log Rule and standard

rough cords. This information should be used for planning purposes only.

The first tree species listed under *commonly grown trees* for a soil is the indicator species for that soil. It is the most common species on the soil and generally is the most productive species.

Recreation

Sherry Dahl-Cox, soil scientist, Forest Service, helped to prepare this section.

Many areas in the county offer opportunities for camping, canoeing, fishing, hiking, hunting, and sightseeing, and some are suited to cross-country skiing. The main public lands available for recreational use are the Monongahela National Forest, Holly River State Park, and Big Ditch Recreational Area.

Cranberry Campground, Bishop Knob Campground, part of the Cranberry Wilderness, and Cranberry Back Country are in the Webster County portion of the Monongahela National Forest. Cranberry Wilderness, which encompasses a total of 35,864 acres, has about 60 miles of marked hiking trails. Only nonmotorized and nonmechanized travel is permitted in Cranberry Wilderness.

A 27,000-acre area west of Cranberry Wilderness has more than 40 miles of hiking trails. This area also provides excellent opportunities for cross-country skiing on the gated roads. It is closed to public motorized travel. Bicycles, horses, and hand drawn carts and wagons are permitted.

Monongahela National Forest, which was originally established to help protect watersheds and supply timber, provides woodland resources and an opportunity for recreational activities. It is rich in wildlife, forage, and recreational opportunities. It is managed by the U.S. Department of Agriculture, Forest Service. Many different specialists coordinate and balance uses of the area so that people will continue to receive maximum benefits throughout the years.

The soils of the survey area are rated in table 10 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 sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In the table, 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 a combination of these measures.

The information in the table can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 13 and interpretations for dwellings without basements and for local roads and streets in table 12.

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

Gary A. Gwinn, state biologist, Natural Resources Conservation Service, helped to prepare this section.

Webster County dominantly is forest land. More than 90 percent of the total acreage is covered with trees. Wildlife species inhabiting the county are those that prefer the wooded environment. Common game species include white-tailed deer, black bear, gray squirrel, wild turkey and ruffed grouse. Furbearers include gray fox, beaver, mink, raccoon, muskrat, and bobcat. Webster County is one of the leading counties in the state in the harvest of bears and bobcats.

A variety of songbirds, including several species of wood warblers, inhabit the county. The county also provides habitat for numerous reptiles and amphibians. Several types of relatively rare salamanders inhabit the high mountain areas.

The county has an abundance of high-quality cold water streams. Native brook trout are in many of the streams. Some of the streams in the county are stocked with trout. They include the Cranberry River, Williams River, and the Back Fork of Elk River.

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

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

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

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

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

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

Hardwood trees and shrubs produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and

blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are gray dogwood and crabapple.

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

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

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

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

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

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

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, frogs, and tree swallow.

Engineering

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

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

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

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

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

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

The information in the tables, along with the soil

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

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

Building Site Development

Table 12 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, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and 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, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

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

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 or to a cemented pan, 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 13 shows the degree and 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.

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

Septic tank absorption fields are areas in which

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

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

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

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

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

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

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

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

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

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the 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 14 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another

place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

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

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

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

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table, 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 high water table at or near the surface.

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

Water Management

Table 15 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil

properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

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

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

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

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

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

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

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

Soil Properties

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

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

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

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

Engineering Index Properties

Table 16 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

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

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

Classification of the soils is determined according to the Unified soil classification system (ASTM 1993) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO 1986).

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, CL-ML.

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 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3

inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

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

The estimates of grain-size distribution, liquid limit, and plasticity index are generally 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 17 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, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$-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 and septic tank absorption fields.

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 the basis of measurements of similar soils.

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

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

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 0.02 to 0.64. Other factors being equal, 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 the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and Water Features

Table 18 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, 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 high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

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

The table 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, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

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 little or no horizon development.

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 estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in the table are the depth to the seasonal high water table; the kind of

water table—that is, perched, apparent, or artesian; 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 the table.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. “More than 6.0” indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is 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 the 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 results in a severe hazard of corrosion. 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 (USDA 1975). 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 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is 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 Udalf (*Ud*, meaning humid, 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; type of saturation; 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 has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup 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 taxonomic class. 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. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. 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 within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each 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” (USDA 1993). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (USDA 1975). Unless otherwise indicated, 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.”

Atkins Series

The Atkins series consists of very deep, poorly drained soils that formed in acid, alluvial deposits washed from soils on uplands. The Atkins soils are on flood plains throughout the county. They are subject to occasional flooding. Slope ranges from 0 to 3 percent.

Atkins soils are on the landscape with the somewhat excessively drained Potomac soils, the well drained Chavies and Pope soils, the moderately well drained Cotaco and Philo soils, and the poorly drained

Elkins soils. Atkins soils are fine-loamy, while Elkins soils are fine-silty.

Typical pedon of Atkins loam in a field that has been cleared of trees; about 500 feet south of Dyer Church; about 1,000 feet north of the Williams River; USGS Webster Springs topographic quadrangle; lat. 38 degrees 22 minutes 54 seconds N. and long. 80 degrees 28 minutes 02 seconds W.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) loam; few fine brown (7.5YR 4/4) mottles; weak medium granular structure; friable; many fine and medium roots; strongly acid; abrupt smooth boundary.

Bg1—7 to 16 inches; grayish brown (10YR 5/2) loam; common fine and medium brown (7.5YR 4/4) mottles; weak medium and coarse subangular blocky structure; friable; common very fine and fine roots; very strongly acid; clear wavy boundary.

Bg2—16 to 35 inches; gray (10YR 6/1) loam; many fine and medium strong brown (7.5YR 5/8) mottles; weak medium and coarse subangular blocky structure; friable; few very fine and fine roots; very strongly acid; clear wavy boundary.

BCg—35 to 48 inches; gray (10YR 6/1) loam; common fine and medium strong brown (7.5YR 5/8 and 4/6) mottles; weak coarse prismatic structure parting to weak medium and coarse subangular blocky; friable; few very fine and fine roots; very strongly acid; gradual wavy boundary.

Cg1—48 to 59 inches; gray (10YR 6/1) silt loam; common fine and medium strong brown (7.5YR 5/8 and 4/6) mottles; massive; friable; few very fine and fine roots; very strongly acid; gradual wavy boundary.

Cg2—59 to 65 inches; gray (10YR 6/1) silty clay loam; common fine and medium strong brown (7.5YR 5/8 and 4/6) mottles; massive; friable; few very fine and fine roots; very strongly acid.

The thickness of the solum ranges from 25 to 50 inches. The depth to bedrock is more than 60 inches. In unlimed areas reaction is very strongly acid or strongly acid.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. The texture of the fine-earth material is loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. The texture of the fine-earth material is loam, silt loam, or silty clay loam.

The BCg horizon has hue of 10YR, value of 6, and chroma of 1. The texture of the fine-earth material is loam.

The Cg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 to 4. The texture of the fine-earth material is loam, silt loam, or silty clay loam.

Cateache Series

The Cateache series consists of moderately deep, well drained soils that formed in material weathered from red interbedded siltstone and shale bedrock. These soils are on mountain side slopes and benches in the central and eastern parts of the county. Slope ranges from 15 to 70 percent.

Cateache soils are on the landscape with the well drained Gilpin, Laidig, and Shouns soils and the moderately well drained Meckesville soils. Cateache soils do not have the yellowish brown Bt horizon that is typical of Gilpin soils. They are not so deep as Laidig, Meckesville, and Shouns soils.

Typical pedon of Cateache channery silt loam in a wooded area of Shouns-Cateache complex, 35 to 70 percent slopes, extremely stony; about 1 mile northwest of Webster Springs; about 150 feet north of State Route 20 at the southeast end of Sommer Lane; USGS Webster Springs topographic quadrangle; lat. 38 degrees 29 minutes 02 seconds N. and long. 80 degrees 25 minutes 03 seconds W.

Oi—2 inches to 0; loose hardwood leaf litter.

A—0 to 4 inches; dark reddish brown (5YR 2.5/2) channery silt loam; weak fine and medium granular structure; very friable; many fine to coarse roots; 20 percent rock fragments; slightly acid; clear wavy boundary.

BA—4 to 9 inches; dark reddish brown (5YR 3/3) channery silt loam; weak fine subangular blocky structure; friable; many fine to coarse roots; 25 percent rock fragments; strongly acid; clear wavy boundary.

Bt—9 to 25 inches; reddish brown (5YR 4/3) channery silt loam; moderate fine and medium subangular blocky structure; firm; common distinct clay films on faces of peds; common fine and medium roots; 15 percent rock fragments; strongly acid; clear wavy boundary.

BC—25 to 31 inches; reddish brown (5YR 4/3) very channery silt loam; weak fine and medium subangular blocky structure; firm; few fine roots; 40 percent rock fragments; strongly acid; clear wavy boundary.

Cr—31 inches; reddish brown (2.5YR 3/4) and reddish gray (5YR 5/2), fractured siltstone bedrock.

The thickness of the solum ranges from 21 to 40 inches. The depth to bedrock ranges from 20 to 40 inches. The content of rock fragments ranges from 5 to

25 percent, by volume, in the A and BA horizons, from 10 to 25 percent, by volume, in the Bt horizon, and from 35 to 80 percent, by volume, in the BC horizon. In unlimed areas reaction is very strongly acid to moderately acid.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 2. The texture of the fine-earth material is silt loam.

The BA horizon has hue of 5YR, value of 3 or 4, and chroma of 2 to 4. The texture of the fine-earth material is silt loam.

The Bt horizon has hue of 2.5YR or 5YR and value and chroma of 3 or 4. The texture of the fine-earth material is silt loam or silty clay loam.

The BC horizon has hue of 5YR, value of 3 or 4, and chroma of 3 to 6. The texture of the fine-earth material is silt loam.

The Cr horizon is weathered siltstone bedrock.

Cedarcreek Series

The Cedarcreek series consists of very deep, well drained soils that formed in a mixture of partially weathered, acid sandstone, siltstone, shale, and coal fragments and partially weathered fine-earth material in areas disturbed by surface mine operations. These soils are on side slopes, benches, and ridgetops throughout the county. Slope ranges from 35 to 70 percent.

Cedarcreek soils are on the landscape with the well drained Gilpin, Itmann, and Laidig soils and Udorthents. Cedarcreek soils are loamy-skeletal, while Gilpin and Laidig soils and Udorthents are fine-loamy. Cedarcreek soils do not have the high content of carbolithic rock fragments that is typical of Itmann soils.

Typical pedon of Cedarcreek very channery loam, very steep, extremely stony, in a wooded area; about 5,500 feet west-northwest of the confluence of Jack's Run and Birch Run; USGS Cowen topographic quadrangle; lat. 38 degrees 25 minutes 26 seconds N. and long. 80 degrees 35 minutes 57 seconds W.

Oi—2 inches to 0; loose hardwood leaf litter.

A—0 to 4 inches; dark brown (10YR 3/3) very channery loam; common black lithochromic mottles; weak medium granular structure; very friable; many very fine to coarse roots; 35 percent rock fragments (10 percent sandstone, 20 percent siltstone, and 5 percent coal); very strongly acid; clear wavy boundary.

C1—4 to 26 inches; dark grayish brown (10YR 4/2) very channery loam; common black and yellowish brown lithochromic mottles; massive; friable; few very fine to coarse roots; 50 percent rock fragments (30 percent sandstone, 15 percent siltstone, and 5 percent coal); very strongly acid; gradual wavy boundary.

C2—26 to 44 inches; dark grayish brown (10YR 4/2) very channery loam; common black and yellowish brown lithochromic mottles; massive; firm; few very fine roots; 50 percent rock fragments (25 percent sandstone, 20 percent siltstone, and 5 percent coal); very strongly acid; gradual wavy boundary.

C3—44 to 65 inches; dark grayish brown (10YR 4/2) extremely channery loam; many black and yellowish brown lithochromic mottles; massive; firm; few very fine and fine roots; 60 percent rock fragments (25 percent sandstone, 25 percent siltstone, and 10 percent coal); very strongly acid.

The depth to bedrock is more than 60 inches. The content of rock fragments of sandstone, siltstone, shale, and coal ranges from 30 to 60 percent, by volume, throughout the profile. The percentage of each rock type is less than 65 percent of the total rock fragments in the control section. Most of the rock fragments are channers, but some are stones or boulders. Most pedons have red, black, brown, yellow, or gray lithochromic mottles in some or all horizons. In unlimed areas reaction is extremely acid or very strongly acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The texture of the fine-earth material is loam or silt loam.

The C horizon is neutral in hue or has hue of 10YR. It has value of 4 or 5 and chroma of 2 to 6. The texture of the fine-earth material is loam or silt loam.

Chavies Series

The Chavies series consists of very deep, well drained soils that formed in acid, alluvial material washed from acid soils on uplands. The Chavies soils are on high flood plains, mainly along the Elk, Gauley, Holly, and Williams Rivers. They are subject to rare flooding. Slope ranges from 0 to 3 percent.

Chavies soils are on the landscape with the somewhat excessively drained Potomac soils, the well drained Craigsville and Pope soils, the moderately well drained Philo soils, and the poorly drained Atkins soils. Chavies soils are coarse-loamy, while Craigsville soils are loamy-skeletal and Potomac soils are sandy-skeletal. Chavies soils flood less frequently than the Pope soils.

Typical pedon of Chavies fine sandy loam in a hayfield along the Elk River; about 500 feet west of County Route 7; about 6 miles north of Webster Springs; USGS Diana topographic quadrangle; lat. 38

degrees 31 minutes 05 seconds N. and long. 80 degrees 29 minutes 07 seconds W.

Ap—0 to 6 inches; dark brown (10YR 4/3) fine sandy loam; weak very fine granular structure; very friable; many very fine to medium roots; 5 percent rock fragments; strongly acid; clear wavy boundary.

BA—6 to 10 inches; dark brown (7.5YR 3/4) fine sandy loam; weak fine subangular blocky structure; very friable; many very fine and fine roots; 5 percent rock fragments; strongly acid; clear wavy boundary.

Bt1—10 to 23 inches; dark brown (7.5YR 4/4) fine sandy loam; weak fine and medium subangular blocky structure; very friable; few distinct clay films on faces of peds and bridging of sand grains; common fine and medium roots; strongly acid; gradual wavy boundary.

Bt2—23 to 30 inches; dark brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; very friable; few distinct clay films on faces of peds and bridging of sand grains; few fine and medium roots; strongly acid; gradual wavy boundary.

BC—30 to 42 inches; dark brown (7.5YR 4/4) fine sandy loam; weak medium and coarse subangular blocky structure; very friable; few fine and medium roots; very strongly acid; clear wavy boundary.

C1—42 to 58 inches; dark brown (7.5YR 4/4) fine sandy loam; massive; very friable; strongly acid; gradual wavy boundary.

C2—58 to 65 inches; dark yellowish brown (10YR 4/6) loamy sand; single grain; loose; very strongly acid.

The thickness of the solum ranges from 30 to 45 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 5 percent, by volume, in the solum and from 0 to 30 percent, by volume, in the C horizon. In unlimed areas reaction is very strongly acid or strongly acid.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. The texture of the fine-earth material is fine sandy loam, loam, or silt loam.

The BA horizon has hue of 5YR, 7.5YR, or 10YR, value of 3 or 4, and chroma of 4 to 6. The texture of the fine-earth material is fine sandy loam.

The Bt horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 to 6, and chroma of 3 to 6. The texture of the fine-earth material is fine sandy loam, loam, or silt loam.

The BC horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The texture of the fine-earth material is fine sandy loam, sandy loam, or loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The texture of the fine-earth material is loamy sand, fine sandy loam, sandy loam, or silt loam.

Cotaco Series

The Cotaco series consists of very deep, moderately well drained soils that formed in acid, alluvial material washed from soils on uplands. The Cotaco soils are on low stream terraces, mainly along Strouds Creek and at the headwaters of Birch River and Laurel Creek near Cowen and along tributaries of the Gauley River. Slope ranges from 3 to 8 percent.

Cotaco soils are on the landscape with the well drained Pope soils, the moderately well drained Philo soils, and the poorly drained Atkins and Elkins soils. Cotaco soils have an argillic horizon, which is not characteristic of Atkins, Elkins, Philo, and Pope soils.

Typical pedon of Cotaco silt loam, 3 to 8 percent slopes, in an idle field; about 400 feet east of County Route 15/8; about 3,150 feet northeast of the intersection of State Route 20 and County Route 15/8; USGS Cowen topographic quadrangle; lat. 38 degrees 24 minutes 52 seconds N. and long. 80 degrees 31 minutes 32 seconds W.

Ap—0 to 5 inches; dark brown (10YR 4/3) silt loam; moderate fine and medium granular structure; friable; common very fine to medium roots; slightly acid; abrupt smooth boundary.

Bt1—5 to 16 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common thin distinct clay films on faces of peds; common very fine and fine roots; common coarse yellowish brown (10YR 5/4) organic stains on faces of peds; strongly acid; clear smooth boundary.

Bt2—16 to 23 inches; yellowish brown (10YR 5/6) silt loam; common medium gray (10YR 6/1) and few fine strong brown (7.5YR 5/6) mottles; moderate medium and coarse subangular blocky structure; friable; many thin distinct clay films on faces of peds; few fine roots; strongly acid; clear wavy boundary.

Bt3—23 to 31 inches; light yellowish brown (10YR 6/4) silt loam; many coarse gray (10YR 6/1) and common medium strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium and coarse subangular blocky; friable; many thin distinct clay films on faces of peds; few very fine roots; very strongly acid; clear wavy boundary.

Btg—31 to 44 inches; gray (10YR 6/1) silt loam; many coarse light yellowish brown (10YR 6/4) and many

medium strong brown (7.5YR 5/8 and 5/6) mottles; moderate coarse prismatic structure parting to weak coarse subangular blocky; firm; common thin distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

BCg—44 to 50 inches; gray (10YR 6/1) loam; many medium strong brown (7.5YR 5/8 and 5/6) and common coarse light yellowish brown (10YR 6/4) mottles; weak coarse subangular blocky structure; friable; common black (N 2/0) concretions; very strongly acid; clear smooth boundary.

Cg—50 to 65 inches; gray (10YR 6/1) loam; many medium strong brown (7.5YR 5/6 and 5/8) and few medium light yellowish brown (10YR 6/4) mottles; massive; friable; few black (N 2/0) concretions; few coarse pockets of fine sandy loam; very strongly acid.

The thickness of the solum ranges from 30 to 55 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 15 percent, by volume, in the solum and from 0 to 50 percent, by volume, in the substratum. In unlimed areas reaction is very strongly acid or strongly acid.

The Ap horizon has hue of 10YR, value of 4, and chroma of 2 or 3. The texture of the fine-earth material is silt loam.

The Bt horizon has hue of 10YR and value of 5 or 6. It has chroma of 4 to 6 in the upper part and 1 to 4 in the lower part. The texture of the fine-earth material is loam, silt loam, or clay loam.

The BCg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 to 6. The texture of the fine-earth material is loam or clay loam.

The Cg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 to 6. The texture of the fine-earth material is loam or sandy clay loam.

Craigsville Series

The Craigsville series consists of very deep, well drained soils that formed in acid, alluvial material washed from soils on uplands. The Craigsville soils are on high flood plains and on alluvial fans at the mouth of hollows throughout the county. They are subject to rare flooding. Slope ranges from 0 to 5 percent.

Craigsville soils are on the landscape with the somewhat excessively drained Potomac soils, the well drained Chavies and Pope soils, and the moderately well drained Philo soils. Craigsville soils are loamy-skeletal, while Chavies, Philo, and Pope soils are coarse-loamy and Potomac soils are sandy-skeletal.

Typical pedon of Craigsville gravelly loam, 0 to 5 percent slopes, in a meadow along Hodam Creek; about 1,600 feet south of the confluence of Hodam Creek and the Left Fork of Holly River; USGS Hacker Valley topographic quadrangle; lat. 38 degrees 38 minutes 38 seconds N. and long. 80 degrees 23 minutes 51 seconds W.

Ap—0 to 5 inches; dark brown (10YR 3/3) gravelly loam; weak medium granular structure; very friable; many very fine and fine roots; 30 percent rock fragments; moderately acid; clear smooth boundary.

Bw—5 to 24 inches; dark yellowish brown (10YR 4/6) very gravelly loam; weak medium and coarse subangular blocky structure; friable; common very fine and fine roots; 45 percent rock fragments; very strongly acid; clear smooth boundary.

BC—24 to 39 inches; dark yellowish brown (10YR 4/6) very gravelly sandy loam; weak medium and coarse subangular blocky structure; friable; few very fine and fine roots; 55 percent rock fragments; very strongly acid; gradual wavy boundary.

2C1—39 to 53 inches; dark yellowish brown (10YR 4/6) gravelly sandy loam; massive; friable; few fine roots; 25 percent rock fragments; very strongly acid; clear wavy boundary.

2C2—53 to 65 inches; dark yellowish brown (10YR 4/6) very gravelly loamy sand; single grain; very friable; 50 percent rock fragments; very strongly acid.

The thickness of the solum ranges from 20 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 10 to 40 percent, by volume, in the A horizon and from 25 to 70 percent, by volume, in the B and C horizons. In unlimed areas reaction is very strongly acid or strongly acid.

The A horizon has hue of 10YR, value of 3, and chroma of 2 or 3. The texture of the fine-earth material is loam.

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 6. The texture of the fine-earth material is loam or sandy loam.

The BC horizon has hue of 10YR, value of 4, and chroma of 6. The texture of the fine-earth material is sandy loam.

The 2C horizon has hue of 10YR, value of 4, and chroma of 4 to 6. The texture of the fine-earth material is loamy sand or sandy loam.

Dekalb Series

The Dekalb series consists of moderately deep, well drained soils that formed in acid material

weathered from sandstone bedrock. These soils are on the upper mountain side slopes and ridgetops, mostly in the western half of the county. Slope ranges from 3 to 70 percent.

Dekalb soils are on the landscape with the well drained Gilpin, Guyandotte, Laidig, and Pineville soils. They are not so deep as the Guyandotte soils. They are loamy-skeletal, while Gilpin, Laidig, and Pineville soils are fine-loamy.

Typical pedon of Dekalb channery sandy loam, in a wooded area of Dekalb-Rock outcrop complex, 35 to 70 percent slopes, extremely stony; about 700 feet west of County Route 28/1; about 3.2 miles northeast of Wainville; USGS Erbacon topographic quadrangle; lat. 38 degrees 31 minutes 13 seconds N. and long. 80 degrees 32 minutes 38 seconds W.

Oi—3 inches to 1 inch; loose hardwood leaf litter.

Oe—1 inch to 0; partially decomposed hardwood leaf litter.

A—0 to 2 inches; very dark gray (10YR 3/1) channery sandy loam; weak fine granular structure; very friable; many fine and medium roots; 20 percent rock fragments; extremely acid; clear wavy boundary.

BA—2 to 5 inches; dark brown (10YR 4/3) channery sandy loam; weak fine subangular blocky structure; very friable; many fine and medium roots; 20 percent rock fragments; very strongly acid; gradual wavy boundary.

Bw1—5 to 13 inches; yellowish brown (10YR 5/4) channery sandy loam; weak fine and medium subangular blocky structure; friable; many fine and medium roots; 30 percent rock fragments; very strongly acid; gradual wavy boundary.

Bw2—13 to 24 inches; yellowish brown (10YR 5/6) very channery sandy loam; weak medium subangular blocky structure; friable; common fine to coarse roots; 45 percent rock fragments; very strongly acid; clear wavy boundary.

C—24 to 34 inches; yellowish brown (10YR 5/6) extremely channery sandy loam; massive; friable; few coarse roots; 75 percent rock fragments; very strongly acid; clear wavy boundary.

R—34 inches; weathered sandstone bedrock.

The thickness of the solum ranges from 20 to 30 inches. The depth to bedrock ranges from 20 to 40 inches. The content of rock fragments ranges from 20 to 50 percent, by volume, in the solum and from 50 to 75 percent, by volume, in the C horizon. In unlimed areas reaction is extremely acid to strongly acid.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The texture of the fine-earth material is fine sandy loam, sandy loam, or loam.

The BA horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The texture of the fine-earth material is fine sandy loam, sandy loam, or loam.

The Bw horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 8. The texture of the fine-earth material is fine sandy loam, sandy loam, or loam.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 6. The texture of the fine-earth material is sandy loam or loam.

Elkins Series

The Elkins series consists of very deep, poorly drained soils that formed in acid, alluvial deposits washed from soils on uplands. The Elkins soils are on flood plains in the southwestern part of the county. They are subject to occasional flooding. Slope ranges from 0 to 3 percent.

Elkins soils are on the landscape with the well drained Pope soils, the moderately well drained Cotaco and Philo soils, and the poorly drained Atkins soils. Elkins soils are fine-silty, while Philo and Pope soils are coarse-loamy and Cotaco soils are fine-loamy.

Typical pedon of Elkins silt loam in a hayfield; about 400 feet north of the junction of Big Ditch Run with State Route 20 in the town of Cowen; about 130 feet west of Big Ditch Run; USGS Cowen topographic quadrangle; lat. 38 degrees 24 minutes 43 seconds N. and long. 80 degrees 33 minutes 19 seconds W.

Ap—0 to 7 inches; very dark brown (10YR 2/2) silt loam; moderate fine and medium granular structure; very friable; many fine and medium roots; neutral; abrupt smooth boundary.

Bg1—7 to 15 inches; dark gray (10YR 4/1) silt loam; common medium strong brown (7.5YR 4/6 and 5/6) mottles; weak medium and coarse subangular blocky structure; friable; common fine roots; moderately acid; clear wavy boundary.

Bg2—15 to 27 inches; dark gray (2.5Y 4/0) silt loam; few medium strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to weak medium and coarse subangular blocky; friable; few fine roots; very strongly acid; clear wavy boundary.

Cg1—27 to 47 inches; gray (5Y 5/1) silt loam; common medium strong brown (7.5YR 5/8) and few medium reddish yellow (7.5YR 6/6) mottles; massive; friable; very strongly acid; clear wavy boundary.

Cg2—47 to 65 inches; gray (2.5Y 5/0) silt loam; massive; friable; very strongly acid.

The thickness of the solum ranges from 25 to 40 inches. The depth to bedrock is more than 60 inches.

In unlimed areas reaction is extremely acid or very strongly acid.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The texture of the fine-earth material is silt loam.

The Bg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 4 or 5 and chroma of 0 to 2. The texture of the fine-earth material is silt loam or silty clay loam.

The Cg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 or 5 and chroma of 0 to 2. The texture of the fine-earth material is silt loam.

Fenwick Series

The Fenwick series consists of moderately deep, moderately well drained soils that formed in acid material weathered from interbedded sandstone, siltstone, and shale bedrock. These soils are on gently sloping ridgetops, mostly in the southern part of the county between the Gauley and Cranberry Rivers. Slope ranges from 3 to 15 percent.

Fenwick soils are on the landscape with the well drained Gilpin soils. Unlike Gilpin soils, Fenwick soils have grayish mottles in the Bt horizon.

Typical pedon of Fenwick loam, 3 to 15 percent slopes, very stony, in a wooded area; about 0.6 mile north of the intersection of Mills Mountain Road and Forest Service Route 101; about 300 feet east of Mills Mountain Road; USGS Webster Springs SW topographic quadrangle; lat. 38 degrees 21 minutes 18 seconds N. and long. 80 degrees 29 minutes 27 seconds W.

Oi—3 inches to 1 inch; loose hardwood leaf litter.

Oe—1 inch to 0; partially decomposed hardwood leaf litter.

A—0 to 2 inches; very dark brown (10YR 2/2) loam; moderate very fine and fine granular structure; very friable; many very fine to coarse roots; 5 percent rock fragments; very strongly acid; abrupt smooth boundary.

BA—2 to 8 inches; dark yellowish brown (10YR 4/4) loam; weak fine subangular blocky structure; friable; many very fine to coarse roots; 10 percent rock fragments; very strongly acid; clear wavy boundary.

Bt1—8 to 15 inches; yellowish brown (10YR 5/6) loam; weak fine and medium subangular blocky structure; friable; few thin distinct clay films on faces of peds; common very fine to medium roots; 10 percent rock fragments; very strongly acid; clear wavy boundary.

Bt2—15 to 20 inches; brownish yellow (10YR 6/6) loam; moderate fine and medium subangular blocky structure; friable; few thin distinct clay films on faces of peds; few fine roots; 10 percent rock fragments; very strongly acid; gradual wavy boundary.

Bt3—20 to 29 inches; brownish yellow (10YR 6/6) loam; few fine light brownish gray (10YR 6/2), common medium light yellowish brown (2.5Y 6/4), and common medium strong brown (7.5YR 5/6) mottles; moderate medium and coarse subangular blocky structure; friable; few thin distinct clay films on faces of peds; few fine and medium roots; 10 percent rock fragments; very strongly acid; clear wavy boundary.

BC—29 to 34 inches; brownish yellow (10YR 6/6) loam; common fine and medium light brownish gray (10YR 6/2), common medium light yellowish brown (2.5Y 6/4), and common medium strong brown (7.5YR 5/6) mottles; weak fine platy structure parting to weak fine subangular blocky; firm; few very fine roots; 10 percent rock fragments; very strongly acid; abrupt wavy boundary.

R—34 inches; porous sandstone bedrock.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The content of rock fragments ranges from 0 to 15 percent, by volume, in the A horizon and from 5 to 25 percent, by volume, in the BA, Bt, and BC horizons. In unlimed areas reaction is very strongly acid or strongly acid.

The A horizon has hue of 10Y and value and chroma of 2 to 4. The texture of the fine-earth material is loam.

The BA horizon has hue of 10YR, value of 3 to 5, and chroma of 3 or 4. The texture of the fine-earth material is loam or silt loam.

The Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 6. The texture of the fine-earth material is loam or silt loam.

The BC horizon has hue of 10YR, value of 5 or 6, and chroma of 6. The texture of the fine-earth material is loam or silt loam.

Gauley Series

The Gauley series consists of moderately deep, well drained soils that formed in acid material weathered from sandstone bedrock. These soils are on ridgetops and shoulder slopes, mainly at elevations of more than 3,400 feet, in the eastern part of the county. Slope ranges from 3 to 35 percent.

Gauley soils are on the landscape with the well drained Mandy soils and the moderately well drained Simoda and Snowdog soils. Unlike Gauley soils,

Mandy, Simoda, and Snowdog soils do not have a spodic horizon.

Typical pedon of Gauley extremely channery sandy loam, 3 to 15 percent slopes, rubbly, in a wooded area; about 5,000 feet south-southwest of the confluence of Dogway Run and Cranberry River; about 50 feet south of Pocahontas Trail; USGS Fork Mountain topographic quadrangle; lat. 38 degrees 14 minutes 28 seconds N. and long. 80 degrees 23 minutes 02 seconds W.

Oi—4 to 3 inches; undecomposed leaf litter from red spruce.

Oe—3 inches to 0; partially decomposed leaf litter from red spruce.

A—0 to 4 inches; black (N 2/0) extremely channery sandy loam; weak fine granular structure; very friable; many very fine to very coarse roots; 75 percent rock fragments; extremely acid; gradual wavy boundary.

E—4 to 14 inches; dark brown (7.5YR 4/2) and grayish brown (10YR 5/2) very channery loamy sand; weak coarse prismatic structure parting to weak medium granular; firm; few very fine and fine roots; 35 percent rock fragments; extremely acid; clear smooth boundary.

Bhs—14 to 19 inches; dark brown (7.5YR 3/2 and 4/4) channery sandy loam; weak fine and medium subangular blocky structure; friable; common very fine and fine roots; few fine black (5YR 2.5/1) organic stains; 30 percent rock fragments; extremely acid; gradual wavy boundary.

Bs—19 to 28 inches; dark brown (7.5YR 4/4) very channery sandy loam; weak coarse and very coarse platy structure parting to weak medium subangular blocky; firm; few fine black (5YR 2.5/1) organic stains; 45 percent rock fragments; extremely acid.

R—28 inches; hard, gray sandstone bedrock.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The content of rock fragments ranges from 20 to 75 percent, by volume, in the individual horizons. In unlimed areas reaction is extremely acid or very strongly acid.

The A horizon is neutral in hue or has hue of 10YR. It has value of 2 and chroma of 0 or 1. The texture of the fine-earth material is sandy loam or loam.

The E horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2. The texture of the fine-earth material is loamy sand or sandy loam.

The Bhs horizon has hue of 7.5YR, value of 3 or 4, and chroma of 2 to 4. The texture of the fine-earth material is sandy loam or loam.

The Bs horizon has hue of 7.5YR, value of 4, and chroma of 4 to 6. The texture of the fine-earth material is sandy loam or loam.

Gilpin Series

The Gilpin series consists of moderately deep, well drained soils that formed in acid material weathered from interbedded sandstone, siltstone, and shale bedrock. These soils are on ridgetops, benches, and side slopes throughout the county. Slope ranges from 3 to 70 percent.

Gilpin soils are on the landscape with the well drained Cateache, Cedarcreek, Dekalb, Guyandotte, Itmann, Kaymine, Laidig, Pineville, and Shouns soils and Udorthents and the moderately well drained Fenwick soils. Gilpin soils are fine-loamy, while Cedarcreek, Dekalb, Guyandotte, Itmann, and Kaymine soils are loamy-skeletal. Gilpin soils are not so deep as the Laidig, Pineville, and Shouns soils and Udorthents. They do not have the reddish brown Bt horizon that is typical of Cateache soils.

Typical pedon of Gilpin silt loam in a wooded area of Pineville-Gilpin-Guyandotte association, very steep, extremely stony; about 600 feet east of Amos Branch; about 1.0 mile east of County Route 28; about 3.6 miles northeast of Wainville; USGS Erbacon topographic quadrangle; lat. 38 degrees 30 minutes 56 seconds N. and long. 80 degrees 31 minutes 19 seconds W.

Oi—2 inches to 1 inch; loose hardwood leaf litter.

Oe—1 inch to 0; partially decomposed hardwood leaf litter.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; very friable; many fine to coarse roots; 10 percent rock fragments; very strongly acid; clear smooth boundary.

Bt1—2 to 11 inches; yellowish brown (10YR 5/6) channery silt loam; weak fine and medium subangular blocky structure; friable; common distinct clay films on faces of peds; common fine to coarse roots; 15 percent rock fragments; very strongly acid; clear wavy boundary.

Bt2—11 to 26 inches; yellowish brown (10YR 5/6) channery silt loam; weak medium subangular blocky structure; friable; common distinct clay films on faces of peds; common fine to coarse roots; 15 percent rock fragments; very strongly acid; clear wavy boundary.

C—26 to 36 inches; yellowish brown (10YR 5/6) channery silt loam; massive; friable; few fine roots; 30 percent rock fragments; very strongly acid.

R—36 inches; sandstone bedrock.

The thickness of the solum ranges from 18 to 36 inches. The depth to bedrock ranges from 20 to 40 inches. The content of rock fragments ranges from 5 to 40 percent, by volume, in individual horizons of the solum and from 30 to 50 percent, by volume, in the C horizon. In unlimed areas reaction is extremely acid to strongly acid.

The A horizon has hue of 10YR, value of 3, and chroma of 2 or 3. The texture of the fine-earth material is loam or silt loam.

The B horizon has hue of 10YR and value and chroma of 4 to 6. The texture of the fine-earth material is loam or silt loam.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. The texture of the fine-earth material is loam or silt loam.

Guyandotte Series

The Guyandotte series consists of very deep, well drained soils that formed in acid, colluvial material moved downslope from soils on uplands. The Guyandotte soils are on north-facing mountain side slopes. Slope ranges from 35 to 70 percent.

Guyandotte soils are on the landscape with the well drained Dekalb, Gilpin, Laidig, and Pineville soils. Guyandotte soils are loamy-skeletal, while Gilpin, Laidig, and Pineville soils are fine-loamy. Guyandotte soils are deeper than Dekalb soils.

Typical pedon of Guyandotte channery silt loam in a wooded area of Pineville-Gilpin-Guyandotte association, very steep, extremely stony; about 0.5 mile west of County Route 28/1; about 2.5 miles east of Erbacon at the head of Camp Creek; USGS Erbacon topographic quadrangle; lat. 38 degrees 31 minutes 16 seconds N. and long. 80 degrees 32 minutes 41 seconds W.

Oi—1 inch to 0; loose hardwood leaf litter.

A1—0 to 11 inches; black (10YR 2/1) channery silt loam; weak medium and coarse granular structure; very friable; many fine and medium roots; 15 percent rock fragments; neutral; clear smooth boundary.

A2—11 to 19 inches; very dark grayish brown (10YR 3/2) channery silt loam; moderate fine subangular blocky structure; very friable; many fine and medium roots; 25 percent rock fragments; neutral; clear smooth boundary.

Bw1—19 to 30 inches; dark yellowish brown (10YR 4/4) very channery silt loam; weak medium subangular blocky structure; friable; many fine and medium roots; 35 percent rock fragments; strongly acid; clear wavy boundary.

Bw2—30 to 55 inches; dark yellowish brown (10YR 4/4) very channery silt loam; weak medium and coarse subangular blocky structure; friable; common fine roots; 55 percent rock fragments; strongly acid; clear smooth boundary.

C—55 to 65 inches; dark yellowish brown (10YR 4/4) extremely channery loam; massive; friable; 70 percent rock fragments; moderately acid.

The thickness of the solum ranges from 50 to 60 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 15 to 65 percent, by volume, in individual horizons of the solum and from 30 to 70 percent, by volume, in the C horizon. In unlimed areas reaction is very strongly acid to neutral in the surface soil and very strongly acid to moderately acid in the B and C horizons.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The texture of the fine-earth material is loam or silt loam.

The Bw horizon has hue of 10YR, value of 3 to 5, and chroma of 4 to 6. The texture of the fine-earth material is loam or silt loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The texture of the fine-earth material is loam or silt loam.

Itmann Series

The Itmann series consists of very deep, somewhat excessively drained soils that formed in acid waste material from deep mined coal. Most areas are covered with as much as 20 inches of natural soil from the surrounding area. The Itmann soils are on ridgetops, benches, and hillsides, mostly around Bolair and Erbacon. Slope ranges from 8 to 70 percent.

Itmann soils are on the landscape with the well drained Cedarcreek, Gilpin, Kaymine, and Laidig soils and Udorthents. Itmann soils have more carbolithic rock fragments throughout the profile than Cedarcreek, Gilpin, Kaymine, and Laidig soils and Udorthents.

Typical pedon of Itmann channery loam, very steep, in an area of reclaimed mine spoil in the community of Bolair; about 1,000 feet behind Spring Ridge Coal Co. tipple; USGS Webster Springs topographic quadrangle; lat. 38 degrees 26 minutes 02 seconds N. and long. 80 degrees 26 minutes 03 seconds W.

A—0 to 14 inches; dark yellowish brown (10YR 4/4 and 4/6) channery loam; massive; very friable; many fine to coarse roots; 25 percent rock fragments (90 percent sandstone, 5 percent mudstone, and 5 percent carbolith); neutral; abrupt smooth boundary.

C1—14 to 22 inches; black (N 2/0) extremely

channery sandy loam; single grain; loose; common very fine to medium roots; 65 percent rock fragments (80 percent carbolith and 20 percent mudstone); strongly acid; gradual wavy boundary.

C2—22 to 55 inches; black (N 2/0) extremely channery sandy loam; single grain; loose; few fine roots; 80 percent rock fragments (80 percent carbolith and 20 percent mudstone); strongly acid; gradual wavy boundary.

C3—55 to 65 inches; black (N 2/0) very channery sandy loam; single grain; loose; 55 percent rock fragments (80 percent carbolith and 20 percent mudstone); strongly acid.

The depth to bedrock is more than 60 inches. The content of rock fragments of carbolith, mudstone, and sandstone ranges from 15 to 80 percent, by volume, throughout the profile but averages 35 percent or more in the control section. Carbolith fragments make up more than 50 percent of the total content of rock fragments. In unlimed areas reaction is extremely acid to strongly acid.

The A horizon has hue of 10YR and value and chroma of 4 to 6. The texture of the fine-earth material is loam.

The C horizon is neutral in hue. The texture of the fine-earth material is sandy loam.

Kaymine Series

The Kaymine series consists of very deep, well drained soils that formed in a mixture of partially weathered sandstone, siltstone, shale, mudstone, and coal rock fragments and partially weathered fine-earth material in areas that have been disturbed by surface mining operations. These soils are on ridgetops, benches, and side slopes throughout the county. Slope ranges from 3 to 80 percent.

Kaymine soils are on the landscape with the well drained Gilpin, Itmann, Laidig, and Pineville soils and Udorthents. Kaymine soils are loamy-skeletal, while Gilpin, Laidig, and Pineville soils and Udorthents are fine-loamy. Kaymine soils do not have the high content of carbolithic rock fragments that is typical of Itmann soils.

Typical pedon of Kaymine very channery silt loam, very steep, extremely stony, in an idle area; about 0.68 mile east of the junction of Board Fork and County Route 44; about 850 feet southeast of Board Fork; USGS Tioga topographic quadrangle; lat. 38 degrees 25 minutes 40 seconds N. and long. 80 degrees 37 minutes 38 seconds W.

A—0 to 7 inches; dark grayish brown (10YR 4/2) very channery silt loam; weak fine subangular blocky structure; friable; many fine and medium roots; 40 percent rock fragments (55 percent mudstone and 45 percent sandstone); neutral; gradual wavy boundary.

C1—7 to 24 inches; brown (10YR 5/3) very channery silt loam; massive; friable; common fine roots; 50 percent rock fragments (55 percent mudstone and 45 percent sandstone); slightly acid; gradual wavy boundary.

C2—24 to 36 inches; yellowish brown (10YR 5/4) very channery silt loam; massive; firm; many fine and medium brown (10YR 5/3) lithochromic mottles; 60 percent rock fragments (55 percent mudstone and 45 percent sandstone); neutral; clear wavy boundary.

C3—36 to 65 inches; dark grayish brown (2.5Y 4/2) extremely channery silt loam; massive; firm; 65 percent rock fragments (50 percent mudstone, 45 percent sandstone, and 5 percent coal); slightly acid.

The depth to bedrock is more than 60 inches. The content of rock fragments of sandstone, siltstone, shale, mudstone, and coal ranges from 15 to 50 percent, by volume, in the A horizon and from 45 to 70 percent, by volume, in the C horizon. The percentage of each rock type is less than 65 percent of the total rock fragments in the control section. Most of the rock fragments are channers, but some are stones or boulders. All of the horizons in some pedons and some of the horizons in other pedons have red, brown, yellow, or gray lithochromic mottles. In unlimed areas reaction is moderately acid to neutral.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The texture of the fine-earth material is silt loam.

The C horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 4. The texture of the fine-earth material is silt loam or loam.

Laidig Series

The Laidig series consists of very deep, well drained soils that formed in acid, colluvial material moved downslope from soils on uplands. The Laidig soils are on foot slopes and mountain side slopes. Slope ranges from 3 to 45 percent.

Laidig soils are on the landscape with the well drained Cateache, Cedarcreek, Dekalb, Gilpin, Guyandotte, Itmann, Kaymine, Mandy, Pineville, and Shouns soils and Udorthents and the moderately well

drained Meckesville and Simoda soils. Laidig soils are deeper than the Cateache, Dekalb, Gilpin, and Mandy soils. They are fine-loamy, while Cedarcreek, Guyandotte, Itmann, and Kaymine soils are loamy-skeletal. Laidig soils have a fragipan, which is not characteristic of Pineville and Shouns soils and Udorthents. They do not have the red Bt horizon typical of Meckesville soils.

Typical pedon of Laidig channery silt loam, 8 to 35 percent slopes, rubbly, in a wooded area; about 150 feet north of Bear Run along a logging road; about 2.1 miles northeast of Forest Service Route 76; about 2.0 miles east of Big Rock campground; USGS Webster Springs SW topographic quadrangle; lat. 38 degrees 18 minutes 54 seconds N. and long. 80 degrees 29 minutes 30 seconds W.

Oe—1 inch to 0; partially decomposed hardwood leaf litter.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) channery silt loam; weak fine and medium granular structure; very friable; many fine to coarse roots; 15 percent rock fragments; extremely acid; clear smooth boundary.

BA—4 to 12 inches; dark yellowish brown (10YR 4/4) channery silt loam; weak fine and medium subangular blocky structure; friable; many medium and coarse roots; 15 percent rock fragments; very strongly acid; clear wavy boundary.

Bt1—12 to 20 inches; yellowish brown (10YR 5/6) channery silt loam; weak medium subangular blocky structure; friable; few distinct clay films on faces of peds; common fine and medium roots; 25 percent rock fragments; extremely acid; gradual wavy boundary.

Bt2—20 to 32 inches; yellowish brown (10YR 5/6) channery loam; few fine yellowish brown (10YR 5/4) and strong brown (7.5YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; few distinct clay films on faces of peds; common fine and medium roots; 30 percent rock fragments; extremely acid; clear smooth boundary.

Btx1—32 to 51 inches; yellowish brown (10YR 5/6) very channery loam; common medium light gray (2.5Y 7/2) and strong brown (7.5YR 5/6) mottles; weak very coarse prismatic structure parting to weak medium subangular blocky; brittle; firm; few distinct clay films on faces of peds and in pores; common black concretions; 50 percent rock fragments; very strongly acid; clear smooth boundary.

Btx2—51 to 60 inches; yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) very channery loam; common medium pinkish gray (7.5YR 7/2) mottles; weak very coarse prismatic structure parting to weak medium subangular blocky; brittle; very firm; few distinct clay films on faces of peds and in pores; common black concretions; 50 percent rock fragments; extremely acid; gradual wavy boundary.

2C—60 to 65 inches; strong brown (7.5YR 5/8) very channery sandy clay loam; common medium yellowish brown (10YR 5/8) mottles; massive; firm; common black concretions; 40 percent rock fragments; extremely acid.

The thickness of the solum ranges from 50 to 70 inches. The depth to bedrock is more than 60 inches. The depth to the fragipan ranges from 30 to 50 inches. The content of rock fragments ranges from 10 to 50 percent, by volume, in the A, BA, and Bt horizons and from 25 to 60 percent, by volume, in the Btx and C horizons. In unlimed areas reaction is extremely acid or very strongly acid.

The A horizon has hue of 10YR, value of 3, and chroma of 1 or 2. The texture of the fine-earth material is silt loam.

The BA horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The texture of the fine-earth material is loam or silt loam.

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. The texture of the fine-earth material is loam or silt loam.

The Btx horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The texture of the fine-earth material is sandy loam, loam, or silt loam.

The C horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 4 to 8. The texture of the fine-earth material is fine sandy loam, loam, silt loam, or sandy clay loam.

Mandy Series

The Mandy series consists of moderately deep, well drained soils that formed in acid material weathered from interbedded sandstone, siltstone, and shale bedrock. These soils are on mountain side slopes, shoulder slopes, and ridgetops, mainly at elevations of more than 3,400 feet, in the eastern part of the county. Slope ranges from 3 to 70 percent.

Mandy soils are on the landscape with the well drained Gauley and Laidig soils and the moderately well drained Simoda and Snowdog soils. Mandy soils are not so deep as the Laidig, Simoda, and Snowdog soils. They do not have the spodic horizon that is typical in Gauley soils.

Typical pedon of Mandy channery silt loam, 35 to 55 percent slopes, extremely stony, in a wooded area; about 2,500 feet south-southeast of the confluence of Pheasant Hollow and Cranberry River; about 100 feet

south of Forest Service Route 77; USGS Webster Springs SW topographic quadrangle; lat. 38 degrees 15 minutes 28 seconds N. and long. 80 degrees 24 minutes 31 seconds W.

Oi—2 inches to 1 inch; loose hardwood leaf litter.
Oe—1 inch to 0; partially decomposed hardwood leaf litter.
A—0 to 2 inches; dark brown (10YR 3/3) channery silt loam; moderate fine and medium granular structure; very friable; many fine to coarse roots; 20 percent rock fragments; extremely acid; abrupt wavy boundary.
BA—2 to 7 inches; dark yellowish brown (10YR 4/4) channery silt loam; weak fine and medium subangular blocky structure; very friable; many fine to coarse roots; 25 percent rock fragments; extremely acid; clear wavy boundary.
Bw1—7 to 14 inches; yellowish brown (10YR 5/6) very channery silt loam; weak fine and medium subangular blocky structure; friable; many very fine to coarse roots; 35 percent rock fragments; extremely acid; clear wavy boundary.
Bw2—14 to 24 inches; yellowish brown (10YR 5/4) very channery silt loam; weak fine and medium subangular blocky structure; friable; few very fine and fine roots; 50 percent rock fragments; very strongly acid; clear wavy boundary.
C—24 to 34 inches; yellowish brown (10YR 5/4) extremely channery silt loam; massive; firm; few very fine to coarse roots; 85 percent rock fragments; very strongly acid; clear wavy boundary.
Cr—34 inches; fractured siltstone bedrock.

The thickness of the solum ranges from 20 to 30 inches. The depth to bedrock ranges from 20 to 40 inches. The content of rock fragments ranges from 15 to 25 percent, by volume, in the A and BA horizons, from 30 to 50 percent, by volume, in the Bw horizon, and from 60 to 90 percent, by volume, in the C horizon. In unlimed areas reaction is extremely acid or very strongly acid.

The A horizon has hue of 10YR and value and chroma of 2 or 3. The texture of the fine-earth material is silt loam.

The BA horizon has hue of 10YR and value and chroma of 3 or 4. The texture of the fine-earth material is silt loam.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The texture of the fine-earth material is loam or silt loam.

The C horizon has hue of 10YR, value of 5, and chroma of 4 to 6. The texture of the fine-earth material is loam or silt loam.

Meckesville Series

The Meckesville series consists of very deep, well drained soils that formed in acid, colluvial material moved downslope from soils on uplands. The Meckesville soils are on foot slopes in the central and eastern parts of the county. Slope ranges from 15 to 35 percent.

Meckesville soils are on the landscape with the well drained Cateache, Laidig, and Shouns soils. They have a fragipan, which is not characteristic of Cateache and Shouns soils. Meckesville soils have a redder Bt horizon than Laidig soils.

Typical pedon of Meckesville silt loam, 15 to 35 percent slopes, extremely stony, in a wooded area; about 500 feet south of Elk River; about 800 feet southeast of the Western Maryland Railroad bridge; USGS Samp topographic quadrangle; lat. 38 degrees 30 minutes 50 seconds N. and long. 80 degrees 13 minutes 40 seconds W.

Oi—1 inch to 0; loose hardwood leaf litter.
A—0 to 3 inches; dark brown (7.5YR 3/2) silt loam; moderate fine and medium granular structure; very friable; many fine to coarse roots; 5 percent rock fragments; slightly acid; abrupt wavy boundary.
Bt1—3 to 15 inches; reddish brown (5YR 4/4) silt loam; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; many fine to coarse roots; 5 percent rock fragments; strongly acid; clear wavy boundary.
Bt2—15 to 29 inches; yellowish red (5YR 4/6) silt loam; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; many fine and medium roots; 10 percent rock fragments; strongly acid; clear wavy boundary.
Bt3—29 to 36 inches; yellowish red (5YR 4/6) channery silt loam; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; many fine roots; 20 percent rock fragments; strongly acid; abrupt wavy boundary.
Btx1—36 to 55 inches; reddish brown (5YR 4/4) channery loam; few fine reddish gray (5YR 5/2) and few medium strong brown (7.5YR 5/6) mottles; weak very coarse prismatic structure parting to weak medium and coarse subangular blocky; firm and brittle; few distinct clay films on faces of peds and in pores; many black concretions; 30 percent rock fragments; strongly acid; gradual wavy boundary.
Btx2—55 to 65 inches; reddish brown (5YR 4/4)

channery loam; few fine and medium reddish gray (5YR 5/2) and few medium strong brown (7.5YR 5/6) mottles; weak very coarse prismatic structure parting to weak very coarse platy; very firm and brittle; few distinct clay films on faces of peds and in pores; many black concretions; 20 percent rock fragments; strongly acid.

The thickness of the solum ranges from 50 to 80 inches. The depth to bedrock is more than 60 inches. The depth to the fragipan ranges from 25 to 40 inches. The content of rock fragments ranges from 5 to 20 percent, by volume, in the A and Bt horizons and from 15 to 40 percent, by volume, in the Btx horizons. In unlimed areas reaction is very strongly acid or strongly acid.

The A horizon has hue of 5YR or 7.5YR, value of 3, and chroma of 2 or 3. The texture of the fine-earth material is silt loam.

The Bt horizon has hue of 5YR, value of 3 or 4, and chroma of 4 to 6. The texture of the fine-earth material is silt loam or silty clay loam.

The Btx horizon has hue of 5YR, value of 3 or 4, and chroma of 4. The texture of the fine-earth material is loam or silt loam.

Philo Series

The Philo series consists of very deep, moderately well drained soils that formed in acid, alluvial deposits washed from soils on uplands. The Philo soils are on narrow flood plains throughout the county. They are subject to occasional flooding. Slope ranges from 0 to 3 percent.

Philo soils are on the landscape with the somewhat excessively drained Potomac soils, the well drained Chavies, Craigsville, and Pope soils, the moderately well drained Cotaco soils, and the poorly drained Atkins and Elkins soils. Cotaco soils are on terraces.

Typical pedon of Philo loam in an idle area of Philo-Pope complex; about 25 feet east of Amos Run; about 1.75 miles northeast of the intersection of County Routes 9 and 28; USGS Erbacon topographic quadrangle; lat. 38 degrees 30 minutes 15 seconds N. and long. 80 degrees 32 minutes 48 seconds W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loam; moderate fine and medium granular structure; very friable; many very fine to coarse roots; neutral; abrupt smooth boundary.

Bw1—9 to 18 inches; dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; friable; many very fine to coarse roots; moderately acid; clear wavy boundary.

Bw2—18 to 30 inches; dark yellowish brown (10YR 4/4) loam; common medium grayish brown (10YR 5/2) and common fine and medium strong brown (7.5YR 4/6 and 5/6) mottles; weak medium and coarse subangular blocky structure; friable; many very fine to coarse roots; moderately acid; clear wavy boundary.

C—30 to 36 inches; dark brown (10YR 4/3) sandy loam; common fine and medium yellowish red (5YR 4/6) and few fine grayish brown (10YR 5/2) mottles; massive; friable; few very fine and fine roots; strongly acid; abrupt wavy boundary.

2C—36 to 65 inches; dark yellowish brown (10YR 4/4) very gravelly sandy loam; few fine grayish brown (10YR 5/2) and strong brown (7.5YR 5/6) mottles; massive; very friable; 40 percent rock fragments; very strongly acid.

The thickness of the solum ranges from 20 to 48 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 20 percent, by volume, in the A, Bw, and C horizons and from 0 to 40 percent, by volume, in the 2C horizon. In unlimed areas reaction is very strongly acid to moderately acid.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The texture of the fine-earth material is loam.

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. The texture of the fine-earth material is loam or silt loam.

The C horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 3. The texture of the fine-earth material is sandy loam, loam, or silt loam.

The 2C horizon is neutral in hue or has hue of 10YR or 2.5Y. It has value of 4 to 6 and chroma of 0 to 4. The texture of the fine-earth material is fine sandy loam or sandy loam.

Pineville Series

The Pineville series consists of very deep, well drained soils that formed in acid, colluvial material that moved downslope from soils on uplands. The Pineville soils are on mountain side slopes and foot slopes. Slope ranges from 35 to 70 percent.

Pineville soils are on the landscape with the well drained Dekalb, Gilpin, Guyandotte, Kaymine, and Laidig soils and Udorthents. Pineville soils are fine-loamy, while Dekalb, Guyandotte, and Kaymine soils are loamy-skeletal. Pineville soils are deeper than Gilpin soils. They do not have a fragipan, which is characteristic of Laidig soils. They have a Bt horizon, which is not typical of Udorthents.

Typical pedon of Pineville channery loam in a wooded area of Pineville-Gilpin-Guyandotte association, very steep, extremely stony; about 1,500 feet west of County Route 28; about 2.5 miles northeast of Wainville; USGS Erbacon topographic quadrangle; lat. 38 degrees 31 minutes 46 seconds N. and long. 80 degrees 32 minutes 29 seconds W.

Oi—3 inches to 1 inch; loose hardwood leaf litter.

Oe—1 inch to 0; partially decomposed hardwood leaf litter.

A—0 to 5 inches; very dark brown (10YR 2/2) channery loam; weak fine and medium granular structure; very friable; common fine and medium roots; 20 percent rock fragments; very strongly acid; clear wavy boundary.

BA—5 to 11 inches; yellowish brown (10YR 5/4) channery loam; weak fine subangular blocky structure; friable; common medium roots; 25 percent rock fragments; very strongly acid; clear wavy boundary.

Bt1—11 to 22 inches; yellowish brown (10YR 5/6) channery loam; moderate fine and medium subangular blocky structure; friable; few distinct clay films on faces of peds and in pores; common medium and coarse roots; 25 percent rock fragments; very strongly acid; gradual wavy boundary.

Bt2—22 to 36 inches; yellowish brown (10YR 5/6) channery loam; moderate medium and coarse subangular blocky structure; friable; few distinct clay films on faces of peds and in pores; common medium and coarse roots; 30 percent rock fragments; very strongly acid; gradual wavy boundary.

BC—36 to 50 inches; yellowish brown (10YR 5/6) very channery loam; weak medium subangular blocky structure; friable; few medium roots; 45 percent rock fragments; very strongly acid; gradual wavy boundary.

C—50 to 65 inches; yellowish brown (10YR 5/6) very channery loam; few medium distinct strong brown (7.5YR 5/6) and faint yellowish brown (10YR 5/4) mottles; massive; friable; few roots; 55 percent rock fragments; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 10 to 55 percent, by volume, in individual horizons of the solum and from 25 to 70 percent, by volume, in the C horizon. In unlimed areas reaction is very strongly acid or strongly acid.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3. The texture of the fine-earth material is sandy loam, loam, or silt loam.

The BA horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 8. The texture of the fine-earth material is sandy loam or loam.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The texture of the fine-earth material is sandy loam or loam.

The BC horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The texture of the fine-earth material is loam.

The C horizon has hue of 10YR, value of 4 to 6, and chroma of 4 to 8. The texture of the fine-earth material is sandy loam or loam.

Pope Series

The Pope series consists of very deep, well drained soils that formed in acid, alluvial deposits washed from soils on uplands. The Pope soils are on flood plains throughout the county. They are subject to occasional flooding. Slope ranges from 0 to 3 percent.

Pope soils are on the landscape with the somewhat excessively drained Potomac soils, the well drained Chavies and Craigsville soils, the moderately well drained Cotaco and Philo soils, and the poorly drained Atkins and Elkins soils. Pope soils are coarse-loamy, while Potomac soils are sandy-skeletal and Craigsville soils are loamy-skeletal. Pope soils do not have the argillic horizon typical of Chavies soils.

Typical pedon of Pope loam in a wooded area along the Gauley River; about 250 feet south of County Route 42; about 3 miles west of Jerryville; USGS Bergoo topographic quadrangle; lat. 38 degrees 25 minutes 33 seconds N. and long. 80 degrees 20 minutes 45 seconds W.

Oi—2 inches to 0; loose hardwood leaf litter.

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam; weak medium and coarse granular structure; very friable; many fine to coarse roots; very strongly acid; clear smooth boundary.

Bw1—4 to 15 inches; dark yellowish brown (10YR 4/4) loam; weak fine and medium subangular blocky structure; very friable; common fine to coarse roots; strongly acid; clear wavy boundary.

Bw2—15 to 47 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak medium and coarse subangular blocky structure; very friable; strongly acid; gradual wavy boundary.

C—47 to 65 inches; dark yellowish brown (10YR 4/6) fine sandy loam; massive; very friable; strongly acid.

The thickness of the solum ranges from 30 to 50 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 15 percent, by volume, in the A and Bw horizons and from 0 to 50 percent, by volume, in the C horizon. In unlimed areas reaction is extremely acid to strongly acid.

The A horizon has hue of 10YR, value of 4, and chroma of 2 or 3. The texture of the fine-earth material is fine sandy loam, sandy loam, or loam.

The Bw horizon has hue of 10YR and value and chroma of 4 to 6. The texture of the fine-earth material is loam.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. The texture of the fine-earth material is loamy sand, fine sandy loam, sandy loam, or loam.

Potomac Series

The Potomac series consists of very deep, somewhat excessively drained soils that formed in acid, alluvial deposits washed from soils on uplands. The Potomac soils are on flood plains throughout the county. They are subject to occasional flooding. Slope ranges from 0 to 3 percent.

Potomac soils are on the landscape with the well drained Chavies, Craigsville, and Pope soils, the moderately well drained Philo soils, and the poorly drained Atkins soils. Potomac soils are sandy-skeletal, while Chavies and Pope soils are coarse-loamy and Craigsville soils are loamy-skeletal.

Typical pedon of Potomac gravelly sandy loam in a wooded area of Pope-Potomac complex, very cobbly; about 1,300 feet upstream from the confluence of Right Fork and Turkey Creek; about 75 feet north of Turkey Creek; USGS Bergoo topographic quadrangle; lat. 38 degrees 24 minutes 35 seconds N. and long. 80 degrees 21 minutes 13 seconds W.

Oi—1 inch to 0; loose hardwood leaf litter.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) gravelly sandy loam; weak fine and medium granular structure; very friable; many very fine to coarse roots; 20 percent gravel; very strongly acid; clear smooth boundary.

A2—4 to 9 inches; dark brown (7.5YR 4/4) gravelly sandy loam; weak medium subangular blocky structure; very friable; many fine to coarse roots; 20 percent gravel; very strongly acid; gradual wavy boundary.

C1—9 to 26 inches; dark yellowish brown (10YR 4/4) very gravelly loamy sand; single grain; loose; common very fine and fine roots; 35 percent gravel; very strongly acid; gradual wavy boundary.

C2—26 to 37 inches; dark yellowish brown (10YR 4/4) very gravelly loamy sand; single grain; loose; few fine roots; 55 percent gravel; very strongly acid; gradual wavy boundary.

C3—37 to 65 inches; dark yellowish brown (10YR 4/4) extremely cobbly loamy coarse sand; single grain; loose; few fine roots; 70 percent cobbles; very strongly acid.

The A horizon is 3 to 9 inches thick. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 20 to 30 percent, by volume, in the A horizon and from 35 to 70 percent, by volume, in the C horizon. In unlimed areas reaction is very strongly acid.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. The texture of the fine-earth material is sandy loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4. The texture of the fine-earth material ranges from coarse sand to fine sandy loam.

Shouns Series

The Shouns series consists of very deep, well drained soils that formed in acid, colluvial material that moved downslope from soils on uplands. The Shouns soils are on mountain side slopes in the central and eastern parts of the county. Slope ranges from 35 to 70 percent.

Shouns soils are on the landscape with the well drained Cateache, Gilpin, and Laidig soils and the moderately well drained Meckesville soils. Shouns soils do not have the fragipan in the subsoil that is typical of Laidig and Meckesville soils. They are deeper than Cateache and Gilpin soils.

Typical pedon of Shouns silt loam in a wooded area of Shouns-Cateache complex, 35 to 70 percent slopes, extremely stony; about 2.5 miles southeast of Bergoo on County Route 26/4; about 300 feet northeast of County Route 26/4; USGS Bergoo topographic quadrangle; lat. 38 degrees 27 minutes 57 seconds N. and long. 80 degrees 15 minutes 58 seconds W.

Oi—2 inches to 0; loose hardwood leaf litter.

A—0 to 4 inches; dark brown (7.5YR 3/2) silt loam; moderate fine and medium granular structure; very friable; many fine roots; 10 percent rock fragments; strongly acid; clear smooth boundary.

BA—4 to 8 inches; dark brown (7.5YR 4/4) silt loam; moderate fine and medium subangular blocky structure; friable; many fine and medium roots; 10 percent rock fragments; strongly acid; clear wavy boundary.

Bt1—8 to 31 inches; reddish brown (5YR 4/4) channery silt loam; moderate medium subangular blocky structure; friable; few distinct clay films on faces of peds; common medium roots; 25 percent rock fragments; strongly acid; clear wavy boundary.

Bt2—31 to 45 inches; reddish brown (5YR 4/4) channery silt loam; weak medium subangular blocky structure; friable; few distinct clay films on faces of peds; common medium roots; 25 percent rock fragments; strongly acid; clear wavy boundary.

C—45 to 65 inches; reddish brown (5YR 4/4) channery silt loam; massive; firm; 20 percent rock fragments; strongly acid.

The thickness of the solum ranges from 45 to 55 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 5 to 25 percent, by volume, in the A, BA, and Bt horizons and from 15 to 50 percent, by volume, in the C horizon. In unlimed areas reaction is very strongly acid or strongly acid.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. The texture of the fine-earth material is silt loam.

The BA horizon has hue of 5YR, 7.5YR, or 10YR, value of 4, and chroma of 3 or 4. The texture of the fine-earth material is loam or silt loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. The texture of the fine-earth material is silt loam or silty clay loam.

The C horizon has hue of 2.5YR or 5YR, value of 4, and chroma of 3 or 4. The texture of the fine-earth material is loam, silt loam, or silty clay loam.

Simoda Series

The Simoda series consists of deep, moderately well drained soils that formed in acid material weathered from interbedded sandstone, siltstone, and shale bedrock. These soils are on broad ridgetops and in upland depressions, mainly at elevations of more than 3,400 feet, in the eastern part of the county. Slope ranges from 3 to 15 percent.

Simoda soils are on the landscape with the well drained Gauley, Laidig, and Mandy soils and the moderately well drained Snowdog soils. They are deeper than Gauley and Mandy soils. Snowdog soils formed in colluvium.

Typical pedon of Simoda silt loam, 3 to 15 percent slopes, very stony, in a wooded area; about 2,000 feet southwest of the confluence of Dogway Fork and Cranberry River; USGS Webster Springs SW topographic quadrangle; lat. 38 degrees 15 minutes 09 seconds N. and long. 80 degrees 22 minutes 52 seconds W.

Oi—1 inch to 0; loose hardwood leaf litter.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) silt loam; moderate fine and medium granular structure; very friable; many very fine to coarse roots; 10 percent rock fragments; extremely acid; clear wavy boundary.

BA—3 to 12 inches; yellowish brown (10YR 5/4) silt loam; moderate fine granular and weak medium subangular blocky structure; friable; many very fine to coarse roots; 10 percent rock fragments; extremely acid; clear wavy boundary.

Bw1—12 to 18 inches; dark yellowish brown (10YR 4/6) silt loam; moderate fine and medium subangular blocky structure; friable; common very fine to coarse roots; 10 percent rock fragments; extremely acid; clear wavy boundary.

Bw2—18 to 23 inches; yellowish brown (10YR 5/6) channery silt loam; common fine light brownish gray (10YR 6/2) and common fine and medium strong brown (7.5YR 5/8) mottles; moderate fine and medium subangular blocky structure; friable; common very fine to coarse roots; 20 percent rock fragments; very strongly acid; clear smooth boundary.

Bx1—23 to 36 inches; yellowish brown (10YR 5/4) channery loam; common medium gray (10YR 5/1) and strong brown (7.5YR 4/6) mottles; moderate very coarse prismatic structure parting to weak coarse platy; very firm and brittle; common black manganese concretions; 20 percent rock fragments; very strongly acid; gradual wavy boundary.

Bx2—36 to 48 inches; yellowish brown (10YR 5/4) channery loam; many medium gray (10YR 6/1) and strong brown (7.5YR 5/8) mottles; weak very coarse prismatic structure parting to weak coarse platy; firm and slightly brittle; few black concretions; 30 percent rock fragments; very strongly acid; abrupt wavy boundary.

R—48 inches; interbedded sandstone and shale bedrock.

The thickness of the solum ranges from 36 to 50 inches. The depth to bedrock ranges from 40 to 60 inches. The depth to the fragipan ranges from 15 to 30 inches. The content of rock fragments ranges from 5 to 30 percent, by volume, in the solum. In unlimed areas reaction is extremely acid or very strongly acid.

The A horizon has hue of 10YR and value and chroma of 2 or 3. The texture of the fine-earth material is loam or silt loam.

The BA horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The texture of the fine-earth material is loam or silt loam.

The Bw and Bx horizons have hue of 10YR, value of 4 or 5, and chroma of 4 to 6. The texture of the fine-earth material is loam or silt loam.

Snowdog Series

The Snowdog series consists of very deep, moderately well drained soils that formed in acid, colluvial material that moved downslope from soils on uplands. The Snowdog soils are on foot slopes and mountain side slopes, mainly at elevations of more than 3,400 feet, in the eastern part of the county. Slope ranges from 15 to 35 percent.

Snowdog soils are on the landscape with the well drained Gauley and Mandy soils and the moderately well drained Simoda soils. They are deeper than the Gauley and Mandy soils. Simoda soils formed in acid material weathered from interbedded sandstone, siltstone, and shale bedrock.

Typical pedon of Snowdog channery loam, 15 to 35 percent slopes, rubbly, in a wooded area; about 1.25 miles north and 80 degrees east of the confluence of Lick Branch and Cranberry River; USGS Webster Springs SW topographic quadrangle; lat. 38 degrees 17 minutes 54 seconds N. and long. 80 degrees 23 minutes 55 seconds W.

Oi—1 inch to 0; partially decomposed hardwood leaf litter.

A—0 to 3 inches; very dark brown (10YR 2/2) channery loam; moderate fine and medium granular structure; very friable; many fine to coarse roots; 30 percent rock fragments; extremely acid; abrupt wavy boundary.

BA—3 to 8 inches; dark yellowish brown (10YR 4/4) channery loam; weak medium subangular blocky structure; friable; many fine to coarse roots; 25 percent rock fragments; extremely acid; abrupt wavy boundary.

Bw—8 to 24 inches; dark yellowish brown (10YR 4/6) channery loam; moderate medium and coarse subangular blocky structure; friable; many fine to coarse roots; 25 percent rock fragments; extremely acid; clear wavy boundary.

Bx1—24 to 33 inches; yellowish brown (10YR 5/6) channery sandy loam; few fine light brownish gray (10YR 6/2) and common medium brown (10YR 5/3) mottles; weak very coarse prismatic structure parting to moderate very coarse platy; firm and brittle; 35 percent rock fragments; very strongly acid; clear wavy boundary.

Bx2—33 to 51 inches; yellowish brown (10YR 5/6) very channery sandy loam; few fine light brownish gray (10YR 6/2) and common medium brown (10YR 5/3) mottles; weak very coarse prismatic structure parting to weak very coarse platy; very firm and brittle; common iron and manganese stains; 45 percent rock fragments; very strongly acid; clear wavy boundary.

C—51 to 65 inches; yellowish brown (10YR 5/8) very channery sandy loam; massive; friable; 55 percent rock fragments; very strongly acid.

The thickness of the solum ranges from 46 to 65 inches. The depth to bedrock is more than 60 inches. The depth to the fragipan ranges from 16 to 35 inches. The content of rock fragments ranges from 15 to 45 percent, by volume, in the A, BA, and Bw horizons and from 20 to 55 percent, by volume, in the Bx and C horizons. In unlimed areas reaction is extremely acid to strongly acid.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 4. The texture of the fine-earth material is loam.

The BA horizon has hue of 7.5YR or 10YR and value and chroma of 3 or 4. The texture of the fine-earth material is loam.

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 8. The texture of the fine-earth material is loam or silt loam.

The Bx horizon has hue of 10YR, value of 3 to 6, and chroma of 2 to 6. The texture of the fine-earth material is sandy loam or loam.

The C horizon has hue of 10YR, value of 4 to 6, and chroma of 4 to 8. The texture of the fine-earth material is sandy loam, loam, or silty clay loam.

Udorthents

Udorthents are generally very deep, well drained soils in areas that have been disturbed by road construction and other urban development. These soils are along highways and railroads and in mining sites, construction sites, and other areas that have been excavated or filled. Slope is 0 percent in places to nearly vertical in cuts.

A typical pedon of Udorthents is not given because of the variability of these soils. The depth to bedrock is generally more than 60 inches. Rock fragments of mudstone, sandstone, and shale vary in size and amount. Reaction ranges from very strongly acid to neutral.

These soils have hue of 5YR, 7.5YR, or 10YR, value of 3 to 6, and chroma of 2 to 8. The texture of the fine-earth material is silt loam, loam, silty clay loam, or clay loam.

Formation of the Soils

The origin and development of the soils in Webster County are explained in this section. The five major factors of soil formation are identified, and their influence on the soils in the county is described. Also, the morphology of the soils is related to horizon nomenclature, the processes of horizon development, and the geologic characteristics of the area.

Factors of Soil Formation

The soils in Webster County formed as a result of the interaction of five major factors of soil formation—parent material, time, climate, living organisms, and topography. Each factor modifies the effect of the others. Parent material, topography, and time have resulted in the major differences among the soils in the county. Climate and living organisms generally influence soil formation uniformly throughout broad areas.

Parent Material, Time, and Climate

The character of the parent material strongly influences the time required for soil formation and the nature of the soil that forms. The soils in Webster County formed in residual, colluvial, and alluvial material. Most formed in material weathered from interbedded sandstone, siltstone, and shale bedrock. For example, Gilpin soils formed in material weathered from interbedded fine-grained sandstone, siltstone, and shale bedrock, Dekalb soils formed in sandstone bedrock, and Shouns soils formed in siltstone and shale bedrock.

The residuum is the oldest parent material in the county. Soil formation has been retarded by clayey material, resistant rock, the slope, and constant erosion. Consequently, the profile of some of the soils that formed in residual material is less well developed than that of some of the soils that formed in younger material.

Colluvial material is along foot slopes and at the head of drainageways. This material moved downslope from areas of residual soils. Laidig soils formed in colluvium below areas of Gilpin soils, and Meckesville and Shouns soils formed in colluvium below areas of Cateache soils.

The parent material on terraces and flood plains was washed from areas of acid soils on uplands. The soil-forming processes have had considerable time to act on the material on terraces. Many additions, losses, and alterations have taken place. The resulting Cotaco soils are strongly leached and have a moderately well developed profile.

The alluvium on flood plains is the youngest parent material in the county. Most of this material is well suited to soil formation, but the soil-forming processes have had little time to act. The soils on flood plains generally have a weakly developed profile. Atkins, Elkins, Philo, Pope, and Potomac soils are examples.

Climate generally is relatively uniform throughout most of the survey area; however, a sharp contrast in climate occurs on the high plateaus south of the Elk River. This contrast in climate is responsible for differences in soils. On the high plateaus, precipitation is greater, mean annual temperatures are lower, and the growing season is shorter. Temperature has exerted a marked influence on the type and quantity of vegetation produced and thus influences the amount of organic matter produced. As a result, some soils have accumulated organic matter-sesquioxide complexes in subsurface horizons, or spodic horizons. The Gauley soils are an example of soils that have a spodic horizon. A detailed description of the climate is given in the section “General Nature of the County.”

Living Organisms

All living organisms, including plants, animals, bacteria, fungi, and people, affect soil formation. The kind and amount of vegetation are generally responsible for the content of organic matter and color of the surface layer and are partly responsible for the content of nutrients. Earthworms and burrowing animals help to keep the soil open and porous. They mix organic material with mineral material by moving soil to the surface. Bacteria and fungi decompose organic matter, thus releasing plant nutrients. They somewhat influence the weathering and decomposition of minerals. People influence the characteristics of the surface layer of soils when they clear vegetation, plow, mine, or otherwise disturb the

soil. They add fertilizer and lime and apply management techniques to increase the tilth and productivity of the surface layer.

Topography

Topography affects soil formation by its effect on the amount of water moving through the soil, the amount and rate of runoff, and the rate of erosion. Large amounts of water have moved through gently sloping and strongly sloping soils. In some places water percolates freely through the soils, such as in the Gilpin soils, and in other places its movement may be restricted, such as in the Laidig soils. On steep and very steep hillsides, less water moves through the soils and more water runs off the surface. The soil material is washed away almost as rapidly as the soil forms. As a result, the soils on many of the steeper hillsides are shallower over bedrock than the soils on the more gentle slopes.

The topography in Webster County favors the formation of soils on flood plains and terraces, and formation is progressing at a rapid rate. The soils on low flood plains are weakly developed, however, mainly because too little time has elapsed since the parent material was deposited.

Morphology of the Soils

The results of the soil-forming processes are evident in the different layers, or horizons, in the soil profile. The profile extends from the surface downward to material that has been little changed by the soil-forming processes. Most soils have three major horizons, called the A, B, and C horizons. Subdivisions of these horizons are indicated by numbers and lowercase letters in the horizon designators.

The A horizon is the surface layer. It is the layer that has the maximum accumulation of organic matter. It is also the layer of maximum leaching, or eluviation, of clay and iron.

The B horizon underlies the A horizon and is commonly called the subsoil. It is the horizon of maximum accumulation, or illuviation, of clay, iron, aluminum, or other compounds leached from the surface layer. It commonly has blocky structure and generally is firmer and lighter in color than the A horizon.

The C horizon is below the A and B horizons. It consists of material that has been modified by weathering but is little altered by the soil-forming processes.

Many processes have influenced the formation of horizons in the soils of Webster County. The more important of these are the accumulation of organic matter, the leaching of soluble soils, the reduction and transfer of iron, the formation and translocation of clay minerals, and the formation of soil structure. These processes are continuous and have been taking place for thousands of years.

In most of the well drained soils on uplands in the county, the B horizon is yellowish brown or reddish brown, mainly because of iron oxides. It has blocky structure and commonly contains translocated clay materials.

A fragipan has formed in the B horizon of the well drained Laidig soils and moderately well drained Meckesville soils on foot slopes. This layer is dense and brittle, is mottled, and is slowly or very slowly permeable to water and air. Most fragipans are grayish or are mottled with gray.

Moderately well drained to poorly drained soils commonly have gray colors. These colors are the result of gleying, or the reduction of iron, during soil formation.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium; on steep, rocky slopes; or in areas disturbed during mining or construction.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone. The material washed down the sides of mountains and hills by ephemeral streams and deposited at the mouth of gorges in the form of a moderately steep, conical mass descending equally in all directions from the point of issue.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

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.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Arroyo. The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in alluvium.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 2.4
Low	2.4 to 3.2
Moderate	3.2 to 5.2
High	more than 5.2

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Back slopes in profile are commonly steep, are linear, and may or may not include cliff segments.

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Bajada. A broad alluvial slope extending from the base of a mountain range out into a basin and formed by coalescence of separate alluvial fans.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height

and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep and very steep broken land at the border of an upland summit that is dissected by ravines.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Butte. An isolated small mountain or hill with steep or precipitous sides and a top variously flat, rounded, or pointed that may be a residual mass isolated by erosion or an exposed volcanic neck.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds directly beneath the solum, or it is exposed at the surface by erosion.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Canyon. A long, deep, narrow, very steep sided valley with high, precipitous walls in an area of high local relief.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Carbolith. Dark sedimentary rocks that leave black or very dark (Munsell value of 3 or less) streaks or powder. Carbolith includes coal, bone coal, and shale and mudstone that have a high content of carbon. In general, this material contains at least 25 percent carbonaceous matter, by volume, oxidizable at 350 to 400 degrees C.

Catena. A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of

exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Cement rock. Shaly limestone used in the manufacture of cement.

Channery soil material. Soil material that is, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Cirque. A semicircular, concave, bowllike area that has steep faces primarily resulting from glacial ice and snow abrasion.

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 depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

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.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Soil material or 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 establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas 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 or miscellaneous areas are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Congeliturbate. Soil material disturbed by frost action.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion

and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

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.

Coppice dune. A small dune of fine grained soil material stabilized around shrubs or small trees.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

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.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Cuesta. A hill or ridge that has a gentle slope on one side and a steep slope on the other; specifically, an asymmetric, homoclinal ridge capped by resistant rock layers of slight or moderate dip.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Delta. A body of alluvium having a surface that is nearly flat and fan shaped; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

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, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Desert pavement. On a desert surface, a layer of gravel or larger fragments that was emplaced by upward movement of the underlying sediments or that remains after finer particles have been removed by running water or the wind.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained,*

somewhat poorly drained, poorly drained, and *very poorly drained*. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Draw. A small stream valley that generally is more open and has broader bottom land than a ravine or gulch.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

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.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Esker. A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

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*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

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.

Gilgai. Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Glacial drift. Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

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 as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 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. Water filling all the unblocked pores of the 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.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head out. To form a flower head.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

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 A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

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 overlying soil material. 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, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

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.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

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.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
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.
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.

Kame. An irregular, short ridge or hill of stratified glacial drift.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

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 (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Lithochromic mottles. Mottles that have inherited their color from the rocks that made up the parent material of the soil.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be

removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mesa. A broad, nearly flat topped and commonly isolated upland mass characterized by summit widths that are more than the heights of bounding erosional scarps.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine. An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

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. 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).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

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. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Outslope. The exposed area sloping away from a bench cut section.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher lying areas of the erosion surface.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permafrost. Layers of soil, or even bedrock, occurring in arctic or subarctic regions, in which a temperature below freezing has existed continuously for a long time.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 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, such as slope, stoniness, and flooding.

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.

Pitting (in tables). Pits caused by melting around ice. They form on the soil after plant cover is removed.

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.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

Playa. The generally dry and nearly level lake plain that occupies the lowest parts of closed depressional areas, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

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.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the

appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

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 degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
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
Slightly 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

Red beds. Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

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.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Salty water (in tables). Water that is too salty for consumption by livestock.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite. Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

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. 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 (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

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.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is silty or clayey, is slippery when wet, and is low in productivity.

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 ensure satisfactory performance of the soil for a specific use.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

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 (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to Ca^{++} + Mg^{++}. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, 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 if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion 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 grain* (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 erosion 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. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a

crop every year. Summer fallow is frequently practiced before planting winter grain.

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."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talus. Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

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. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

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.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

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.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded 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.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

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 a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1951-86 at Webster Springs, West Virginia)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	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-----	42.5	21.5	32.0	69	-10	68	3.29	2.03	4.41	9	13.7
February----	46.8	23.8	35.3	73	-4	85	3.10	1.77	4.27	8	11.4
March-------	56.2	30.9	43.6	82	6	197	4.04	2.47	5.44	10	5.6
April-------	67.9	39.6	53.8	88	20	414	4.06	2.47	5.48	10	.9
May---------	76.2	47.8	62.0	90	28	682	4.42	2.76	5.92	9	.0
June--------	82.0	55.6	68.8	92	39	864	4.84	3.10	6.41	9	.0
July--------	84.5	59.9	72.2	93	44	998	5.87	3.74	7.78	10	.0
August------	82.8	59.1	71.0	92	43	961	4.59	2.82	6.16	9	.0
September---	77.8	52.7	65.3	91	33	759	3.81	1.88	5.48	7	.0
October-----	68.2	41.5	54.9	84	21	462	3.49	1.75	5.00	7	.2
November----	56.2	32.9	44.6	78	9	181	3.57	1.99	4.96	8	3.0
December----	46.2	25.7	36.0	72	-3	97	3.39	1.93	4.67	9	8.8
Yearly:											
Average----	65.6	40.9	53.3	---	---	---	---	---	---	---	---
Extreme----	---	---	---	94	-11	---	---	---	---	---	---
Total------	---	---	---	---	---	5,768	48.47	41.29	55.42	105	43.6

* 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 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1951-86 at Webster Springs, West 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--	Apr. 20	May 6	May 24
2 years in 10 later than--	Apr. 14	Apr. 30	May 17
5 years in 10 later than--	Apr. 4	Apr. 20	May 4
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 20	Oct. 8	Sept. 25
2 years in 10 earlier than--	Oct. 25	Oct. 13	Sept. 30
5 years in 10 earlier than--	Nov. 3	Oct. 22	Oct. 9

Table 3.--Growing Season

(Recorded in the period 1951-86 at Webster Springs, West 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	189	162	133
8 years in 10	197	170	141
5 years in 10	212	185	157
2 years in 10	227	199	173
1 year in 10	235	207	181

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
At	Atkins loam	255	0.1
CaE	Cateache channery silt loam, 15 to 35 percent slopes, extremely stony	690	0.2
CeF	Cedarcreek very channery loam, very steep, extremely stony	550	0.2
Ch	Chavies fine sandy loam	3,040	0.9
CoB	Cotaco silt loam, 3 to 8 percent slopes	835	0.2
Cr	Craigsville gravelly loam, 0 to 5 percent slopes	1,000	0.3
DkC	Dekalb channery sandy loam, 3 to 15 percent slopes, extremely stony	1,095	0.3
DrF	Dekalb-Rock outcrop complex, 35 to 70 percent slopes, extremely stony	7,135	2.0
Ek	Elkins silt loam	580	0.2
FeC	Fenwick loam, 3 to 15 percent slopes, very stony	580	0.2
GaC	Gauley extremely channery sandy loam, 3 to 15 percent slopes, rubbly	2,075	0.6
GaE	Gauley extremely channery sandy loam, 15 to 35 percent slopes, rubbly	1,260	0.4
GbB	Gilpin silt loam, 3 to 8 percent slopes	475	0.1
GbC	Gilpin silt loam, 8 to 15 percent slopes	7,385	2.1
GbD	Gilpin silt loam, 15 to 25 percent slopes	2,305	0.6
GbE	Gilpin silt loam, 25 to 35 percent slopes	7,185	2.0
GbF	Gilpin silt loam, 35 to 70 percent slopes	7,250	2.0
GcC	Gilpin silt loam, 3 to 15 percent slopes, very stony	8,710	2.4
GcF	Gilpin silt loam, 35 to 70 percent slopes, very stony	8,685	2.4
GdE	Gilpin-Dekalb complex, 15 to 35 percent slopes, extremely stony	17,110	4.8
GLF	Gilpin-Laidig association, very steep, extremely stony	111,045	31.2
ItF	Itmann channery loam, very steep	240	0.1
KaF	Kaymine very channery silt loam, very steep, extremely stony	5,035	1.4
LaC	Laidig channery silt loam, 8 to 15 percent slopes	270	0.1
LaD	Laidig channery silt loam, 15 to 25 percent slopes	290	0.1
LdC	Laidig channery silt loam, 3 to 15 percent slopes, extremely stony	895	0.3
LdE	Laidig channery silt loam, 15 to 35 percent slopes, extremely stony	14,365	4.0
LgE	Laidig channery silt loam, 8 to 35 percent slopes, rubbly	10,560	3.0
MaC	Mandy channery silt loam, 3 to 15 percent slopes, extremely stony	4,140	1.2
MaE	Mandy channery silt loam, 15 to 35 percent slopes, extremely stony	4,360	1.2
MaF	Mandy channery silt loam, 35 to 55 percent slopes, extremely stony	8,420	2.4
MaG	Mandy channery silt loam, 55 to 70 percent slopes, extremely stony	945	0.3
MkE	Meckesville silt loam, 15 to 35 percent slopes, extremely stony	1,530	0.4
Pe	Philo-Pope complex	745	0.2
PgG	Pineville-Gilpin complex, 55 to 70 percent slopes, extremely stony	1,245	0.3
PLF	Pineville-Gilpin-Guyandotte association, very steep, extremely stony	87,360	24.5
Po	Pope loam	1,885	0.5
Pp	Pope-Potomac complex, very cobbly	3,015	0.8
ScF	Shouns-Cateache complex, 35 to 70 percent slopes, extremely stony	12,495	3.5
SmC	Simoda silt loam, 3 to 15 percent slopes, very stony	1,390	0.4
SwE	Snowdog channery loam, 15 to 35 percent slopes, rubbly	5,805	1.6
Ud	Udorthents, smoothed	560	0.2
	Water	1,205	0.3
	Total	356,000	100.0

Table 5.--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
Ch	Chavies fine sandy loam
GbB	Gilpin silt loam, 3 to 8 percent slopes
Pe	Philo-Pope complex
Po	Pope loam

Table 6.--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	Oats	Wheat	Grass-legume hay	Alfalfa hay	Kentucky bluegrass
		Bu	Bu	Bu	Tons	Tons	AUM*
At---------- Atkins	IIIw	100	60	30	3.0	---	4.5
CaE---------- Cateache	VIIs	---	---	---	---	---	---
CeF---------- Cedarcreek	VIIs	---	---	---	---	---	---
Ch---------- Chavies	I	125	80	50	4.0	5.5	5.5
CoB---------- Cotaco	IIe	110	65	35	3.0	3.5	4.5
Cr---------- Craigsville	IIs	70	45	25	2.0	2.5	3.5
DkC---------- Dekalb	VIIs	---	---	---	---	---	---
DrF---------- Dekalb-Rock outcrop	VIIs	---	---	---	---	---	---
Ek---------- Elkins	IIIw	100	60	30	3.0	---	4.5
FeC---------- Fenwick	VIs	---	---	---	---	---	3.0
GaC, GaE-------- Gauley	VIIs	---	---	---	---	---	---
GbB---------- Gilpin	IIe	90	65	40	3.0	3.5	4.5
GbC---------- Gilpin	IIIe	85	60	35	3.0	3.5	4.5
GbD---------- Gilpin	IVe	80	55	30	2.5	3.0	4.0
GbE---------- Gilpin	VIe	---	---	---	---	---	3.0
GbF---------- Gilpin	VIIe	---	---	---	---	---	---
GcC---------- Gilpin	VIs	---	---	---	---	---	3.0
GcF---------- Gilpin	VIIs	---	---	---	---	---	---
GdE---------- Gilpin-Dekalb	VIIs	---	---	---	---	---	---

See footnotes at end of table.

Table 6.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Oats	Wheat	Grass-legume hay	Alfalfa hay	Kentucky bluegrass
		Bu	Bu	Bu	Tons	Tons	AUM*
GLF**---------- Gilpin-Laidig	VIIs	---	---	---	---	---	---
ItF---------- Itmann	VIIs	---	---	---	---	---	---
KaF---------- Kaymine	VIIs	---	---	---	---	---	---
LaC---------- Laidig	IIIe	95	65	35	3.0	4.0	4.5
LaD---------- Laidig	IVe	85	60	30	2.5	3.5	4.0
LdC, LdE, LgE--- Laidig	VIIs	---	---	---	---	---	---
MaC, MaE, MaF, MaG---------- Mandy	VIIs	---	---	---	---	---	---
MkE---------- Meckesville	VIIs	---	---	---	---	---	---
Pe---------- Philo-Pope	IIw	110	65	40	3.0	3.5	4.0
PgG---------- Pineville-Gilpin	VIIs	---	---	---	---	---	---
PLF**---------- Pineville-Gilpin-Guyandotte	VIIs	---	---	---	---	---	---
Po---------- Pope	IIw	115	70	45	3.5	4.5	4.5
Pp---------- Pope-Potomac	Vs	---	---	---	---	---	2.5
ScF---------- Shouns-Cateache	VIIs	---	---	---	---	---	---
SmC---------- Simoda	VIIs	---	---	---	---	---	---
SwE---------- Snowdog	VIIs	---	---	---	---	---	---
Ud. Udorthents							

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

Table 7.--Capability Classes and Subclasses

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	3,040	---	---	---
II	4,940	1,310	2,630	1,000
III	8,490	7,655	835	---
IV	2,595	2,595	---	---
V	3,015	---	---	3,015
VI	16,475	7,185	---	9,290
VII	315,680	7,250	---	308,430
VIII	---	---	---	---

Table 8.--Woodland Management Concerns

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that the soil was not rated)

Map symbol and soil name	Erosion hazard*	Seedling mortality*	Plant competition*	Haul roads and skid roads**	Log landings**	Operability of equipment in logging areas**
At: Atkins	Slight	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
CaE: Cateache	Moderate: slope.	Slight	Moderate: high productivity.	Severe: slippage.	Severe: slope, slippage.	Severe: slippage.
CeF: Cedarcreek	Severe: slope.	Severe: rock fragments.	Moderate: high productivity.	Severe: slope.	Severe: slope.	Severe: slope.
Ch: Chavies	Slight	Slight	Moderate: high productivity.	Moderate: low strength.	Moderate: low strength.	Slight.
CoB: Cotaco	Slight	Slight	Severe: high productivity.	Moderate: low strength.	Moderate: low strength.	Slight.
Cr: Craigsville	Slight	Moderate: rock fragments.	Moderate: high productivity.	Slight	Slight	Slight.
DkC: Dekalb	Slight	Moderate: rock fragments.	Slight	Moderate: stony, depth to rock.	Moderate: stony, depth to rock, slope.	Slight.
DrF***:						
Dekalb	Severe: slope.	Moderate: rock fragments.	Slight	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.						
Ek: Elkins	Slight	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
FeC: Fenwick	Slight	Slight	Moderate: high productivity.	Moderate: low strength, depth to rock.	Moderate: low strength, depth to rock, slope.	Slight.
GaC: Gauley	Slight	Severe: rock fragments.	Severe: high productivity.	Severe: stones.	Severe: stones.	Severe: boulders, stones.
GaE: Gauley	Moderate: slope.	Severe: rock fragments.	Severe: high productivity.	Severe: stones.	Severe: stones, slope.	Severe: boulders, stones.
GbB: Gilpin	Slight	Slight	Moderate: high productivity.	Moderate: low strength, depth to rock.	Moderate: depth to rock, low strength.	Slight.

See footnotes at end of table.

Table 8.--Woodland Management Concerns--Continued

Map symbol and soil name	Erosion hazard*	Seedling mortality*	Plant competition*	Haul roads and skid roads**	Log landings**	Operability of equipment in logging areas**
GbC:						
Gilpin	Slight	Slight	Moderate: high productivity.	Moderate: low strength, depth to rock.	Moderate: depth to rock, low strength, slope.	Slight.
GbD, GbE:						
Gilpin	Moderate: slope.	Slight	Moderate: high productivity.	Moderate: slope, low strength, depth to rock.	Severe: slope.	Moderate: slope.
GbF:						
Gilpin	Severe: slope.	Slight	Moderate: high productivity.	Severe: slope.	Severe: slope.	Severe: slope.
GcC:						
Gilpin	Slight	Slight	Moderate: high productivity.	Moderate: low strength, depth to rock.	Moderate: depth to rock, low strength, slope.	Slight.
GcF:						
Gilpin	Severe: slope.	Slight	Moderate: high productivity.	Severe: slope.	Severe: slope.	Severe: slope.
GdE***:						
Gilpin	Moderate: slope.	Slight	Moderate: high productivity.	Moderate: slope, stones, low strength, depth to rock.	Severe: slope.	Moderate: slope.
Dekalb	Moderate: slope.	Moderate: rock fragments.	Slight	Moderate: slope, stones, depth to rock.	Severe: slope.	Moderate: slope.
GLF***:						
Gilpin	Severe: slope.	Slight	Moderate: high productivity.	Severe: slope.	Severe: slope.	Severe: slope.
Laidig	Severe: slope.	Slight	Slight	Severe: slope.	Severe: slope.	Severe: slope.
ItF:						
Itmann	Severe: slope.	Severe: rock fragments.	Slight	Severe: slope.	Severe: slope.	Severe: slope.
KaF:						
Kaymine	Severe: slope.	Severe: rock fragments.	Moderate: high productivity.	Severe: slope.	Severe: slope.	Severe: slope.
LaC:						
Laidig	Slight	Slight	Moderate: high productivity.	Moderate: low strength.	Moderate: low strength, slope.	Slight.
LaD:						
Laidig	Slight	Slight	Moderate: high productivity.	Moderate: slope, low strength.	Severe: slope.	Moderate: slope.

See footnotes at end of table.

Table 8.--Woodland Management Concerns--Continued

Map symbol and soil name	Erosion hazard*	Seedling mortality*	Plant competition*	Haul roads and skid roads**	Log landings**	Operability of equipment in logging areas**
LdC: Laidig	Slight	Slight	Slight	Moderate: stones, low strength.	Moderate: stones, low strength, slope.	Slight.
LdE: Laidig	Slight	Slight	Slight	Moderate: slope, stones, low strength.	Severe: slope.	Moderate: slope.
LgE: Laidig	Moderate: slope.	Moderate: rock fragments.	Moderate: high productivity.	Severe: stones.	Severe: stones, slope.	Moderate: slope, stones.
MaC: Mandy	Slight	Slight	Moderate: high productivity.	Moderate: stones, depth to rock.	Moderate: stones, depth to rock, slope.	Slight.
MaE: Mandy	Moderate: slope.	Slight	Moderate: high productivity.	Moderate: slope, stones, depth to rock.	Severe: slope.	Moderate: slope.
MaF, MaG: Mandy	Severe: slope.	Slight	Moderate: high productivity.	Severe: slope.	Severe: slope.	Severe: slope.
MkE: Meckesville	Moderate: slope.	Slight	Severe: high productivity.	Moderate: slope, stones, low strength.	Severe: slope.	Moderate: slope.
Pe***:						
Philo	Slight	Slight	Severe: high productivity.	Moderate: low strength, flooding.	Moderate: flooding, low strength.	Moderate: flooding.
Pope	Slight	Slight	Severe: high productivity.	Moderate: low strength, flooding.	Moderate: flooding, low strength.	Moderate: flooding.
PgG***:						
Pineville	Severe: slope.	Slight	Moderate: high productivity.	Severe: slope.	Severe: slope.	Severe: slope.
Gilpin	Severe: slope.	Slight	Moderate: high productivity.	Severe: slope.	Severe: slope.	Severe: slope.
PLF***:						
Pineville	Severe: slope.	Slight	Moderate: high productivity.	Severe: slope.	Severe: slope.	Severe: slope.
Gilpin	Severe: slope.	Slight	Moderate: high productivity.	Severe: slope.	Severe: slope.	Severe: slope.

See footnotes at end of table.

Table 8.--Woodland Management Concerns--Continued

Map symbol and soil name	Erosion hazard*	Seedling mortality*	Plant competition*	Haul roads and skid roads**	Log landings**	Operability of equipment in logging areas**
PLF***:						
Guyandotte	Severe: slope.	Severe: rock fragments.	Severe: high productivity.	Severe: slope.	Severe: slope.	Severe: slope.
Po	Slight	Slight	Severe: high productivity.	Moderate: low strength, flooding.	Moderate: flooding, low strength.	Moderate: flooding.
Pp***:						
Pope	Slight	Slight	Severe: high productivity.	Moderate: low strength, flooding.	Moderate: flooding, low strength.	Moderate: flooding.
Potomac	Slight	Moderate: droughty, rock fragments.	Moderate: high productivity.	Moderate: flooding.	Moderate: flooding, low strength.	Moderate: flooding.
ScF***:						
Shouns	Severe: slope.	Slight	Moderate: high productivity.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.
Cateache	Severe: slope.	Slight	Moderate: high productivity.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.
SmC	Slight	Moderate: restrictive layer.	Moderate: high productivity.	Moderate: low strength.	Moderate: low strength, slope.	Slight.
SwE	Moderate: slope.	Moderate: restrictive layer.	Moderate: high productivity.	Severe: boulders.	Severe: boulders, slope.	Moderate: slope, stones.
Ud.						
Udorthents						

* Ratings for erosion hazard, seedling mortality, and plant competition are from criteria in the "National Forestry Manual."

** Ratings for haul roads and skid roads, log landings, and operability of equipment in logging areas are from criteria jointly prepared by the Natural Resources Conservation Service and the U.S. Department of Agriculture, Forest Service.

*** See description of the map unit for composition and behavior characteristics of the map unit.

Table 9.--Woodland Productivity

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that data were not available. If a soil has a slope of more than 15 percent, the site index given is for north aspects. It generally is 5 to 10 points lower on south aspects)

Map symbol and soil name	Ordination symbol*	Potential productivity: Commonly grown trees	Site index	Average annual growth in**--: Cubic feet per acre	Board feet per acre	Cords per acre
At: Atkins	5W	Pin oak	88	70	306	0.92
		Red maple	---	---	---	---
		American sycamore	---	---	---	---
CaE: Cateache	4R	Northern red oak	80	62	250	0.81
		Yellow-poplar	---	---	---	---
		Black cherry	80	50	---	---
		Cucumbertree	80	---	---	---
		Sugar maple	80	50	---	---
CeF: Cedarcreek	4R	Northern red oak	80	62	250	0.81
		Eastern white pine	94	174	---	---
		Yellow-poplar	105	115	650	1.32
		American sycamore	90	98	---	---
		Black locust	91	---	---	---
Ch: Chavies	4A	Northern red oak	80	62	250	0.81
		Yellow-poplar	93	95	482	1.10
		Black walnut	---	---	---	---
		Black cherry	---	---	---	---
		Sugar maple	---	---	---	---
		Red maple	---	---	---	---
		White oak	---	---	---	---
CoB: Cotaco	5A	Northern red oak	87	69	299	0.91
		Yellow-poplar	95	98	510	1.14
		American beech	---	---	---	---
		Black walnut	---	---	---	---
Cr: Craigsville	4A	Northern red oak	80	62	250	0.81
		Yellow-poplar	95	98	510	1.14
		Virginia pine	80	122	---	---
DkC: Dekalb	4A	Northern red oak	69	51	173	0.65
		White oak	71	53	187	0.68
		Black cherry	83	51	---	---
		Hickory	---	---	---	---
		Red maple	---	---	---	---
DrF***:						
Dekalb	4R	Northern red oak	69	51	173	0.65
		White oak	71	53	187	0.68
Rock outcrop.						
Ek: Elkins	5W	Pin oak	94	76	348	1.00
		Yellow-poplar	90	90	440	1.04
		Black willow	---	---	---	---
FeC: Fenwick	4A	Northern red oak	75	57	215	0.74
		Black cherry	85	52	---	---
		Yellow-poplar	90	90	440	1.04
		White ash	85	111	---	---
		Sugar maple	80	50	---	---
		Hickory	---	---	---	---

See footnotes at end of table.

Table 9.--Woodland Productivity--Continued

Map symbol and soil name	Ordination symbol*	Potential productivity: Commonly grown trees	Site index	Average annual growth in**--: Cubic feet per acre	Board feet per acre	Cords per acre
GaC---------- Gauley	6X	Red spruce----------	42	88	---	---
		Yellow birch----------	---	---	---	---
		Red maple----------	---	---	---	---
GaE---------- Gauley	6R	Red spruce----------	42	88	---	---
		Yellow birch----------	---	---	---	---
		Red maple----------	---	---	---	---
GbB, GbC---------- Gilpin	4A	Northern red oak----------	80	62	250	0.81
		Yellow-poplar----------	95	98	510	1.14
		White oak----------	74	56	208	0.73
GbD, GbE, GbF---------- Gilpin	4R	Northern red oak----------	80	62	250	0.81
		Yellow-poplar----------	95	98	510	1.14
		White oak----------	74	56	208	0.73
GcC---------- Gilpin	4A	Northern red oak----------	80	62	250	0.81
		Yellow-poplar----------	95	98	510	1.14
		White oak----------	74	56	208	0.73
GcF---------- Gilpin	4R	Northern red oak----------	80	62	250	0.81
		Yellow-poplar----------	95	98	510	1.14
		White oak----------	74	56	208	0.73
GdE***:						
Gilpin----------	4R	Northern red oak----------	80	62	250	0.81
		Yellow-poplar----------	95	98	510	1.14
		Red maple----------	---	---	---	---
		Sugar maple----------	---	---	---	---
Dekalb----------	4R	Northern red oak----------	69	51	173	0.65
		Yellow-poplar----------	95	98	510	1.14
		Red maple----------	---	---	---	---
		Sugar maple----------	---	---	---	---
		Sweet birch----------	---	---	---	---
GLF***:						
Gilpin----------	4R	Northern red oak----------	80	62	250	0.81
		Yellow-poplar----------	95	98	510	1.14
		Red maple----------	---	---	---	---
		Sugar maple----------	---	---	---	---
Laidig----------	4R	Northern red oak----------	80	62	250	0.81
		White oak----------	80	62	250	0.81
		Yellow-poplar----------	90	90	440	1.04
		Sugar maple----------	80	50	---	---
		American basswood---------	---	---	---	---
ItF---------- Itmann	---	Black locust----------	---	---	---	---
		Eastern white pine--------	---	---	---	---
		Virginia pine----------	---	---	---	---
KaF---------- Kaymine	4R	Northern red oak----------	80	62	250	0.81
		Eastern white pine--------	94	174	---	---
		Black locust----------	---	---	---	---

See footnotes at end of table.

Table 9.--Woodland Productivity--Continued

Map symbol and soil name	Ordination symbol*	Potential productivity: Commonly grown trees	Site index	Average annual growth in**--: Cubic feet per acre	Board feet per acre	Cords per acre
LaC---------- Laidig	4A	Northern red oak----------	80	62	250	0.81
		Yellow-poplar----------	90	90	440	1.04
		White oak----------	80	62	250	0.81
		Sugar maple----------	80	50	---	---
LaD---------- Laidig	4R	Northern red oak----------	80	62	250	0.81
		Yellow-poplar----------	90	90	440	1.04
		White oak----------	80	62	250	0.81
		Sugar maple----------	80	50	---	---
LdC---------- Laidig	4A	Northern red oak----------	80	62	250	0.81
		Yellow-poplar----------	90	90	440	1.04
		White oak----------	80	62	250	0.81
		Sugar maple----------	80	50	---	---
		American basswood---------	---	---	---	---
LdE---------- Laidig	4R	Northern red oak----------	80	62	250	0.81
		Yellow-poplar----------	90	90	440	1.04
		White oak----------	80	62	250	0.81
		Sugar maple----------	80	50	---	---
		American basswood---------	---	---	---	---
LgE---------- Laidig	4R	Northern red oak----------	80	62	250	0.81
		Yellow-poplar----------	90	90	440	1.04
		Black cherry----------	95	57	---	---
		Sugar maple----------	80	50	---	---
		American basswood---------	---	---	---	---
MaC---------- Mandy	4A	Black cherry----------	80	50	---	---
		Red maple----------	---	---	---	---
		Red spruce----------	65	152	---	---
		Yellow birch----------	---	---	---	---
MaE, MaF, MaG---------- Mandy	4R	Black cherry----------	80	50	---	---
		Red maple----------	---	---	---	---
		Red spruce----------	65	152	---	---
		Yellow birch----------	---	---	---	---
MkE---------- Meckesville	5R	Northern red oak----------	90	72	320	0.95
		Yellow-poplar----------	105	115	650	1.32
		American basswood---------	---	---	---	---
		White oak----------	---	---	---	---
		Black cherry----------	---	---	---	---
Pe***:						
Philo----------	5A	Northern red oak----------	86	68	292	0.89
		Yellow-poplar----------	102	110	608	1.27
		White oak----------	85	67	285	0.88
		American sycamore---------	---	---	---	---
Pope----------	4A	White oak----------	80	62	250	0.81
		Yellow-poplar----------	104	114	636	1.31
		American sycamore---------	---	---	---	---
		Northern red oak----------	---	---	---	---

See footnotes at end of table.

Table 9.--Woodland Productivity--Continued

Map symbol and soil name	Ordination symbol*	Potential productivity: Commonly grown trees	Site index	Average annual growth in**--: Cubic feet per acre	Board feet per acre	Cords per acre
PgG***:						
Pineville	5R	Northern red oak	88	70	306	0.92
		Yellow-poplar	112	127	749	1.46
		Sugar maple	---	---	---	---
		Hickory	---	---	---	---
		American basswood	---	---	---	---
		Cucumbertree	---	---	---	---
Gilpin	4R	Northern red oak	80	62	250	0.81
		Yellow-poplar	95	98	510	1.14
		Sugar maple	---	---	---	---
		Cucumbertree	---	---	---	---
PLF***:						
Pineville	5R	Northern red oak	88	70	306	0.92
		Yellow-poplar	112	127	749	1.46
		Sugar maple	---	---	---	---
		Hickory	---	---	---	---
		American basswood	---	---	---	---
		Cucumbertree	---	---	---	---
Gilpin	4R	Northern red oak	80	62	250	0.81
		Yellow-poplar	95	98	510	1.14
		Sugar maple	---	---	---	---
		Cucumbertree	---	---	---	---
Guyandotte	5R	Northern red oak	95	77	355	1.02
		American basswood	110	---	---	---
		Yellow-poplar	114	130	779	1.50
		Black cherry	114	---	---	---
Po	4A	White oak	80	62	250	0.81
Pope		Yellow-poplar	104	114	636	1.31
		American sycamore	---	---	---	---
		Northern red oak	---	---	---	---
Pp***:						
Pope	4A	White oak	80	62	250	0.81
		Yellow-poplar	104	114	636	1.31
		American sycamore	---	---	---	---
		Northern red oak	---	---	---	---
Potomac	4F	Northern red oak	70	52	180	0.67
		White oak	70	52	180	0.67
		Black walnut	---	---	---	---
		American sycamore	---	---	---	---
		Yellow-poplar	---	---	---	---
ScF***:						
Shouns	4R	Northern red oak	80	62	250	0.81
		Yellow-poplar	90	90	440	1.04
		American basswood	---	---	---	---
		White oak	---	---	---	---
		Red maple	---	---	---	---
Cateache	4R	Northern red oak	80	62	250	0.81
		Yellow-poplar	---	---	---	---
		Black cherry	80	50	---	---
		Cucumbertree	---	---	---	---
		Sugar maple	80	50	---	---

See footnotes at end of table.

Table 9.--Woodland Productivity--Continued

Map symbol and soil name	Ordination symbol*	Potential productivity: Commonly grown trees	Potential productivity: Site index	Average annual growth in**--: Cubic feet per acre	Average annual growth in**--: Board feet per acre	Average annual growth in**--: Cords per acre
SmC Simoda	3A	Black cherry	60	38	---	---
		Red spruce	45	95	---	---
		Red maple	---	---	---	---
		Yellow birch	---	---	---	---
SwE Snowdog	4R	Black cherry	80	50	---	---
		Red spruce	65	---	---	---
		Red maple	---	---	---	---
		Yellow birch	---	---	---	---

* The number in the ordination symbol is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands. The woodland ordination symbols have been developed from criteria in the "National Soil Survey Handbook" and from separate criteria developed for this soil survey by the Natural Resources Conservation Service and the U.S. Department of Agriculture, Forest Service.

** Average annual growth is equal to total volume growth at rotation divided by rotation age. Actual annual growth varies with stand vigor and other factors. Yield data are based on site indices of natural stands at age 50 using the International 1/4 Log Rule and standard rough cords. This information should be used for planning purposes only.

*** See description of the map unit for composition and behavior characteristics of the map unit.

Table 10.--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
At: Atkins	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
CaE: Cateache	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones, small stones.	Severe: slope.	Severe: slope.
CeF: Cedarcreek	Variable	Variable	Variable	Variable	Variable.
Ch: Chavies	Severe: flooding.	Slight	Slight	Slight	Slight.
CoB: Cotaco	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness, small stones.	Moderate: wetness.	Moderate: wetness.
Cr: Craigsville	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
DkC: Dekalb	Severe: large stones.	Severe: large stones.	Severe: slope, small stones, large stones.	Slight	Moderate: small stones, slope, large stones.
DrF*:					
Dekalb	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, small stones, large stones.	Severe: slope.	Severe: slope.
Rock outcrop.					
Ek: Elkins	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
FeC: Fenwick	Moderate: large stones, wetness.	Moderate: wetness, large stones.	Severe: large stones, slope.	Moderate: wetness.	Moderate: large stones, wetness.
GaC: Gauley	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: large stones.
GaE: Gauley	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Severe: large stones, slope.
GbB: Gilpin	Slight	Slight	Moderate: small stones, slope.	Slight	Moderate: thin layer.

See footnote at end of table.

Table 10.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
GbC: Gilpin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, thin layer.
GbD: Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
GbE, GbF: Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
GcC: Gilpin	Moderate: small stones, large stones, slope.	Moderate: small stones, large stones, slope.	Severe: slope, small stones.	Slight	Moderate: small stones, slope, thin layer.
GcF: Gilpin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
GdE*:					
Gilpin	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Dekalb	Severe: slope, large stones.	Moderate: slope, large stones.	Severe: slope, small stones, large stones.	Severe: slope.	Severe: slope.
GLF*:					
Gilpin	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Laidig	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones, small stones.	Severe: slope.	Severe: slope.
ItF: Itmann	Variable	Variable	Variable	Variable	Variable.
KaF: Kaymine	Variable	Variable	Variable	Variable	Variable.
LaC: Laidig	Moderate: slope, percs slowly, small stones.	Moderate: slope, percs slowly, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
LaD: Laidig	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
LdC: Laidig	Severe: large stones.	Severe: large stones.	Severe: slope, large stones, small stones.	Slight	Moderate: large stones, small stones, slope.

See footnote at end of table.

Table 10.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LdE: Laidig	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones, small stones.	Severe: slope.	Severe: slope.
LgE: Laidig	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, small stones, large stones.	Moderate: slope.	Severe: slope, large stones.
MaC: Mandy	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Slight	Moderate: droughty, small stones, large stones.
MaE, MaF, MaG: Mandy	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
MkE: Meckesville	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Severe: slope.	Severe: slope.
Pe*:					
Philo	Severe: flooding.	Moderate: wetness.	Moderate: small stones, flooding, wetness.	Moderate: wetness.	Moderate: wetness, flooding.
Pope	Severe: flooding.	Slight	Moderate: small stones, flooding.	Slight	Moderate: flooding.
PgG*:					
Pineville	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Gilpin	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
PLF*:					
Pineville	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Gilpin	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Guyandotte	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope, small stones.

See footnote at end of table.

Table 10.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Po: Pope	Severe: flooding.	Slight	Moderate: small stones, flooding.	Slight	Moderate: flooding.
Pp*:					
Pope	Severe: flooding.	Slight	Moderate: small stones, flooding.	Slight	Moderate: flooding.
Potomac	Severe: flooding, large stones.	Severe: large stones.	Severe: small stones, large stones.	Slight	Severe: droughty.
ScF*:					
Shouns	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Severe: slope.	Severe: slope.
Cateache	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones, small stones.	Severe: slope.	Severe: slope.
SmC: Simoda	Moderate: large stones.	Moderate: large stones.	Severe: large stones, slope, small stones.	Slight	Moderate: small stones, wetness, slope.
SwE: Snowdog	Severe: large stones, slope.	Severe: large stones, slope.	Severe: large stones, small stones, slope.	Severe: slope.	Severe: large stones, slope.
Ud. Udorthents					

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 11.--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
At---------- Atkins	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
CaE---------- Cateache	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
CeF---------- Cedarcreek	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Ch---------- Chavies	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CoB---------- Cotaco	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Cr---------- Craigsville	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
DkC---------- Dekalb	Very poor.	Very poor.	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
DrF*:										
Dekalb----------	Very poor.	Very poor.	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Rock outcrop------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Ek---------- Elkins	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
FeC---------- Fenwick	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
GaC, GaE---------- Gauley	Very poor.	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Poor	Very poor.
GbB---------- Gilpin	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GbC---------- Gilpin	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GbD---------- Gilpin	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GbE---------- Gilpin	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
GbF---------- Gilpin	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
GcC---------- Gilpin	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

See footnote at end of table.

Table 11.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
GcF---------- Gilpin	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
GdE*:										
Gilpin----------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Dekalb----------	Very poor.	Very poor.	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
GLF*:										
Gilpin----------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Laidig----------	Very poor.	Very poor.	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
ItF---------- Itmann	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
KaF---------- Kaymine	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
LaC---------- Laidig	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
LaD---------- Laidig	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
LdC---------- Laidig	Very poor.	Very poor.	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
LdE---------- Laidig	Very poor.	Very poor.	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
LgE---------- Laidig	Very poor.	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Poor	Very poor.
MaC, MaE, MaF, MaG- Mandy	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
MkE---------- Meckesville	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Pe*:										
Philo----------	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Pope----------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
PgG*:										
Pineville---------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Gilpin----------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
PLF*:										
Pineville---------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

Table 11.--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
PLF*:										
Gilpin	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Guyandotte	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Po Pope	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Pp*:										
Pope	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Potomac	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
ScF*:										
Shouns	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Cateache	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
SmC Simoda	Very poor.	Very poor.	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
SwE Snowdog	Very poor.	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Ud. Udorthents										

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 12.--Building Site Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
At: Atkins	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, frost action.	Severe: wetness.
CaE: Cateache	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope.
CeF: Cedarcreek	Variable	Variable	Variable	Variable	Variable	Variable.
Ch: Chavies	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
CoB: Cotaco	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: wetness.
Cr: Craigsville	Severe: cutbanks cave, large stones.	Severe: flooding, large stones.	Severe: flooding, large stones.	Severe: flooding, large stones.	Severe: large stones.	Moderate: small stones.
DkC: Dekalb	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, large stones.	Moderate: small stones, slope, large stones.
DrF*:						
Dekalb	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.						
Ek: Elkins	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, frost action.	Severe: wetness.
FeC: Fenwick	Severe: depth to rock, wetness.	Moderate: wetness, depth to rock.	Severe: wetness, depth to rock.	Severe: slope.	Severe: frost action.	Moderate: large stones, wetness.
GaC: Gauley	Severe: depth to rock, cutbanks cave, large stones.	Severe: large stones.	Severe: depth to rock, large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: large stones.
GaE: Gauley	Severe: depth to rock, cutbanks cave, large stones.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.

See footnote at end of table.

Table 12.--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
GbB Gilpin	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Moderate: thin layer.
GbC Gilpin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, thin layer.
GbD, GbE, GbF Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
GcC Gilpin	Moderate: depth to rock, large stones, slope.	Moderate: slope, large stones.	Moderate: depth to rock, slope, large stones.	Severe: slope.	Moderate: slope, frost action, large stones.	Moderate: small stones, slope, thin layer.
GcF Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
GdE*:						
Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Dekalb	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
GLF*:						
Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Laidig	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
ItF Itmann	Variable	Variable	Variable	Variable	Variable	Variable.
KaF Kaymine	Variable	Variable	Variable	Variable	Variable	Variable.
LaC Laidig	Moderate: wetness, slope.	Moderate: slope.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope.
LaD Laidig	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LdC Laidig	Moderate: wetness, slope.	Moderate: slope, large stones.	Moderate: wetness, slope, large stones.	Severe: slope.	Moderate: frost action, slope.	Moderate: large stones, small stones, slope.
LdE, LgE Laidig	Severe: slope, large stones.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MaC Mandy	Moderate: depth to rock, slope, large stones.	Moderate: slope, large stones.	Moderate: depth to rock, slope, large stones.	Severe: slope.	Moderate: slope, large stones.	Moderate: droughty, small stones, large stones.

See footnote at end of table.

Table 12.--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
MaE, MaF, MaG----- Mandy	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MkE---------- Meckesville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pe*:						
Philo----------	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: wetness, flooding.
Pope----------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
PgG*:						
Pineville--------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Gilpin----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PLF*:						
Pineville--------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Gilpin----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Guyandotte-------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
Po---------- Pope	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Pp*:						
Pope----------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Potomac----------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: droughty.
ScF*:						
Shouns----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Cateache---------	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope.
SmC---------- Simoda	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: low strength, wetness, slope.	Moderate: large stones.
SwE---------- Snowdog	Severe: slope, wetness, large stones.	Severe: slope, large stones.	Severe: slope, wetness, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 13.--Sanitary Facilities

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "severe," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
At Atkins	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Poor: wetness.
CaE Cateache	Severe: slope, depth to rock, slippage.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, slippage.	Severe: slope, depth to rock, slippage.	Poor: slope, depth to rock, thin layer.
CeF Cedarcreek	Variable	Variable	Variable	Variable	Variable.
Ch Chavies	Moderate: flooding.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
CoB Cotaco	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Cr Craigsville	Severe: poor filter, large stones.	Severe: seepage, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: seepage, large stones.
DkC Dekalb	Severe: depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.
DrF*:					
Dekalb	Severe: slope, depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones, area reclaim.
Rock outcrop.					
Ek Elkins	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
FeC Fenwick	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock.	Poor: depth to rock.
GaC Gauley	Severe: depth to rock, large stones.	Severe: seepage, depth to rock, slope, large stones.	Severe: depth to rock, seepage, large stones.	Severe: depth to rock, seepage, large stones.	Poor: depth to rock, small stones, large stones.

See footnote at end of table.

Table 13.--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
GaE: Gauley	Severe: depth to rock, slope, large stones.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
GbB: Gilpin	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
GbC: Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
GbD, GbE, GbF: Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.
GcC: Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
GcF: Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
GdE*:					
Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Dekalb	Severe: slope, depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones, area reclaim.
GLF*:					
Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: seepage, slope.	Poor: depth to rock, small stones, slope.
Laidig	Severe: slope, percs slowly, wetness.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Poor: slope.
ItF: Itmann	Variable	Variable	Variable	Variable	Variable.
KaF: Kaymine	Variable	Variable	Variable	Variable	Variable.
LaC: Laidig	Severe: percs slowly, wetness.	Severe: slope, wetness.	Moderate: wetness, slope.	Moderate: slope, wetness.	Fair: slope, small stones, wetness.

See footnote at end of table.

Table 13.--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
LaD---------- Laidig	Severe: slope, percs slowly, wetness.	Severe: slope, wetness.	Severe: slope.	Severe: slope, seepage.	Poor: slope.
LdC---------- Laidig	Severe: percs slowly, wetness.	Severe: slope, wetness.	Moderate: wetness, large stones, slope.	Severe: seepage.	Fair: small stones, wetness, slope.
LdE---------- Laidig	Severe: slope, percs slowly, wetness.	Severe: slope, wetness.	Severe: slope.	Severe: seepage, slope.	Poor: slope.
LgE---------- Laidig	Severe: wetness, percs slowly, slope.	Severe: slope, wetness, large stones.	Severe: slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
MaC---------- Mandy	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
MaE, MaF, MaG------- Mandy	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
MkE---------- Meckesville	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope, thin layer.
Pe*:					
Philo----------	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage.	Severe: flooding, wetness.	Fair: wetness.
Pope----------	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Good.
PgG*:					
Pineville----------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Gilpin----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
PLF*:					
Pineville----------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.

See footnote at end of table.

Table 13.--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
PLF*:					
Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Guyandotte	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Po Pope	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Good.
Pp*:					
Pope	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Good.
Potomac	Severe: flooding, poor filter.	Severe: seepage, large stones.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: seepage, too sandy,
ScF*:					
Shouns	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Cateache	Severe: slope, depth to rock, slippage.	Severe: slope, depth to rock, slippage.	Severe: slope, depth to rock, slippage.	Severe: slope, depth to rock, slippage.	Poor: slope, depth to rock, thin layer.
SmC Simoda	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: depth to rock, wetness.	Moderate: depth to rock, wetness, slope.	Fair: small stones, depth to rock, slope.
SwE Snowdog	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: large stones, slope.
Ud. Udorthents					

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 14.--Construction Materials

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
At: Atkins	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
CaE: Cateache	Poor: slope, depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
CeF: Cedarcreek	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Ch: Chavies	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
CoB: Cotaco	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Cr: Craigsville	Poor: large stones.	Improbable: large stones.	Improbable: large stones.	Poor: large stones, area reclaim.
DkC: Dekalb	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
DrF*:				
Dekalb	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Rock outcrop.				
Ek: Elkins	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
FeC: Fenwick	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
GaC: Gauley	Poor: depth to rock, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
GaE: Gauley	Poor: depth to rock, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
GbB, GbC: Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
GbD: Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.

See footnote at end of table.

Table 14.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
GbE, GbF: Gilpin	Poor: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
GcC: Gilpin	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
GcF: Gilpin	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
GdE*:				
Gilpin	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Dekalb	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
GLF*:				
Gilpin	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Laidig	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, area reclaim.
ItF: Itmann	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
KaF: Kaymine	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
LaC: Laidig	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
LaD: Laidig	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
LdC: Laidig	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
LdE: Laidig	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, area reclaim.

See footnote at end of table.

Table 14.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
LgE: Laidig	Poor: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim, slope.
MaC: Mandy	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
MaE, MaF, MaG: Mandy	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
MkE: Meckesville	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Pe*:				
Philo	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Pope	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
PgG*:				
Pineville	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Gilpin	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
PLF*:				
Pineville	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Gilpin	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Guyandotte	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim, slope.
Po: Pope	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Pp*:				
Pope	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Potomac	Fair: large stones.	Probable	Probable	Poor: too sandy, small stones, area reclaim.

See footnote at end of table.

Table 14.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
ScF*:				
Shouns	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Cateache	Poor: slope, depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
SmC	Fair: depth to rock, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
SwE	Poor: slope, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones, area reclaim.
Ud.				
Udorthents				

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 15.--Water Management

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "moderate" and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Drainage	Features affecting-- Terraces and diversions	Grassed waterways
At---------- Atkins	Severe: seepage.	Severe: piping, wetness.	Flooding, frost action, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
CaE---------- Cateache	Severe: slope, slippage.	Severe: thin layer, piping.	Deep to water----	Slope, depth to rock, slippage.	Slope, depth to rock.
CeF---------- Cedarcreek	Severe: seepage, slope.	Severe: large stones.	Deep to water----	Slope, large stones.	Large stones, slope, droughty.
Ch---------- Chavies	Severe: seepage.	Severe: piping.	Deep to water----	Soil blowing-----	Favorable.
CoB---------- Cotaco	Moderate: seepage, slope.	Severe: piping.	Slope----------	Erodes easily, wetness.	Erodes easily.
Cr---------- Craigsville	Severe: seepage.	Severe: seepage, large stones.	Deep to water----	Large stones, too sandy.	Large stones, droughty.
DkC---------- Dekalb	Severe: seepage, slope.	Severe: piping, large stones, thin layer.	Deep to water----	Slope, depth to rock, large stones.	Slope, large stones, droughty.
DrF*:					
Dekalb----------	Severe: seepage, slope.	Severe: piping, large stones.	Deep to water----	Slope, depth to rock, large stones.	Slope, large stones, droughty.
Rock outcrop.					
Ek---------- Elkins	Moderate: seepage.	Severe: wetness, piping.	Percs slowly, flooding, poor outlets.	Wetness, percs slowly, poor outlets.	Wetness, erodes easily, percs slowly.
FeC---------- Fenwick	Severe: slope.	Severe: piping, thin layer.	Depth to rock, frost action, slope.	Depth to rock, wetness.	Depth to rock.
GaC, GaE---------- Gauley	Severe: seepage, slope.	Severe: large stones, thin layer.	Deep to water----	Slope, large stones, depth to rock.	Large stones, slope, droughty.
GbB---------- Gilpin	Moderate: seepage, depth to rock, slope.	Severe: piping, thin layer.	Deep to water----	Depth to rock, large stones.	Depth to rock, large stones.

See footnote at end of table.

Table 15.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
GbC, GbD, GbE, GbF: Gilpin	Severe: slope.	Severe: piping, thin layer.	Deep to water	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
GcC, GcF: Gilpin	Severe: slope.	Severe: piping, thin layer.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
GdE*:					
Gilpin	Severe: slope.	Severe: piping, thin layer.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Dekalb	Severe: seepage, slope.	Severe: piping, large stones, thin layer.	Deep to water	Slope, depth to rock, large stones.	Slope, large stones, droughty.
GLF*:					
Gilpin	Severe: slope.	Severe: piping, thin layer.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Laidig	Severe: seepage, slope.	Severe: piping.	Slope, percs slowly, large stones.	Slope, large stones, rooting depth.	Large stones, slope, rooting depth.
ItF: Itmann	Severe: seepage, slope.	Severe: seepage.	Deep to water	Slope	Slope, droughty.
KaF: Kaymine	Severe: seepage, slope.	Severe: large stones.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
LaC, LaD: Laidig	Severe: seepage, slope.	Severe: piping.	Slope, percs slowly.	Slope, rooting depth.	Slope, rooting depth.
LdC: Laidig	Severe: seepage, slope.	Severe: piping.	Slope, percs slowly, large stones.	Slope, large stones, rooting depth.	Large stones, rooting depth.
LdE: Laidig	Severe: seepage, slope.	Severe: piping.	Slope, percs slowly, large stones.	Slope, large stones, rooting depth.	Large stones, slope, rooting depth.
LgE: Laidig	Severe: seepage, slope.	Severe: piping.	Slope, percs slowly, large stones.	Slope, large stones, wetness.	Large stones, slope, rooting depth.
MaC, MaE, MaF, MaG: Mandy	Severe: slope.	Severe: thin layer.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
MkE: Meckesville	Severe: slope.	Severe: piping.	Slope	Slope, large stones, wetness.	Large stones, slope, rooting depth.

See footnote at end of table.

Table 15.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
Pe*:					
Philo	Severe: seepage.	Severe: piping.	Flooding	Erodes easily, wetness.	Erodes easily.
Pope	Severe: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
PgG*:					
Pineville	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope.
Gilpin	Severe: slope.	Severe: piping, thin layer.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
PLF*:					
Pineville	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, large stones.	Slope, large stones.
Gilpin	Severe: slope.	Severe: piping, thin layer.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Guyandotte	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, large stones.	Slope, large stones.
Po Pope	Severe: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
Pp*:					
Pope	Severe: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
Potomac	Severe: seepage.	Severe: seepage, large stones.	Deep to water	Large stones, too sandy, soil blowing.	Large stones, droughty.
ScF*:					
Shouns	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope.
Cateache	Severe: slope, slippage.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock, slippage.	Slope, depth to rock.
SmC Simoda	Severe: slope.	Severe: piping.	Percs slowly, large stones, slope.	Slope, large stones, wetness.	Large stones, slope, rooting depth.
SwE Snowdog	Severe: slope, seepage.	Severe: large stones, piping.	Percs slowly, large stones, slope.	Slope, large stones, wetness.	Large stones, slope, rooting depth.
Ud. Udorthents					

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 16.--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: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
At---------- Atkins	0-7	Loam----------	ML, CL, SM, SC	A-4, A-6	0-5	90-100	80-100	60-95	45-75	20-35	1-15
	7-48	Silty clay loam, loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-5	90-100	85-100	65-100	45-85	20-40	3-20
	48-65	Stratified silty clay loam to gravelly sandy loam.	SM, CL, GM, ML	A-2, A-4, A-6	0-15	60-100	60-100	50-95	30-85	20-40	1-15
CaE---------- Cateache	0-9	Extremely stony silt loam.	CL, CL-ML, GM-GC, GC	A-4, A-6	15-30	70-85	65-80	60-75	45-70	20-40	4-15
	9-31	Channery silt loam, very channery silt loam, channery silty clay loam.	CL-ML, CL, GC, GM-GC	A-2, A-4, A-6	0-15	40-85	35-80	30-80	25-70	20-40	4-15
	31	Weathered bedrock	---	---	---	---	---	---	---	---	---
CeF---------- Cedarcreek	0-4	Extremely stony loam.	GC	A-2, A-4, A-6	30-55	45-60	40-55	30-50	20-40	25-35	7-12
	4-65	Extremely channery loam, very channery loam, very channery sandy loam.	GC	A-2, A-4	5-30	30-55	25-50	20-45	15-40	25-35	7-12
Ch---------- Chavies	0-6	Fine sandy loam	SM, ML, CL-ML, SC-SM	A-4	0	85-100	75-100	40-90	40-75	<25	NP-5
	6-42	Fine sandy loam, silt loam, loam.	SM, ML	A-4	0	85-100	75-100	65-100	45-85	<35	NP-8
	42-65	Fine sandy loam, gravelly fine sandy loam, loamy sand.	SM, ML, CL-ML, SC-SM	A-4, A-2, A-1-b	0-5	70-100	60-95	40-85	20-75	<25	NP-5
CoB---------- Cotaco	0-5	Silt loam--------	ML, CL-ML, SM, SC-SM	A-4	0-5	80-100	75-95	55-85	35-80	<30	NP-7
	5-50	Gravelly sandy clay loam, loam, silt loam.	SC, SM, GC, CL	A-2, A-4, A-6, A-1-b	0-10	60-100	50-95	40-90	20-80	<35	NP-15
	50-65	Gravelly silt loam, clay loam, loam.	SC, SM, GC, CL	A-2, A-4, A-6, A-1-b	0-10	60-100	50-95	40-90	20-80	<35	NP-15
Cr---------- Craigsville	0-5	Gravelly loam----	ML, SM, CL-ML, SC	A-2, A-4	0-25	65-90	60-85	40-75	25-60	<25	NP-10
	5-39	Gravelly sandy loam, very gravelly 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
	39-65	Very gravelly loamy sand, gravelly sandy loam, very 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

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
DkC---------- Dekalb	0-2	Extremely stony sandy loam.	SM, GM, ML, CL-ML	A-2, A-4, A-1	15-30	50-90	45-80	40-75	20-55	10-32	NP-10
	2-24	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML, GM-GC	A-2, A-4, A-1	5-40	50-85	40-75	40-75	20-55	15-32	NP-9
	24-34	Channery sandy loam, extremely channery sandy loam, very flaggy loamy sand.	SM, GM, SC, GC	A-2, A-4, A-1	10-50	45-85	25-75	20-65	15-40	15-32	NP-9
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
DrF*:											
Dekalb----------	0-2	Extremely stony sandy loam.	SM, GM, ML, CL-ML	A-2, A-4, A-1	15-30	50-90	45-80	40-75	20-55	10-32	NP-10
	2-24	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML, GM-GC	A-2, A-4, A-1	5-40	50-85	40-75	40-75	20-55	15-32	NP-9
	24-34	Channery sandy loam, extremely channery sandy loam, very flaggy loamy sand.	SM, GM, SC, GC	A-2, A-4, A-1	10-50	45-85	25-75	20-65	15-40	15-32	NP-9
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
Ek---------- Elkins	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	85-95	75-90	20-40	4-14
	7-27	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	95-100	90-100	85-95	75-90	20-40	4-17
	27-65	Silt loam, loam, fine sandy loam.	ML, CL, SM, SC	A-4, A-6	0	95-100	90-100	65-95	40-85	15-35	1-13
FeC---------- Fenwick	0-2	Very stony loam	ML, CL-ML	A-4	0-15	85-100	80-100	70-95	60-90	20-35	2-10
	2-34	Loam, silt loam, clay loam.	ML, CL, CL-ML	A-4, A-6	0-10	85-100	75-100	65-95	55-90	25-40	4-14
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GaC, GaE--------- Gauley	0-4	Rubbly sandy loam	ML, CL-ML, SM, GM	A-1, A-2, A-4	50-85	40-80	40-75	35-70	20-55	15-25	NP-7
	4-14	Very channery loamy sand, channery sandy loam.	ML, CL-ML, SM, GM	A-1, A-2, A-4	10-40	40-80	40-80	40-75	20-55	15-25	NP-7
	14-28	Channery sandy loam, very channery sandy loam.	SC-SM, GM-GC, SM, GM	A-1, A-2, A-4	10-50	45-75	30-75	25-70	20-50	15-25	NP-7
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
GbB, GbC, GbD, GbE, GbF--------- Gilpin	0-2	Silt loam--------	CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	2-26	Channery loam, channery silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	26-36	Channery loam, channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GcC, GcF--------- Gilpin	0-2	Very stony silt loam.	GC, CL, SC, CL-ML	A-2, A-4, A-6	2-10	50-90	45-85	35-75	30-70	20-40	4-15
	2-26	Channery silt loam, channery loam, silty clay loam.	GM-GC, CL, CL-ML, SC	A-2, A-4, A-5	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	26-36	Channery loam, channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-5	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GdE*:											
Gilpin----------	0-2	Extremely stony silt loam.	GC, CL, SC, CL-ML	A-2, A-4, A-6	10-40	50-90	45-85	35-75	30-70	20-40	4-15
	2-26	Channery silt loam, channery loam, silty clay loam.	GM-GC, CL, CL-ML, SC	A-2, A-4, A-5	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	26-36	Channery loam, very channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-5	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Dekalb----------	0-2	Extremely stony sandy loam.	SM, GM, ML, CL-ML	A-2, A-4, A-1	15-30	50-90	45-80	40-75	20-55	10-32	NP-10
	2-24	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML, GM-GC	A-2, A-4, A-1	5-40	50-85	40-75	40-75	20-55	15-32	NP-9
	24-34	Channery sandy loam, extremely channery sandy loam, very flaggy loamy sand.	SM, GM, SC, GC	A-2, A-4, A-1	10-50	45-85	25-75	20-65	15-40	15-32	NP-9
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
GLF*:											
Gilpin----------	0-2	Extremely stony silt loam.	GC, CL, SC, CL-ML	A-2, A-4, A-6	10-40	50-90	45-85	35-75	30-70	20-40	4-15
	2-26	Channery silt loam, channery loam, silty clay loam.	GM-GC, CL, CL-ML, SC	A-2, A-4, A-5	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	26-36	Channery loam, channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-5	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Laidig----------	0-4	Extremely stony silt loam.	GM-GC, CL-ML, SC-SM, SM	A-4	15-30	65-90	50-80	45-80	35-70	15-30	NP-10
	4-32	Channery loam, channery sandy clay loam, channery sandy loam.	SM, SC, CL, ML	A-2, A-4, A-6	5-20	70-95	50-90	40-80	20-70	15-40	2-18
	32-65	Very channery sandy clay loam, very channery loam, channery sandy loam.	GC, GM-GC, CL-ML, SC	A-2, A-4, A-6	5-20	50-90	40-85	30-80	15-70	15-35	2-16
ItF---------- Itmann	0-14	Channery loam----	ML, CL, SM, SC	A-2, A-4	0-10	65-85	60-80	50-75	30-60	20-30	NP-8
	14-65	Very channery sandy loam, very channery loam, extremely channery sandy loam.	GM, GM-GC	A-1, A-2	0-15	30-55	25-50	20-45	10-35	15-25	NP-7
KaF---------- Kaymine	0-7	Extremely stony silt loam.	GC	A-2, A-4, A-6	30-55	45-60	40-55	30-50	20-40	25-35	7-12
	7-65	Extremely channery silt loam, very channery silt loam, very channery loam.	GC	A-2, A-4, A-6	5-30	30-55	25-50	20-45	15-40	25-35	7-12
LaC, LaD--------- Laidig	0-4	Channery silt loam.	GM, SM, ML, CL	A-4	0-5	65-90	50-80	45-80	35-70	15-30	1-10
	4-32	Channery loam, channery sandy clay loam, channery sandy loam.	SM, SC, CL, ML	A-2, A-4, A-6	5-20	70-95	50-90	40-80	20-70	15-40	2-18
	32-65	Very channery sandy clay loam, very channery loam, channery sandy loam.	GC, SC, GM-GC, CL-ML	A-2, A-4, A-6	5-20	50-90	40-85	30-80	15-70	15-35	2-16

See footnote at end of table.

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
LdC, LdE--------- Laidig	0-4	Extremely stony silt loam.	GM-GC, CL-ML, SC-SM, SM	A-4	15-30	65-90	50-80	45-80	35-70	15-30	NP-10
	4-32	Channery loam, channery sandy clay loam, channery sandy loam.	SM, SC, CL, ML	A-2, A-4, A-6	5-20	70-95	50-90	40-80	20-70	15-40	2-18
	32-65	Very channery sandy clay loam, very channery loam, channery sandy loam.	GC, GM-GC, CL-ML, SC	A-2, A-4, A-6	5-20	50-90	40-85	30-80	15-70	15-35	2-16
LgE---------- Laidig	0-4	Rubbly silt loam	GM-GC, CL-ML, SC-SM, SM	A-4	15-30	65-90	50-80	45-80	35-70	15-30	NP-10
	4-32	Channery loam, channery silt loam, channery sandy loam.	SM, SC, CL, ML	A-2, A-4, A-6	5-20	70-95	50-90	40-80	20-70	15-40	2-18
	32-65	Very channery sandy clay loam, very channery loam, channery sandy loam.	GC, GM-GC, CL-ML, SC	A-2, A-4, A-6	5-20	50-90	40-85	30-80	15-70	15-35	2-16
MaC, MaE, MaF, MaG---------- Mandy	0-2	Extremely stony silt loam.	CL-ML, CL	A-4	15-30	65-80	60-75	55-70	50-65	20-32	4-10
	2-24	Channery silt loam, very channery silt loam, extremely channery loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	20-32	4-10
	24-34	Extremely channery silt loam, extremely channery loam.	GM, GC, SM, SC	A-1, A-2	0-40	35-65	25-55	20-40	15-35	20-32	4-10
	34	Weathered bedrock	---	---	---	---	---	---	---	---	---
MkE---------- Meckesville	0-3	Extremely stony silt loam.	ML	A-4	15-25	80-100	70-95	65-85	55-80	---	---
	3-36	Loam, channery silt loam, gravelly silty clay loam.	ML, CL	A-4, A-6	0-20	60-100	60-95	60-90	55-70	25-40	2-15
	36-65	Channery loam, channery silt loam, gravelly clay loam.	ML, CL, GM, SC	A-4, A-2	0-20	45-95	40-90	35-85	30-65	20-30	2-10
Pe*:											
Philo----------	0-9	Loam----------	ML, CL-ML	A-4	0-5	95-100	80-100	75-90	60-80	20-35	1-10
	9-30	Silt loam, loam, sandy loam.	ML, SM, CL-ML	A-4	0-5	95-100	75-100	70-90	45-80	20-35	1-10
	30-65	Stratified sand to silt loam.	GM, SM, ML, CL-ML	A-2, A-4	0-5	60-95	50-90	40-85	30-80	15-30	1-10

See footnote at end of table.

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
Pe*:											
Pope	0-4	Loam	ML, CL, SM, CL-ML	A-4	0	85-100	75-100	70-100	45-90	<30	NP-10
	4-47	Fine sandy loam, sandy loam, loam.	SM, SC-SM, ML, CL-ML	A-2, A-4	0	95-100	80-100	51-95	25-75	<30	NP-7
	47-65	Sandy loam, loamy sand, fine sandy loam.	SM, SC-SM, ML, GM	A-2, A-1, A-4	0-20	45-100	35-100	30-95	15-70	<30	NP-7
PgG*:											
Pineville	0-5	Extremely stony loam.	ML, CL-ML, SM, SC-SM	A-2, A-4	15-30	55-90	50-85	45-80	30-75	25-35	4-10
	5-50	Channery loam, channery clay loam, very channery loam.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6	0-10	55-85	50-80	45-75	30-65	25-40	6-15
	50-65	Very channery loam, very channery clay loam, very channery sandy loam.	GM, GM-GC, SC, SC-SM	A-1, A-2, A-4, A-6	5-20	35-75	30-70	25-65	20-60	25-35	4-12
Gilpin	0-2	Extremely stony silt loam.	GC, CL, SC, CL-ML	A-2, A-4, A-6	10-40	50-90	45-85	35-75	30-70	20-40	4-15
	2-26	Channery silt loam, channery loam, silty clay loam.	GM-GC, CL, CL-ML, SC	A-2, A-4, A-5	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	26-36	Channery loam, channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-5	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
PLF*:											
Pineville	0-5	Extremely stony loam.	ML, CL-ML, SM, SC-SM	A-2, A-4	15-30	55-90	50-85	45-80	30-75	25-35	4-10
	5-50	Channery loam, channery clay loam, very channery loam.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6	0-10	55-85	50-80	45-75	30-65	25-40	6-15
	50-65	Very channery loam, very channery clay loam, very channery sandy loam.	GM, GM-GC, SC, SC-SM	A-1, A-2, A-4, A-6	5-20	35-75	30-70	25-65	20-60	25-35	4-12

See footnote at end of table.

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
PLF*:											
Gilpin----------	0-2	Extremely stony silt loam.	GC, CL, SC, CL-ML	A-2, A-4, A-6	10-40	50-90	45-85	35-75	30-70	20-40	4-15
	2-26	Channery silt loam, channery loam, silty clay loam.	GM-GC, CL, CL-ML, SC	A-2, A-4, A-5	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	26-36	Channery loam, channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-5	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Guyandotte------	0-19	Extremely stony silt loam.	GM-GC, SC-SM, CL-ML, ML	A-1, A-2, A-4	20-50	25-65	20-60	15-55	10-55	20-30	NP-8
	19-65	Very channery sandy loam, very channery silt loam, extremely channery loam.	GM-GC, SC-SM, CL-ML, ML	A-1, A-2, A-4	5-35	25-65	20-60	15-55	10-55	20-30	NP-8
Po---------- Pope	0-4	Loam----------	ML, CL, SM, CL-ML	A-4	0	85-100	75-100	70-100	45-90	<30	NP-10
	4-47	Fine sandy loam, sandy loam, loam.	SM, SC-SM, ML, CL-ML	A-2, A-4	0	95-100	80-100	51-95	25-75	<30	NP-7
	47-65	Sandy loam, loamy sand, fine sandy loam.	SM, SC-SM, ML, GM	A-2, A-1, A-4	0-20	45-100	35-100	30-95	15-70	<30	NP-7
Pp*:											
Pope----------	0-4	Very cobbly loam	ML, CL, SM, CL-ML	A-4	0	85-100	75-100	70-100	45-90	<30	NP-10
	4-47	Fine sandy loam, sandy loam, loam.	SM, SC-SM, ML, CL-ML	A-2, A-4	0	95-100	80-100	51-95	25-75	<30	NP-7
	47-65	Sandy loam, loamy sand, fine sandy loam.	SM, SC-SM, ML, GM	A-2, A-1, A-4	0-20	45-100	35-100	30-95	15-70	<30	NP-7
Potomac---------	0-9	Very cobbly sandy loam.	SM, GM, SC-SM, GM-GC	A-1, A-2, A-4	0-25	50-85	40-75	30-65	15-50	<20	NP-5
	9-65	Extremely cobbly loamy sand, very gravelly loamy sand, very gravelly sand.	SM, GM, SW-SM, GW-GM	A-1, A-2	15-50	50-80	35-70	20-50	5-25	<15	NP-3

See footnote at end of table.

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
ScF*:											
Shouns----------	0-4	Extremely stony silt loam.	ML, CL, CL-ML	A-4, A-6	5-15	80-100	75-100	65-95	55-90	15-30	3-12
	4-45	Silty clay loam, silt loam, channery silt loam.	CL, CL-ML	A-4, A-6	0-5	80-100	75-100	70-95	60-90	25-40	8-17
	45-65	Silty clay loam, clay loam, channery silt loam.	CL, ML	A-6, A-7	10-25	75-100	65-90	60-85	50-75	30-45	10-20
Cateache--------	0-9	Extremely stony silt loam.	CL, CL-ML, GM-GC, GC	A-4, A-6	15-30	70-85	65-80	60-75	45-70	20-40	4-15
	9-31	Channery silt loam, very channery silt loam.	CL-ML, CL, GC, GM-GC	A-2, A-4, A-6	0-15	40-85	35-80	30-80	25-70	20-40	4-15
	31	Weathered bedrock	---	---	---	---	---	---	---	---	---
SmC---------- Simoda	0-3	Very stony silt loam.	CL, CL-ML, GC, GM-GC	A-4	25-60	55-75	50-70	45-65	35-60	20-30	5-10
	3-23	Silt loam, channery silt loam, silty clay loam.	ML, CL, GC, SC	A-4, A-6	0-20	70-100	65-100	60-95	45-90	25-40	7-14
	23-48	Sandy loam, channery loam, silty clay loam.	ML, CL, GC, SC	A-4, A-6	0-20	65-100	60-95	55-90	35-85	25-40	7-14
	48	Weathered bedrock	---	---	---	---	---	---	---	---	---
SwE---------- Snowdog	0-3	Rubbly loam------	CL, CL-ML, SC, SC-SM	A-2, A-4	0-25	60-95	55-90	45-90	35-80	20-30	4-10
	3-24	Channery loam, very channery loam, channery silt loam.	ML, CL, SM, SC	A-2, A-4, A-6	0-15	60-95	55-90	45-90	35-80	25-35	6-15
	24-51	Channery sandy loam, channery loam, very channery sandy loam.	ML, CL, SM, SC	A-2, A-4, A-6	10-30	45-80	40-75	25-75	10-70	25-35	6-15
	51-65	Channery loam, very channery loam, very channery sandy loam.	ML, CL, SM, SC	A-2, A-4, A-6	10-30	45-80	40-75	25-75	10-70	20-40	4-18
Ud. Udorthents											

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 17.--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 K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
At---------- Atkins	0-7	15-25	1.20-1.40	0.6-2.0	0.14-0.22	4.5-5.5	Low----------	0.28	5	2-4
	7-48	18-35	1.20-1.50	0.06-2.0	0.14-0.18	4.5-5.5	Low----------	0.32		
	48-65	10-35	1.20-1.50	0.2-6.0	0.08-0.18	4.5-5.5	Low----------	0.28		
CaE---------- Cateache	0-9	15-27	1.20-1.40	0.6-2.0	0.14-0.18	4.5-6.0	Low----------	0.28	3	1-4
	9-31	18-35	1.30-1.60	0.6-2.0	0.12-0.16	4.5-6.0	Moderate-----	0.28		
	31	---	---	---	---	---	----------	----		
CeF---------- Cedarcreek	0-4	18-27	1.35-1.65	0.6-6.0	0.07-0.16	3.6-5.5	Low----------	0.32	5	<.5
	4-65	18-27	1.35-1.65	0.6-6.0	0.07-0.16	3.6-5.5	Low----------	0.32		
Ch---------- Chavies	0-6	7-18	1.20-1.40	2.0-6.0	0.11-0.18	4.5-5.5	Low----------	0.24	4	.5-4
	6-42	7-18	1.20-1.40	2.0-6.0	0.11-0.20	4.5-5.5	Low----------	0.24		
	42-65	7-18	1.30-1.50	2.0-6.0	0.08-0.18	4.5-5.5	Low----------	0.24		
CoB---------- Cotaco	0-5	7-27	1.20-1.40	0.6-6.0	0.12-0.20	4.5-5.5	Low----------	0.37	3	.5-4
	5-50	18-35	1.20-1.50	0.6-2.0	0.07-0.15	4.5-5.5	Low----------	0.28		
	50-65	18-35	1.20-1.50	0.6-2.0	0.07-0.15	4.5-5.5	Low----------	0.28		
Cr---------- Craigsville	0-5	5-15	1.20-1.40	2.0-20	0.07-0.15	4.5-5.5	Low----------	0.17	3	1-5
	5-39	5-15	1.30-1.60	2.0-20	0.06-0.15	4.5-5.5	Low----------	0.17		
	39-65	5-10	1.35-1.55	>6.0	0.04-0.09	4.5-5.5	Low----------	0.17		
DkC---------- Dekalb	0-2	10-20	1.20-1.50	6.0-20	0.08-0.12	3.6-6.5	Low----------	0.17	2	2-4
	2-24	7-18	1.20-1.50	6.0-20	0.06-0.12	3.6-5.5	Low----------	0.17		
	24-34	5-15	1.20-1.50	>6.0	0.05-0.10	3.6-5.5	Low----------	0.17		
	34	---	---	---	---	---	----------	----		
DrF*:										
Dekalb----------	0-2	10-20	1.20-1.50	6.0-20	0.08-0.12	3.6-6.5	Low----------	0.17	2	2-4
	2-24	7-18	1.20-1.50	6.0-20	0.06-0.12	3.6-5.5	Low----------	0.17		
	24-34	5-15	1.20-1.50	>6.0	0.05-0.10	3.6-5.5	Low----------	0.17		
	34	---	---	---	---	---	----------	----		
Rock outcrop.										
Ek---------- Elkins	0-7	18-30	1.20-1.50	0.6-2.0	0.18-0.24	3.6-5.0	Low----------	0.37	5	1-5
	7-27	18-35	1.30-1.60	0.06-0.2	0.12-0.16	3.6-5.0	Moderate-----	0.37		
	27-65	7-27	1.30-1.60	0.2-2.0	0.10-0.14	3.6-5.0	Low----------	0.32		
FeC---------- Fenwick	0-2	10-27	1.20-1.40	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.28	3	1-4
	2-34	18-35	1.20-1.50	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.24		
	34	---	---	---	---	---	----------	----		
GaC, GaE--------- Gauley	0-14	3-15	1.20-1.40	2.0-6.0	0.10-0.16	3.6-5.0	Low----------	0.17	2	2-4
	14-28	5-18	1.20-1.40	2.0-6.0	0.07-0.12	3.6-5.0	Low----------	0.17		
	28	---	---	---	---	---	----------	----		
GbB, GbC, GbD, GbE, GbF-------- Gilpin	0-2	15-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Low----------	0.32	3	.5-4
	2-26	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.24		
	26-36	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low----------	0.24		
	36	---	---	0.2-2.0	---	---	----------	----		

See footnote at end of table.

Table 17.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
GcC, GcF---------	0-2	15-27	1.20-1.40	0.6-2.0	0.08-0.14	3.6-5.5	Low----------	0.24	3	.5-4
Gilpin	2-26	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.24		
	26-36	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low----------	0.24		
	36	---	---	---	---	---	----------	----		
GdE*:										
Gilpin----------	0-2	15-27	1.20-1.40	0.6-2.0	0.08-0.14	3.6-5.5	Low----------	0.24	3	.5-4
	2-26	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.24		
	26-36	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low----------	0.24		
	36	---	---	---	---	---	----------	----		
Dekalb----------	0-2	10-20	1.20-1.50	6.0-20	0.08-0.12	3.6-6.5	Low----------	0.17	2	2-4
	2-24	7-18	1.20-1.50	6.0-20	0.06-0.12	3.6-5.5	Low----------	0.17		
	24-34	5-15	1.20-1.50	>6.0	0.05-0.10	3.6-5.5	Low----------	0.17		
	34	---	---	---	---	---	----------	----		
GLF*:										
Gilpin----------	0-2	15-27	1.20-1.40	0.6-2.0	0.08-0.14	3.6-5.5	Low----------	0.24	3	.5-4
	2-26	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.24		
	26-36	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low----------	0.24		
	36	---	---	---	---	---	----------	----		
Laidig----------	0-4	7-27	1.20-1.40	0.6-6.0	0.08-0.12	3.6-5.0	Low----------	0.24	4	1-4
	4-32	18-35	1.30-1.50	0.6-6.0	0.08-0.12	3.6-5.0	Low----------	0.24		
	32-65	18-35	1.30-1.60	0.06-0.6	0.06-0.10	3.6-5.0	Low----------	0.17		
ItF----------	0-14	10-20	1.00-1.30	0.6-6.0	0.08-0.15	3.6-5.5	Low----------	0.32	5	<.5
Itmann	14-65	4-15	1.00-1.30	2.0-20	0.05-0.12	3.6-5.5	Low----------	0.32		
KaF----------	0-7	18-27	1.35-1.65	0.6-6.0	0.07-0.16	5.6-7.3	Low----------	0.32	5	<.5
Kaymine	7-65	18-27	1.35-1.65	0.6-6.0	0.07-0.16	5.6-7.3	Low----------	0.32		
LaC, LaD---------	0-4	10-27	1.20-1.40	0.6-6.0	0.10-0.14	3.6-5.0	Low----------	0.28	4	1-4
Laidig	4-32	18-35	1.30-1.50	0.6-6.0	0.08-0.12	3.6-5.0	Low----------	0.24		
	32-65	18-35	1.30-1.60	0.06-0.6	0.06-0.10	3.6-5.0	Low----------	0.17		
LdC, LdE---------	0-4	7-27	1.20-1.40	0.6-6.0	0.08-0.12	3.6-5.0	Low----------	0.24	4	1-4
Laidig	4-32	18-35	1.30-1.50	0.6-6.0	0.08-0.12	3.6-5.0	Low----------	0.24		
	32-65	18-35	1.30-1.60	0.06-0.6	0.06-0.10	3.6-5.0	Low----------	0.17		
LgE----------	0-4	7-27	1.20-1.40	0.6-6.0	0.08-0.12	3.6-5.0	Low----------	0.10	4	1-3
Laidig	4-32	18-35	1.30-1.50	0.6-6.0	0.08-0.12	3.6-5.0	Low----------	0.24		
	32-65	18-35	1.30-1.60	0.06-0.6	0.06-0.10	3.6-5.0	Low----------	0.17		
MaC, MaE, MaF,										
MaG----------	0-2	7-25	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.0	Low----------	0.20	3	.5-3
Mandy	2-24	10-27	1.20-1.60	0.6-2.0	0.04-0.10	3.6-5.0	Low----------	0.17		
	24-34	10-27	1.20-1.60	0.6-2.0	0.04-0.10	3.6-5.0	Low----------	0.17		
	34	---	---	---	---	---	----------	----		
MkE----------	0-3	10-27	1.10-1.30	0.6-2.0	0.10-0.14	4.5-5.5	Low----------	0.24	4	1-4
Meckesville	3-36	18-35	1.20-1.40	0.6-2.0	0.10-0.14	4.5-5.5	Low----------	0.24		
	36-65	18-35	1.30-1.60	0.2-0.6	0.08-0.12	4.5-5.5	Low----------	0.24		
Pe*:										
Philo----------	0-9	10-18	1.20-1.40	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.37	5	2-4
	9-30	10-18	1.20-1.40	0.6-2.0	0.10-0.20	4.5-6.0	Low----------	0.32		
	30-65	5-18	1.20-1.40	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.24		

See footnote at end of table.

Table 17.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Pe*:										
Pope----------	0-4	5-15	1.20-1.40	0.6-2.0	0.14-0.23	3.6-5.5	Low----------	0.37	5	1-4
	4-47	5-18	1.30-1.60	0.6-6.0	0.10-0.18	3.6-5.5	Low----------	0.28		
	47-65	5-20	1.30-1.60	0.6-6.0	0.10-0.18	3.6-5.5	Low----------	0.28		
PgG*:										
Pineville-------	0-5	15-25	1.00-1.30	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.20	4	.5-5
	5-50	18-30	1.30-1.60	0.6-2.0	0.08-0.14	4.5-5.5	Low----------	0.15		
	50-65	15-30	1.30-1.60	0.6-6.0	0.06-0.14	4.5-5.5	Low----------	0.15		
Gilpin----------	0-2	15-27	1.20-1.40	0.6-2.0	0.08-0.14	3.6-5.5	Low----------	0.24	3	.5-4
	2-26	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.24		
	26-36	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low----------	0.24		
	36	---	---	---	---	---	----------	----		
PLF*:										
Pineville-------	0-5	15-25	1.00-1.30	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.20	4	.5-5
	5-50	18-30	1.30-1.60	0.6-2.0	0.08-0.14	4.5-5.5	Low----------	0.15		
	50-65	15-30	1.30-1.60	0.6-6.0	0.06-0.14	4.5-5.5	Low----------	0.15		
Gilpin----------	0-2	15-27	1.20-1.40	0.6-2.0	0.08-0.14	3.6-5.5	Low----------	0.24	3	.5-4
	2-26	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.24		
	26-36	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low----------	0.24		
	36	---	---	---	---	---	----------	----		
Guyandotte------	0-19	5-27	1.00-1.30	0.6-6.0	0.10-0.16	4.5-7.3	Low----------	0.10	4	2-10
	19-65	5-27	1.30-1.60	0.6-6.0	0.05-0.15	4.5-6.0	Low----------	0.17		
Po---------- Pope	0-4	5-15	1.20-1.40	0.6-2.0	0.14-0.23	3.6-5.5	Low----------	0.37	5	1-4
	4-47	5-18	1.30-1.60	0.6-6.0	0.10-0.18	3.6-5.5	Low----------	0.28		
	47-65	5-20	1.30-1.60	0.6-6.0	0.10-0.18	3.6-5.5	Low----------	0.28		
Pp*:										
Pope----------	0-4	5-15	1.20-1.40	0.6-2.0	0.14-0.23	3.6-5.5	Low----------	0.37	5	1-4
	4-47	5-18	1.30-1.60	0.6-6.0	0.10-0.18	3.6-5.5	Low----------	0.28		
	47-65	5-20	1.30-1.60	0.6-6.0	0.10-0.18	3.6-5.5	Low----------	0.28		
Potomac---------	0-9	5-12	1.20-1.40	2.0-6.0	0.08-0.12	5.1-7.8	Low----------	0.20	3	0-2
	9-65	4-10	1.30-1.60	>6.0	0.03-0.06	5.1-7.8	Low----------	0.17		
ScF*:										
Shouns----------	0-4	15-27	1.35-1.50	0.6-2.0	0.11-0.18	4.5-5.5	Low----------	0.20	5	.5-3
	4-45	27-35	1.40-1.60	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.28		
	45-65	27-35	1.40-1.60	0.6-2.0	0.09-0.15	4.5-5.5	Low----------	0.28		
Cateache--------	0-9	15-27	1.20-1.40	0.6-2.0	0.14-0.18	4.5-6.0	Low----------	0.28	3	1-4
	9-31	18-35	1.30-1.60	0.6-2.0	0.12-0.16	4.5-6.0	Moderate-----	0.28		
	31	---	---	---	---	---	----------	----		
SmC---------- Simoda	0-3	10-27	1.20-1.50	0.6-2.0	0.10-0.14	3.6-5.0	Low----------	0.17	3	1-4
	3-23	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.0	Low----------	0.24		
	23-48	18-35	1.40-1.70	0.06-0.2	0.08-0.12	3.6-5.0	Low----------	0.24		
	48	---	---	---	---	---	----------	----		
SwE---------- Snowdog	0-3	7-27	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.17	3	1-4
	3-24	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.24		
	24-51	18-35	1.40-1.70	0.06-0.6	0.08-0.12	3.6-5.5	Low----------	0.24		
	51-65	7-40	1.20-1.50	0.6-6.0	0.08-0.12	3.6-5.5	Low----------	0.24		
Ud. Udorthents										

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 18.--Soil and Water Features

("Flooding" and "water table" and terms such as "rare," "occasional," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding	High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
			Ft			In				
At---------- Atkins	D	Occasional------	0-1.0	Apparent	Nov-Jun	>60	---	High-----	High-----	Moderate.
CaE---------- Cateache	C	None----------	>6.0	---	---	20-40	Soft	Moderate	Moderate	Moderate.
CeF---------- Cedarcreek	C	None----------	>6.0	---	---	>60	---	Moderate	Moderate	High.
Ch---------- Chavies	B	Rare----------	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
CoB---------- Cotaco	C	None----------	1.5-2.5	Apparent	Nov-May	>60	---	Moderate	Moderate	High.
Cr---------- Craigsville	B	Rare----------	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
DkC---------- Dekalb	C	None----------	>6.0	---	---	20-40	Hard	Low------	Low------	High.
DrF*:										
Dekalb----------	C	None----------	>6.0	---	---	20-40	Hard	Low------	Low------	High.
Rock outcrop.										
Ek---------- Elkins	D	Occasional------	0-1.5	Apparent	Nov-Jun	>60	---	High-----	High-----	High.
FeC---------- Fenwick	C	None----------	1.5-2.5	Perched	Nov-Apr	20-40	Hard	High-----	Moderate	High.
GaC, GaE---------- Gauley	C	None----------	>6.0	---	---	20-40	Hard	Moderate	Low------	High.
GbB, GbC, GbD, GbE, GbF, GcC, GcF---------- Gilpin	C	None----------	>6.0	---	---	20-40	Hard	Moderate	Low------	High.
GdE*:										
Gilpin----------	C	None----------	>6.0	---	---	20-40	Hard	Moderate	Low------	High.

See footnote at end of table.

Table 18.--Soil and Water Features--Continued

Soil name and map symbol	Hydrologic group	Flooding	High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
			Ft			In				
GdE*:										
Dekalb	C	None	>6.0	---	---	20-40	Hard	Low	Low	High.
GLF*:										
Gilpin	C	None	>6.0	---	---	20-40	Hard	Moderate	Low	High.
Laidig	C	None	2.5-4.0	Perched	Jan-Mar	>60	---	Moderate	Moderate	High.
ItF Itmann	C	None	>6.0	---	---	>60	---	Moderate	High	High.
KaF Kaymine	C	None	>6.0	---	---	>60	---	Moderate	Low	Low.
LaC, LaD, LdC, LdE, LgE Laidig	C	None	2.5-4.0	Perched	Jan-Mar	>60	---	Moderate	Moderate	High.
MaC, MaE, MaF, MaG Mandy	C	None	>6.0	---	---	20-40	Soft	Low	Low	High.
MkE Meckesville	C	None	2.5-4.0	Perched	Nov-Apr	>60	---	Moderate	Moderate	High.
Pe*:										
Philo	B	Occasional	1.5-3.0	Apparent	Dec-Apr	>60	---	Moderate	Low	High.
Pope	B	Occasional	>6.0	---	---	>60	---	Moderate	Low	High.
PgG*:										
Pineville	B	None	>6.0	---	---	>60	---	Moderate	Low	High.
Gilpin	C	None	>6.0	---	---	20-40	Hard	Moderate	Low	High.
PLF*:										
Pineville	B	None	>6.0	---	---	>60	---	Moderate	Low	High.
Gilpin	C	None	>6.0	---	---	20-40	Hard	Moderate	Low	High.
Guyandotte	B	None	>6.0	---	---	>60	---	Low	Low	High.
Po Pope	B	Occasional	>6.0	---	---	>60	---	Moderate	Low	High.

See footnote at end of table.

Table 18.--Soil and Water Features--Continued

Soil name and map symbol	Hydrologic group	Flooding	High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
			Ft			In				
Pp*:										
Pope	B	Occasional	>6.0	---	---	>60	---	Moderate	Low	High.
Potomac	A	Occasional	4.0-6.0	Apparent	---	>60	---	Low	Low	Moderate.
ScF*:										
Shouns	B	None	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
Cateache	C	None	>6.0	---	---	20-40	Soft	Moderate	Moderate	Moderate.
SmC Simoda	C	None	1.5-2.5	Perched	Nov-May	40-60	Hard	Moderate	Moderate	High.
SwE Snowdog	C	None	1.5-2.5	Perched	Nov-May	>60	---	Moderate	Moderate	High.
Ud. Udorthents										

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 19.--Classification of the Soils

Soil name	Family or higher taxonomic class
Atkins	Fine-loamy, mixed, acid, mesic Typic Fluvaquents
Cateache	Fine-loamy, mixed, mesic Ultic Hapludalfs
Cedarcreek	Loamy-skeletal, mixed, acid, mesic Typic Udorthents
Chavies	Coarse-loamy, mixed, mesic Ultic Hapludalfs
Cotaco	Fine-loamy, mixed, mesic Aquic Hapludults
Craigsville	Loamy-skeletal, mixed, mesic Fluventic Dystrochrepts
Dekalb	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Elkins	Fine-silty, mixed, acid, mesic Humaqueptic Fluvaquents
Fenwick	Fine-loamy, mixed, mesic Aquic Hapludults
Gauley	Loamy-skeletal, siliceous, frigid Typic Haplorthods
Gilpin	Fine-loamy, mixed, mesic Typic Hapludults
Guyandotte	Loamy-skeletal, mixed, mesic Typic Haplumbrepts
Itmann	Loamy-skeletal, mixed, acid, mesic Typic Udorthents
Kaymine	Loamy-skeletal, mixed, nonacid, mesic Typic Udorthents
Laidig	Fine-loamy, siliceous, mesic Typic Fragiudults
Mandy	Loamy-skeletal, mixed, frigid Typic Dystrochrepts
Meckesville	Fine-loamy, mixed, mesic Typic Fragiudults
Philo	Coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts
Pineville	Fine-loamy, mixed, mesic Typic Hapludults
Pope	Coarse-loamy, mixed, mesic Fluventic Dystrochrepts
Potomac	Sandy-skeletal, mixed, mesic Typic Udifluvents
Shouns	Fine-loamy, mixed, mesic Typic Hapludults
Simoda	Fine-loamy, mixed, frigid Typic Fragiochrepts
Snowdog	Fine-loamy, mixed, frigid Typic Fragiochrepts
Udorthents	Udorthents