United States Department of Agriculture

Natural Resources Conservation Service

United States Department of the Interior

National Park Service

Soil Survey of Bluestone National Scenic River, West Virginia

How To Use This Soil Survey

This publication consists of text, tables, and a map. The text includes descriptions of detailed soil map units and provides an explanation of the information presented in the tables. It also includes a glossary of terms used in the text and tables and a list of references.

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 map sheet. Note the map unit symbols that are in that area. Go to the Contents, which lists the map units by symbol and name and shows where each map unit is described.

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.

National Cooperative Soil Survey

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 has leadership for the Federal part of the National Cooperative Soil Survey.

The 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, the maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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Cover Caption

Looking downstream along the Bluestone River in spring.

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Foreword

This soil survey was developed in conjunction with the National Park Service's Soil Inventory and Monitoring Program and is intended to serve as the official source document for soils occurring within Bluestone National Scenic River.

This soil survey contains information that affects current and future land use planning in the park. It contains predictions of soil behavior for selected land uses. The survey highlights soil limitations, actions needed to overcome the limitations, and the impact of selected land uses on the environment. It is designed to meet the needs of the National Park Service and its partners to better understand the properties of the soils in the park and the effects of these soil properties on various natural ecological characteristics. This knowledge can help the National Park Service and its partners to 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 on 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. The location of each map unit is shown on the detailed soil maps. Each soil in the survey area is described, and information on specific uses is given. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the park office for Bluestone National Scenic River.

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Soil Survey of
Bluestone National Scenic River, West Virginia

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Bluestone National Scenic River is located in parts of Mercer and Summers Counties, West Virginia. This park was created in 1988 and preserves more than 10 miles of the lower Bluestone River, providing a scenic and diverse natural experience for visitors. The many popular outdoor activities include hiking, mountain biking, birding, wildlife watching, fishing, and canoeing and kayaking. The landscape of the park is defined by the steep and rugged river gorge, which is characterized by sandstone cliffs and narrow, rubbly drainageways that lead down to broader, gently sloping bottomlands and the Bluestone River (fig. 1).

General Nature of the Survey Area

This section provides general information about the survey area. It discusses the history, environment, and climate of Bluestone National Scenic River.

History

American Indians called the Bluestone River “Momongosenka” (Big Stone River), supposedly inspired by their travels along ancient pathways through the boulder-strewn lower gorge. Many native prehistoric sites, from nomadic Paleo-Indian hunting camps dating back to the times of Ice-Age mammoth and mastodon, through hundreds of generations of village and burial sites of the Archaic and Woodland cultures, to the Delaware, Cherokee, and Shawnee tribes of the 1600s and 1700s, have been documented throughout the Bluestone River watershed.

In the mid-1700s, European and African peoples began to explore and establish subsistence homesteads along the river. Settlers at the river’s headwaters, in present-day Tazewell County, Virginia, named the river Bluestone as the waters course over a blue limestone streambed. At the confluence of the Bluestone and Little Bluestone Rivers in the National Scenic River near Bluestone State Park, the lost community of Lilly once flourished. Lilly was one of the first Appalachian settlements in present-day

Figure 1.—A rock outcrop of a shale member of the Hinton Formation, located in an area of Cateache-Pipestem complex, 35 to 90 percent slopes, extremely stony. The steep side slopes of the Blue River gorge expose many of these cliff areas, some of which display the effects of weathering in bright reddish-yellow areas of iron oxidation.

West Virginia, settled in the 1700s by Robert and Frances Lilly, Josiah Meador, and their families.

Robert Lilly and Josiah Meador moved from Dublin Pulaski, Virginia to what is present-day West Virginia. Both families settled on the Bluestone River and survived by subsistence farming and logging. It has been said that the families arrived with a bible, an ax, and a gun and created a new life on wild and rugged land. Lilly soon became home to more than 30 families. Schools, churches, stores, and cemeteries were built.

Lilly continued to thrive until the mid-1900s when the construction of the Bluestone Dam began. Construction calculations predicted Lilly would be underwater, and residents were forced to move. Cemeteries were exhumed and moved to new locations. Buildings, churches, stores, and homes were all destroyed or moved to new locations. A few of their foundations still remain.

The Lilly family is one of the largest families in the world. Each year, family members come to celebrate on the Lilly Family grounds in the town of Flat Top. The Lilly reunion began in the early 1900s and still continues today. It is recognized by the Guinness Book of World Records as the largest family reunion in the world.

The Bluestone Turnpike, a riverbank road that evolved from the original Indian trail through the gorge, was used by those who farmed and timbered the area until the 1940s. It serves today as the main trail access for park visitors.

The Bluestone National Scenic River was created in 1988 under the Wild and Scenic Rivers Act. The Wild and Scenic Rivers System was established for the purpose of protecting for the present, and preserving for the future, undeveloped,

free-flowing rivers that possess “outstandingly remarkable” scenic, natural, cultural, geological, and recreational values (USDI-NPS, 2011).

Environment

The headwaters of the Bluestone River begin on East River Mountain (at an elevation of 3,500 feet) near Bluefield, Virginia, and flow for 77 miles to Bluestone Lake (at an elevation of 1,409 feet) near Hinton, West Virginia. The Bluestone River is a tributary of the New River, draining parts of southwestern Virginia and southern West Virginia.

The area of the Bluestone River, including the rugged and ancient gorge it has carved, is a richly diverse and scenic area of the southern Appalachian Mountains. It has more than a thousand species of plants growing in several forest habitat types. A diverse mix of Southern Appalachian forest types, from oaks and hickories on the ridgetops to birch and sycamores along the riverbanks, occurs along the Bluestone River. Two hundred species of birds have been spotted in the park. The Bluestone National Scenic River provides excellent areas for watching many mammal, amphibian, reptile, and insect species. The riverbed habitat is alive with a carpet of macro-invertebrate aquatic species and supports healthy populations of many warm-water game and non-game fishes. The Bluestone River is classified as a High Quality Warm Water Stream by the State of West Virginia.

The reason for this great diversity of plants stems from the varied topography of the gorge. The northeasterly flow of the Bluestone River provides a pathway for southern plants to migrate and grow on the lower elevation riverbanks. This area of West Virginia was spared from glacial activity, thereby providing a refuge for more northern plant species at higher elevations.

Biologists classify the forest of the gorge as mixed mesophytic, a forest that generally receives a moderate amount of moisture. This classification can also be broken down into types of forest communities.

Of the six forest communities commonly found in the southern Appalachians, five can be found within Bluestone National Scenic River. Sunny, drier, southern-facing slopes support a mainly oak-hickory forest. Cool, damp northern exposures are home to hardwood forests of beech and maple, with an abundance of eastern hemlock. River bottoms and flood plains support a northern riverine type forest of sycamore and river birch. Fire-prone areas and ridgelines with thin rocky soil are usually covered with scrub pine and oak forests. Appalachian cove forests in sheltered valleys with rich, thick soils and tall tulip poplars and basswoods are exceptionally rich in plant and animal diversity. The only southern Appalachian forest community that does not occur is the boreal forest of spruce and fir, which is only at elevations above 5,000 feet.

All plant and animal species coexist and interact in communities. The communities in the gorge are divided by differences in moisture levels and types of soil, the effects of elevation and direction of slope, and the presence of certain indicator species that are usually common to a specific community.

These forest communities seldom have distinct boundaries and are not limited to the indicator species; however, the general habitat patterns they describe are very helpful in the study of not only the plants but of all the life of the forest (USDI-NPS, 2011).

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Bluestone Lake, West Virginia, in the period 1971 to 2000. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on the length of the growing season.

In winter, the average temperature is 33.8 degrees F and the average daily minimum temperature is 24.3 degrees. The lowest temperature on record, which occurred at Bluestone Lake on January 21, 1985, is -17 degrees. In summer, the average temperature is 71.7 degrees and the average daily maximum temperature is 82.7 degrees. The highest temperature on record, which occurred at Bluestone Lake on August 29, 1948, is 103 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 average annual total precipitation is 37.77 inches. Of this, 23.52 inches, or about 62 percent, usually falls in April through October. The growing season for most crops falls within this period. The heaviest 1-day rainfall during the period of record was 3.94 inches, recorded at Bluestone Lake on August 20, 1969. Thunderstorms occur on about 46 days each year, and most occur in July.

The average seasonal snowfall is 21.2 inches. The greatest snow depth at any one time during the period of record was 23 inches, recorded on January 8, 1996. On an average, 20 days per year have at least 1 inch of snow on the ground. The heaviest 1-day snowfall on record was 16.0 inches, recorded on January 7, 1996.

The average relative humidity in mid-afternoon is about 61 percent. Humidity is higher at night, and the average at dawn is about 83 percent. The sun shines 56 percent of the time in summer and 35 percent in winter. The prevailing wind is from the southeast. Average windspeed is highest, 9.6 miles per hour, in March.

How This Survey Was Made

This survey was made in conjunction with the National Park Service’s Soil Inventory and Monitoring Program to provide information about the soils and miscellaneous areas in Bluestone National Scenic River. A scoping meeting was held in 2005 with park staff to identify their soil resource information needs and to relate those needs to the existing soil survey. Of particular importance to park staff was information regarding management of the land for recreation, forest health, historical significance, wildlife, and watershed planning.

The soil survey area of Bluestone National Scenic River was established in 2007 as part of the existing soil survey of Mercer and Summers Counties, West Virginia (USDA-NRCS, 2007). Fieldwork for the project commenced in 2007 and ended in 2010, concentrating on areas of concern pointed out by park staff.

During the soil survey, soil component relationships were observed and soil-site correlation concepts were established to help design the map units. Soil and plant specialists tested the concepts during mapping and collected field documentation at numerous points across the landscape.

The information in the survey 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 native plants; and the kinds of bedrock. They examined many hand-augered (4-inch diameter) excavations as well as a few larger pit (2- to 3-foot diameter) excavations in order 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, soils 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 soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify 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, they 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.

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 applied knowledge of soil-landscape relationships and used remote-sensing tools, including slope analysis and three-dimensional modeling, to delineate the boundaries of these bodies on digital imagery and identified each as a specific map unit.

Detailed Soil Map Units

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the park. 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.

A map unit delineation on a soil 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. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils 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 minor components that belong to taxonomic classes other than those of the major soils.

Most minor 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, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. 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 contrasting components are mentioned in the map unit descriptions. A few areas of minor components 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 minor components 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. If intensive use of small areas is planned, however, 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*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. The soils of a given 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, Cateache channery silt loam, 8 to 15 percent slopes, is a phase of the Cateache series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes. 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. Gilpin-Berks complex, 25 to 35 percent slopes, very stony, is an example.

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

CaC—Cateache channery silt loam, 8 to 15 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 493 to 614 meters
Mean annual precipitation: 865 to 1,044 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 158 to 205 days

Map Unit Composition

Cateache and similar soils: 75 percent
Dissimilar minor components: 25 percent

Description of Cateache Soil

Classification
Fine-loamy, mixed, active, mesic Ultic Hapludalfs

Setting
Landform: Ridges and structural benches
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountain flank
Down-slope shape: Linear
Across-slope shape: Convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 8 to 15 percent
Parent material: Nonacid fine-loamy residuum weathered from shale and siltstone

Properties and Qualities
Depth to restrictive feature: 51 to 102 centimeters to paralithic bedrock
Shrink-swell potential: Low (about 2.4 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately low

Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 12.4 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 3e
West Virginia grassland suitability group (WVGSG): Limy Uplands (LU2)
Dominant vegetation map class(es):
Oak - Eastern White Pine / Ericad Forest
Successional Eastern White Pine - Tuliptree Forest
Hydric soil status: No
Hydrologic soil group: C

Representative Profile
Oi—0 to 2 centimeters; slightly decomposed plant material
A—2 to 9 centimeters; channery silt loam
Bt1—9 to 75 centimeters; channery silty clay loam
Bt2—75 to 92 centimeters; channery silty clay loam
Cr—92 to 102 centimeters; bedrock

Minor Components

Pipestem soils
Percent of map unit: 15 percent
Slope: 8 to 15 percent
Landform: Mountain slopes
Hydric soil status: No

Berks soils
Percent of map unit: 5 percent
Slope: 8 to 15 percent
Landform: Ridges and structural benches
Hydric soil status: No

Macove soils
Percent of map unit: 5 percent
Slope: 8 to 15 percent
Landform: Colluvium-mantled mountain slopes
Hydric soil status: No

CbD—Cateache channery silt loam, 15 to 25 percent slopes, very stony

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 509 to 529 meters
Mean annual precipitation: 865 to 1,044 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 158 to 205 days

Map Unit Composition

Cateache and similar soils: 75 percent
Dissimilar minor components: 25 percent

Description of Cateache Soil

Classification
Fine-loamy, mixed, active, mesic Ultic Hapludalfs

Setting
Landform: Ridges and structural benches
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountain flank
Down-slope shape: Linear
Across-slope shape: Convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 15 to 25 percent
Parent material: Nonacid fine-loamy residuum weathered from shale and siltstone

Properties and Qualities
Depth to restrictive feature: 51 to 102 centimeters to paralithic bedrock
Shrink-swell potential: Low (about 2.4 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately low
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 12.4 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 6s
West Virginia grassland suitability group (WVGSG): Very Rocky, Limy Soils (RL2)
Dominant vegetation map class(es):
Oak - Eastern White Pine - Ericad Forest
Oak - Hickory - Sugar Maple Forest
Hydric soil status: No
Hydrologic soil group: C

Representative Profile
Oi—0 to 2 centimeters; slightly decomposed plant material
A—2 to 9 centimeters; channery silt loam
Bt1—9 to 75 centimeters; channery silty clay loam
Bt2—75 to 92 centimeters; channery silty clay loam
Cr—92 to 102 centimeters; bedrock

Minor Components

Pipestem soils
Percent of map unit: 15 percent
Slope: 15 to 25 percent
Landform: Mountain slopes
Hydric soil status: No

Berks soils
Percent of map unit: 5 percent
Slope: 15 to 25 percent

Landform: Ridges and structural benches
Hydric soil status: No

Macove soils
Percent of map unit: 5 percent
Slope: 15 to 25 percent
Landform: Colluvium-mantled mountain slopes
Hydric soil status: No

CbE—Cateache channery silt loam, 25 to 35 percent slopes, very stony

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 467 to 662 meters
Mean annual precipitation: 865 to 1,044 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 158 to 205 days

Map Unit Composition

Cateache and similar soils: 75 percent
Dissimilar minor components: 25 percent

Description of Cateache Soil

Classification
Fine-loamy, mixed, active, mesic Ultic Hapludalfs

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountain flank
Down-slope shape: Linear
Across-slope shape: Convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 25 to 35 percent
Parent material: Nonacid fine-loamy residuum weathered from shale and siltstone

Properties and Qualities
Depth to restrictive feature: 51 to 102 centimeters to paralithic bedrock
Shrink-swell potential: Low (about 2.4 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately low
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 12.6 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 6s
West Virginia grassland suitability group (WVGSG): Very Rocky, Limy Soils (RL2)
Dominant vegetation map class(es):
Oak - Eastern White Pine - Ericad Forest
Oak - Hickory - Sugar Maple Forest
Hydric soil status: No
Hydrologic soil group: C

Representative Profile
Oi—0 to 1 centimeter; slightly decomposed plant material
A—1 to 9 centimeters; channery silt loam
Bt1—9 to 75 centimeters; channery silty clay loam
Bt2—75 to 92 centimeters; channery silty clay loam
Cr—92 to 102 centimeters; bedrock

Minor Components

Pipestem soils
Percent of map unit: 15 percent
Slope: 25 to 35 percent
Landform: Mountain slopes
Hydric soil status: No

Berks soils
Percent of map unit: 5 percent
Slope: 25 to 35 percent
Landform: Mountain slopes
Hydric soil status: No

Macove soils
Percent of map unit: 5 percent
Slope: 25 to 35 percent
Landform: Colluvium-mantled mountain slopes
Hydric soil status: No

CeG—Cateache-Pipestem complex, 35 to 90 percent slopes, extremely stony

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 438 to 723 meters
Mean annual precipitation: 865 to 1,346 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 158 to 205 days

Map Unit Composition

Cateache and similar soils: 60 percent
Pipestem and similar soils: 20 percent
Dissimilar minor components: 20 percent

Description of Cateache Soil

Classification
Fine-loamy, mixed, active, mesic Ultic Hapludalfs

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountain flank
Down-slope shape: Linear
Across-slope shape: Convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 35 to 90 percent
Parent material: Nonacid fine-loamy residuum weathered from shale and siltstone

Properties and Qualities
Depth to restrictive feature: 51 to 102 centimeters to paralithic bedrock
Shrink-swell potential: Low (about 2.4 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately low
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 12.6 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Oak - Eastern White Pine - Ericad Forest
Oak - Hickory - Sugar Maple Forest
Hydric soil status: No
Hydrologic soil group: C

Representative Profile
A—0 to 8 centimeters; channery silt loam
Bt1—8 to 74 centimeters; channery silty clay loam
Bt2—74 to 91 centimeters; channery silty clay loam
Cr—91 to 101 centimeters; bedrock

Description of Pipestem Soil

Classification
Fine, mixed, active, mesic Dystric Eutrudepts

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountain flank
Down-slope shape: Linear
Across-slope shape: Concave
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 35 to 80 percent
Parent material: Reddish brown silty and clayey colluvium derived from interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (about 2.3 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 28.2 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Oak - Hickory - Sugar Maple Forest
Sugar Maple - Yellow Buckeye - American Basswood Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 1 centimeter; slightly decomposed plant material
A—1 to 11 centimeters; channery silty clay loam
BA+Bw—11 to 137 centimeters; stony silty clay loam
BC—137 to 200 centimeters; very stony silty clay loam

Minor Components

Litz soils
Percent of map unit: 5 percent
Slope: 35 to 80 percent
Landform: Mountain slopes
Dominant vegetation map class(es):
Virginia Pine - Oak Shale Woodland
Hydric soil status: No

Gilpin soils
Percent of map unit: 4 percent
Slope: 35 to 65 percent
Landform: Mountain slopes and ridges
Hydric soil status: No

Macove soils
Percent of map unit: 4 percent
Slope: 35 to 65 percent
Landform: Colluvium-mantled mountain slopes
Dominant vegetation map class(es):
Eastern Hemlock - American Basswood Forest
Hydric soil status: No

Rock outcrop
Percent of map unit: 4 percent
Landform: Sandstone outcrops on mountain slopes
Hydric soil status: No

Rubble land
Percent of map unit: 3 percent
Slope: 35 to 80 percent
Landform: Plateaus and mountain slopes
Hydric soil status: No

ChA—Chavies fine sandy loam, 0 to 3 percent slopes, rarely flooded

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 437 to 496 meters
Mean annual precipitation: 865 to 1,044 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 158 to 205 days

Map Unit Composition

Chavies and similar soils: 75 percent
Dissimilar minor components: 25 percent

Description of Chavies Soil

Classification
Coarse-loamy, mixed, active, mesic Ultic Hapludalfs

Setting
Landform: Flood plains in river valleys
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Mountain base
Down-slope shape: Linear
Across-slope shape: Linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 0 to 3 percent
Parent material: Coarse-loamy alluvium derived from interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): High
Natural drainage class: Well drained
Flooding frequency: Rare (see table 23)
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 24.1 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 1
West Virginia grassland suitability group (WVGSG): Fertile Loams (FL2)

Dominant vegetation map class(es):
Disturbed Area
Successional Eastern White Pine - Tuliptree Forest
Hydric soil status: No
Hydrologic soil group: A

Representative Profile
Oi—0 to 2 centimeters; slightly decomposed plant material
A—2 to 28 centimeters; fine sandy loam
Bt+BC—28 to 107 centimeters; fine sandy loam
C—107 to 165 centimeters; sandy loam

Minor Components

Potomac soils
Percent of map unit: 10 percent
Slope: 0 to 3 percent
Landform: High-energy flood plains in river valleys
Hydric soil status: No

Kanawha soils
Percent of map unit: 5 percent
Slope: 0 to 3 percent
Landform: Flood plains in river valleys and low terraces
Hydric soil status: No

Middlebury soils
Percent of map unit: 5 percent
Slope: 0 to 3 percent
Landform: High-energy flood plains in river valleys
Hydric soil status: No

Hustontown soils
Percent of map unit: 3 percent
Slope: 3 to 8 percent
Landform: Mountain slopes
Hydric soil status: No

Pipestem soils
Percent of map unit: 2 percent
Slope: 3 to 15 percent
Landform: Mountain slopes
Hydric soil status: No

CoA—Combs fine sandy loam, 0 to 3 percent slopes, occasionally flooded

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 435 to 511 meters
Mean annual precipitation: 865 to 1,044 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 158 to 205 days

Map Unit Composition

Combs and similar soils: 85 percent
Dissimilar minor components: 15 percent

Description of Combs Soil

Classification
Coarse-loamy, mixed, active, mesic Fluventic Hapludolls

Setting
Landform: Flood plains in river valleys
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Mountain base
Down-slope shape: Linear
Across-slope shape: Linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 0 to 3 percent
Parent material: Recent coarse-loamy alluvium derived from interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: Occasional (see table 23)
Ponding frequency: None
Depth to seasonal water table: About 107 to 183 centimeters (see table 23)
Available water capacity (entire profile): Very high (about 32.0 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 2w
West Virginia grassland suitability group (WVGSG): Moist Loams (ML2)
Dominant vegetation map class(es):
Floodplain Forest and Woodland
Modified Successional Floodplain Forest and Woodland
Successional Eastern White Pine - Tuliptree Forest
Hydric soil status: No
Hydrologic soil group: A

Representative Profile
A—0 to 25 centimeters; fine sandy loam
Bw—25 to 122 centimeters; fine sandy loam
C—122 to 200 centimeters; cobbly sandy loam

Minor Components

Middlebury soils
Percent of map unit: 5 percent
Slope: 0 to 3 percent
Landform: High-energy flood plains in river valleys
Hydric soil status: No

Grigsby soils
Percent of map unit: 5 percent
Slope: 0 to 3 percent
Landform: High-energy flood plains in river valleys
Hydric soil status: No

Yeager soils
Percent of map unit: 5 percent
Slope: 0 to 3 percent
Landform: Flood plains in river valleys
Hydric soil status: No

CxA—Craigsville very gravelly sandy loam, 0 to 5 percent slopes, extremely stony, rarely flooded

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 473 to 495 meters
Mean annual precipitation: 865 to 1,044 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 158 to 205 days

Map Unit Composition

Craigsville and similar soils: 90 percent
Dissimilar minor components: 10 percent

Description of Craigsville Soil

Classification
Loamy-skeletal, mixed, superactive, mesic Fluventic Dystrudepts

Setting
Landform: Alluvial fans in river valleys and high-energy flood plains in river valleys
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Mountain base
Down-slope shape: Linear and convex
Across-slope shape: Convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 0 to 5 percent
Parent material: Loamy-skeletal alluvium derived from sandstone and shale

Properties and Qualities
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): High
Natural drainage class: Well drained
Flooding frequency: Rare (see table 23)
Ponding frequency: None

Depth to seasonal water table: About 102 to 152 centimeters (see table 23)
Available water capacity (entire profile): Very high (about 15.2 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Acid Loams (AL2)
Dominant vegetation map class(es):
Floodplain Forest and Woodland
Successional Tuliptree / Northern Spicebush Forest
Eastern Hemlock - American Basswood Forest
Hydric soil status: No
Hydrologic soil group: A

Representative Profile
Oi—0 to 5 centimeters; slightly decomposed plant material
Oe—5 to 8 centimeters; moderately decomposed plant material
A—8 to 21 centimeters; very gravelly sandy loam
Bw—21 to 60 centimeters; very gravelly sandy loam
C—60 to 200 centimeters; extremely gravelly loamy coarse sand

Minor Components

Pope soils
Percent of map unit: 6 percent
Slope: 0 to 3 percent
Landform: Alluvial fans in river valleys and high-energy flood plains in river valleys
Hydric soil status: No

Highsplint soils
Percent of map unit: 4 percent
Slope: 5 to 15 percent
Landform: Mountain slopes
Hydric soil status: No

GaC—Gilpin loam, 8 to 15 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 596 to 702 meters
Mean annual precipitation: 865 to 1,044 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 158 to 205 days

Map Unit Composition

Gilpin and similar soils: 70 percent
Dissimilar minor components: 30 percent

Description of Gilpin Soil

Classification
Fine-loamy, mixed, active, mesic Typic Hapludults

Setting
Landform: Structural benches and ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop

Down-slope shape: Convex
Across-slope shape: Convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 8 to 15 percent
Parent material: Acid fine-loamy residuum weathered from shale and siltstone

Properties and Qualities
Depth to restrictive feature: 51 to 102 centimeters to paralithic bedrock
Shrink-swell potential: Low (about 2.2 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): High (about 11.1 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 3e
West Virginia grassland suitability group (WVGSG): Acid Loams (AL2)
Dominant vegetation map class(es):
Oak - Eastern White Pine / Ericad Forest
Oak - Hickory - Sugar Maple Forest
Hydric soil status: No
Hydrologic soil group: C

Representative Profile
Oi—0 to 2 centimeters; slightly decomposed plant material
A—2 to 10 centimeters; loam
BA—10 to 32 centimeters; channery silt loam
Bt—32 to 63 centimeters; channery silty clay loam
BC—63 to 76 centimeters; very channery silty clay loam
Cr—76 to 96 centimeters; bedrock

Minor Components

Lily soils
Percent of map unit: 15 percent
Slope: 8 to 15 percent
Landform: Structural benches and ridges
Hydric soil status: No

Berks soils
Percent of map unit: 10 percent
Slope: 8 to 15 percent
Landform: Structural benches and ridges
Hydric soil status: No

Cateache soils
Percent of map unit: 5 percent
Slope: 8 to 15 percent
Landform: Structural benches and ridges
Hydric soil status: No

GaD—Gilpin loam, 15 to 25 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 568 to 738 meters
Mean annual precipitation: 865 to 1,044 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 158 to 205 days

Map Unit Composition

Gilpin and similar soils: 70 percent
Dissimilar minor components: 30 percent

Description of Gilpin Soil

Classification
Fine-loamy, mixed, active, mesic Typic Hapludults

Setting
Landform: Structural benches and ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 15 to 25 percent
Parent material: Acid fine-loamy residuum weathered from shale and siltstone

Properties and Qualities
Depth to restrictive feature: 51 to 102 centimeters to paralithic bedrock
Shrink-swell potential: Low (about 2.2 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): High (about 11.1 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 4e
West Virginia grassland suitability group (WVGSG): Acid Loams (AL2)
Dominant vegetation map class(es):
Oak - Eastern White Pine / Ericad Forest
Oak - Hickory - Sugar Maple Forest
Hydric soil status: No
Hydrologic soil group: C

Representative Profile
Oi—0 to 2 centimeters; slightly decomposed plant material
A—2 to 8 centimeters; loam

BA—8 to 32 centimeters; channery silt loam
Bt—32 to 63 centimeters; channery silty clay loam
BC—63 to 76 centimeters; very channery silty clay loam
Cr—76 to 96 centimeters; bedrock

Minor Components

Lily soils
Percent of map unit: 15 percent
Slope: 15 to 25 percent
Landform: Structural benches and ridges
Hydric soil status: No

Berks soils
Percent of map unit: 10 percent
Slope: 15 to 25 percent
Landform: Structural benches and ridges
Hydric soil status: No

Cateache soils
Percent of map unit: 5 percent
Slope: 15 to 25 percent
Landform: Structural benches and mountain slopes
Hydric soil status: No

GbE—Gilpin-Berks complex, 25 to 35 percent slopes, very stony

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 436 to 735 meters
Mean annual precipitation: 865 to 1,044 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 158 to 205 days

Map Unit Composition

Gilpin and similar soils: 60 percent
Berks and similar soils: 20 percent
Dissimilar minor components: 20 percent

Description of Gilpin Soil

Classification
Fine-loamy, mixed, active, mesic Typic Hapludults

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder and backslope
Landform position (three-dimensional): Upper third of mountain flank
Down-slope shape: Linear and convex
Across-slope shape: Convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 25 to 35 percent
Parent material: Acid fine-loamy residuum weathered from shale and siltstone

Properties and Qualities
Depth to restrictive feature: 51 to 102 centimeters to paralithic bedrock
Shrink-swell potential: Low (about 2.2 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): High (about 10.9 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 6s
West Virginia grassland suitability group (WVGSG): Very Rocky, Acid Soils (RA2)
Dominant vegetation map class(es):
Oak - Eastern White Pine / Ericad Forest
Oak - Hickory - Sugar Maple Forest
Hydric soil status: No
Hydrologic soil group: C

Representative Profile
Oi—0 to 3 centimeters; slightly decomposed plant material
A—3 to 8 centimeters; loam
BA—8 to 32 centimeters; channery silt loam
Bt—32 to 63 centimeters; channery silty clay loam
BC—63 to 76 centimeters; very channery silty clay loam
Cr—76 to 96 centimeters; bedrock

Description of Berks Soil

Classification
Loamy-skeletal, mixed, active, mesic Typic Dystrudepts

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder and backslope
Landform position (three-dimensional): Upper third of mountain flank
Down-slope shape: Convex
Across-slope shape: Convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 25 to 35 percent
Parent material: Residuum weathered from interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: 51 to 102 centimeters to lithic bedrock
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained

Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): Moderate (about 7.0 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 6s
West Virginia grassland suitability group (WVGSG): Dry Uplands (DU2)
Dominant vegetation map class(es):
Oak - Eastern White Pine / Ericad Forest
Oak - Hickory - Sugar Maple Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 3 centimeters; slightly decomposed plant material
A—3 to 13 centimeters; channery silt loam
BA—13 to 24 centimeters; channery silt loam
Bw—24 to 85 centimeters; very channery silt loam
C—85 to 94 centimeters; extremely channery silt loam
R—94 to 104 centimeters; bedrock

Minor Components

Lily soils
Percent of map unit: 15 percent
Slope: 25 to 35 percent
Landform: Mountain slopes
Hydric soil status: No

Cateache soils
Percent of map unit: 5 percent
Slope: 25 to 35 percent
Landform: Mountain slopes
Hydric soil status: No

GhG—Gilpin-Highsplint-Berks complex, 35 to 90 percent slopes, extremely stony

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 437 to 731 meters
Mean annual precipitation: 865 to 1,044 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 158 to 205 days

Map Unit Composition

Gilpin and similar soils: 45 percent
Highsplint and similar soils: 25 percent
Berks and similar soils: 20 percent
Dissimilar minor components: 10 percent

Description of Gilpin Soil

Classification
Fine-loamy, mixed, active, mesic Typic Hapludults

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountain flank
Down-slope shape: Convex
Across-slope shape: Convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 35 to 90 percent
Parent material: Acid fine-loamy residuum weathered from shale and siltstone

Properties and Qualities
Depth to restrictive feature: 51 to 102 centimeters to paralithic bedrock
Shrink-swell potential: Low (about 2.2 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): High (about 9.8 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Oak - Eastern White Pine / Ericad Forest
Oak - Hickory - Sugar Maple Forest
Hydric soil status: No
Hydrologic soil group: C

Representative Profile
A—0 to 5 centimeters; loam
BA—5 to 22 centimeters; channery silt loam
Bt—22 to 53 centimeters; channery silt loam
BC—53 to 66 centimeters; very channery silt loam
Cr—66 to 86 centimeters; bedrock

Description of Highsplint Soil

Classification
Loamy-skeletal, mixed, active, mesic Typic Dystrudepts

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountain flank
Down-slope shape: Linear
Across-slope shape: Concave
Aspect (representative): Southwest

Aspect range: All aspects
Slope range: 35 to 90 percent
Parent material: Loamy-skeletal colluvium derived from interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (about 2.1 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 16.1 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Eastern Hemlock - American Basswood Forest
Sugar Maple - Yellow Buckeye - American Basswood Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 1 centimeter; slightly decomposed plant material
A—1 to 18 centimeters; channery loam
AB—18 to 27 centimeters; channery loam
Bw—27 to 108 centimeters; very channery loam
BC—108 to 135 centimeters; very channery loam
C—135 to 165 centimeters; extremely channery loam

Description of Berks Soil

Classification
Loamy-skeletal, mixed, active, mesic Typic Dystrudepts

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountain flank
Down-slope shape: Convex
Across-slope shape: Convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 35 to 90 percent
Parent material: Residuum weathered from interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: 51 to 102 centimeters to lithic bedrock
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): Moderate (about 6.5 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Oak - Eastern White Pine / Ericad Forest
Oak - Hickory - Sugar Maple Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
A—0 to 5 centimeters; channery silt loam
BA—5 to 16 centimeters; channery silt loam
Bw—16 to 77 centimeters; very channery silt loam
C—77 to 86 centimeters; extremely channery silt loam
R—86 to 96 centimeters; bedrock

Minor Components

Weikert soils
Percent of map unit: 6 percent
Slope: 35 to 90 percent
Landform: Mountain slopes
Dominant vegetation map class(es):
Virginia Pine - Oak Shale Woodland
Hydric soil status: No

Laidig soils
Percent of map unit: 3 percent
Slope: 35 to 55 percent
Landform: Mountain slopes
Hydric soil status: No

Rock outcrop
Percent of map unit: 1 percent
Landform: Rock outcrops on mountain slopes
Hydric soil status: No

HgE—Highsplint channery loam, 15 to 35 percent slopes, very stony

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 530 to 715 meters
Mean annual precipitation: 865 to 1,346 millimeters
Mean annual air temperature: 5 to 18 degrees C
Frost-free period: 141 to 205 days

Map Unit Composition

Highsplint and similar soils: 70 percent
Dissimilar minor components: 30 percent

Description of Highsplint Soil

Classification
Loamy-skeletal, mixed, active, mesic Typic Dystrudepts

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountain flank
Down-slope shape: Linear
Across-slope shape: Concave
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 15 to 35 percent
Parent material: Very stony colluvium derived from interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (about 2.1 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 15.8 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 6s
West Virginia grassland suitability group (WVGSG): Very Rocky, Acid Soils (RA3)
Dominant vegetation map class(es):
- Oak - Hickory - Sugar Maple Forest
- Successional Eastern White Pine - Tuliptree Forest
- Successional Tuliptree / Northern Spicebush Forest

Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 3 centimeters; slightly decomposed plant material
A—3 to 18 centimeters; channery loam
AB—18 to 27 centimeters; channery loam
Bw—27 to 108 centimeters; very channery loam
BC—108 to 135 centimeters; very channery loam
C—135 to 165 centimeters; extremely channery loam

Minor Components

Laidig soils
Percent of map unit: 10 percent
Slope: 15 to 35 percent

Landform: Mountain slopes
Hydric soil status: No

Pineville soils
Percent of map unit: 10 percent
Slope: 15 to 35 percent
Landform: Mountain slopes
Hydric soil status: No

Berks soils
Percent of map unit: 5 percent
Slope: 15 to 35 percent
Landform: Convex mountain slopes
Dominant vegetation map class(es):
Oak - Eastern White Pine / Ericad Forest
Hydric soil status: No

Gilpin soils
Percent of map unit: 3 percent
Slope: 25 to 35 percent
Landform: Mountain slopes
Hydric soil status: No

Cotaco soils
Percent of map unit: 2 percent
Slope: 8 to 15 percent
Landform: Remnant stream terraces in mountain valleys
Hydric soil status: No

HxA—Holly-Lobdell complex, 0 to 3 percent slopes, occasionally flooded

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 435 to 480 meters
Mean annual precipitation: 865 to 1,044 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 158 to 205 days

Map Unit Composition

Holly and similar soils: 55 percent
Lobdell and similar soils: 25 percent
Dissimilar minor components: 20 percent

Description of Holly Soil

Classification
Fine-loamy, mixed, active, nonacid, mesic Fluvaquentic Endoaquepts

Setting
Landform: Flood plains in river valleys
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Mountain base
Down-slope shape: Linear
Across-slope shape: Linear

Aspect (representative): South
Aspect range: All aspects
Slope range: 0 to 3 percent
Parent material: Fine-loamy alluvium derived from limestone, sandstone, and shale

Properties and Qualities
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Poorly drained
Flooding frequency: Occasional (see table 23)
Ponding frequency: Occasional (see table 23)
Depth to seasonal water table: At the soil surface to 15 centimeters (see table 23)
Available water capacity (entire profile): Very high (about 33.4 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 5w
West Virginia grassland suitability group (WVGSG): Wetlands (W2)
Dominant vegetation map class(es):
Modified Successional Floodplain Forest and Woodland
Developed Area
Disturbed Area
Hydric soil status: Yes
Hydrologic soil group: D

Representative Profile
A—0 to 15 centimeters; silt loam
Bg—15 to 74 centimeters; silt loam
BCg+Cg—74 to 200 centimeters; silty clay

Description of Lobdell Soil

Classification
Fine-loamy, mixed, active, mesic Fluvaquentic Eutrudepts

Setting
Landform: Flood plains in river valleys
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Mountain base
Down-slope shape: Linear
Across-slope shape: Linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 0 to 3 percent
Parent material: Fine-loamy alluvium derived from limestone, sandstone, and shale

Properties and Qualities
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Moderately well drained
Flooding frequency: Occasional (see table 23)
Ponding frequency: None
Depth to seasonal water table: About 41 to 91 centimeters (see table 23)
Available water capacity (entire profile): Very high (about 34.5 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 2w
West Virginia grassland suitability group (WVGSG): Moist Loams (ML2)
Dominant vegetation map class(es):
Modified Successional Floodplain Forest and Woodland
Developed Area
Disturbed Area
Hydric soil status: No
Hydrologic soil group: C

Representative Profile
A—0 to 25 centimeters; silt loam
Bw—25 to 80 centimeters; loam
BC—80 to 130 centimeters; loam
C—130 to 200 centimeters; loam

Minor Components

Kanawha soils
Percent of map unit: 10 percent
Slope: 0 to 3 percent
Landform: Flood plains in river valleys and low terraces
Hydric soil status: No

Pipestem soils
Percent of map unit: 10 percent
Slope: 3 to 15 percent
Landform: Mountain slopes
Dominant vegetation map class(es):
Successional Eastern White Pine Forest - Tuliptree Forest
Hydric soil status: No

LIC—Lily loam, 8 to 15 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 670 to 738 meters
Mean annual precipitation: 865 to 1,044 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 158 to 205 days

Map Unit Composition

Lily and similar soils: 70 percent
Dissimilar minor components: 30 percent

Description of Lily Soil

Classification
Fine-loamy, siliceous, semiactive, mesic Typic Hapludults

Setting
Landform: Structural benches and ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 8 to 15 percent
Parent material: Acid fine-loamy residuum weathered from sandstone

Properties and Qualities
Depth to restrictive feature: 51 to 102 centimeters to lithic bedrock
Shrink-swell potential: Low (about 2.1 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 12.3 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 3e
West Virginia grassland suitability group (WVGSG): Acid Loams (AL2)
Dominant vegetation map class(es):
Oak - Eastern White Pine / Ericad Forest
Oak - Hickory - Sugar Maple Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 2 centimeters; slightly decomposed plant material
Oe—2 to 5 centimeters; moderately decomposed plant material
A—5 to 11 centimeters; loam
BA—11 to 19 centimeters; loam
Bt—19 to 78 centimeters; loam
C—78 to 90 centimeters; channery sandy loam
R—90 to 100 centimeters; bedrock

Minor Components

Gilpin soils
Percent of map unit: 20 percent
Slope: 8 to 15 percent
Landform: Structural benches and ridges
Hydric soil status: No

Berks soils
Percent of map unit: 10 percent
Slope: 8 to 15 percent
Landform: Structural benches and ridges
Hydric soil status: No

MoB—Monongahela silt loam, 3 to 8 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 448 to 472 meters
Mean annual precipitation: 865 to 1,044 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 158 to 205 days

Map Unit Composition

Monongahela and similar soils: 80 percent
Dissimilar minor components: 20 percent

Description of Monongahela Soil

Classification
Fine-loamy, mixed, semiactive, mesic Typic Fragiudults

Setting
Landform: High-stream terraces in river valleys
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 3 to 8 percent
Parent material: Old, acid alluvium derived from sandstone and shale

Properties and Qualities
Depth to restrictive feature: 140 to 190 centimeters to lithic bedrock; 46 to 76 centimeters to fragipan
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately low
Natural drainage class: Moderately well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 46 to 91 centimeters to a perched water table (see table 23)
Available water capacity (entire profile): Very high (about 20.3 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 2e
West Virginia grassland suitability group (WVGSG): Acid Loams (AL2)

Dominant vegetation map class(es):
Successional Eastern White Pine - Tuliptree Forest
Oak - Hickory - Sugar Maple Forest
Oak - Eastern White Pine / Ericad Forest
Hydric soil status: No
Hydrologic soil group: C

Representative Profile
Oi—0 to 2 centimeters; slightly decomposed plant material
Ap—2 to 23 centimeters; silt loam
BE+Bt—23 to 64 centimeters; loam
Btx—64 to 152 centimeters; clay loam
R—152 to 162 centimeters; bedrock

Minor Components

Cotaco soils
Percent of map unit: 15 percent
Slope: 3 to 8 percent
Landform: Low stream terraces in mountain valleys
Hydric soil status: No

Chavies soils
Percent of map unit: 5 percent
Slope: 0 to 3 percent
Landform: Flood plains in river valleys
Hydric soil status: No

PkC—Pipestem channery silty clay loam, 3 to 15 percent slopes, very stony

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 436 to 544 meters
Mean annual precipitation: 865 to 1,044 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 158 to 205 days

Map Unit Composition

Pipestem and similar soils: 85 percent
Dissimilar minor components: 15 percent

Description of Pipestem Soil

Classification
Fine, mixed, active, mesic Dystric Eutrudepts

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountain flank
Down-slope shape: Linear
Across-slope shape: Concave
Aspect (representative): Southwest
Aspect range: All aspects

Slope range: 3 to 15 percent
Parent material: Reddish brown silty and clayey colluvium derived from interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (about 2.3 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 28.2 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 6s
West Virginia grassland suitability group (WVGSG): Very Rocky, Limy Soils (RL2)
Dominant vegetation map class(es):
Modified Successional Floodplain Forest and Woodland
Disturbed Area
Successional Eastern White Pine - Tuliptree Forest
Oak - Hickory - Sugar Maple Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 1 centimeter; slightly decomposed plant material
A—1 to 11 centimeters; channery silty clay loam
BA+Bw—11 to 137 centimeters; stony silty clay loam
BC—137 to 200 centimeters; very stony silty clay loam

Minor Components

Hustontown soils
Percent of map unit: 10 percent
Slope: 3 to 15 percent
Landform: Mountain slopes
Hydric soil status: No

Cateache soils
Percent of map unit: 5 percent
Slope: 3 to 15 percent
Landform: Mountain slopes
Hydric soil status: No

PmE—Pipestem channery silty clay loam, 15 to 35 percent slopes, extremely stony

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains

Elevation: 435 to 635 meters
Mean annual precipitation: 865 to 1,044 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 158 to 205 days

Map Unit Composition

Pipestem and similar soils: 80 percent
Dissimilar minor components: 20 percent

Description of Pipestem Soil

Classification
Fine, mixed, active, mesic Dystric Eutrudepts

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountain flank
Down-slope shape: Linear
Across-slope shape: Concave
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 15 to 35 percent
Parent material: Reddish brown silty and clayey colluvium derived from interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (about 2.3 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 28.2 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Very Rocky, Limy Soils (RL2)
Dominant vegetation map class(es):
- Oak - Hickory - Sugar Maple Forest
- Oak - Eastern White Pine / Ericad Forest
- Sugar Maple - Yellow Buckeye - American Basswood Forest
- Successional Eastern White Pine – Tuliptree Forest

Hydric soil status: No
Hydrologic soil group: B

Representative Profile (fig. 2)
Oi—0 to 1 centimeter; slightly decomposed plant material
A—1 to 11 centimeters; channery silty clay loam
BA+Bw—11 to 137 centimeters; stony silty clay loam
BC—137 to 200 centimeters; very stony silty clay loam

Figure 2.—Surface stones in an area of Pipestem channery silty clay loam, 15 to 35 percent slopes, extremely stony. The stones (which are more than 10 inches across on one or more sides) are a distinct landscape characteristic of this map unit.

Minor Components

Cateache soils
Percent of map unit: 15 percent
Slope: 15 to 35 percent
Landform: Mountain slopes
Hydric soil status: No

Hustontown soils
Percent of map unit: 5 percent
Slope: 15 to 35 percent
Landform: Mountain slopes
Hydric soil status: No

PxA—Potomac-Nelse complex, 0 to 5 percent slopes, extremely stony, frequently flooded

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 435 to 478 meters

Figure 3.—Islands in the Bluestone River, as seen from the mouth of the Little Bluestone River, are mapped as Potomac-Nelse complex, 0 to 5 percent slopes, extremely stony, frequently flooded.

Mean annual precipitation: 865 to 1,044 millimeters
Mean annual air temperature: 6 to 18 degrees C
Frost-free period: 147 to 205 days

Map Unit Composition

Potomac and similar soils: 60 percent
Nelse and similar soils: 20 percent
Dissimilar minor components: 20 percent

Description of Potomac Soil

Classification

Sandy-skeletal, mixed, mesic Typic Udifluvents

Setting

Landform: High-energy flood plains in river valleys (fig. 3)
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 0 to 5 percent
Parent material: Skeletal, nonacid sandy alluvium derived from interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat excessively drained
Flooding frequency: Frequent (see table 23)
Ponding frequency: None
Depth to seasonal water table: None within a depth of 160 centimeters
Available water capacity (entire profile): High (about 10.8 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 5w
West Virginia grassland suitability group (WVGSG): Sands (SA3)
Dominant vegetation map class(es):
Floodplain Forest and Woodland
Modified Successional Floodplain Forest and Woodland
Oak - Hickory - Sugar Maple Forest
Hydric soil status: No
Hydrologic soil group: A

Representative Profile
Oi—0 to 2 centimeters; slightly decomposed plant material
A—2 to 20 centimeters; gravelly sandy loam
C—20 to 200 centimeters; very gravelly loamy sand

Description of Nelse Soil

Classification
Sandy, mixed, mesic Mollic Udifluvents

Setting
Landform: High-energy flood plains in river valleys (fig. 3)
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 0 to 5 percent
Parent material: Nonacid sandy alluvium derived from interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: Frequent (see table 23)
Ponding frequency: None

Depth to seasonal water table: About 122 to 183 centimeters (see table 23)
Available water capacity (entire profile): Very high (about 18.7 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 5w
West Virginia grassland suitability group (WVGSG): Moist Loams (ML3)
Dominant vegetation map class(es):
Floodplain Forest and Woodland
Modified Successional Floodplain Forest and Woodland
Oak - Hickory - Sugar Maple Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
A1+A2—0 to 30 centimeters; sandy loam
C1+C2—30 to 74 centimeters; loamy sand
C3+C4—74 to 200 centimeters; sand

Minor Components

Yeager soils
Percent of map unit: 10 percent
Slope: 0 to 3 percent
Landform: Flood plains in river valleys
Hydric soil status: No

Riverwash
Percent of map unit: 5 percent
Slope: 0 to 3 percent
Landform: Sand and cobble bars along rivers on high-energy flood plains in river valleys
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Sycamore - River Birch Riverscour Woodland
Hydric soil status: No

Lobdell soils
Percent of map unit: 5 percent
Slope: 0 to 3 percent
Landform: High-energy flood plains in river valleys
Hydric soil status: No

W—Water

Map Unit Setting

Landscape: Mountains
Major land resource area: 127—Eastern Allegheny Plateau and Mountains
Elevation: 435 to 498 meters, mainly on the Bluestone River
Mean annual precipitation: 865 to 1,346 millimeters
Mean annual air temperature: 5 to 18 degrees C

Map Unit Composition

Water: 100 percent

Description of Water

General

This map unit is made up of ponds, lakes, rivers, and some streams within the boundaries of the Bluestone National Scenic River.

Setting

Landform: River valleys

Interpretive Groups

Dominant vegetation map class(es):

River

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in Bluestone National Scenic River. 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 as rangeland and as sites for buildings, sanitary facilities, highways and other transportation systems, and recreational facilities. 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 park. 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, and trees and shrubs.

Interpretive Ratings

The interpretive tables in this survey rate the soils in the park for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited, slightly limited, somewhat limited,* and *very limited*. The suitability ratings are expressed as *well suited, moderately well suited, poorly suited,* and *unsuited* or as *good, fair,* and *poor*.

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact

on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Yields per Acre

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

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

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

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the 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 rangeland, for forestland, or for engineering purposes.

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

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

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, 2e. 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 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, wildlife habitat, or recreation.

The capability classification of map units in this park is given in the section “Detailed Soil Map Units” and in table 5.

Prime and Other Important Farmland

Table 6 lists the map units in the park that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation’s food supply.

Prime farmland 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, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, 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. The water supply is dependable and of adequate quality. Prime farmland 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. 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.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas 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.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

Hydric Soils

Table 7 lists the map unit components that are rated as hydric soils in the park. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; USDA-NRCS, 2010).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in “Soil Taxonomy” (Soil Survey Staff, 1999) and “Keys to Soil Taxonomy” (Soil Survey Staff, 2010) and in the “Soil Survey Manual” (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in “Field Indicators of Hydric Soils in the United States” (USDA-NRCS, 2010).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2B3). Definitions for the codes are as follows:

1. All Histels except for Folistels and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
    A. are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
    B. are poorly drained or very poorly drained and have either:
        1) a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
        2) a water table at a depth of 0.5 foot or less during the growing season if saturated hydraulic conductivity (Ksat) is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or
        3) a water table at a depth of 1.0 foot or less during the growing season if saturated hydraulic conductivity (Ksat) is less than 6.0 in/hr in any layer within a depth of 20 inches.
3. Soils that are frequently ponded for periods of long or very long duration during the growing season.
4. Soils that are frequently flooded for periods of long or very long duration during the growing season.

Landscape, Parent Material, West Virginia Grassland Suitability Class, and Dominant Vegetation Map Class

Table 8 displays information on the landscape, parent material, and the grassland suitability classes that are correlated to each soil in the map units. Dominant vegetation classes are given for each map unit component in the section “Detailed Soil Map Units.”

Percent of map unit is the extent of the named soil in the map unit.

Slope is 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. The table shows the low and high range of slope for the named component or soil.

Elevation is the height of an object or area on the earth’s surface in reference to a fixed reference point, such as mean sea level. The typical low and high range of elevation is displayed for each soil.

MAP is the mean annual precipitation for areas of the soil in the map unit.

Landscape refers to the broad shape of the earth in the area where the soil occurs. Examples are a valley and a mountain.

Landform is a specific shape of the earth in the area where a soil typically occurs. Examples are a mountain summit and a valley bottom.

Parent material is the material in which soils formed. Examples are the underlying geological material (including bedrock), a surficial deposit (such as volcanic ash), and organic material. Soils inherit their chemical and physical properties from the parent material.

West Virginia grassland suitability class names and numbers are groupings of soils which have similar capabilities for growing adapted herbaceous plants and have similar responses to management. These groupings, when combined with climate and aspect, reflect the productive potential of soils and provide a guide for conservation and management decisions when permanent grassland is the land use objective.

Dominant vegetation map classes are assigned to components of soil map units and are listed in the “Detailed Soil Map Units” section with other interpretive groups. The soil components are correlated with the vegetation map classes that are published in “Vegetation Classification and Mapping of Bluestone National Scenic River, West Virginia” (Technical Report NPS/NER/NRTR—2008/106). All major map unit components (including miscellaneous land types such as Rock outcrop) are correlated to a vegetation map class or classes. Each vegetation map class listed in the map unit description provides coverage of at least 15 percent of the total acreage of the map unit. The U.S. National Vegetation Classification (USNVC) is the standard used for vegetation classification. Dominant vegetation map classes are also assigned to aquatic areas, disturbed areas, and cultural and transportation features. Additional information is included in appendix 1.

Forest Productivity

In table 9, the *potential productivity* of *characteristic trees* on a soil is expressed as a site index base age, a site index, and a volume number. Characteristic trees are overstory tree species that typically occur on the specific map unit component. These and other typical plant species are listed by common name in appendix 2 and by their national plant symbol in appendix 3. The *site index base age* is the number in the National Register of Site Index Curves that corresponds to the site index curve used to determine the site index and the annual productivity of overstory tree species. The *site index* is the height in feet of the dominant trees or dominant and co-dominant trees at some index age (excepting the pinyon-juniper forest type, for which site index is determined by basal area). In this report, the site index for a species on a

given component is based on the site index curve shown in the “site index base age” column. More detailed information is available in the “National Forestry Manual,” which is available in local offices of the Natural Resources Conservation Service or on the Internet.

The *volume of wood fiber*, a number, is the yield likely to be produced by the most important tree species. This number, expressed as cubic feet per acre per year and calculated at the age of culmination of the mean annual increment (CMAI), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

Land Management

In table 10, parts I through IV, interpretive ratings are given for various aspects of land management. The ratings are both verbal and numerical.

Some rating class terms indicate the degree to which the soils are suited to a specified land management practice. *Well suited* indicates that the soil has features that are favorable for the specified practice and has no limitations. Good performance can be expected, and little or no maintenance is needed. *Moderately suited* indicates that the soil has features that are moderately favorable for the specified practice. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. *Poorly suited* indicates that the soil has one or more properties that are unfavorable for the specified practice. Overcoming the unfavorable properties requires special design, extra maintenance, and costly alteration. *Unsuited* indicates that the expected performance of the soil is unacceptable for the specified practice or that extreme measures are needed to overcome the undesirable soil properties.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified land management practice (1.00) and the point at which the soil feature is not a limitation (0.00).

Rating class terms for *fire damage* and *seedling mortality* are expressed as low, moderate, and high. Where these terms are used, the numerical ratings indicate gradations between the point at which the potential for fire damage or seedling mortality is highest (1.00) and the point at which the potential is lowest (0.00).

Rating class terms for *hazard of erosion* are expressed as slight, moderate, severe, and very severe. Where these terms are used, the numerical ratings indicate gradations between the point at which the potential for erosion is highest (1.00) and the point at which the potential is lowest (0.00).

The paragraphs that follow indicate the soil properties considered in rating the soils for land management practices.

Ratings in the columns *suitability for hand planting* and *suitability for mechanical planting* are based on slope, depth to a restrictive layer, content of sand, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, moderately suited, poorly suited, or unsuited to these methods of planting. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column *soil rutting hazard* are based on depth to a water table, rock fragments on or below the surface, the Unified classification, depth to a restrictive layer, and slope. Ruts form as a result of the operation of planting equipment. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that the soil is subject to little or no rutting, *moderate* indicates that rutting is likely, and *severe* indicates that ruts form readily.

Ratings in the column *hazard of erosion* are based on slope and on soil erodibility factor K. The soil loss is caused by sheet or rill erosion in areas where 50 to 75

percent of the surface has been exposed by different kinds of disturbance. The hazard is described as slight, moderate, severe, or very severe. A rating of *slight* indicates that erosion is unlikely under ordinary climatic conditions; *moderate* indicates that some erosion is likely and that erosion-control measures may be needed; *severe* indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and *very severe* indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Ratings in the column *hazard of erosion on roads and trails* are based on the soil erodibility factor K, slope, and content of rock fragments. The ratings apply to unsurfaced roads and trails. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that little or no erosion is likely; *moderate* indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and *severe* indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Ratings in the column *suitability for roads (natural surface)* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The ratings indicate the suitability for using the natural surface of the soil for roads. The soils are described as well suited, moderately suited, or poorly suited to this use.

Ratings in the column *suitability for mechanical site preparation (deep)* are based on slope, depth to a restrictive layer, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 3 feet is considered in the ratings.

Ratings in the column *suitability for mechanical site preparation (surface)* are based on slope, depth to a restrictive layer, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 1 foot is considered in the ratings.

Ratings in the column *potential for damage to soil by fire* are based on texture of the surface layer, content of rock fragments and organic matter in the surface layer, thickness of the surface layer, and slope. The soils are described as having a low, moderate, or high potential for this kind of damage. The ratings indicate an evaluation of the potential impact of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter in the surface layer.

Ratings in the column *potential for seedling mortality* are based on flooding, ponding, depth to a water table, content of lime, reaction, salinity, available water capacity, soil moisture regime, soil temperature regime, aspect, and slope. The soils are described as having a low, moderate, or high potential for seedling mortality.

Recreation

The soils of the park are rated in table 11, parts I and II, according to limitations that affect their suitability for recreation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome

without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the table 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 also are important. Soils that are 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.

The information in table 11 can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, and water management.

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 ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas. The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Foot traffic and equestrian trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Mountain bike and off-road vehicle trails require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely. The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, depth to a water table, ponding, slope, flooding, and texture of the surface layer.

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, landscaping, 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 between the surface and a depth of 5 to 7 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 particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, 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, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for 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, ponds, 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.

Dwellings and Small Commercial Buildings

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Table 12 shows the degree and kind of soil limitations that affect dwellings and small commercial buildings.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected.

Somewhat limited indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Roads and Streets, Shallow Excavations, and Landscaping

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Table 13 shows the degree and kind of soil limitations that affect local roads and streets, shallow excavations, and landscaping.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

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 soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Landscaping requires soils on which turf, trees, and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Sewage Disposal

Table 14 shows the degree and kind of soil limitations that affect septic tank absorption fields and sewage lagoons. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

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 or between a depth of 24 inches and a restrictive layer is evaluated. The ratings are based on the soil properties that affect

absorption of the effluent, construction and maintenance of the system, and public health. Saturated hydraulic conductivity (Ksat), depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

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. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, saturated hydraulic conductivity (Ksat), depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Saturated hydraulic conductivity (Ksat) is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a Ksat rate of more than 14 micrometers per second are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, 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. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

Source of Gravel and Sand

Table 15 gives information about the soils as potential sources of gravel and sand. Normal compaction, minor processing, and other standard construction practices are assumed.

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. Only the likelihood 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 Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the bottom layer of the soil contains sand or gravel, the soil is considered a likely source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness. The ratings are for the whole soil, from the surface to a depth of about 6 feet.

The soils are rated *good, fair,* or *poor* as potential sources of sand and gravel. A rating of *good* or *fair* means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of sand or gravel. The number 0.00 indicates that the layer is a poor source. The number 1.00 indicates that

the layer is a good source. A number between 0.00 and 1.00 indicates the degree to which the layer is a likely source.

Source of Reclamation Material, Roadfill, and Topsoil

Table 16 gives information about the soils as potential sources of reclamation material, roadfill, and topsoil. Normal compaction, minor processing, and other standard construction practices are assumed.

The soils are rated *good, fair,* or *poor* as potential sources of reclamation material, roadfill, and topsoil. The features that limit the soils as sources of these materials are specified in the table. Numerical ratings between 0.00 and 0.99 are given after the specified features. These numbers indicate the degree to which the features limit the soils as sources of topsoil, reclamation material, or roadfill. The lower the number, the greater the limitation.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil. These properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

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 whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a 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 AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

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. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

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.

Ponds and Embankments

Table 17 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir

areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

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 saturated hydraulic conductivity (Ksat) 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. Embankments that have zoned construction (core and shell) are not considered. 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 5 or 6 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

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

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

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

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

Soil properties are ascertained 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 particle-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 are shown in tables. They include engineering properties, physical and chemical properties, and pertinent soil and water features.

Appendix 4 lists pedons that were analyzed by the Natural Resources Conservation Service, Kellogg Soil Survey Laboratory, Lincoln, Nebraska. This table provides the correlated name, pedon type, name the pedon was sampled as (if there was a name), user site ID, user pedon ID, lab source, and lab pedon number. The results of physical and chemical analyses are available at http://ssldata.nrcs.usda.gov/querypage.asp.

Engineering Properties

Table 18 gives the engineering classifications and the range of engineering properties for the layers of each soil in the park.

Depth to the upper and lower boundaries of each layer is indicated.

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 15 percent or more, an appropriate modifier is added, for example, “gravelly.”

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-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 particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

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

Rock fragments larger than 250 millimeters in diameter and 75 to 25 millimeters 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.

Physical Soil Properties

Table 19 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the park. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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 soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), 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

$^1/_3$- or $^1/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each 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 linear extensibility, 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. Depending on soil texture, a bulk density of more than 1.4 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 (Ksat) refers to the ability of a soil to transmit water or air. The term "permeability," as used in soil surveys, indicates saturated hydraulic conductivity (Ksat). The estimates in the table indicate the rate of water movement, in inches per hour, 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 soil layer. The capacity varies, depending on soil properties that affect retention of water. 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.

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,* 6 to 9 percent; and *very high,* greater than 9 percent.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this 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 by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion Properties

Table 20 shows estimates of some erosion factors that affect a soil's potential for different uses. These estimates are given for each layer of every soil for K factors and are given as one rating for the entire soil for the T factor. Values are reported for each soil in the park. Estimates are based on field observations and on test data for these and similar soils.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Soil erosion factors Kw and Kf quantify soil detachment by runoff and raindrop impact.

These erosion factors are indexes used to predict the long-term average soil loss from sheet and rill erosion under crop systems and conservation techniques. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) 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 and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

The procedure for determining the Kf factor is outlined in Agriculture Handbook 703, “Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE),” USDA, Agricultural Research Service, 1997.

Depth to the upper and lower boundaries of each layer is indicated.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments. In horizons where total rock fragments are 15 percent or more, by volume, the Kw factor is always less than the Kf factor.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size. Soil horizons that do not have rock fragments are assigned equal Kw and Kf factors.

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

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the “National Soil Survey Handbook.”

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Total Soil Carbon

Table 21 gives estimates of total soil carbon. Soil carbon occurs as organic and inorganic carbon.

Soil organic carbon (SOC) is carbon (C) in soil that originated from a biological source, such as plants, animals, or micro-organisms. SOC is found in both organic and mineral soil layers. The term “soil organic carbon” refers only to the carbon occurring in soil organic matter (SOM). Soil organic carbon makes up about one-half the weight of soil organic matter. The rest of SOM is mostly oxygen, nitrogen, and hydrogen.

Soil inorganic carbon (SIC) is carbon found in soil carbonates, typically as calcium carbonate layers in the soil or as clay-sized fractions throughout the soil. Carbonates in soils are most common in areas where evaporation rates exceed precipitation, as is the case in most desert environments. Typically, the carbonates accumulated from carbonatic dust or from solution during periods of wetter climates. Soil inorganic carbon also occurs in soils that formed in marl in all regions of the country.

The SOC and SIC contents are reported in kilograms per square meter to a depth of 2 meters or to a representative depth of either hard bedrock or a cemented horizon. The SOC and SIC values are on a whole soil basis, corrected for rock fragments.

SOC can be an indicator of overall soil fertility and soil quality that affects ecosystem function. SOM is the main reservoir for most plant nutrients, such as phosphorus and nitrogen. Managing for SOC by managing for SOM increases the content of these elements and improves soil resiliency.

Soil organic matter binds soil particles together and thus increases soil porosity and water infiltration and allows better root penetration and waterflow into the soil. Greater inflow of water reduces the hazard of erosion and the rate of surface water runoff.

Greater SOC levels improve not only soil quality but also the quality of air and water. Soil acts as a filter and improves water quality. Fertile soils that support plant life remove CO_2 from the atmosphere and increase oxygen levels through photosynthesis. Maintaining the level of soil organic carbon reduces C release into the atmosphere and thus can lessen the effects of global warming.

SIC influences the types of plants that will grow. High SIC levels are commonly associated with a higher soil pH, which limits the types of plants that will thrive.

Like SOM, soil carbonates, the source of SIC, also bind soil particles together. They fill voids in the soil and thus can reduce soil porosity. Compacted soil carbonates may restrict root penetration and waterflow into the soil.

Chemical Soil Properties

Table 22 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the park. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable 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. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable cations plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil 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.

Water Features

Table 23 gives estimates of various soil 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.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

The *months* in the table indicate the portion of the year in which a water table, ponding, and/or flooding is most likely to be a concern.

Water table refers to a saturated zone in the soil. Table 23 indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding 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 ponding 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 ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area 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.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

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.

Soil Features

Table 24 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness of the restrictive layer, which significantly affects the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Potential for 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, saturated hydraulic conductivity (Ksat), 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 to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes 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 or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete 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 also is 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 (Soil Survey Staff, 1999 and 2010). 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. The categories are defined in the following paragraphs.

ORDER. Twelve 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 Alfisol.

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 *alf*, from Alfisol).

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 Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols 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 *Ultic* identifies an intergrade that has a decrease in base saturation with increasing depth (transition towards Ultisols). An example is Ultic Hapludalfs.

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, active, mesic Ultic Hapludalfs.

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.

Table 25 indicates the order, suborder, great group, subgroup, and family of the soil series in the park. Table 26 displays classification as a key sorted by soil order.

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” (Soil Survey Division Staff, 1993). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (Soil Survey Staff, 1999) and in “Keys to Soil Taxonomy” (Soil Survey Staff, 2010). 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.

Berks Series

The Berks series consists of moderately deep, well drained soils that formed in residuum weathered from shale, siltstone, and fine grained sandstone. Geologic parent material is upper Mississippian-age interbedded sedimentary deposits. Berks soils are on mountain slopes and ridges. Slopes range from 25 to 90 percent. The mean annual precipitation is 959 millimeters, and the mean annual temperature is 11.7 degrees C.

Taxonomic Classification

Loamy-skeletal, mixed, active, mesic Typic Dystrudepts

Typical Pedon

Berks channery silt loam (fig. 4); Fayette County, West Virginia; at an elevation of 463 meters (1,519 feet), on a north-facing, 51 percent slope in a forested area about 724 meters (2,375 feet) southeast of the confluence of Peters Creek and the Gauley River; USGS Ansted, West Virginia topographic quadrangle; lat. 38 degrees 13 minutes 8 seconds N. and long. 81 degrees 2 minutes 35 seconds W.; NAD83. (When described, the soil was moist throughout.)

Oi—0 to 3 centimeters (0 to 1 inch); slightly decomposed plant material; abrupt wavy boundary.

A—3 to 13 centimeters (1 to 5 inches); dark brown (10YR 3/3), crushed, channery silt loam; 19 percent clay; moderate fine and medium granular structure; very friable; 15 percent moderately cemented shale channers; very strongly acid, pH 4.6 by Hellige-Truog; clear wavy boundary.

BA—13 to 24 centimeters (5 to 9 inches); dark yellowish brown (10YR 4/4), broken face, channery silt loam; 20 percent clay; weak medium subangular blocky structure; friable; common very fine to very coarse roots throughout; 25 percent shale channers; very strongly acid, pH 4.5 by Hellige-Truog; clear wavy boundary.

Bw1—24 to 53 centimeters (9 to 21 inches); yellowish brown (10YR 5/6), broken face, very channery silt loam; 22 percent clay; moderate medium subangular blocky structure; friable; common medium coarse and few very fine roots throughout; 10 percent strongly cemented shale flagstones and 25 percent moderately cemented shale channers; very strongly acid, pH 4.8 by Hellige-Truog; clear wavy boundary.

Bw2—53 to 75 centimeters (21 to 30 inches); yellowish brown (10YR 5/6), broken face, very channery silt loam; 22 percent clay; weak medium subangular blocky structure; friable; few fine to coarse roots throughout; 40 percent moderately cemented shale channers; very strongly acid, pH 4.8 by Hellige-Truog; clear wavy boundary.

Bw3—75 to 85 centimeters (30 to 33 inches); yellowish brown (10YR 5/4), broken face, very channery silt loam; 23 percent clay; 1 percent fine prominent dark yellowish brown (10YR 4/6) and 1 percent fine prominent brown (10YR 5/3)

Figure 4.—A representative profile of Berks soil, a major residual soil that formed in the Bluestone and Princeton Formations. The moderate depth to bedrock (20 to 40 inches) and high content of rock fragments throughout the profile are distinct characteristics that identify this soil type in Bluestone National Scenic River. Scale is in inches. (Image is from Pocahontas County, West Virginia.)

mottles; weak coarse subangular blocky structure; friable; 10 percent cemented shale flagstones and 35 percent moderately cemented shale channers; very strongly acid, pH 4.8 by Hellige-Truog; gradual wavy boundary.

C—85 to 94 centimeters (33 to 37 inches); yellowish brown (10YR 5/4), broken face, very channery silt loam; 23 percent clay; 1 percent fine prominent dark yellowish

brown (10YR 4/6) and 1 percent fine prominent brown (10YR 5/3) mottles; massive; friable; 40 percent moderately cemented shale channers; very strongly acid, pH 4.8 by Hellige-Truog; clear wavy boundary.

Cr—94 to 109 centimeters (37 to 43 inches); yellowish brown (10YR 5/4) weathered shale bedrock; moderate excavation difficulty; abrupt wavy boundary.

R—109 centimeters (43 inches); unweathered shale bedrock; high excavation difficulty.

Range in Characteristics

Solum thickness: 30 to 102 centimeters (12 to 40 inches)

Depth to bedrock: 50 to 102 centimeters (20 to 40 inches)

Content of rock fragments: 10 to 50 percent in the Ap and A horizons, 15 to 75 percent in individual subhorizons of the B horizon, and 35 to 90 percent in the C horizon; the average volume of rock fragments in the particle-size control section is more than 35 percent

Soil reaction: Extremely acid to slightly acid throughout the profile

Ap or A horizon:

Color—hue of 10YR, value of 3 to 5, and chroma of 2 to 4

Texture (fine-earth fraction)—loam or silt loam

B horizon:

Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8; hue of 5YR is restricted to the lower part of horizon

Texture—loam, silt loam, or silty clay loam in the fine-earth fraction; containing 5 to 32 percent clay and 40 to 60 percent silt

C horizon (if it occurs):

Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 8

Texture (fine-earth fraction)—loam or silt loam

Cateache Series

The Cateache series consists of moderately deep, well drained soils that formed in residuum from interbedded reddish brown calcareous shale, siltstone, and limestone. Geologic parent material is Missisippian-age interbedded sedimentary deposits. Cateache soils are on mountain slopes, ridges, and structural benches. Slopes range from 8 to 90 percent. The mean annual precipitation is 959 millimeters, and the mean annual temperature is 11.7 degrees C.

Taxonomic Classification

Fine-loamy, mixed, active, mesic Ultic Hapludalfs

Typical Pedon

Cateache channery silt loam (fig. 5); Summers County, West Virginia; at an elevation of 695 meters (2,280 feet), on a 74 percent slope in a forested area about 305 meters (1,000 feet) north of Lick Creek and 7.2 kilometers (4.5 miles) southeast of the intersection of County Route 4 and Interstate Highway 64 at Green Sulphur Springs; USGS Meadow Creek, West Virginia topographic quadrangle; lat. 37 degrees 46 minutes 48 seconds N. and long. 80 degrees 45 minutes 44 seconds W.; NAD83; (When described, the soil was moist throughout.)

A—0 to 9 centimeters (0 to 4 inches); dark brown (7.5YR 3/2), crushed, channery silt loam; weak fine and medium granular structure; very friable; common very fine to very coarse roots throughout; 2 percent moderately cemented siltstone flagstones

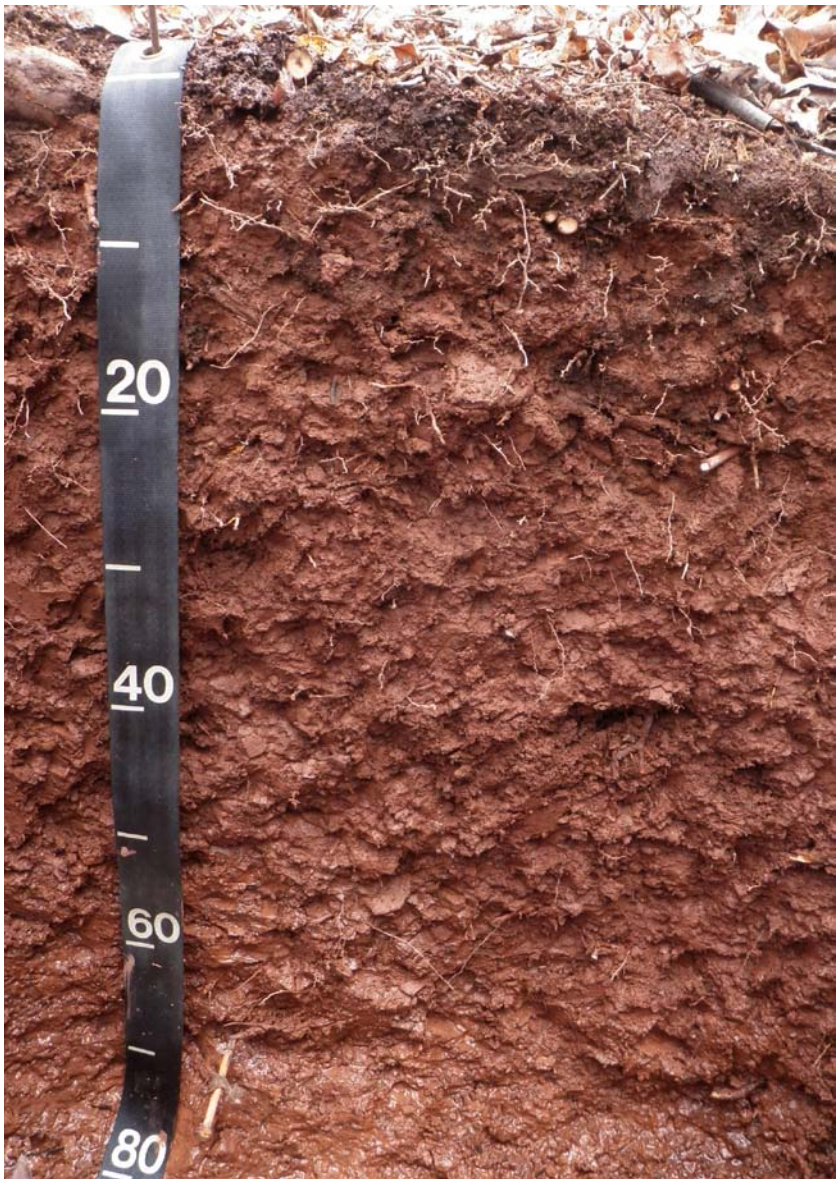

Figure 5.—A representative profile of Cateache soil, the major residual soil that formed in the Hinton Formation. A soft bedrock (paralithic) contact is at a depth of 72 centimeters. Scale is in centimeters. (Image is from Tucker County, West Virginia.)

and 20 percent moderately cemented siltstone channers; very strongly acid, pH 4.8 by pH meter 1:1 water; clear wavy boundary.

Bt1—9 to 21 centimeters (4 to 8 inches); reddish brown (5YR 4/3), broken face, very channery silty clay loam; weak fine and medium subangular blocky structure; friable; common very fine to very coarse roots throughout; 4 percent faint clay films on all faces of peds; 2 percent strongly cemented siltstone flagstones and 36 percent moderately cemented siltstone channers; very strongly acid, pH 4.9 by pH meter 1:1 water; clear wavy boundary.

Bt2—21 to 53 centimeters (8 to 21 inches); dark reddish brown (5YR 3/3), broken face, channery silty clay loam; moderate fine and medium subangular blocky structure; firm; common very fine to medium roots throughout; 10 percent faint clay films on all faces of peds; 2 percent strongly cemented siltstone flagstones and 30 percent

moderately cemented siltstone channers; very strongly acid, pH 5.1 by pH meter 1:1 water; clear wavy boundary.

Bt3—53 to 75 centimeters (21 to 30 inches); dark reddish brown (2.5YR 3/4), broken face, silty clay loam; moderate medium subangular blocky structure; friable; common fine roots throughout; 30 percent faint clay films on all faces of peds; 10 percent moderately cemented siltstone channers; moderately acid, pH 5.7 by pH meter 1:1 water; gradual wavy boundary.

Bt4—75 to 92 centimeters (30 to 36 inches); dark reddish brown (2.5YR 3/4), broken face, flaggy silty clay; moderate fine and medium subangular blocky structure; friable; common fine roots throughout; 60 percent faint clay films on all faces of peds; 10 percent strongly cemented siltstone flagstones and 11 percent moderately cemented siltstone channers; moderately acid, pH 5.8 by pH meter 1:1 water; abrupt broken boundary.

Cr—92 centimeters (36 inches); dark reddish brown (2.5YR 3/3), crushed, highly weathered and fractured siltstone bedrock; moderate excavation difficulty.

Range in Characteristics

Solum thickness: 46 to 102 centimeters (18 to 40 inches)

Depth to bedrock: 51 to 102 centimeters (20 to 40 inches)

Rock fragments (content, size, kind): 5 to 25 percent, by volume, in the A and BA horizons, 10 to 50 percent in the Bt horizon, and 35 to 80 percent in the BC and C horizons; content averages 15 to 35 percent, by volume, in the particle-size control section; dominantly highly weathered channers and flagstones of reddish brown siltstone but also including shale and fine grained sandstone

Soil reaction: Very strongly acid to moderately acid

O horizon (if it occurs):

Texture—slightly to highly decomposed organic matter derived from hardwood leaf litter; pedons in forested areas commonly have an O horizon that is as much as 10 centimeters (4 inches) thick

A or Ap horizon:

Color—hue of 10YR to 5YR and value and chroma of 2 to 4

Texture (fine-earth fraction)—loam, silt loam, or silty clay loam

BA horizon (if it occurs):

Color—hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 2 to 4

Texture (fine-earth fraction)—loam, silt loam, or silty clay loam

Bt horizon:

Color—hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 3 to 6

Texture (fine-earth fraction)—silt loam, silty clay loam, or silty clay

BC horizon (if it occurs):

Color—similar to the Bt horizon

Texture—similar to the Bt horizon

C horizon (if it occurs):

Color—hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 2 to 4

Texture (fine-earth fraction)—silt loam, silty clay loam, or silty clay

Chavies Series

The Chavies series consists of very deep, well drained soils that formed in mixed alluvium derived from nonacid interbedded sedimentary rock. Geologic parent material is mixed Pennsylvanian- and Mississippian-age deposits from throughout the Bluestone River watershed. Chavies soils are on river terraces in river valleys. Slopes

Figure 6.—A representative profile of Chavies soil, a major second- and third-bottom flood-plain soil along the Bluestone River. Scale is in centimeters. (Image is from New River Gorge National River, West Virginia.)

range from 0 to 3 percent. The mean annual precipitation is 959 millimeters, and the mean annual temperature is 11.7 degrees C.

Taxonomic Classification

Coarse-loamy, mixed, active, mesic Ultic Hapludalfs

Typical Pedon

Chavies sandy loam (fig. 6); Raleigh County, West Virginia; at an elevation of 358 meters (1,174 feet), on a 4 percent slope on a forested river terrace of the New River near the Grandview Sandbar Campground; USGS Prince, West Virginia topographic quadrangle; lat. 37 degrees 51 minutes 25 seconds N. and long. 81 degrees 3 minutes 5 seconds W.; NAD83. (When described, the soil was moist throughout.)

A1—0 to 6 centimeters (0 to 2 inches); dark gray (10YR 4/1), broken face and dry, and very dark brown (10YR 2/2), broken face and moist, sandy loam; 5 percent clay; moderate medium granular structure; very friable; moderately acid, pH 6.0 by pH meter 1:1 water; abrupt smooth boundary.

A2—6 to 25 centimeters (2 to 10 inches); grayish brown (10YR 5/2), broken face and dry, and very dark grayish brown (10YR 3/2), broken face and moist, loamy sand; 3 percent clay; weak fine granular structure; loose; strongly acid, pH 5.3 by pH meter 1:1 water; clear wavy boundary.

BE—25 to 42 centimeters (10 to 17 inches); dark grayish brown (10YR 4/2), broken face, sandy loam; 5 percent clay; weak fine granular structure; very friable; strongly acid, pH 5.3 by pH meter 1:1 water; clear wavy boundary.

Bt1—42 to 67 centimeters (17 to 26 inches); dark yellowish brown (10YR 4/4), broken face, sandy loam; 8 percent clay; weak coarse subangular blocky structure; very friable; 2 percent faint clay bridges between sand grains; moderately acid, pH 5.9 by pH meter 1:1 water; gradual wavy boundary.

Bt2—67 to 127 centimeters (26 to 50 inches); dark yellowish brown (10YR 4/4), broken face, sandy loam; 15 percent clay; weak coarse subangular blocky structure; very friable; 6 percent faint clay bridges between sand grains; slightly acid, pH 6.2 by pH meter 1:1 water; clear wavy boundary.

BC—127 to 173 centimeters (50 to 68 inches); dark yellowish brown (10YR 4/4), broken face, sandy loam; 12 percent clay; weak very coarse prismatic structure; very friable; 10 percent sandstone gravel; slightly acid, pH 6.4 by pH meter 1:1 water.

Range in Characteristics

Solum thickness: 76 to 200 centimeters (30 to 79 inches)

Depth to bedrock: More than 152 centimeters (60 inches)

Rock fragments (content, size, kind): 0 to 15 percent, by volume, in the solum and 0 to 30 percent in the substratum; sandstone or quartzitic gravel that is less than 1/4 inch to about 3 inches in size; volume and size generally increase as depth increases

Soil reaction: Very strongly acid to neutral

A horizon:

Color—hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4

Texture—fine sandy loam, sandy loam, loam, silt loam, or loamy sand

Bt horizon:

Color—hue of 10YR to 5YR, value of 4 to 6, and chroma of 2 to 6; in some pedons the lower B horizons have mottles in shades of brown

Texture—silt loam, fine sandy loam, sandy loam, or loam

C horizon (if it occurs):

Color—similar to the Bt horizon; mottles in shades of brown and gray occur in some pedons

Texture—generally the same as the Bt horizon but including loamy sand and sandy loam and their gravelly analogues; stratified in some pedons

Combs Series

The Combs series consists of very deep, well drained soils that formed in loamy alluvium from interbedded sedimentary rock. Geologic parent material is recent alluvium derived from Pennsylvanian- and Mississippian-age deposits. Combs soils are on flood plains in river valleys. Slopes range from 0 to 3 percent. The mean annual precipitation is 959 millimeters, and the mean annual temperature is 11.7 degrees C.

Taxonomic Classification

Coarse-loamy, mixed, active, mesic Fluventic Hapludolls

Typical Pedon

Combs fine sandy loam (fig. 7); Raleigh County, West Virginia; at an elevation of 384 meters (1,259 feet), on a 1 percent slope in a forested area about 800 meters (0.5 mile) downstream from the mouth of Sewell Branch on the New River, across the New River from the town of Meadow Creek; USGS Meadow Creek, West Virginia

Figure 7.—An exposure along the Bluestone River in Combs fine sandy loam. This profile shows a deep, dark surface horizon. Deeper in the profile, another dark horizon is buried within the subsoil, indicating that the material was covered with more recent alluvial deposits. The intact buried A horizon suggests that the recent deposits are of Holocene age or younger. Note the smooth, rounded rock fragments in the foreground.

topographic quadrangle; lat. 37 degrees 48 minutes 26 seconds N. and long. 80 degrees 55 minutes 34 seconds W.; NAD83. (When described, the soil was moist throughout.)

A—0 to 25 centimeters (0 to 10 inches); brown (10YR 4/3), crushed and dry, and very dark grayish brown (10YR 3/2), crushed and moist, fine sandy loam; 12 percent clay; weak medium granular structure; very friable; many very fine to coarse and common very coarse roots; moderately acid, pH 6.0 by Hellige-Truog; clear smooth boundary.

Bw1—25 to 76 centimeters (10 to 30 inches); brown (10YR 4/3), broken face, fine sandy loam; 12 percent clay; weak medium subangular blocky structure; friable; common very fine to very coarse roots; slightly acid, pH 6.2 by Hellige-Truog; clear wavy boundary.

Bw2—76 to 122 centimeters (30 to 48 inches); brown (10YR 4/3), broken face, sandy loam; 13 percent clay; weak medium and coarse subangular blocky structure; friable; common very fine to medium roots; slightly acid, pH 6.2 by Hellige-Truog; gradual wavy boundary.

C—122 to 200 centimeters (48 to 79 inches); dark yellowish brown (10YR 4/4), broken face, cobbly sandy loam; 14 percent clay; massive; friable; few very fine roots; 15 percent sandstone cobbles; neutral, pH 7.0 by Hellige-Truog.

Range in Characteristics

Solum thickness: 102 to 200 centimeters (40 to 79 inches)
Depth to bedrock: More than 152 centimeters (60 inches)
Rock fragments (content, size): As much as 15 percent, by volume, throughout the profile; gravel and cobbles
Soil reaction: Moderately acid to neutral

Ap or A horizon:
Color—hue of 10YR or 7.5YR, value of 3, and chroma of 2 or 3
Texture—silt loam, loam, sandy loam, or fine sandy loam

AB horizon (if it occurs):
Color—hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 or 3
Texture—similar to the Ap or A horizon

Bw horizon:
Color—hue of 10YR to 2.5Y, value of 4 or 5, and chroma of 4 to 6; in some pedons the upper part of the horizon has value of 3 and chroma of 2 or 3
Texture—loam, silt loam, sandy loam, or fine sandy loam; including sandy clay loam below a depth of 40 inches in a few pedons

BC horizon (if it occurs):
Color—similar to the Bw horizon
Texture—similar to the Bw horizon but commonly stratified

C horizon (if it occurs):
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6; in some pedons in swales or near drainageways, horizon has redoximorphic depletions and iron masses below a depth of 40 inches
Texture—loam, silt loam, sandy loam, or sandy clay loam; commonly stratified

Craigsville Series

The Craigsville series consists of very deep, well drained soils that formed in acid, sandy and gravelly alluvium derived from interbedded sedimentary rock. Geologic parent material is recent alluvium derived from Pennsylvanian- and Mississippian-age sandstone, shale, and siltstone. Craigsville soils are on high-energy flood plains and alluvial fans in river valleys. Slopes range from 0 to 5 percent. The mean annual precipitation is 959 millimeters, and the mean annual temperature is 11.7 degrees C.

Taxonomic Classification

Loamy-skeletal, mixed, superactive, mesic Fluventic Dystrudepts

Figure 8.—A representative profile of Craigsville soil, a dominant soil that formed in alluvial fans where larger tributaries join the Bluestone River. Scale is in centimeters. (Image is from New River Gorge National River, West Virginia.)

Typical Pedon

Craigsville very stony sandy loam (fig. 8); Raleigh County, West Virginia; at an elevation of 372 meters (1,220 feet), on a 2 percent slope in a forested area near the mouth of Glade Creek; USGS Prince, West Virginia topographic quadrangle; lat. 37 degrees 49 minutes 43 seconds N. and long. 81 degrees 0 minutes 46 seconds W.; NAD83. (When described, the soil was moist throughout.)

Oi—0 to 2 centimeters (0 to 1 inch); slightly decomposed plant material; abrupt smooth boundary.

Oe—2 to 3 centimeters (1 to 1.5 inches); moderately decomposed plant material; abrupt broken boundary.

A—3 to 13 centimeters (1.5 to 5 inches); very dark brown (10YR 2/2), crushed, very stony sandy loam; 7 percent clay; weak fine and medium granular structure; very friable; many fine to very coarse roots throughout; 10 percent sandstone cobbles

and 35 percent sandstone stones; very strongly acid, pH 4.5 by Hellige-Truog; abrupt smooth boundary.

Bw1—13 to 30 centimeters (5 to 12 inches); dark brown (7.5YR 3/4), broken face, very stony sandy loam; 7 percent clay; weak fine and medium subangular blocky structure; very friable; many fine to very coarse roots throughout; 11 percent sandstone cobbles and 44 percent sandstone stones; very strongly acid, pH 4.5 by Hellige-Truog; clear wavy boundary.

Bw2—30 to 52 centimeters (12 to 20 inches); brown (7.5YR 4/4), broken face, extremely stony sandy loam; 5 percent clay; weak medium subangular blocky structure; very friable; common fine and medium roots throughout; 12 percent sandstone cobbles and 48 percent sandstone stones; very strongly acid, pH 4.5 by Hellige-Truog; gradual wavy boundary.

C—52 to 165 centimeters (20 to 65 inches); strong brown (7.5YR 4/6), crushed, extremely stony loamy sand; 3 percent clay; massive; loose; few fine roots throughout; 15 percent sandstone cobbles and 60 percent sandstone stones; very strongly acid, pH 4.5 by Hellige-Truog.

Range in Characteristics

Solum thickness: 51 to 102 centimeters (20 to 40 inches)
Depth to bedrock: More than 152 centimeters (60 inches)
Rock fragments (content, size): 5 to 60 percent, by volume, in the A horizon and 35 to 75 percent in the B and C horizons; gravel, cobbles, and stones
Soil reaction: Very strongly acid or strongly acid

A horizon:
Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4
Texture (fine-earth fraction)—sandy loam to silt loam

B horizon:
Color—hue of 5YR to 10YR, value of 4 or 5, and chroma of 4 or 6
Texture (fine-earth fraction)—loam or sandy loam

BC horizon (if it occurs):
Color—hue of 5YR to 10YR, value of 4 or 5, and chroma of 4 or 6
Texture (fine-earth fraction)—loam, sandy loam, or loamy sand

C or 2C horizon:
Color—hue of 5YR to 10YR, value of 4 or 5, and chroma of 3 to 6
Texture—loamy sand or sandy loam in the fine-earth fraction; thin nonconforming horizons may have less than 15 percent gravel or cobbles

Gilpin Series

The Gilpin series consists of moderately deep, well drained soils that formed in residuum from shale, siltstone, and fine-grained sandstone. Geologic parent material is upper Mississippian-age interbedded sedimentary deposits. Gilpin soils are on mountain ridges and slopes. Slopes range from 8 to 90 percent. The mean annual precipitation is 959 millimeters, and the mean annual temperature is 11.7 degrees C.

Taxonomic Classification

Fine-loamy, mixed, active, mesic Typic Hapludults

Typical Pedon

Gilpin loam (fig. 9); Summers County, West Virginia; at an elevation of 622 meters (2,040 feet), on a 16 percent slope in a forested area about 0.96 kilometer (0.6 mile) northeast of the community of Meadow Creek and 1,500 feet north of County Road

Figure 9.—A representative profile of Gilpin soil, the dominant residual soil that formed in the Bluestone and Princeton Formations in the Bluestone National Scenic River area. Scale is in centimeters. (Image is from Marion County, West Virginia.)

7-2; USGS Meadow Creek, West Virginia topographic quadrangle; lat. 37 degrees 48 minutes 47 seconds N. and long. 80 degrees 54 minutes 42 seconds W.; NAD83. (When described, the soil was moist throughout.)

Oi—0 to 1 centimeter (0 to 0.5 inch); slightly decomposed plant material; abrupt broken boundary.

Oe—1 to 2 centimeters (0.5 to 1 inch); moderately decomposed plant material; abrupt wavy boundary.

A—2 to 16 centimeters (1 to 6 inches); very dark grayish brown (10YR 3/2), crushed, loam; 19 percent clay; weak fine granular structure; very friable; many very fine and fine and common medium to very coarse roots; 5 percent very strongly cemented sandstone gravel; strongly acid, pH 5.4 by Hellige-Truog; clear smooth boundary.

BA—16 to 29 centimeters (6 to 11 inches); dark yellowish brown (10YR 4/4), broken face, loam; 20 percent clay; weak medium subangular blocky structure; friable; common very fine to very coarse roots; 5 percent very strongly cemented sandstone gravel; strongly acid, pH 5.2 by Hellige-Truog; clear wavy boundary.

Bt1—29 to 54 centimeters (11 to 21 inches); yellowish brown (10YR 5/6), broken face, channery loam; 24 percent clay; weak fine and medium subangular blocky structure; friable; slightly sticky, slightly plastic; common very fine to very coarse roots; 15 percent faint clay films on vertical faces of peds; 15 percent very strongly cemented sandstone gravel; very strongly acid, pH 4.8 by Hellige-Truog; clear wavy boundary.

Bt2—54 to 70 centimeters (21 to 28 inches); strong brown (7.5YR 5/6), broken face, channery silt loam; 25 percent clay; moderate medium subangular blocky structure; friable; slightly sticky, slightly plastic; few very fine and fine and common medium to very coarse roots; 30 percent faint clay films on vertical faces of peds; 30 percent very strongly cemented sandstone gravel; very strongly acid, pH 4.6 by Hellige-Truog; gradual wavy boundary.

C—70 to 76 centimeters (28 to 30 inches); strong brown (7.5YR 5/6), broken face, very channery silt loam; 25 percent clay; massive; firm; slightly sticky, slightly plastic; few very fine and fine roots; 10 percent faint clay films on rock fragments; 35 percent very strongly cemented sandstone gravel; very strongly acid, pH 4.6 by Hellige-Truog; clear wavy boundary.

R—76 to 86 centimeters (30 to 34 inches); very strongly cemented siltstone bedrock; high excavation difficulty.

Range in Characteristics

Solum thickness: 46 to 91 centimeters (18 to 36 inches)
Depth to bedrock: 51 to 102 centimeters (20 to 40 inches)
Rock fragments (content, size, kind): 5 to 40 percent, by volume, in the solum and 30 to 90 percent in the C horizon; mostly angular to subangular channers of shale, siltstone, and sandstone
Soil reaction: Strongly acid to extremely acid

Ap horizon (if it occurs):
Color—hue of 10YR or 2.5Y, value of 3 to 5 (6 or 7 dry), and chroma of 2 to 4
Texture (fine-earth fraction)—silt loam or loam

A horizon (if it occurs):
Color—hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 to 3
Texture (fine-earth fraction)—silt loam or loam

E, BE, and BA horizons (if they occur):
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 5
Texture (fine-earth fraction)—silt loam or loam

Bt horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8; colors tend to become redder as depth increases
Texture (fine-earth fraction)—silt loam, loam, clay loam, or silty clay loam

BC horizon (if it occurs):
Color—similar to the C horizon
Texture—similar to the C horizon

C horizon:

Color—hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 6
Texture (fine-earth fraction)—silt loam, loam, or silty clay loam

Highsplint Series

The Highsplint series consists of very deep, well drained soils that formed in colluvium from interbedded shale and sandstone. Geologic parent material is upper Mississippian-age sedimentary deposits. Highsplint soils are on mountain slopes. Slopes range from 15 to 90 percent. The mean annual precipitation is 959 millimeters, and the mean annual temperature is 11.7 degrees C.

Taxonomic Classification

Loamy-skeletal, mixed, active, mesic Typic Dystrudepts

Typical Pedon

Highsplint channery loam (fig. 10); Raleigh County, West Virginia; at an elevation of 725 meters (2,380 feet), on a 66 percent slope in a forested area on Spruce Mountain, about 2.53 kilometers (1.57 miles) west-southwest on a bearing of 253 degrees from the intersection of the West Virginia Turnpike and Clear Fork Road (County Route 1); USGS Eccles, West Virginia topographic quadrangle; lat. 37 degrees 52 minutes 22.40 seconds N. and long. 81 degrees 17 minutes 40.85 seconds W.; NAD 83. (When described, the soil was moist throughout.)

Oi—0 to 2 centimeters (0 to 0.5 inch); slightly decomposed plant material.

Oe—2 to 4 centimeters (0.5 inch to 1.5 inches); moderately decomposed plant material.

A1—4 to 10 centimeters (1.5 to 4 inches); very dark grayish brown (10YR 3/2) channery loam; moderate fine granular structure; very friable; common fine, common medium, common coarse, common very coarse, and common very fine roots throughout; 30 percent unspecified fragments; moderately acid, pH 6.0 by pH meter 1:1 water; abrupt wavy boundary.

A2—10 to 22 centimeters (4 to 9 inches); dark brown (10YR 3/3) very channery loam; weak fine subangular blocky structure; very friable; common fine, common medium, common coarse, common very coarse, and common very fine roots throughout; 40 percent unspecified fragments; moderately acid, pH 5.7 by pH meter 1:1 water; clear irregular boundary.

BA—22 to 31 centimeters (9 to 12 inches); dark yellowish brown (10YR 4/4) very channery loam; weak fine and weak medium subangular blocky structure; friable; common fine, common medium, and common coarse roots throughout; 40 percent unspecified fragments; strongly acid, pH 5.3 by pH meter 1:1 water; clear wavy boundary.

Bw1—31 to 73 centimeters (12 to 29 inches); dark yellowish brown (10YR 4/6) very channery loam; weak medium subangular blocky structure; friable; common fine, common medium, and common coarse roots throughout; 45 percent unspecified fragments; strongly acid, pH 5.1 by pH meter 1:1 water; gradual wavy boundary.

Bw2—73 to 120 centimeters (29 to 47 inches); strong brown (7.5YR 5/6) very channery loam; weak medium subangular blocky structure; friable; common medium and common coarse roots throughout; 50 percent unspecified fragments; very strongly acid, pH 4.9 by pH meter 1:1 water; gradual wavy boundary.

BC—120 to 140 centimeters (47 to 55 inches); strong brown (7.5YR 5/6) extremely channery loam; weak fine and weak medium subangular blocky structure; friable; common fine and common medium roots throughout; 60 percent unspecified fragments; strongly acid, pH 5.1 by pH meter 1:1 water; gradual wavy boundary.

Figure 10.—A representative profile of Highsplint soil, the dominant colluvial soil in the higher landscape positions that formed from upper Mauch Chunk and lower Pottsville Group geologies in the Bluestone National Scenic River area. Scale is in centimeters. (Image from Gauley River National Recreation Area, West Virginia.)

C—140 to 165 centimeters (55 to 65 inches); strong brown (7.5YR 5/6) extremely channery loam; friable; common fine and common medium roots throughout; 80 percent unspecified fragments; strongly acid, pH 5.1 by pH meter 1:1 water.

Range in Characteristics

Solum thickness: 102 to 152 centimeters (40 to 60 inches) or more
Depth to bedrock: More than 152 centimeters (60 inches)
Rock fragments (content, size, kind): 35 to 90 percent, by volume; mostly sandstone channers and flagstones; in a few pedons, to a depth of about 24 inches, horizons contain 15 to 35 percent rock fragments
Soil reaction: Extremely acid to slightly acid in the surface layer and extremely acid to strongly acid in the solum and substratum

A horizon:
Color—hue of 10YR, value of 3 to 5, and chroma of 2 to 4; some pedons have thin A horizons with value of 2 and chroma of 1
Texture—sandy loam, fine sandy loam, silt loam, or loam
Other characteristics—transitional horizons dominated by A material (AB horizons) have the same colors and textures as the A horizon; a few pedons meet depth requirements for mollic or umbric epipedons but do not meet dry color criteria

AB or BA horizon (if it occurs):
Color—hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 3 to 6
Texture—loam, silt loam, or silty clay loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8; some pedons, below a depth of 40 inches, have lithochromic mottles or redoximorphic features in shades of brown, olive, or gray
Texture—loam, silt loam, clay loam, or silty clay loam; silt content ranges from 35 to about 65 percent

BC horizon:
Colors—similar to the Bw horizon
Textures—similar to the Bw horizon
Other characteristics—horizon commonly displays weak fragic properties believed to be the result of cementation from lateral water movement; horizon also may have lithochromic mottles or redoximorphic features in shades of brown, olive, or gray below a depth of 40 inches

CB or C horizon (if it occurs):
Color—hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6
Texture—sandy loam, fine sandy loam, silt loam, silty clay loam, loam, or clay loam
Redoximorphic features—shades of brown, olive, or gray; common below a depth of 40 inches and generally increasing in number as depth increases

Holly Series

The Holly series consists of very deep, poorly drained soils that formed in loamy alluvium weathered primarily from shale, sandstone, and siltstone. Geologic parent material is recent alluvium derived primarily from Mississippian-age deposits. Holly soils are on river valley flood plains. Slopes range from 0 to 3 percent. The mean annual precipitation is 959 millimeters, and the mean annual temperature is 11.7 degrees C.

Taxonomic Classification

Fine-loamy, mixed, active, nonacid, mesic Fluvaquentic Endoaquepts

Figure 11.—A representative profile of Holly soil, a major component in limited, poorly drained, upper flood-plain landscape positions in the Bluestone National Scenic River area. Scale is in centimeters. (Image is from Lincoln County, West Virginia.)

Typical Pedon

Holly silt loam (fig. 11); Summers County, West Virginia; at an elevation of 448 meters (1,470 feet), on a 0.5 percent slope in a wooded area on the flood plain along the Bluestone River, about 1.26 linear miles downstream from the confluence of the Bluestone and Little Bluestone Rivers; USGS Pipestem, West Virginia topographic quadrangle; lat. 37 degrees 35 minutes 31 seconds N. and long. 80 degrees 57 minutes 5 seconds W.; NAD83. (When described, the soil was moist throughout.)

Ap1—0 to 5 centimeters (0 to 2 inches); very dark brown (10YR 2/2), broken face, silt loam; weak medium granular structure; friable; many very fine, fine, and coarse roots throughout; 5 percent medium strong brown (7.5YR 4/6) masses of oxidized iron on surfaces along root channels and 5 percent medium black (10YR 2/1) iron depletions in matrix; neutral, pH 7.0 by Hellige-Truog; abrupt wavy boundary.

Ap2—5 to 15 centimeters (2 to 6 inches); very dark grayish brown (10YR 3/2), broken face, silt loam; weak medium granular structure; friable; common very fine, fine, and coarse roots throughout; 3 percent medium and strong brown (7.5YR 4/6) masses of oxidized iron on surfaces along root channels, 10 percent medium strong brown (7.5YR 5/8) masses of oxidized iron in matrix surrounding redoximorphic depletions, and 10 percent medium dark gray (5Y 4/1) iron depletions in matrix; neutral, pH 7.0 by Hellige-Truog; abrupt smooth boundary.

Bg1—15 to 51 centimeters (6 to 20 inches); brown (7.5YR 4/2), broken face, silt loam; weak very coarse prismatic structure parting to weak medium subangular blocky; friable; slightly sticky, slightly plastic; few very fine, fine, and coarse roots throughout; 3 percent coarse dark gray (5Y 4/1) iron depletions in matrix and 10 percent fine strong brown (7.5YR 5/8 and 4/6) masses of oxidized iron in matrix

surrounding redoximorphic depletions; neutral, pH 6.8 by Hellige-Truog; clear wavy boundary.

Bg2—51 to 74 centimeters (20 to 29 inches); brown (7.5YR 4/2), broken face, silt loam; weak very coarse prismatic structure parting to weak coarse subangular blocky; firm; slightly sticky, slightly plastic; few very fine and fine roots throughout; 3 percent coarse dark gray (5Y 4/1) iron depletions in matrix and 21 percent fine strong brown (7.5YR 5/8 and 4/6) masses of oxidized iron in matrix surrounding redoximorphic depletions; slightly acid, pH 6.5 by Hellige-Truog; gradual wavy boundary.

BCg—74 to 97 centimeters (29 to 38 inches); brown (7.5YR 4/2), broken face, silty clay loam; weak very coarse prismatic structure parting to weak very coarse platy; firm; moderately sticky, slightly plastic; 3 percent coarse dark gray (5Y 4/1) iron depletions infused into matrix along faces of peds and 21 percent fine strong brown (7.5YR 5/8 and 4/6) masses of oxidized iron in matrix; slightly acid, pH 6.5 by Hellige-Truog; gradual wavy boundary.

Cg—97 to 200 centimeters (38 to 79 inches); dark gray (7.5YR 4/1), broken face, silty clay; weak very coarse prismatic structure; firm; moderately sticky, moderately plastic; 15 percent medium strong brown (7.5YR 4/6), moist, and red (7.5R 5/8) masses of oxidized iron infused into matrix along faces of peds; 10 percent flat rounded moderately cemented shale gravel; slightly acid, pH 6.5 by Hellige-Truog.

Range in Characteristics

Solum thickness: 50 to 112 centimeters (20 to 44 inches)
Depth to bedrock: More than 152 centimeters (60 inches)
Content of rock fragments: 0 to 10 percent, by volume, in the A horizon, 0 to 15 percent in the Bg horizon, and 0 to 25 percent in the Cg horizon
Soil reaction: Strongly acid to slightly alkaline

A or Ap horizon:
Color—hue of 10YR, value of 2 to 4 (6 or more dry), and chroma of 1 or 2
Texture—silt loam, loam, silty clay loam, or sandy loam

Bg horizon:
Color—horizon has hue of 7.5YR, 10YR, 2.5Y, or 5Y or is neutral in hue, has value of 4 to 6, and has chroma of 2 or less
Texture—silt loam or loam or, less commonly, sandy loam or silty clay loam; thin layers (less than 4 inches thick) with coarser or finer texture occur in some pedons

Cg horizon:
Color—horizon has hue of 10YR to 5GY or is neutral in hue, has value of 4 to 6, and has chroma of 0 to 2
Texture—silt loam, loam, sandy loam, clay loam, silty clay loam, or silty clay; representatively stratified and including loamy sand, sand, and their gravelly analogues; thin strata of silty clay loam occur in some pedons below a depth of 40 inches

Lily Series

The Lily series consists of moderately deep, well drained soils that formed in residuum primarily from sandstone. Geologic parent material is Mississippian-age sandstone. Lily soils are on mountain ridges. Slopes range from 8 to 15 percent. The mean annual precipitation is 959 millimeters, and the mean annual temperature is 11.7 degrees C.

Figure 12.—A representative profile of Lily soil, a major residual soil that formed in the Bluestone and Princeton Formations in the Bluestone National Scenic River area. Scale is in centimeters. Lily soils occur in the uppermost landscape positions and have coarser textures and less fertility than the similarly formed Gilpin soils. (Image is from Lincoln County, West Virginia.)

Taxonomic Classification

Fine-loamy, siliceous, semiactive, mesic Typic Hapludults

Typical Pedon

Lily loam (fig. 12); Summers County, West Virginia; at an elevation of 710 meters (2,329 feet), on a 9 percent slope in a forested area on Hump Mountain, about 800 meters (0.5 mile) southwest of Sandstone Road and 1,500 meters (0.93 mile) east of the community of Meadow Creek; USGS Meadow Creek, West Virginia topographic quadrangle; lat. 37 degrees 48 minutes 6 seconds N. and long. 80 degrees 54 minutes 13 seconds W.; NAD83. (When described, the soil was moist throughout.)

Oi—0 to 2 centimeters (0 to 1 inch); slightly decomposed plant material; very abrupt broken boundary.

Oe—2 to 5 centimeters (1 to 2 inches); moderately decomposed plant material; abrupt wavy boundary.

A—5 to 11 centimeters (2 to 4 inches); very dark grayish brown (10YR 3/2), broken face, loam; moderate fine and medium granular structure; very strongly acid, pH 4.5 by Hellige–Truog; abrupt wavy boundary.

B/A—11 to 19 centimeters (4 to 7 inches); 50 percent very dark grayish brown (10YR 3/2) and 50 percent yellowish brown (10YR 5/4), broken face, loam; weak fine and medium subangular blocky structure; very strongly acid, pH 4.5 by Hellige–Truog; abrupt wavy boundary.

Bt1—19 to 54 centimeters (7 to 21 inches); yellowish brown (10YR 5/4), broken face, loam; 19 percent clay; moderate medium subangular blocky structure; very strongly acid, pH 4.7 by Hellige–Truog; clear wavy boundary.

Bt2—54 to 88 centimeters (21 to 35 inches); strong brown (7.5YR 5/6), broken face, gravelly loam; 22 percent clay; moderate medium subangular blocky structure; 20 percent sandstone gravel; very strongly acid, pH 4.7 by Hellige–Truog; gradual wavy boundary.

C—88 to 99 centimeters (35 to 39 inches); 20 percent brownish yellow (10YR 6/6) and 80 percent strong brown (7.5YR 5/8), broken face, sandy loam; 16 percent clay; massive; very strongly acid, pH 4.6; very abrupt wavy boundary.

R—99 to 109 centimeters (39 to 43 inches); indurated sandstone bedrock; very high excavation difficulty.

Range in Characteristics

Solum thickness: 51 to 102 centimeters (20 to 40 inches)
Depth to bedrock: 51 to 102 centimeters (20 to 40 inches)
Rock fragments (content, size, kind): 0 to 30 percent to a depth of about 24 inches and 0 to 35 percent below a depth of 24 inches; mostly sandstone channers
Soil reaction: Extremely acid to strongly acid, except in limed areas

Ap or E horizon (if it occurs):
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4
Texture—loam, silt loam, fine sandy loam, or sandy loam

A horizon:
Color—hue of 10YR or 7.5YR, value of 2 to 5, and chroma of 1 to 3
Texture—loam, silt loam, fine sandy loam, or sandy loam

AB, BA, or BE horizon (if it occurs):
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 1 to 8
Texture—loam, fine sandy loam, or sandy loam

Bt horizon:
Color—hue of 10YR to 5YR, value of 4 to 6, and chroma of 4 to 8
Lithochromic mottles—shades of red, brown, or yellow; becoming more common as depth increases
Texture—loam, sandy clay loam, or clay loam; subhorizons of fine sandy loam occur in the lower part of some pedons

BC or C horizon:
Color—hue of 10YR to 2.5YR, value of 4 to 6, and chroma of 4 to 8
Texture—loamy sand, sandy loam, fine sandy loam, loam, sandy clay loam, or clay loam

Lobdell Series

The Lobdell series consists of very deep, moderately well drained soils that formed in loamy alluvium weathered from shale, sandstone, and limestone. Geologic parent material is recent alluvium derived primarily from Mississippian-age deposits. Lobdell

soils are on river valley flood plains. Slopes range from 0 to 3 percent. The mean annual precipitation is 959 millimeters, and the mean annual temperature is 11.7 degrees C.

Taxonomic Classification

Fine-loamy, mixed, active, mesic Fluvaquentic Eutrudepts

Typical Pedon

Lobdell silt loam; Summers County, West Virginia; at an elevation of 450 meters (1,476 feet), about 0.8 kilometer (1.5 miles) downstream from the confluence of the Bluestone and Little Bluestone Rivers, on a 2.5 percent slope in a forested area on the flood plain of the Bluestone River; USGS Pipestem, West Virginia topographic quadrangle; lat. 37 degrees 35 minutes 48 seconds N. and long. 80 degrees 56 minutes 52 seconds W.; NAD83. (When described, the soil was moist throughout.)

A—0 to 25 centimeters (0 to 10 inches); very dark grayish brown (10YR 3/2), broken face, silt loam; weak medium granular structure; very friable; common very fine, fine, and coarse roots throughout; strongly acid, pH 5.6 by Hellige-Truog; gradual wavy boundary.

Bw1—25 to 53 centimeters (10 to 21 inches); dark yellowish brown (10YR 4/4), broken face, silt loam; weak medium subangular blocky structure; friable; common very fine, fine, and coarse roots throughout; 3 percent fine yellowish brown (10YR 5/8) and 5 percent fine yellowish red (5YR 5/8) masses of oxidized iron in matrix; strongly acid, pH 5.6 by Hellige-Truog; clear wavy boundary.

Bw2—53 to 80 centimeters (21 to 31 inches); brown (7.5YR 4/4), broken face, loam; weak medium subangular blocky structure; friable; few very fine, fine, and coarse roots throughout; 15 percent fine pinkish gray (7.5YR 6/2) iron depletions in matrix and 15 percent fine yellowish red (5YR 5/8) masses of oxidized iron in matrix surrounding redoximorphic depletions; moderately acid, pH 5.8 by Hellige-Truog; gradual wavy boundary.

BC—80 to 130 centimeters (31 to 51 inches); strong brown (7.5YR 4/6), broken face, loam; weak coarse subangular blocky structure; friable; few very fine, fine, and coarse roots; 20 percent coarse pinkish gray (7.5YR 6/2) iron depletions in matrix and 20 percent medium strong brown (7.5YR 5/8) masses of oxidized iron in matrix surrounding redoximorphic depletions; moderately acid, pH 5.8 by Hellige-Truog; gradual wavy boundary.

C—130 to 200 centimeters (51 to 79 inches); brown (7.5YR 4/4), broken face, loam; massive; firm; 10 percent coarse pinkish gray (7.5YR 6/2) iron depletions in matrix and 15 percent medium strong brown (7.5YR 5/8) masses of oxidized iron in matrix surrounding redoximorphic concentrations; moderately acid, pH 6.0 by Hellige-Truog.

Range in Characteristics

Solum thickness: 61 to 132 centimeters (24 to 52 inches)
Depth to bedrock: More than 152 centimeters (60 inches)
Rock fragments (content, kind): 0 to 5 percent in the A horizon and commonly 0 to 15 percent in the Bw and C horizons; dominantly sandstone, siltstone, and shale
Soil reaction: Strongly acid to neutral

A horizon:

Color—hue of 10YR or 7.5YR, value of 2 to 4 (4 to 6 dry), and chroma of 1 to 3; many pedons have an Ap horizon as much as 10 inches thick that has hue of 10YR, value of 3 or 4 (6 dry), and chroma of 2 or 3

Texture—silt loam or loam or, less commonly, sandy loam or fine sandy loam; an Ap horizon, if it occurs, has similar textures

Bw horizon:

Color—hue of 10YR, 7.5YR, or 2.5Y, value of 4 or 5, and chroma of 3 or 4; thin layers that have value of 2 or 3 and chroma of 2 occur in some pedons

Texture—horizon is silt loam or loam or, less commonly, has subhorizons of sandy loam, fine sandy loam, clay loam, or silty clay loam; the particle-size control section is 18 to 30 percent clay and 15 to 40 percent sand coarser than very fine

Redoximorphic features—low-chroma redoximorphic features occur at a depth of 15 to 24 inches

BC and C horizons:

Color—hue of 10YR, 7.5YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 to 8

Texture—silt loam or loam or, less commonly, sandy loam, sandy clay loam, clay loam, or fine sand; horizon ranges from highly stratified to relatively uniform; horizons below a depth of 40 inches may include thin gravelly and stony sandy layers

Monongahela Series

The Monongahela series consists of very deep, moderately well drained soils that formed in alluvium from interbedded sedimentary rock. Geologic parent material is old weathered Pennsylvanian- and Mississippian-age alluvial deposits from throughout the Bluestone River watershed. Monongahela soils are on river valley terraces. Slopes range from 3 to 8 percent. The mean annual precipitation is 959 millimeters, and the mean annual temperature is 11.7 degrees C.

Taxonomic Classification

Fine-loamy, mixed, semiactive, mesic Typic Fragiudults

Typical Pedon

Monongahela silt loam (fig. 13); Summers County, West Virginia; at an elevation of 468 meters (1,535 feet), on a 5 percent slope in a wooded area along the Bluestone River, at a fishing trail access near the confluence of the Little Bluestone River; USGS Pipestem, West Virginia topographic quadrangle; lat. 37 degrees 35 minutes 10 seconds N. and long. 80 degrees 58 minutes 15 seconds W.; NAD83. (When described, the soil was moist throughout.)

Oi—0 to 2 centimeters (0 to 1 inch); slightly decomposed plant material; very friable.

Ap—2 to 23 centimeters (1 to 9 inches); 40 percent brown (10YR 4/3), crushed, and 60 percent brown (10YR 5/3), crushed, silt loam; moderate medium and coarse granular structure; very friable; very strongly acid, pH 5.0 by Hellige-Truog; clear smooth boundary.

BE—23 to 33 centimeters (9 to 13 inches); yellowish brown (10YR 5/4), crushed, silt loam; weak coarse subangular blocky structure; friable; very strongly acid, pH 5.0 by Hellige-Truog; clear wavy boundary.

Bt1—33 to 54 centimeters (13 to 21 inches); light yellowish brown (10YR 6/4), crushed, silt loam; moderate medium subangular blocky structure; friable; moderately acid, pH 6.0 by Hellige-Truog; clear wavy boundary.

Bt2—54 to 64 centimeters (21 to 25 inches); light yellowish brown (10YR 6/4), crushed, silt loam; moderate medium and coarse subangular blocky structure; friable; 2 percent medium pale brown (10YR 6/3) iron depletions throughout and 10 percent coarse strong brown (7.5YR 4/6) masses of oxidized iron throughout; moderately acid, pH 5.8 by Hellige-Truog; clear wavy boundary.

Figure 13.—A representative profile of Monongahela soil, the dominant soil in limited terrace landscape positions along the Bluestone River. Scale is in centimeters. Monongahela soils are unique in their formation. They have a fragipan beginning at a depth of 46 to 76 centimeters that restricts rooting depth and water movement. Monongahela is recognized as the State soil of West Virginia. The carved section shown here will be excavated as a soil monolith and used as a tool for teaching soil processes in schools across the State. (Image is from Randolph County, West Virginia.)

Btx—64 to 162 centimeters (25 to 64 inches); light yellowish brown (10YR 6/4), crushed, silt loam; moderate medium and coarse subangular blocky structure; firm; brittle; 3 percent coarse strong brown (7.5YR 4/6) masses of oxidized iron throughout and 5 percent medium light gray (10YR 7/2) iron depletions throughout; very strongly acid, pH 4.8 by Hellige-Truog.

Range in Characteristics

Solum thickness: 102 to 183 centimeters (40 to 72 inches)
Depth to the fragipan: 18 to 30 inches
Rock fragments (content, size): Generally 0 to 15 percent but ranging from 0 to 30 percent above the fragipan, from 0 to 35 percent in the fragipan, and from 10 to 40 percent in the C horizon; dominantly rounded gravel and cobbles
Soil reaction: Strongly acid or very strongly acid throughout the profile, except in limed areas

Ap horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 2 to 4; an A horizon that is less than 5 inches thick and ranges from dark brown (10YR 3/3) to dark yellowish brown (10YR 4/4) occurs in undisturbed areas
Texture (fine-earth fraction)—silt loam, loam, or fine sandy loam; an A horizon, if it occurs, has the same textures

BA horizon (if it occurs):
Color—hue of 10YR, value of 4 or 5, and chroma of 4 to 8
Texture—silt loam

BE horizon (if it occurs):
Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4
Texture—loam or silt loam

Bt horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8
Texture—silt loam, loam, silty clay loam, clay loam, or sandy clay loam

Btx horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8
Texture—typically silt loam, loam, or sandy clay loam; clay loam or fine sandy loam in some pedons; the expression of the fragipan is evident to strong
Redoximorphic features—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 8

C horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 2 to 8
Texture—sandy loam, loam, silt loam, silty clay loam, or clay loam

Nelse Series

The Nelse series consists of very deep, well drained soils that formed in recent coarse textured alluvium on gently sloping river banks. Geologic parent material is Pennsylvanian- and Mississippian-age sandstone, siltstone, and shale and a minor component of coal. Nelse soils are on high-energy flood plains in river valleys. Slopes range from 0 to 5 percent. The mean annual precipitation is 959 millimeters, and the mean annual temperature is 11.7 degrees C.

Taxonomic Classification

Sandy, mixed, mesic Mollic Udifluvents

Typical Pedon

Nelse sandy loam (fig. 14); Raleigh County, West Virginia; at an elevation of 390 meters (1,279 feet), on a 2 percent slope on a forested flood plain of the New River, just downstream from Sandstone Falls, approximately 268 meters (880 feet) southeast of the parking area at Sandstone Falls State Park; USGS Meadow Creek, West Virginia topographic quadrangle; lat. 37 degrees 45 minutes 26 seconds N. and long.

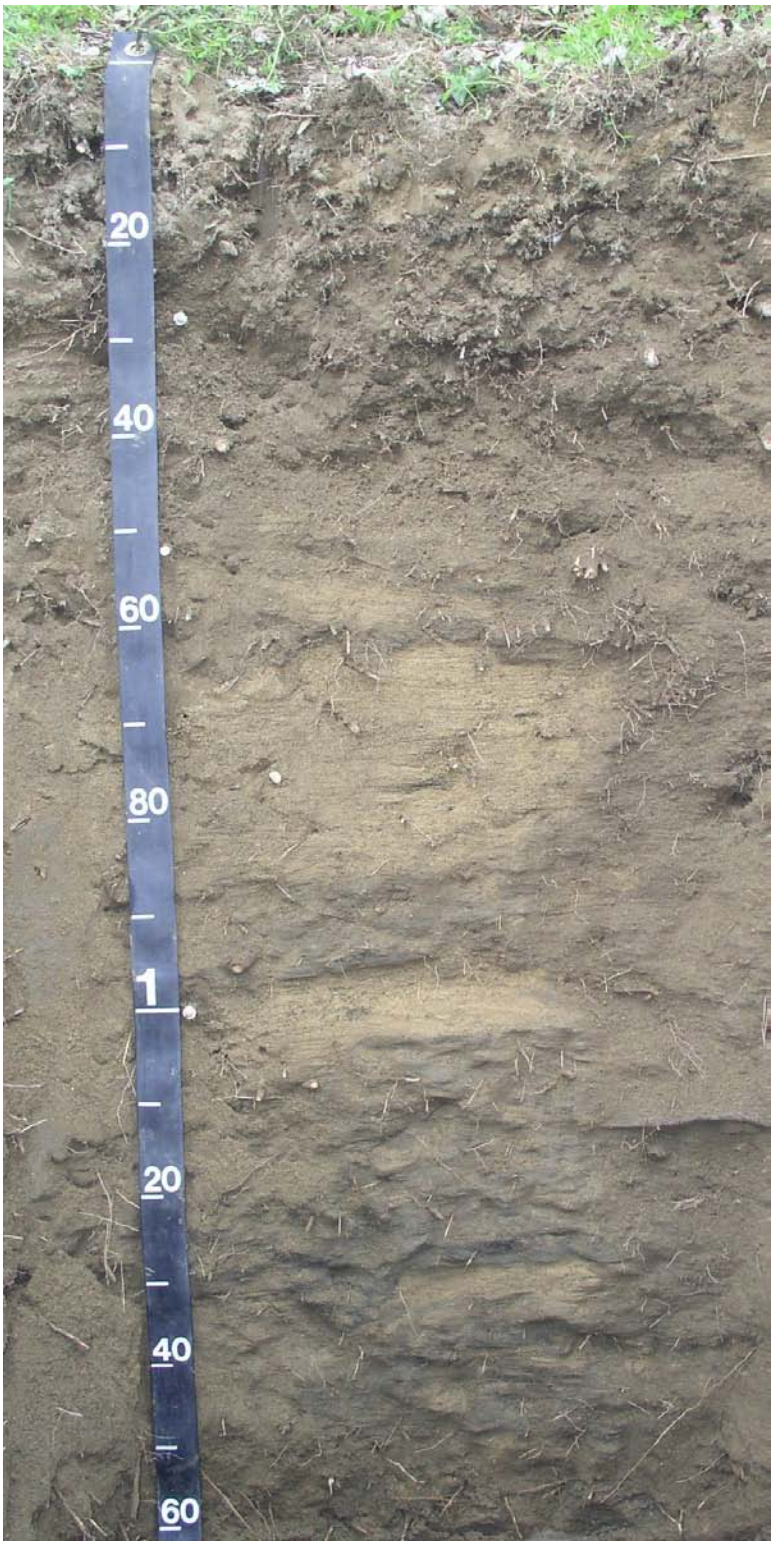

Figure 14.—A representative profile of Nelse soil, a major soil on first-bottom flood plains in the Bluestone National Scenic River area. Scale is in centimeters. (Image is from Lincoln County, West Virginia.)

80 degrees 54 minutes 13 seconds W.; NAD83. (When described, the soil was moist throughout.)

A1—0 to 10 centimeters (0 to 4 inches); very dark grayish brown (10YR 3/2), crushed and dry, and black (10YR 2/1), crushed, sandy loam; weak medium granular structure; very friable; common very fine and fine roots; slightly acid, pH 6.3 by Hellige-Truog; clear smooth boundary.

A2—10 to 30 centimeters (4 to 12 inches); dark brown (10YR 3/3), crushed and dry, and brown (10YR 5/3), crushed, sandy loam; weak medium granular structure; very friable; common fine roots; slightly acid, pH 6.5 by Hellige-Truog; clear smooth boundary.

C1—30 to 46 centimeters (12 to 18 inches); dark yellowish brown (10YR 4/6), crushed, loamy sand; structureless; very friable; slightly acid, pH 6.5 by Hellige-Truog; clear wavy boundary.

C2—46 to 74 centimeters (18 to 29 inches); yellowish brown (10YR 5/6), crushed, loamy sand; structureless; very friable; slightly acid, pH 6.5 by Hellige-Truog; gradual wavy boundary.

C3—74 to 100 centimeters (29 to 39 inches); dark yellowish brown (10YR 4/6), crushed, sand; single grain; loose; slightly acid, pH 6.5 by Hellige-Truog; gradual wavy boundary.

C4—100 to 200 centimeters (39 to 79 inches); strong brown (7.5YR 4/6), crushed, sand; single grain; loose; 2 percent sandstone gravel; slightly acid, pH 6.5 by Hellige-Truog.

Range in Characteristics

Depth to bedrock: More than 203 centimeters (80 inches)

Rock fragments (content, size): As much as 15 percent in individual horizons; rounded or subrounded fragments that are 2 millimeters to 10 inches across; the content of coal fragments that are 1 millimeter to 3 inches across also ranges from 0 to 15 percent

Soil reaction: Strongly acid to moderately alkaline

A horizon:

Color—horizon representatively has hue of 2.5Y or 10YR, value of 2 to 5, and chroma of 2 to 4; after mixing to a depth of 6 inches, it has value and chroma (moist) of less than 4

Texture—silt loam, loam, fine sandy loam, sandy loam, loamy sand, or loamy fine sand; commonly stratified

C horizon:

Color—hue of 2.5Y or 10YR, value of 3 to 6, and chroma of 2 to 6

Texture—silt loam, loam, fine sandy loam, sandy loam, loamy fine sand, loamy sand, or sand; stratified in some pedons

The Nelse soils in Bluestone National Scenic River are considered taxadjuncts to the series. They typically have sandier textures in the particle-size control section than what is allowed by the series. These Nelse soils, on average, respond to use and management the same as those of the series.

Pipestem Series

The Pipestem series consists of very deep, well drained soils that formed in colluvium derived from interbedded sedimentary rocks. Geologic parent material is Mississippian-age red shale and siltstone interbedded with fine grained sandstone and thin layers of limestone. It includes members of the Mauch Chunk geologic group. The surface of the soil is commonly covered with stones and boulders from the

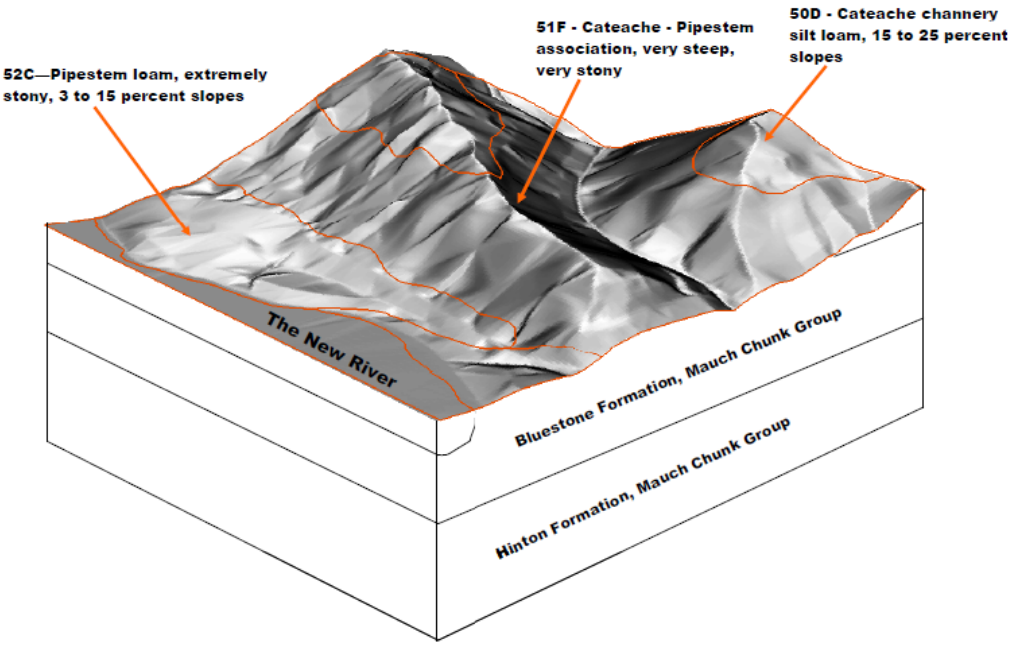

Figure 15.—Typical landforms of Pipestem soils.

Pennsylvanian-age Pottsville geologic group. Pipestem soils are on mountain slopes and footslopes. Slopes range from 3 to 80 percent. The mean annual precipitation is 959 millimeters, and the mean annual temperature is 11.7 degrees C.

Pipestem soils have an exceptionally high capacity for holding nutrients, thereby supporting a diverse forest ecosystem. Dominant overstory species include American beech, basswood, black cherry, black oak, buckeye, cucumber magnolia, sugar maple, northern red oak, tulip poplar, and white ash. Common species on the forest floor include blue cohosh, black cohosh, white baneberry, maidenhair fern, wood nettle, and an assortment of short-season wildflowers.

The Pipestem series takes its name from a tributary of the New River and a nearby community. Pipestem is the local name for *Spirea alba*, a shrub with fragrant white flowers and woody stems. For generations, this shrub was used for smoking pipes. The hollowed woody stems worked well with native tribes' carved stone pipes as well as with the clay and corncob pipes of European settlers. This shrub, also known as meadowsweet, grows in lowlands in poorly drained soils, not in areas of Pipestem soils. The series name honors the plant's rich cultural history.

Figure 15 shows the typical landforms on which Pipestem soils are located and their relationship to the surrounding landscape, geologic formations, and associated soil series.

Taxonomic Classification

Fine, mixed, active, mesic Dystric Eutrudepts

Typical Pedon

Pipestem channery silty clay loam (fig. 16); Raleigh County, West Virginia; on a 60 percent slope on a forested mountain slope above the National Park Service river access road near Prince, about 5.44 kilometers (3.4 miles) on Glade Creek Road, east-southeast of the junction of Glade Creek Road and West Virginia Route 41; USGS Prince, West Virginia topographic quadrangle; lat. 37 degrees 49 minutes

Figure 16.—A road cut in Pipestem channery silty clay loam in an area of Cateache-Pipestem complex, 35 to 90 percent slopes, extremely stony. Note the reddish brown colors and angular rock fragments. The tape shows depth in centimeters.

54.3 seconds N. and long. 81 degrees 2 minutes 58.3 seconds W.; NAD83. (When described, the soil was moist throughout.)

A—0 to 11 centimeters (0 to 4 inches); brown (7.5YR 5/3), crushed and dry, and dark brown (7.5YR 3/3), crushed, channery silty clay loam; moderate medium granular structure; very friable; common very fine to very coarse roots throughout; 5 percent sandstone flagstones and 10 percent flat siltstone channers; strongly acid, pH 5.5 by pH meter 1:1 water; clear wavy boundary.

BA—11 to 30 centimeters (4 to 12 inches); 20 percent dark brown (7.5YR 3/3) and 80 percent reddish brown (5YR 4/3), broken face, stony silty clay loam; moderate and medium subangular blocky structure; very friable; common very fine to very coarse

roots throughout; 5 percent sandstone stones, 5 percent sandstone flagstones, and 10 percent siltstone channers; strongly acid, pH 5.6 by pH meter 1:1 water; clear wavy boundary.

Bw1—30 to 61 centimeters (12 to 24 inches); reddish brown (5YR 4/3), broken face, stony silty clay loam; moderate medium subangular blocky structure; friable; common very fine roots to very coarse roots throughout; 40 percent continuous distinct reddish brown (5YR 4/3) clay films on vertical faces of peds; 5 percent sandstone stones, 5 percent sandstone flagstones, and 10 percent siltstone channers; strongly acid, pH 5.6 by pH meter 1:1 water; gradual wavy boundary.

Bw2—61 to 98 centimeters (24 to 39 inches); 50 percent reddish brown (5YR 4/3) and 50 percent dark reddish brown (2.5YR 3/3), broken face, flaggy silty clay loam; moderate medium subangular blocky structure; friable; common fine to medium roots throughout; 40 percent continuous distinct reddish brown (5YR 4/3) clay films on vertical faces of peds; 5 percent sandstone stones, 10 percent siltstone channers, and 10 percent sandstone flagstones; strongly acid, pH 5.3 by pH meter 1:1 water; gradual wavy boundary.

Bw3—98 to 137 centimeters (39 to 54 inches); dark reddish brown (2.5YR 3/3), broken face, flaggy silty clay loam; weak medium subangular blocky structure; friable; common fine to medium roots throughout; 40 percent continuous distinct reddish brown (5YR 4/3) clay films on vertical faces of peds; 5 percent sandstone stones, 10 percent siltstone channers, and 10 percent sandstone flagstones; very strongly acid, pH 5.1 by pH meter 1:1 water; gradual wavy boundary.

BC—137 to 160 centimeters (54 to 63 inches); dark reddish brown (2.5YR 3/3), broken face, very stony silty clay loam; weak medium columnar structure; friable; common fine roots throughout; 10 percent sandstone stones, 10 percent sandstone flagstones, and 15 percent flat siltstone channers; very strongly acid, pH 5.1 by pH meter 1:1 water.

Range in Characteristics

Solum thickness: 83 to 200 centimeters (33 to 79 inches)

Depth to bedrock: More than 152 centimeters (60 inches)

Rock fragments (content, size, kind): 5 to 35 percent, by volume, in the A horizon, 5 to 60 percent in subhorizons of the B horizon, and 15 to 75 percent in the C horizon (if it occurs); a mixture of channers, gravel, flagstones, and stones of siltstone, shale, fine grained sandstone, and, in some areas, limestone; volume and size generally increase as depth increases

Soil reaction: Strongly acid to neutral

A or Ap horizon:

Color—hue of 7.5YR to 2.5YR, value of 2.5 to 4, and chroma of 2 to 4

Texture (fine-earth fraction)—silt loam or silty clay loam

BA horizon (if it occurs):

Color—hue of 7.5YR to 2.5YR and value and chroma of 3 or 4

Texture (fine-earth fraction)—silt loam or silty clay loam

Bw horizon:

Color—hue of 7.5YR to 2.5YR and value and chroma of 3 or 4

Texture (fine-earth fraction)—silt loam, silty clay loam, or silty clay; the clay content in the B horizon ranges from 25 to 45 percent and the weighted average in the control section is more than 35 percent

C horizon (if it occurs):

Color—similar to the B horizon

Texture—similar to the B horizon

Figure 17.—A representative profile of Potomac soil, the dominant soil on first-bottom flood plains in the Bluestone National Scenic River area. Potomac soils are characterized by a high content of cobbles and gravel throughout and commonly have layers from depositional events, as shown here. Scale is in feet. (Image is from Pocahontas County, West Virginia.)

Potomac Series

The Potomac series consists of very deep, somewhat excessively drained soils that formed in sandy and gravelly alluvial material. Geologic parent material is Pennsylvanian- and Mississippian-age sandstone, siltstone, shale, and some limestone. Potomac soils are on high-energy flood plains in river valleys. Slopes range from 0 to 5 percent. The mean annual precipitation is 959 millimeters, and the mean annual temperature is 11.7 degrees C.

Taxonomic Classification

Sandy-skeletal, mixed, mesic Typic Udifluvents

Typical Pedon

Potomac gravelly sandy loam (fig. 17); Fayette County, West Virginia; at an elevation of 346 meters (1,135 feet), on a 2 percent slope on a forested flood plain of the New River, approximately 4 kilometers (2.5 miles) west of Prince and 482 meters (1,584 feet) south of Terry, near the Army Camp Campground; USGS Prince, West Virginia topographic quadrangle; lat. 37 degrees 51 minutes 26 seconds N. and long. 81 degrees 5 minutes 59 seconds W.; NAD83. (When described, the soil was moist throughout.)

Oi—0 to 2 centimeters (0 to 1 inch); slightly decomposed plant material; very abrupt broken boundary.

Ap—2 to 20 centimeters (1 to 8 inches); dark brown (7.5YR 3/3), broken face, gravelly sandy loam; weak fine granular structure; 15 percent sandstone gravel; slightly alkaline, pH 7.5 by Hellige-Truog; abrupt smooth boundary.

C1—20 to 46 centimeters (8 to 18 inches); dark brown (7.5YR 3/4), broken face, gravelly loamy sand; single grain; 25 percent sandstone gravel; neutral, pH 7.0 by Hellige-Truog; clear wavy boundary.

C2—46 to 200 centimeters (18 to 79 inches); brown (7.5YR 4/4), broken face, stratified very gravelly sand to very gravelly loamy sand; single grain; 15 percent sandstone cobbles and 25 percent sandstone gravel; neutral, pH 7.0 by Hellige-Truog.

Range in Characteristics

Solum thickness: The A horizon is 0 to 20 centimeters (0 to 8 inches) thick

Depth to bedrock: More than 152 centimeters (60 inches)

Rock fragments (content, size, kind): 0 to 50 percent in the A horizon; the weighted average, by volume, in the C horizon is dominantly more than 50 percent but ranges from 35 to 70 percent; in some pedons subhorizons of the C horizon are nearly free of rock fragments and in other pedons the C horizon has as much as 80 percent; fragments are gravel and cobblestones dominantly of sandstone

Soil reaction: Mildly alkaline to very strongly acid

A horizon:

Color—hue of 10YR or 7.5YR, value of 2 to 4 (6 or more dry), and chroma of 2 to 4

Texture—fine sandy loam, sandy loam, loam, loamy sand, or loamy fine sand; the lower part of the horizon shows stratification in some pedons

C horizon:

Color—hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 3 or 4

Texture—loamy sand or sand; subhorizons of sandy loam or gravelly or cobbly sandy loam occur in some pedons

Formation of the Soils

This section discusses the factors of soil formation and relates them to the soils in Bluestone National Scenic River.

Factors of Soil Formation

Soil covers the surface of the earth as a three-dimensional body of varying depth and is made up of different proportions of organic and mineral material, pore space with gases, and water. Soils differ in their appearance, productivity, and management requirements due to their chemical and physical properties. The characteristics and properties of soils are determined by interrelated physical and chemical processes that result from the interaction of five soil-forming factors—parent material, climate, plant and animal organisms, topography (fig. 18), and time. The factors of soil formation are interdependent, and few generalizations can be made regarding any one factor unless the effects of the other factors are known (Jenny, 1941). The term pedogenesis is

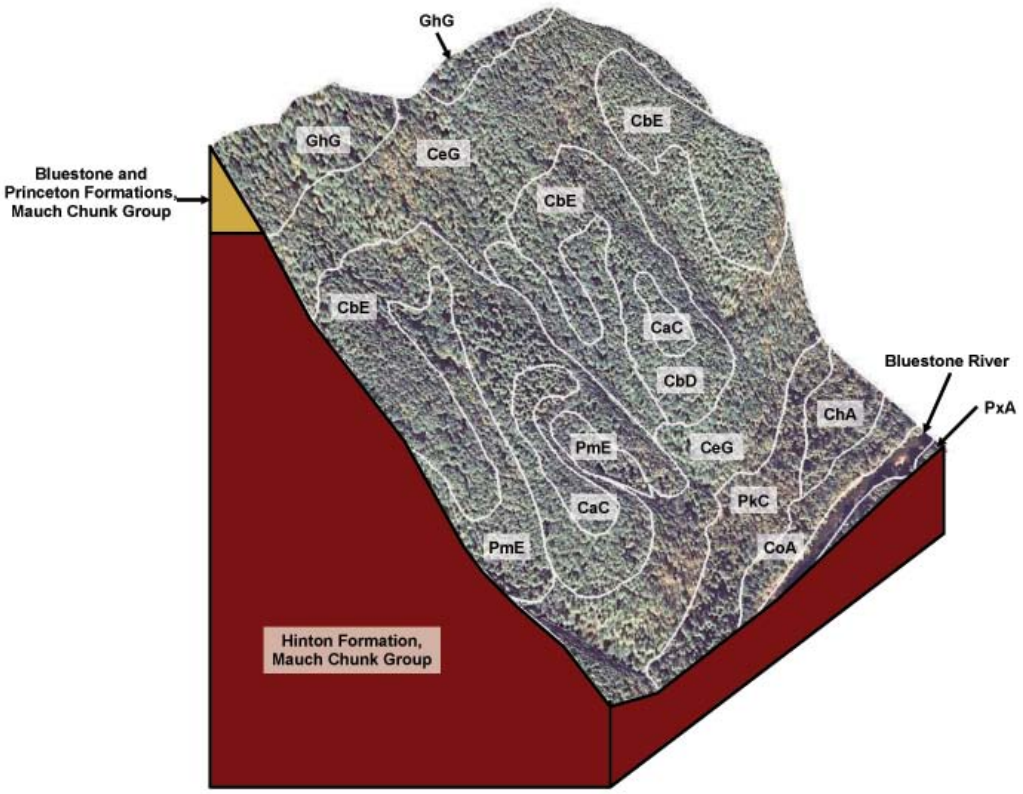

Figure 18.—Soil map units in Bluestone National Scenic River as they occur on a typical landscape and corresponding bedrock geology.

often used to connote the process of soil formation. The study of soil science, known as pedology, began in the 19th century as scientists began to consider soils as natural bodies, independent of their underlying geology.

Parent material is the source material in which soils formed. Soils are influenced by the texture and structure of the parent material and its mineralogical and chemical composition. Climate is predominantly the temperature and kind and amount of precipitation. Organisms are the plants and other organisms living in and on the soil, including humans. Time refers to how long the soil-forming factors have been operating. Relief or topography is the shape and elevation of the landscape. It affects internal and external soil properties, such as soil drainage, aeration, susceptibility to erosion, and the soil's exposure to the sun and wind. The examination of the relationships and influences of each of these soil-forming factors within a survey area can help us to better understand the soils' physical and chemical characteristics.

The influence of any one of the soil-forming factors varies among all parks and within localities of a particular park. Soils may differ significantly from place to place in a park and within very short distances. In some instances parks may have vast stretches of the same type of soil because of uniform soil-forming factors.

Parent Material and Time

Soils are described as having formed in various types of parent material. The properties of the parent material strongly influence the time required for soil formation and the nature of the soils produced. The general types of parent material in Bluestone National Scenic River are alluvium from primarily high-base sedimentary deposits and residuum and colluvium from both high-base and more acidic sedimentary materials. These parent materials support the 14 major soil types (named soil series) described within the boundaries of Bluestone National Scenic River.

Soils that formed in residuum are weathered in place from the underlying Mississippian-age sedimentary deposits. Residual soils are Cateache, Berks, Gilpin, and Lily soils. These are the oldest soils in the survey area and also the most well developed. They occur on mountain ridges, nose slopes, shoulders, and structural benches. Map units of Gilpin and Berks soils on ridge, shoulder, and upper backslope landforms are located near the community of Ellison on the north side of the park. A map unit of gently sloping Gilpin soils occurs on a structural bench below Bearwallow Ridge, also on the north side of the park. Berks and Cateache soils also occur on the steep side slopes throughout the river gorge. Berks soils are not as well developed as the other residual soils because the soil-forming processes have been hindered by a combination of the steep slopes and the shale and sandstone bedrock of the Bluestone and Princeton Formations. This shale and sandstone bedrock is more resistant to weathering than the bedrock of the adjacent Hinton Formation, on which Cateache soils formed. Berks, Gilpin, and Lily soils formed from the Bluestone and Princeton Formations. They retain the coarser textures and relatively low fertility of the parent bedrock, where as Cateache soils on the Hinton Formation have finer textures and high fertility. The transition from Berks to Cateache residual soils can be observed on the steep side slopes surrounding the waterfall located on Pine Grove Road (outside the town of Lerona), on the south side of the park. Berks soils occur above the thick outcrop of Princeton Sandstone, and Cateache soils occur below it.

Most of the soils in Bluestone National Scenic River formed in colluvium, which is soil material that has been transported by gravity and deposited on side slopes and footslopes. Colluvial soils include Highsplint and Pipestem soils. These are generally younger and less developed soils. They show less evidence of ions, clay minerals, organic matter, and other particles moving through the soil profile (as additions, translocations, or removals). This activity is reflected in various measurable soil properties, such as the soil structure, which is graded as weak, moderate, or strong. These younger soils generally have moderate to weak soil structure. The distinction

between layers or horizons in the soil profile is also gradual or diffuse in younger soils. These soils formed on active landscapes where material is still moving either by gravity down slopes, by tree throws, or by other influences. Pipestem and Highsplint soils differ because of the different formations from which they formed—the Hinton Formation and the Bluestone and Princeton Formations, respectively. Pipestem soils have notably higher levels of fertility and finer textures; Highsplint soils have lower levels of fertility and coarser textures. The transition from the residual soils near the ridge downslope through dominantly Highsplint then Pipestem soils can be observed while hiking down the gorge on the River Trail from Pipestem State Park. The trail ends at the river's edge in a map unit of Potomac and Nelse soils.

Soils that formed in alluvium are on flood plains and river terraces, where materials were washed from higher landscape positions. In Bluestone National Scenic River, these materials are carried and then deposited by the rivers. The rock fragments in these soils are generally round, from being smoothed by the water; more angular rock fragments occur in residual and colluvial soils. Alluvial soils include Combs, Potomac, Nelse, Holly, Lobdell, Chavies, Monongahela, and Craigsville soils. These soils occur on the most active landscape, the river valley, and are the youngest soils in the park. Monongahela soils are an exception. They formed on a terrace at the confluence of the Little Bluestone River. This terrace is an ancient flood plain set above the current bottom land and no longer receives alluvial deposits. Monongahela soils are much older than the flood plain soils on the same river valley landscape and exhibit moderately well developed profiles. They show the strong leaching of minerals by the low-chroma colors of entire horizons or of mottles within horizons as well as by subsoil layers that are dense, restrictive to roots and water movement, and brittle. The restrictive subsoil layer is known as a fragipan. Alluvial soils have weakly developed horizons and generally lack genetic features common in older soils, such as fragipans, which are evidence of translocated clay minerals (i.e., clay films), strong soil structure, and rich (high-chroma) soil colors. These soils are separated based on their flooding frequency, which also affects their development, or morphology. Potomac and Nelse soils are flooded frequently and have associated coarser textures and very weak development. Holly and Lobdell soils are located on very flat or slightly depressed landforms in positions where finer alluvium is deposited, resulting in finer textures and slow permeability. Combs soils are the most extensive soils on the flood plains. They may have developed their distinctively dark, deep surface horizons (mollic epipedons) from being in grassland for long periods in pre-Colonial times, since these soils normally formed under grassland vegetation.

Climate

Differences in climate can result in differences in soils. Temperature and moisture influence soil formation. Weathering is most active when soils are moist and warm since these soil conditions are conducive to rapid chemical reactions. Cooler temperatures result in slower chemical reactions.

During periods of rainfall or snowmelt, water carrying dissolved or suspended solids moves through the soil in a process called leaching. The leaching process becomes active with the onset of rainfall or snowmelt. Different temperature and moisture amounts cause different patterns of weathering and leaching in the soil. Seasonal and daily changes in temperature affect moisture effectiveness, biological activity, rates of chemical reactions, and kinds of vegetation (fig. 19).

Present-day climate variations in the park are the result of topography and relief. In most areas of the United States, temperature generally decreases and precipitation generally increases as elevation increases. As the amount of precipitation increases, the extent of leaching and the amount of vegetation generally increase until the point when they then decrease because of decreasing temperatures. Colder temperatures result in less leaching because of decreased microbial growth, decreased vegetation,

Figure 19.—Dense growth in early spring in an open-area canopy on Chavies fine sandy loam, 0 to 3 percent slopes, rarely flooded.

and possibly frozen soil. Fluctuations in temperature and moisture affect the rate of organic matter decomposition and accumulation and the weathering of minerals. For these reasons, cycling of bases is pronounced in areas with a warm climate and large amounts of vegetation.

The climate of Bluestone National Scenic River is a humid continental type characterized by marked seasonal temperature changes and relatively uniform precipitation throughout the year (Vanderhorst and others, 2007). Mean monthly temperature and precipitation are recorded at the nearby Bluestone Lake weather station. At Bluestone Lake, the mean annual precipitation is 95.9 centimeters and the mean annual temperature is 11.7 degrees C. This climate profile is in a somewhat intense weathering regime with regard to soil formation. Because the soils in the park are not dry or frozen for long periods, the processes of soil formation are active throughout the year.

Plant and Animal Organisms

Plants, animals, micro-organisms, and humans affect the formation of soils. Flora, such as fungi and bacteria, help to decompose organic matter and add nutrients to the soil. Animals and micro-organisms mix soils and form burrows and pores. Plant roots open channels in the soils. Abandoned tunnels commonly are filled with loose material from the overlying horizons and transmit water more readily than the surrounding undisturbed soil material.

Different types of roots have different effects on soils. Grass roots are fibrous near the surface and easily decompose, adding organic matter to the soil. Fine grass roots can extend below the surface for many feet. Plant roots also help to develop soil structure and aggregate stability. Vegetation increases soil stability by protecting the surface against erosion. Taproots open pathways through dense layers. Microorganisms affect chemical exchanges between roots and soil. Humans also can mix the soil extensively.

The native vegetation depends on climate, topography, and biological factors plus many soil factors, such as soil density, depth, chemistry, temperature, and moisture. Leaves from plants fall to the surface and decompose on the soil. Organisms decompose these leaves and mix them with the upper part of the soil, resulting in the cycling of nutrients and energy back to vegetation. Trees and shrubs have large roots that may grow to considerable depths and aid in the fracturing of underlying rocks.

The majority of soils in Bluestone National Scenic River formed under mixed mesophytic (hardwood) forest, which represents one of the most biologically diverse temperate regions of the world (Loucks and others, 2001). Most soils are topped by thin, dark, organic layers formed as a result of the breakdown of forest litter, including leaves and woody debris. The recycling effect of the deciduous forest concentrates the base cations (nutrients) in the upper part of the soils (epipedons).

Topography

Topography refers to the shape of the landscape and differences in elevation. The overall landscape in Bluestone National Scenic River is the result of erosional processes. These processes may have occurred in response to changes in climate, fluctuating sea levels, and/or tectonic activities. Cyclic periods of landscape stability and instability influence the types of soils that form.

The slope and aspect of the overall landscape can affect the moisture and temperature of the soil. Steep slopes facing the sun are warmer. The effects of aspect on soils in this park were not large enough to delineate at the scale of mapping used.

Steep soils may be eroded and lose their topsoil as they form. Thus, soils on the upper parts of side slopes are generally thinner than those on the lower parts that receive deposits from areas upslope. Cateache and Berks soils are on upper side slopes; Pipestem and Highsplint soils are in the lower positions and on footslopes. Soils that formed on steep slopes also show less development in the soil profile. For example, Berks and Highsplint soils, which formed on steep slopes, have cambic horizons and Gilpin and Lily soils, which formed on ridges, have argillic horizons. Deeper, darker soils, such as Combs and Chavies, occur on the bottom land. Soil-forming factors continue to affect soils even on more stable landforms, such as Gilpin and Lily soils on ridges. Materials are deposited on the surface of these soils, and materials are blown or washed away from the surface. Additions, removals, and alterations are slow or rapid, depending on climate, landscape position, and biological activity.

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Glossary

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 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.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

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 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

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.

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.

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.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A map unit of two or more kinds of soil 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.

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.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

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.

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.

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.

Ecological site. An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological 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 ecological sites in kind and/or proportion of species or in total production.

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.

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.

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.

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.

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.

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.

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.

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.

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 has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Ground water. Water filling all the unblocked pores of the material below the water table.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

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.

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.

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.

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

Ksat. Saturated hydraulic conductivity. (See Permeability.)

Leaching. The removal of soluble material from soil or other material by percolating water.

LEP. See Linear extensibility percent.

Linear extensibility (LE). Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Linear extensibility percent. Refers to the percent change in linear extensibility.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.
Low strength. The soil is not strong enough to support loads.
Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.
Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.
Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.
Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.
Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.
Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)
Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.
Organic matter. Plant and animal residue in the soil in various stages of decomposition. 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

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.
Parent material. The unconsolidated organic and mineral material in which soil forms.
Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.
Pedon. The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.
Percolation. The movement of water through the soil.
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.)
Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.
Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

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.

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.

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.

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

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.

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.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

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.

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.

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.

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.

Series, soil. A group of soils that have profiles that are almost alike. 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.

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.

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.

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.

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

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

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 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.

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.

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).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

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.

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.”

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

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.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

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.

Tables

Table 1.—Temperature and Precipitation

(Recorded in the period 1971-2000 at Bluestone Lake, West Virginia)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temp. higher than--	Minimum temp. lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snow-fall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January--	40.6	22.5	31.5	68	-5	31	3.04	1.59	4.43	7	7.8
February-	45.4	24.5	35.0	72	2	55	2.67	1.50	3.84	6	5.6
March----	54.9	31.4	43.2	80	11	175	3.45	2.03	4.71	7	3.1
April----	65.5	39.2	52.3	86	24	380	3.27	1.97	4.48	7	0.4
May------	73.8	48.3	61.1	88	31	653	3.95	2.68	5.07	8	0.0
June-----	80.6	57.7	69.2	92	42	875	3.33	1.98	4.61	7	0.0
July-----	84.3	62.5	73.4	94	51	1,036	4.18	2.63	5.67	8	0.0
August---	83.1	61.8	72.4	94	50	1,005	3.36	2.37	4.33	6	0.0
September	76.8	55.3	66.0	91	39	781	2.83	1.36	4.22	5	0.0
October--	66.4	42.5	54.5	82	27	450	2.60	1.21	3.96	5	0.0
November-	54.9	33.3	44.1	77	17	182	2.52	1.58	3.37	5	0.8
December-	44.0	25.8	34.9	68	3	55	2.57	1.45	3.60	6	3.5
Yearly:											
Average	64.2	42.1	53.1	---	---	---	---	---	---	---	---
Extreme	99	-17	---	95	-8	---	---	---	---	---	---
Total--	---	---	---	---	---	5,679	37.77	34.06	41.11	77	21.2

* 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 1971-2000 at Bluestone Lake, 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. 4	Apr. 22	May 12
2 years in 10 later than--	Mar. 29	Apr. 17	May 6
5 years in 10 later than--	Mar. 18	Apr. 7	Apr. 24
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 2	Oct. 18	Oct. 8
2 years in 10 earlier than--	Nov. 8	Oct. 24	Oct. 13
5 years in 10 earlier than-	Nov. 19	Nov. 4	Oct. 22

Table 3.—Growing Season

(Recorded in the period 1971-2000 at Bluestone Lake, 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	221	186	158
8 years in 10	229	194	166
5 years in 10	245	211	181
2 years in 10	260	227	197
1 year in 10	269	236	205

Table 4.—Acres, Hectares, and Proportionate Extent of the Map Units

Map symbol	Map unit name	Acres	Hectares	Percent
CaC	Cateache channery silt loam, 8 to 15 percent slopes	6	2	0.1
CbD	Cateache channery silt loam, 15 to 25 percent slopes, very stony	15	6	0.3
CbE	Cateache channery silt loam, 25 to 35 percent slopes, very stony	132	53	3.4
CeG	Cateache-Pipestem complex, 35 to 90 percent slopes, extremely stony	1,983	802	45.4
ChA	Chavies fine sandy loam, 0 to 3 percent slopes, rarely flooded	18	7	0.4
CoA	Combs fine sandy loam, 0 to 3 percent slopes, occasionally flooded	212	86	4.9
CxA	Craigsville very gravelly sandy loam, 0 to 5 percent slopes, extremely stony, rarely flooded	9	4	0.2
GaC	Gilpin loam, 8 to 15 percent slopes	33	13	0.8
GaD	Gilpin loam, 15 to 25 percent slopes	53	22	1.2
GbE	Gilpin-Berks complex, 25 to 35 percent slopes, very stony	102	41	2.4
GhG	Gilpin-Highsplint-Berks complex, 35 to 90 percent slopes, extremely stony	866	351	20.3
HgE	Highsplint channery loam, 15 to 35 percent slopes, very stony	48	19	1.4
HxA	Holly-Lobdell complex, 0 to 3 percent slopes, occasionally flooded	24	10	0.6
LlC	Lily loam, 8 to 15 percent slopes	2	1	*
MoB	Monongahela silt loam, 3 to 8 percent slopes	16	7	0.3
PkC	Pipestem channery silty clay loam, 3 to 15 percent slopes, very stony	90	36	1.9
PmE	Pipestem channery silty clay loam, 15 to 35 percent slopes, extremely stony	453	183	9.9
PxA	Potomac-Nelse complex, 0 to 5 percent slopes, extremely stony, frequently flooded	113	46	2.7
W	Water	160	65	3.7
	Total	4,335	1,754	100.0

* Less than 0.1 percent.

Table 5.—Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Land capability	Corn	Grass-legume hay	Kentucky bluegrass	Oats	Wheat
		Bu	Tons	AUM	Bu	Bu
CaC:						
Cateache	3e	90.00	3.00	4.50	65.00	35.00
CbD:						
Cateache	6s	---	---	2.50	---	---
CbE:						
Cateache	6s	---	---	2.00	---	---
CeG:						
Cateache	7s	80.00	2.50	---	55.00	30.00
Pipestem	7s					
ChA:						
Chavies, rarely flooded	1	130.00	3.50	5.50	75.00	45.00
CoA:						
Combs, occasionally flooded	2w	135.00	4.50	6.00	75.00	60.00
CxA:						
Craigsville, rarely flooded	7s	---	---	---	---	---
GaC:						
Gilpin	3e	85.00	3.00	4.50	60.00	35.00
GaD:						
Gilpin	4e	80.00	2.50	4.00	55.00	30.00
GbE:						
Gilpin	6s	---	---	3.00	---	---
Berks	6s					
GhG:						
Gilpin	7s	---	---	---	---	---
Highsplint	7s					
Berks	7s					
HgE:						
Highsplint	6s	---	---	3.00	---	---
HxA:						
Holly, occasionally flooded	5w	---	---	---	---	---
Lobdell, occasionally flooded	2w					
LlC:						
Lily	3e	85.00	3.00	4.50	60.00	35.00
MoB:						
Monongahela	2e	110.00	3.00	4.50	65.00	40.00

Table 5.—Land Capability and Yields per Acre of Crops and Pasture—Continued

Map symbol and soil name	Land capability	Corn	Grass-legume hay	Kentucky bluegrass	Oats	Wheat
		Bu	Tons	AUM	Bu	Bu
PkC:						
Pipestem	6s	---	---	4.50	---	---
PmE:						
Pipestem	7s	---	---	---	---	---
PxA:						
Potomac, frequently flooded	5w	---	---	3.00	---	---
Nelse, frequently flooded	5w					
W.						
Water						

Table 6.—Prime and Other Important Farmland

(Only the soils considered prime or important farmland are listed. Urban or built-up areas of the soils listed are not considered prime or important farmland)

Map unit symbol	Map unit name	Farmland classification
ChA	Chavies fine sandy loam, 0 to 3 percent slopes, rarely flooded	All areas are prime farmland
CoA	Combs fine sandy loam, 0 to 3 percent slopes, occasionally flooded	All areas are prime farmland
CaC	Cateache channery silt loam, 8 to 15 percent slopes	Farmland of statewide importance
GaC	Gilpin loam, 8 to 15 percent slopes	Farmland of statewide importance
GaD	Gilpin loam, 15 to 25 percent slopes	Farmland of statewide importance
LlC	Lily loam, 8 to 15 percent slopes	Farmland of statewide importance
MoB	Monongahela silt loam, 3 to 8 percent slopes	Farmland of statewide importance

Table 7.—Hydric Soils

(This report lists only those map unit components that are rated as hydric. Definitions of hydric criteria codes are included at the end of the report)

Map unit symbol and map unit name	Component	Percent of map unit	Hydric rating	Landform	Hydric soils criteria			
					Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
HxA: Holly-Lobdell complex, 0 to 3 percent slopes, occasionally flooded	Holly, occasionally flooded	55	Yes	flood plains in river valleys	2B3	Yes	No	No

Explanation of hydric criteria codes

1. All Histels (except for Folistels), and Histosols (except for Folists), which are, by definition, saturated.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   A. are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
   B. are poorly drained or very poorly drained and have either:
      1) a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
      2) a water table at a depth of 0.5 foot or less during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or
      3) a water table at a depth of 1.0 foot or less during the growing season if permeability is less than 6.0 in/hr in any layer within a depth of 20 inches.
3. Soils that are frequently ponded for periods of long or very long duration during the growing season.
4. Soils that are frequently flooded for periods of long or very long duration during the growing season.

Table 8.—Landscape, Parent Material, and West Virginia Grassland Suitability Class

(Miscellaneous nonsoil components are not displayed in this report. Component percents may not add up to 100. MAP is the mean annual precipitation)

Map unit symbol and soil name	Percent of map unit	Slope	Elevation	MAP	Landscape	Landform	Parent material	WV grassland suitability class name and number
	Pct	Pct	Meters	mm				
CaC:								
Cateache	75	8-15	493-614	865-1044	Mountains	Ridge and structural bench	Nonacid fine-loamy residuum weathered from shale and siltstone	Limy Uplands (LU2)
CbD:								
Cateache	75	15-25	509-529	865-1044	Mountains	Ridge and structural bench	Nonacid fine-loamy residuum weathered from shale and siltstone	Very Rocky, Limy Soils (RL2)
CbE:								
Cateache	75	25-35	467-662	865-1044	Mountains	Mountain slope	Nonacid fine-loamy residuum weathered from shale and siltstone	Very Rocky, Limy Soils (RL2)
CeG:								
Cateache	60	35-90	438-723	865-1044	Mountains	Mountain slope	Nonacid fine-loamy residuum weathered from shale and siltstone	Not Suited (NS)
Pipestem	20	35-80	438-723	865-1044	Mountains	Mountain slope	Reddish brown silty and clayey colluvium derived from interbedded sedimentary rock	Not Suited (NS)
ChA:								
Chavies, rarely flooded	75	0-3	437-496	865-1044	Mountains	Flood plain in river valley	Coarse-loamy alluvium derived from interbedded sedimentary rock	Fertile Loams (FL2)
CoA:								
Combs, occasionally flooded	85	0-3	302-511	435-511	Mountains	Flood plain in river valley	Recent coarse-loamy alluvium derived from interbedded sedimentary rock	Moist Loams (ML2)

Table 8.—Landscape, Parent Material, and West Virginia Grassland Suitability Class—Continued

Map unit symbol and soil name	Percent of map unit	Slope	Elevation	MAP	Landscape	Landform	Parent material	WV grassland suitability class name and number
	Pct	Pct	Meters	mm				
CxA:								
Craigsville, rarely flooded	90	0-5	256-491	473-495	Mountains	Alluvial fan in river valley and high-energy flood plain in river valley	Loamy-skeletal alluvium derived from sandstone and shale	Acid Loams (AL2)
GaC:								
Gilpin	70	8-15	596-702	865-1044	Mountains	Ridge and structural bench	Acid fine-loamy residuum weathered from shale and siltstone	Acid Loams (AL2)
GaD:								
Gilpin	70	15-25	568-738	865-1044	Mountains	Ridge and structural bench	Acid fine-loamy residuum weathered from shale and siltstone	Acid Loams (AL2)
GbE:								
Gilpin	60	25-35	436-735	865-1044	Mountains	Mountain slope	Acid fine-loamy residuum weathered from shale and siltstone	Very Rocky, Acid Soils (RA2)
Berks	20	25-35	436-735	865-1044	Mountains	Mountain slope	Residuum weathered from interbedded sedimentary rock	Dry Uplands (DU2)
GhG:								
Gilpin	45	35-90	437-731	865-1044	Mountains	Mountain slope	Acid fine-loamy residuum weathered from shale and siltstone	Not Suited (NS)
Highsplint	25	35-90	437-731	865-1044	Mountains	Mountain slope	Loamy-skeletal colluvium derived from interbedded sedimentary rock	Not Suited (NS)
Berks	20	35-90	437-731	865-1044	Mountains	Mountain slope	Residuum weathered from interbedded sedimentary rock	Not Suited (NS)

Table 8.—Landscape, Parent Material, and West Virginia Grassland Suitability Class—Continued

Map unit symbol and soil name	Percent of map unit	Slope	Elevation	MAP	Landscape	Landform	Parent material	WV grassland suitability class name and number
	Pct	Pct	Meters	mm				
HgE:								
Highsplint---------	70	15-35	530-715	1034-1289	Mountains	Mountain slope	Very stony colluvium derived from interbedded sedimentary rock	Very Rocky, Acid Soils (RA3)
HxA:								
Holly, occasionally flooded----------	55	0-3	435-480	865-1044	Mountains	Flood plain in river valley	Fine-loamy alluvium derived from limestone, sandstone, and shale	Wetlands (W2)
Lobdell, occasionally flooded----------	25	0-3	435-480	865-1044	Mountains	Flood plain in river valley	Fine-loamy alluvium derived from limestone, sandstone, and shale	Moist Loams (ML2)
LlC:								
Lily----------	70	8-15	670-738	865-1044	Mountains	Ridge and structural bench	Acid fine-loamy residuum weathered from sandstone	Acid Loams (AL2)
MoB:								
Monongahela--------	80	3-8	448-472	865-1044	Mountains	High stream terrace in river valley	Old, acid alluvium derived from sandstone and shale	Acid Loams (AL2)
PkC:								
Pipestem----------	85	3-15	436-544	865-1044	Mountains	Mountain slope	Reddish brown silty and clayey colluvium derived from interbedded sedimentary rock	Very Rocky, Limy Soils (RL2)
PmE:								
Pipestem----------	80	15-35	435-635	865-1044	Mountains	Mountain slope	Reddish brown silty and clayey colluvium derived from interbedded sedimentary rock	Very Rocky, Limy Soils (RL2)

Table 8.—Landscape, Parent Material, and West Virginia Grassland Suitability Class—Continued

Map unit symbol and soil name	Percent of map unit	Slope	Elevation	MAP	Landscape	Landform	Parent material	WV grassland suitability class name and number
	Pct	Pct	Meters	mm				
PxA:								
Potomac, frequently flooded	60	0-5	435-478	865-1044	Mountains	High-energy flood plain in river valley	Skeletal, nonacid sandy alluvium derived from interbedded sedimentary rock	Sands (SA3)
Nelse, frequently flooded	20	0-5	435-478	865-1044	Mountains	High-energy flood plain in river valley	Nonacid sandy alluvium derived from interbedded sedimentary rock	Moist Loams (ML3)

Table 9.—Forestland Productivity

Map unit symbol and soil name	Potential productivity: Characteristic trees	Site index base age	Site index	Volume of wood fiber (CMAI)
		yrs	ft	cu ft/ac/yr
CaC:				
Cateache	northern red oak	50	80	62
	black cherry	50	80	---
	cucumbertree	50	80	---
	sugar maple	50	80	---
	American beech		---	---
CbD:				
Cateache	northern red oak	50	80	62
	black cherry	50	80	---
	cucumbertree	50	80	---
	sugar maple	50	80	---
	American beech		---	---
CbE:				
Cateache	northern red oak	50	80	62
	black cherry	50	80	---
	cucumbertree	50	80	---
	sugar maple	50	80	---
	American beech		---	---
CeG:				
Cateache	northern red oak	50	80	62
	black cherry	50	80	---
	cucumbertree	50	80	---
	sugar maple	50	80	---
	American beech		---	---
Pipestem	northern red oak	50	80	52
	yellow-poplar	50	90	---
	white oak	50	75	52
	black cherry		---	---
	eastern hemlock		---	---
	American beech		---	---
	sugar maple		---	---
ChA:				
Chavies, rarely flooded	yellow-poplar	50	93	---
	northern red oak	50	80	57
	red maple		---	---
	sugar maple		---	---
	hickory		---	---
	black walnut		---	---
	American sycamore		---	---
	black cherry		---	---
	white oak	50	---	---
CoA:				
Combs, occasionally flooded	northern red oak	50	90	72
	white oak		---	---
	American sycamore		---	---
	yellow-poplar	50	115	129
	black walnut		---	---

Table 9.—Forestland Productivity—Continued

Map unit symbol and soil name	Potential productivity: Characteristic trees	Site index base age	Site index	Volume of wood fiber (CMAI)
		yrs	ft	cu ft/ac/yr
CxA:				
Craigsville, rarely flooded	eastern white pine	50	90	172
	northern red oak	50	75	57
	Virginia pine	50	80	114
	yellow-poplar	50	90	100
GaC:				
Gilpin	yellow-poplar	50	86	82
	northern red oak	50	72	54
	white oak	50	67	49
	American beech		---	---
	hickory		---	---
GaD:				
Gilpin	yellow-poplar	50	86	82
	northern red oak	50	72	54
	white oak	50	67	49
	American beech		---	---
	hickory		---	---
GbE:				
Gilpin	yellow-poplar	50	86	82
	northern red oak	50	72	54
	white oak	50	67	49
	American beech		---	---
	hickory		---	---
Berks	black oak	50	73	55
	northern red oak	50	75	57
GhG:				
Gilpin	yellow-poplar	50	86	82
	northern red oak	50	72	54
	white oak	50	67	49
	American beech		---	---
	hickory		---	---
Highsplint	yellow-poplar	50	100	114
	northern red oak	50	87	71
	sugar maple		---	---
	white oak		---	---
Berks	black oak	50	73	55
	northern red oak	50	75	57
HgE:				
Highsplint	yellow-poplar	50	100	114
	northern red oak	50	87	71
	sugar maple		---	---
	white oak		---	---
HxA:				
Holly, occasionally flooded	pin oak	50	90	72
	American sycamore		---	---
	river birch		---	---
	red maple		---	---
	eastern white pine		---	---

Table 9.—Forestland Productivity—Continued

Map unit symbol and soil name	Potential productivity: Characteristic trees	Site index base age	Site index	Volume of wood fiber (CMAI)
		yrs	ft	cu ft/ac/yr
HxA:				
Lobdell, occasinally flooded	black cherry		---	---
	northern red oak	50	87	72
	sugar maple		---	---
	white ash		---	---
	white oak		---	---
	yellow-poplar	50	96	---
LlC:				
Lily	black oak		---	---
	chestnut oak		76	57
	hickory		---	---
	northern red oak		80	57
	red maple		---	---
	scarlet oak		64	43
	white oak		---	---
MoB:				
Monongahela	black walnut		---	---
	eastern white pine	50	72	129
	northern red oak	50	70	57
	Virginia pine	50	66	---
	white ash		---	---
	yellow-poplar	50	85	86
PkC:				
Pipestem	northern red oak	50	80	52
	yellow-poplar	50	90	---
	white oak	50	75	52
	black cherry		---	---
	eastern hemlock		---	---
	American beech		---	---
	sugar maple		---	---
PmE:				
Pipestem	northern red oak	50	80	52
	yellow-poplar	50	90	---
	white oak	50	75	52
	black cherry		---	---
	eastern hemlock		---	---
	American beech		---	---
	sugar maple		---	---
PxA:				
Potomac, frequently flooded	northern red oak	50	70	52
	white oak	50	70	52
	eastern white pine	50	80	144
	river birch		---	---
	American sycamore		---	---
Nelse, frequently flooded	sweetgum	50	98	129
W.				
Water				

Table 10.—Land Management, Part I (Planting)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Suitability for hand planting: Rating class and limiting features	Value	Suitability for mechanical planting: Rating class and limiting features	Value	Soil rutting hazard: Rating class and limiting features	Value
CaC:							
Cateache	75	Moderately suited		Moderately suited		Severe	
		Stickiness; high plasticity index	0.50	Slope	0.50	Low strength	1.00
				Stickiness; high plasticity index	0.50		
				Rock fragments	0.50		
CbD:							
Cateache	75	Moderately suited		Poorly suited		Severe	
		Stickiness; high plasticity index	0.50	Slope	0.75	Low strength	1.00
				Rock fragments	0.50		
				Stickiness; high plasticity index	0.50		
CbE:							
Cateache	75	Moderately suited		Unsuited		Severe	
		Stickiness; high plasticity index	0.50	Slope	1.00	Low strength	1.00
				Rock fragments	0.50		
				Stickiness; high plasticity index	0.50		
CeG:							
Cateache	60	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Rock fragments	0.50	Rock fragments	0.75		
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50		
Pipestem	20	Moderately suited		Unsuited		Severe	
		Rock fragments	0.50	Slope	1.00	Low strength	1.00
		Stickiness; high plasticity index	0.50	Rock fragments	0.75		
		Slope	0.50	Stickiness; high plasticity index	0.50		
ChA:							
Chavies, rarely flooded	80	Well suited		Well suited		Moderate	
						Low strength	0.50
CoA:							
Combs, occasionally flooded	90	Well suited		Well suited		Moderate	
						Low strength	0.50
CxA:							
Craigsville, rarely flooded	90	Moderately suited		Poorly suited		Moderate	
		Rock fragments	0.50	Rock fragments	0.75	Low strength	0.50
GaC:							
Gilpin	70	Well suited		Moderately suited		Slight	
				Slope	0.50	Strength	0.10

Table 10.—Land Management, Part I (Planting)—Continued

Map unit symbol and soil name	Pct. of map unit	Suitability for hand planting: Rating class and limiting features	Value	Suitability for mechanical planting: Rating class and limiting features	Value	Soil rutting hazard: Rating class and limiting features	Value
GaD:							
Gilpin	70	Well suited		Poorly suited		Slight	
				Slope	0.75	Strength	0.10
GbE:							
Gilpin	60	Well suited		Unsuited		Slight	
				Slope	1.00	Strength	0.10
				Rock fragments	0.50		
Berks	20	Well suited		Unsuited		Slight	
				Slope	1.00	Strength	0.10
				Rock fragments	0.50		
GhG:							
Gilpin	45	Moderately suited		Unsuited		Slight	
		Slope	0.50	Slope	1.00	Strength	0.10
		Rock fragments	0.50	Rock fragments	0.75		
Highsplint	25	Moderately suited		Unsuited		Slight	
		Slope	0.50	Slope	1.00	Strength	0.10
		Rock fragments	0.50	Rock fragments	0.75		
Berks	20	Moderately suited		Unsuited		Slight	
		Slope	0.50	Slope	1.00	Strength	0.10
		Rock fragments	0.50	Rock fragments	0.75		
HgE:							
Highsplint	70	Well suited		Poorly suited		Slight	
				Slope	0.75	Strength	0.10
				Rock fragments	0.50		
HxA:							
Holly, occasionally flooded	55	Moderately suited		Poorly suited		Severe	
		Wetness	0.50	Wetness	0.75	Low strength	1.00
						Wetness	0.50
Lobdell, occasionally flooded	25	Well suited		Well suited		Severe	
						Low strength	1.00
LlC:							
Lily	70	Well suited		Moderately suited		Severe	
				Slope	0.50	Low strength	1.00
MoB:							
Monongahela	80	Well suited		Moderately suited		Severe	
				Slope	0.50	Low strength	1.00
PkC:							
Pipestem	85	Moderately suited		Moderately suited		Severe	
		Stickiness; high plasticity index	0.50	Rock fragments	0.50	Low strength	1.00
				Stickiness; high plasticity index	0.50		
				Slope	0.50		

Table 10.—Land Management, Part I (Planting)—Continued

Map unit symbol and soil name	Pct. of map unit	Suitability for hand planting: Rating class and limiting features	Value	Suitability for mechanical planting: Rating class and limiting features	Value	Soil rutting hazard: Rating class and limiting features	Value
PmE:							
Pipestem	80	Moderately suited		Poorly suited		Severe	
		Stickiness; high plasticity index	0.50	Slope	0.75	Low strength	1.00
				Rock fragments	0.75		
		Rock fragments	0.50	Stickiness; high plasticity index	0.50		
PxA:							
Potomac, frequently flooded	60	Moderately suited		Poorly suited		Moderate	
		Rock fragments	0.50	Rock fragments	0.75	Low strength	0.50
Nelse, frequently flooded	20	Moderately suited		Poorly suited		Severe	
		Rock fragments	0.50	Rock fragments	0.75	Low strength	1.00
W:							
Water	100	Not rated		Not rated		Not rated	

Table 10.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Hazard of erosion: Rating class and limiting features	Value	Hazard of erosion on roads and trails: Rating class and limiting features	Value	Suitability for roads (natural surface): Rating class and limiting features	Value
CaC:							
Cateache	75	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Slope	1.00
						Low strength	0.50
						Landslides	0.08
CbD:							
Cateache	75	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.14
CbE:							
Cateache	75	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	0.60
						Low strength	0.50
CeG:							
Cateache	60	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Rock fragments	0.50
						Low strength	0.50
Pipestem	20	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Rock fragments	0.50
						Low strength	0.50
ChA:							
Chavies, rarely flooded	80	Slight		Slight		Well suited	
CoA:							
Combs, occasionally flooded	90	Slight		Slight		Poorly suited	
						Flooding	1.00
CxA:							
Craigsville, rarely flooded	90	Slight		Slight		Moderately suited	
						Rock fragments	0.50
GaC:							
Gilpin	70	Moderate		Severe		Moderately suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	0.50
						Landslides	0.06
GaD:							
Gilpin	70	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	0.15

Table 10.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

Map unit symbol and soil name	Pct. of map unit	Hazard of erosion: Rating class and limiting features	Value	Hazard of erosion on roads and trails: Rating class and limiting features	Value	Suitability for roads (natural surface): Rating class and limiting features	Value
GbE:							
Gilpin	60	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	0.60
Berks	20	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	0.60
GhG:							
Gilpin	45	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Landslides	0.60
						Rock fragments	0.50
Highsplint	25	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Rock fragments	0.50
Berks	20	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Rock fragments	0.50
HgE:							
Highsplint	70	Moderate		Moderate		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.50	Slope	1.00
						Landslides	0.60
HxA:							
Holly, occasionally flooded	55	Slight		Slight		Poorly suited	
						Ponding	1.00
						Flooding	1.00
						Wetness	1.00
						Low strength	0.50
Lobdell, occasionally flooded	25	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50
						Wetness	0.50
LlC:							
Lily	70	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
						Landslides	0.05
MoB:							
Monongahela	80	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
						Landslides	0.01

Table 10.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

Map unit symbol and soil name	Pct. of map unit	Hazard of erosion: Rating class and limiting features	Value	Hazard of erosion on roads and trails: Rating class and limiting features	Value	Suitability for roads (natural surface): Rating class and limiting features	Value
PkC:							
Pipestem	85	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
						Landslides	0.12
PmE:							
Pipestem	80	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	0.90
						Rock fragments	0.50
						Low strength	0.50
PxA:							
Potomac, frequently flooded	60	Slight		Slight		Poorly suited	
						Flooding	1.00
						Rock fragments	0.50
Nelse, frequently flooded	20	Slight		Slight		Poorly suited	
						Flooding	1.00
						Rock fragments	0.50
						Low strength	0.50
W:							
Water	100	Not rated		Not rated		Not rated	

Table 10.—Land Management, Part III (Site Preparation)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep): Rating class and limiting features	Value	Suitability for mechanical site preparation (surface): Rating class and limiting features	Value
CaC:					
Cateache	75	Well suited		Well suited	
CbD:					
Cateache	75	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
CbE:					
Cateache	75	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
CeG:					
Cateache	60	Unsuited		Poorly suited	
		Slope	1.00	Slope	1.00
		Rock fragments	0.50	Rock fragments	0.50
Pipestem	20	Unsuited		Poorly suited	
		Slope	1.00	Slope	1.00
		Rock fragments	0.50	Rock fragments	0.50
ChA:					
Chavies, rarely flooded	80	Well suited		Well suited	
CoA:					
Combs, occasionally flooded	90	Well suited		Well suited	
CxA:					
Craigsville, rarely flooded	90	Poorly suited		Poorly suited	
		Rock fragments	0.50	Rock fragments	0.50
GaC:					
Gilpin	70	Well suited		Well suited	
GaD:					
Gilpin	70	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
GbE:					
Gilpin	60	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
Berks	20	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
GhG:					
Gilpin	45	Unsuited		Poorly suited	
		Slope	1.00	Slope	1.00
		Rock fragments	0.50	Rock fragments	0.50

Table 10.—Land Management, Part III (Site Preparation)—Continued

Map unit symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep): Rating class and limiting features	Value	Suitability for mechanical site preparation (surface): Rating class and limiting features	Value
GhG:					
Highsplint	25	Unsuited		Poorly suited	
		Slope	1.00	Slope	1.00
		Rock fragments	0.50	Rock fragments	0.50
Berks	20	Unsuited		Poorly suited	
		Slope	1.00	Slope	1.00
		Rock fragments	0.50	Rock fragments	0.50
		Restrictive layer	0.50		
HgE:					
Highsplint	70	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
HxA:					
Holly, occasionally flooded	55	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
Lobdell, occasionally flooded	25	Well suited		Well suited	
LlC:					
Lily	70	Poorly suited		Well suited	
		Restrictive layer	0.50		
MoB:					
Monongahela	80	Well suited		Well suited	
PkC:					
Pipestem	85	Well suited		Well suited	
PmE:					
Pipestem	80	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
		Rock fragments	0.50	Rock fragments	0.50
PxA:					
Potomac, frequently flooded	60	Poorly suited		Poorly suited	
		Rock fragments	0.50	Rock fragments	0.50
Nelse, frequently flooded	20	Poorly suited		Poorly suited	
		Rock fragments	0.50	Rock fragments	0.50
W:					
Water	100	Not rated		Not rated	

Table 10.—Land Management, Part IV (Site Restoration)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire: Rating class and limiting features	Value	Potential for seedling mortality: Rating class and limiting features	Value
CaC:					
Cateache	75	Moderate Texture/surface depth/rock fragments	0.50	Low	
CbD:					
Cateache	75	Moderate Texture/surface depth/rock fragments	0.50	Moderate Available water	0.50
CbE:					
Cateache	75	Moderate Texture/slope/surface depth/rock fragments	0.50	Moderate Available water	0.50
CeG:					
Cateache	60	Moderate Texture/slope/surface depth/rock fragments	0.50	Moderate Available water	0.50
Pipestem	20	Low		Moderate Available water	0.50
ChA:					
Chavies, rarely flooded	80	Low Texture/rock fragments	0.10	High Wetness	1.00
CoA:					
Combs, occasionally flooded	90	Low Texture/rock fragments	0.10	High Wetness	1.00
CxA:					
Craigsville, rarely flooded	90	Moderate Texture/rock fragments	0.50	High Wetness Soil reaction	1.00 0.50
GaC:					
Gilpin	70	Moderate Texture/surface depth/rock fragments	0.50	Low	

Table 10.—Land Management, Part IV (Site Restoration)—Continued

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire: Rating class and limiting features	Value	Potential for seedling mortality: Rating class and limiting features	Value
GaD:					
Gilpin	70	Moderate Texture/surface depth/rock fragments	0.50	Moderate Available water	0.50
GbE:					
Gilpin	60	Moderate Texture/slope/surface depth/rock fragments	0.50	Moderate Available water	0.50
Berks	20	Moderate Texture/slope/surface depth/rock fragments	0.50	Moderate Available water	0.50
GhG:					
Gilpin	45	Moderate Texture/slope/surface depth/rock fragments	0.50	Moderate Available water	0.50
Highsplint	25	Low		Moderate Available water	0.50
Berks	20	Moderate Texture/slope/surface depth/rock fragments	0.50	Moderate Available water	0.50
HgE:					
Highsplint	70	Low Texture/rock fragments	0.10	Moderate Available water	0.50
HxA:					
Holly, occasionally flooded	55	Low Texture/rock fragments	0.10	High Wetness	1.00
Lobdell, occasionally flooded	25	Low Texture/rock fragments	0.10	High Wetness	1.00
LlC:					
Lily	70	Moderate Texture/surface depth/rock fragments	0.50	Moderate Soil reaction	0.50
MoB:					
Monongahela	80	Low Texture/rock fragments	0.10	Low	
PkC:					
Pipestem	85	Low		Low	

Table 10.—Land Management, Part IV (Site Restoration)—Continued

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire: Rating class and limiting features	Value	Potential for seedling mortality: Rating class and limiting features	Value
PmE:					
Pipestem	80	Low		Moderate	
				Available water	0.50
PxA:					
Potomac, frequently flooded	60	Low		High	
		Texture/rock fragments	0.10	Wetness	1.00
Nelse, frequently flooded	20	Low		High	
		Texture/rock fragments	0.10	Wetness	1.00
W:					
Water	100	Not rated		Not rated	

Table 11.—Recreation, Part I (Camp and Picnic Areas)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Value	Picnic areas: Rating class and limiting features	Value
CaC:					
Cateache	75	Somewhat limited		Somewhat limited	
		Slope	0.84	Slope	0.84
		Slow water movement	0.50	Slow water movement	0.50
CbD:					
Cateache	75	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Slow water movement	0.50	Slow water movement	0.50
		Large stones content	0.47	Large stones content	0.47
CbE:					
Cateache	75	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Slow water movement	0.50	Slow water movement	0.50
		Large stones content	0.47	Large stones content	0.47
CeG:					
Cateache	60	Very limited		Very limited	
		Too steep	1.00	Large stones content	1.00
		Large stones content	1.00	Too steep	1.00
		Slow water movement	0.50	Slow water movement	0.50
		Gravel	0.31	Gravel	0.31
Pipestem	20	Very limited		Very limited	
		Too steep	1.00	Large stones content	1.00
		Large stones content	1.00	Too steep	1.00
ChA:					
Chavies, rarely flooded	80	Very limited		Not limited	
		Flooding	1.00		
CoA:					
Combs, occasionally flooded	90	Very limited		Not limited	
		Flooding	1.00		
CxA:					
Craigsville, rarely flooded	90	Very limited		Very limited	
		Flooding	1.00	Large stones content	1.00
		Large stones content	1.00		

Table 11.—Recreation, Part I (Camp and Picnic Areas)—Continued

Map unit symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
GaC:					
Gilpin	70	Somewhat limited		Somewhat limited	
		Slope	0.37	Slope	0.37
GaD:					
Gilpin	70	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
GbE:					
Gilpin	60	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Large stones content	0.47	Large stones content	0.47
Berks	20	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Large stones content	0.47	Large stones content	0.47
GhG:					
Gilpin	45	Very limited		Very limited	
		Too steep	1.00	Large stones content	1.00
		Large stones content	1.00	Too steep	1.00
Highsplint	25	Very limited		Very limited	
		Too steep	1.00	Large stones content	1.00
		Large stones content	1.00	Too steep	1.00
Berks	20	Very limited		Very limited	
		Too steep	1.00	Large stones content	1.00
		Large stones content	1.00	Too steep	1.00
		Gravel	0.81	Gravel	0.81
HgE:					
Highsplint	70	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Large stones content	0.47	Large stones content	0.47
HxA:					
Holly, occasionally flooded	55	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00		
Lobdell, occasionally flooded	25	Very limited		Somewhat limited	
		Flooding	1.00	Depth to saturated zone	0.48
		Depth to saturated zone	0.81		
LlC:					
Lily	70	Somewhat limited		Somewhat limited	
		Slope	0.16	Slope	0.16

Table 11.—Recreation, Part I (Camp and Picnic Areas)—Continued

Map unit symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
MoB:					
Monongahela	80	Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.07	Depth to saturated zone	0.03
PkC:					
Pipestem	85	Somewhat limited		Somewhat limited	
		Large stones content	0.47	Large stones content	0.47
		Slope	0.04	Slope	0.04
PmE:					
Pipestem	80	Very limited		Very limited	
		Too steep	1.00	Large stones content	1.00
		Large stones content	1.00	Too steep	1.00
PxA:					
Potomac, frequently flooded	60	Very limited		Very limited	
		Flooding	1.00	Large stones content	1.00
		Large stones content	1.00	Flooding	0.40
Nelse, frequently flooded	20	Very limited		Very limited	
		Flooding	1.00	Large stones content	1.00
		Large stones content	1.00	Flooding	0.40
W:					
Water	100	Not rated		Not rated	

Table 11.—Recreation, Part II (Trail Management)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails: Rating class and limiting features	Value	Mountain bike and off-road vehicle trails: Rating class and limiting features	Value
CaC:					
Cateache	75	Not limited		Not limited	
CbD:					
Cateache	75	Somewhat limited		Somewhat limited	
		Large stones content	0.47	Large stones content	0.47
		Slope	0.32		
CbE:					
Cateache	75	Very limited		Somewhat limited	
		Slope	1.00	Large stones content	0.47
		Large stones content	0.47	Slope	0.22
CeG:					
Cateache	60	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	1.00	Slope	1.00
Pipestem	20	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	1.00	Slope	1.00
ChA:					
Chavies, rarely flooded	75	Not limited		Not limited	
CoA:					
Combs, occasionally flooded	85	Not limited		Not limited	
CxA:					
Craigsville, rarely flooded	90	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
GaC:					
Gilpin	70	Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00
GaD:					
Gilpin	70	Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00
		Slope	0.50		

Table 11.—Recreation, Part II (Trail Management)—Continued

Map unit symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails: Rating class and limiting features	Value	Mountain bike and off-road vehicle trails: Rating class and limiting features	Value
GbE:					
Gilpin	60	Very limited		Very limited	
		Slope	1.00	Water erosion	1.00
		Water erosion	1.00	Large stones content	0.47
		Large stones content	0.47	Slope	0.22
Berks	20	Very limited		Somewhat limited	
		Slope	1.00	Large stones content	0.47
		Large stones content	0.47	Slope	0.22
GhG:					
Gilpin	45	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	1.00	Water erosion	1.00
		Water erosion	1.00	Slope	1.00
Highsplint	25	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	1.00	Slope	1.00
Berks	20	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	1.00	Slope	1.00
HgE:					
Highsplint	70	Very limited		Somewhat limited	
		Slope	1.00	Large stones content	0.47
		Large stones content	0.47		
HxA:					
Holly, occasionally flooded	55	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
Lobdell, occasionally flooded	25	Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.11	Depth to saturated zone	0.11
LlC:					
Lily	70	Not limited		Not limited	
MoB:					
Monongahela	80	Not limited		Not limited	
PkC:					
Pipestem	85	Somewhat limited		Somewhat limited	
		Large stones content	0.47	Large stones content	0.47

Table 11.—Recreation, Part II (Trail Management)—Continued

Map unit symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails: Rating class and limiting features	Value	Mountain bike and off-road vehicle trails: Rating class and limiting features	Value
PmE:					
Pipestem	80	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	0.92		
PxA:					
Potomac, frequently flooded	60	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Flooding	0.40	Flooding	0.40
Nelse, frequently flooded	20	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Flooding	0.40	Flooding	0.40
W:					
Water	100	Not rated		Not rated	

Table 12.—Dwellings and Small Commercial Buildings

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
CaC:							
Cateache	75	Somewhat limited Slope	0.84	Somewhat limited Slope Depth to soft bedrock	0.84 0.05	Very limited Slope	1.00
CbD:							
Cateache	75	Very limited Too steep	1.00	Very limited Too steep Depth to soft bedrock	1.00 0.05	Very limited Slope	1.00
CbE:							
Cateache	75	Very limited Too steep	1.00	Very limited Too steep Depth to soft bedrock	1.00 0.05	Very limited Slope	1.00
CeG:							
Cateache	60	Very limited Too steep	1.00	Very limited Too steep Depth to soft bedrock	1.00 0.06	Very limited Slope	1.00
Pipestem	20	Very limited Too steep	1.00	Very limited Too steep	1.00	Very limited Slope	1.00
ChA:							
Chavies, rarely flooded	80	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
CoA:							
Combs, occasionally flooded	90	Very limited Flooding	1.00	Very limited Flooding Depth to saturated zone	1.00 0.35	Very limited Flooding	1.00
CxA:							
Craigsville, rarely flooded	90	Very limited Flooding	1.00	Very limited Flooding Depth to saturated zone	1.00 0.35	Very limited Flooding	1.00
GaC:							
Gilpin	70	Somewhat limited Slope	0.37	Somewhat limited Depth to soft bedrock Slope	0.46 0.37	Very limited Slope	1.00

Table 12.—Dwellings and Small Commercial Buildings—Continued

Map unit symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
GaD:							
Gilpin	70	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
				Depth to soft bedrock	0.46		
GbE:							
Gilpin	60	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
				Depth to soft bedrock	0.46		
Berks	20	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Depth to hard bedrock	0.03	Depth to hard bedrock	1.00	Depth to hard bedrock	0.03
GhG:							
Gilpin	45	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
				Depth to soft bedrock	0.79		
Highsplint	25	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
Berks	20	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Depth to hard bedrock	0.15	Depth to hard bedrock	1.00	Depth to hard bedrock	0.15
HgE:							
Highsplint	70	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
HxA:							
Holly, occasionally flooded	55	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
Lobdell, occasionally flooded	25	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.81	Depth to saturated zone	1.00	Depth to saturated zone	0.81
LlC:							
Lily	70	Somewhat limited		Very limited		Very limited	
		Slope	0.16	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.08	Slope	0.16	Depth to hard bedrock	0.08
MoB:							
Monongahela	80	Somewhat limited		Very limited		Somewhat limited	
		Depth to thin cemented pan	0.50	Depth to saturated zone	1.00	Slope	0.50
		Depth to saturated zone	0.07			Depth to saturated zone	0.07

Table 12.—Dwellings and Small Commercial Buildings—Continued

Map unit symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
PkC:							
Pipestem	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.04	Slope	0.04	Slope	1.00
PmE:							
Pipestem	80	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
PxA:							
Potomac, frequently flooded	60	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
Nelse, frequently flooded	20	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.15		
W:							
Water	100	Not rated		Not rated		Not rated	

Table 13.—Roads and Streets, Shallow Excavations, and Landscaping

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Landscaping: Rating class and limiting features	Value
CaC:							
Cateache	75	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Slope	0.84	Slope	0.84
		Slope	0.84	Unstable excavation walls	0.10	Depth to bedrock	0.05
		Frost action	0.50	Depth to soft bedrock	0.05		
CbD:							
Cateache	75	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Low strength	1.00	Unstable excavation walls	0.10	Large stones	0.20
		Frost action	0.50	Depth to soft bedrock	0.05	Depth to bedrock	0.05
CbE:							
Cateache	75	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Low strength	1.00	Unstable excavation walls	0.10	Large stones	0.20
		Frost action	0.50	Depth to soft bedrock	0.05	Depth to bedrock	0.05
CeG:							
Cateache	60	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Low strength	1.00	Unstable excavation walls	0.10	Gravel	0.31
		Frost action	0.50	Depth to soft bedrock	0.06	Depth to bedrock	0.06
Pipestem	20	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Low strength	1.00	Unstable excavation walls	0.10	Large stones	1.00
		Frost action	0.50				
ChA:							
Chavies, rarely flooded	80	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Unstable excavation walls	0.10		
		Flooding	0.40				
CoA:							
Combs, occasionally flooded	90	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Frost action	0.50	Depth to saturated zone	0.35		
				Unstable excavation walls	0.10		

Table 13.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map unit symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Landscaping: Rating class and limiting features	Value
CxA:							
Craigsville, rarely flooded	90	Somewhat limited		Very limited		Very limited	
		Frost action	0.50	Unstable excavation walls	1.00	Large stones	1.00
		Flooding	0.40	Depth to saturated zone	0.35	Droughty	0.28
GaC:							
Gilpin	70	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Slope	0.37	Slope	0.37	Slope	0.37
		Low strength	0.22	Unstable excavation walls	0.10		
GaD:							
Gilpin	70	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Low strength	0.22	Unstable excavation walls	0.10		
GbE:							
Gilpin	60	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Frost action	0.50	Depth to soft bedrock	0.46	Depth to bedrock	0.46
		Low strength	0.22	Unstable excavation walls	0.10	Large stones	0.20
Berks	20	Very limited		Very limited		Very limited	
		Too steep	1.00	Depth to hard bedrock	1.00	Too steep	1.00
		Frost action	0.50	Too steep	1.00	Droughty	0.68
		Depth to hard bedrock	0.03	Unstable excavation walls	0.10	Large stones	0.20
						Depth to bedrock	0.03
GhG:							
Gilpin	45	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Frost action	0.50	Depth to soft bedrock	0.79	Depth to bedrock	0.80
		Low strength	0.22	Unstable excavation walls	0.10	Droughty	0.01
Highsplint	25	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Frost action	0.50	Unstable excavation walls	0.10	Large stones	1.00
Berks	20	Very limited		Very limited		Very limited	
		Too steep	1.00	Depth to hard bedrock	1.00	Too steep	1.00
		Frost action	0.50	Too steep	1.00	Droughty	0.83
		Depth to hard bedrock	0.15	Unstable excavation walls	0.10	Gravel	0.81
						Depth to bedrock	0.16
						Large stones	0.03

Table 13.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map unit symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Landscaping: Rating class and limiting features	Value
HgE:							
Highsplint	70	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Frost action	0.50	Unstable excavation walls	0.10	Large stones	0.20
HxA:							
Holly, occasionally flooded	55	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Too clayey	0.12		
		Low strength	1.00	Unstable excavation walls	0.10		
Lobdell, occasionally flooded	25	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Depth to saturated zone	1.00	Flooding	0.60
		Frost action	0.50	Flooding	0.60	Depth to saturated zone	0.48
		Depth to saturated zone	0.48	Unstable excavation walls	0.10		
LlC:							
Lily	70	Somewhat limited		Very limited		Somewhat limited	
		Frost action	0.50	Depth to hard bedrock	1.00	Slope	0.16
		Slope	0.16	Slope	0.16	Depth to bedrock	0.08
		Depth to hard bedrock	0.08	Unstable excavation walls	0.10		
MoB:							
Monongahela	80	Very limited		Very limited		Somewhat limited	
		Low strength	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.03
		Frost action	0.50	Unstable excavation walls	0.10		
		Depth to saturated zone	0.03				
PkC:							
Pipestem	85	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Unstable excavation walls	0.10	Large stones	0.20
		Frost action	0.50	Slope	0.04	Slope	0.04
		Slope	0.04				
PmE:							
Pipestem	80	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Low strength	1.00	Unstable excavation walls	0.10	Large stones	1.00
		Frost action	0.50				
PxA:							
Potomac, frequently flooded	60	Very limited		Very limited		Very limited	
		Flooding	1.00	Unstable excavation walls	1.00	Flooding	1.00
				Flooding	0.80	Large stones	1.00
						Droughty	0.95

Table 13.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map unit symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Landscaping: Rating class and limiting features	Value
PxA:							
Nelse, frequently flooded	20	Very limited		Very limited		Very limited	
		Flooding	1.00	Unstable excavation walls	1.00	Flooding	1.00
				Flooding	0.80	Large stones	0.11
				Depth to saturated zone	0.15		
W:							
Water	100	Not rated		Not rated		Not rated	

Table 14.—Sewage Disposal

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
CaC:					
Cateache	75	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slow water movement	1.00	Slope	1.00
		Slope	0.84	Seepage	0.50
CbD:					
Cateache	75	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slow water movement	1.00	Slope	1.00
		Too steep	1.00	Seepage	0.50
CbE:					
Cateache	75	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slow water movement	1.00	Slope	1.00
		Too steep	1.00	Seepage	0.50
CeG:					
Cateache	60	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slow water movement	1.00	Slope	1.00
		Too steep	1.00	Seepage	0.50
Pipestem	20	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Slow water movement	0.46	Seepage	0.53
ChA:					
Chavies, rarely flooded	75	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Flooding	0.40	Flooding	0.40
CoA:					
Combs, occasionally flooded	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to saturated zone	0.84	Depth to saturated zone	0.17

Table 14.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
CxA:					
Craigsville, rarely flooded	90	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
				Flooding	0.40
		Seepage, bottom layer	1.00	Depth to saturated zone	0.17
		Depth to saturated zone	0.84	Slope	0.02
		Flooding	0.40		
GaC:					
Gilpin	70	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slow water movement	0.61	Slope	1.00
		Slope	0.37	Seepage	0.50
GaD:					
Gilpin	70	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Too steep	1.00	Slope	1.00
		Slow water movement	0.61	Seepage	0.50
GbE:					
Gilpin	60	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Too steep	1.00	Slope	1.00
		Slow water movement	0.61	Seepage	0.50
Berks	20	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Too steep	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
GhG:					
Gilpin	45	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Too steep	1.00	Slope	1.00
		Slow water movement	0.61	Seepage	0.50
Highsplint	25	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Berks	20	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Too steep	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
HgE:					
Highsplint	70	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50

Table 14.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
HxA:					
Holly, occasionally flooded	55	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.72		
Lobdell, occasionally flooded	25	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50		
LlC:					
Lily	70	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.16	Seepage	1.00
MoB:					
Monongahela	80	Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Slope	0.92
		Slow water movement	1.00	Seepage	0.50
				Depth to saturated zone	0.44
PkC:					
Pipestem	85	Somewhat limited		Very limited	
		Slow water movement	0.46	Slope	1.00
		Slope	0.04	Seepage	0.53
PmE:					
Pipestem	80	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Slow water movement	0.46	Seepage	0.53
PxA:					
Potomac, frequently flooded	60	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.02
		Filtering capacity	1.00		

Table 14.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
PxA:					
Nelse, frequently flooded	20	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Filtering capacity	1.00	Seepage	1.00
				Slope	0.02
		Seepage, bottom layer	1.00		
		Depth to saturated zone	0.40		
W:					
Water	100	Not rated		Not rated	

Table 15.—Source of Gravel and Sand

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The ratings given for the thickest layer are for the thickest layer above and excluding the bottom layer. The numbers in the value columns range from 0.00 to 0.99. The greater the value, the greater the likelihood that the bottom layer or thickest layer of the soil is a source of sand or gravel. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Gravel source		Sand source	
		Rating class	Value	Rating class	Value
CaC:					
Cateache	75	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Organic matter content	0.00	Organic matter content	0.00
CbD:					
Cateache	75	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Organic matter content	0.00	Organic matter content	0.00
CbE:					
Cateache	75	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Organic matter content	0.00	Organic matter content	0.00
CeG:					
Cateache	60	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Pipestem	20	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Organic matter content	0.00	Thickest layer	0.00
		Bottom layer	0.00	Organic matter content	0.00
ChA:					
Chavies, rarely flooded	75	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.03
CoA:					
Combs, occasionally flooded	85	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.03
CxA:					
Craigsville, rarely flooded	90	Poor		Poor	
		Bottom layer	0.00	Organic matter content	0.00
		Thickest layer	0.00	Thickest layer	0.03
		Organic matter content	0.00	Bottom layer	0.12

Table 15.—Source of Gravel and Sand—Continued

Map unit symbol and soil name	Pct. of map unit	Gravel source: Rating class	Gravel source: Value	Sand source: Rating class	Sand source: Value
GaC:					
Gilpin	70	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Organic matter content	0.00	Thickest layer	0.00
		Bottom layer	0.00	Organic matter content	0.00
GaD:					
Gilpin	70	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Organic matter content	0.00	Thickest layer	0.00
		Bottom layer	0.00	Organic matter content	0.00
GbE:					
Gilpin	60	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Organic matter content	0.00	Thickest layer	0.00
		Bottom layer	0.00	Organic matter content	0.00
Berks	20	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.07	Thickest layer	0.00
GhG:					
Gilpin	45	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Highsplint	25	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Berks	20	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.07	Thickest layer	0.00
HgE:					
Highsplint	70	Poor		Poor	
		Organic matter content	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Organic matter content	0.00
HxA:					
Holly, occasionally flooded	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Lobdell, occasionally flooded	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
LlC:					
Lily	70	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02

Table 15.—Source of Gravel and Sand—Continued

Map unit symbol and soil name	Pct. of map unit	Gravel source: Rating class	Gravel source: Value	Sand source: Rating class	Sand source: Value
MoB:					
Monongahela	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
PkC:					
Pipestem	85	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
PmE:					
Pipestem	80	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
PxA:					
Potomac, frequently flooded	60	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.00	Bottom layer	0.10
Nelse, frequently flooded	20	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.08
		Thickest layer	0.00	Bottom layer	0.31
W:					
Water	100	Not rated		Not rated	

Table 16.—Source of Reclamation Material, Roadfill, and Topsoil

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The smaller the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Source of reclamation material: Rating class and limiting features	Value	Roadfill source: Rating class and limiting features	Value	Topsoil source: Rating class and limiting features	Value
CaC:							
Cateache	75	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Rock fragments	0.00
		Droughty	0.76	Low strength	0.00	Slope	0.16
		Too clayey	0.92			Too clayey	0.74
		Depth to bedrock	0.95			Too acid	0.92
						Depth to bedrock	0.95
CbD:							
Cateache	75	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.79	Low strength	0.00	Rock fragments	0.00
		Too clayey	0.92	Slope	0.68	Too clayey	0.74
		Depth to bedrock	0.95			Too acid	0.92
						Depth to bedrock	0.95
CbE:							
Cateache	75	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.79	Slope	0.00	Rock fragments	0.00
		Too clayey	0.92	Low strength	0.00	Too clayey	0.74
		Depth to bedrock	0.95			Too acid	0.92
						Depth to bedrock	0.95
CeG:							
Cateache	60	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.79	Slope	0.00	Rock fragments	0.00
		Too clayey	0.92	Low strength	0.00	Too clayey	0.74
		Depth to bedrock	0.93			Too acid	0.92
						Depth to bedrock	0.93
Pipestem	20	Fair		Poor		Poor	
		Stone content	0.10	Slope	0.00	Slope	0.00
		Too clayey	0.50	Low strength	0.00	Too clayey	0.41
		Too acid	0.61	Stones	0.51	Hard to reclaim (rock fragments)	0.50
						Rock fragments	0.86
ChA:							
Chavies, rarely flooded	80	Fair		Good		Good	
		Too acid	0.84				
CoA:							
Combs, occasionally flooded	90	Fair		Good		Fair	
		Too acid	0.92			Hard to reclaim (rock fragments)	0.40
						Rock fragments	0.68

Table 16.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	Pct. of map unit	Source of reclamation material: Rating class and limiting features	Value	Roadfill source: Rating class and limiting features	Value	Topsoil source: Rating class and limiting features	Value
CxA:							
Craigsville, rarely flooded	90	Fair		Good		Poor	
		Too sandy	0.09			Rock fragments	0.00
		Too acid	0.50			Hard to reclaim (rock fragments)	0.00
						Too sandy	0.09
						Too acid	0.88
GaC:							
Gilpin	70	Fair		Poor		Fair	
		Droughty	0.46	Depth to bedrock	0.00	Rock fragments	0.32
		Too acid	0.50	Low strength	0.78	Depth to bedrock	0.54
		Depth to bedrock	0.54			Slope	0.63
		Organic matter content low	0.82			Too acid	0.68
GaD:							
Gilpin	70	Fair		Poor		Poor	
		Droughty	0.46	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.50	Rock fragments	0.32
		Depth to bedrock	0.54	Low strength	0.78	Depth to bedrock	0.54
		Organic matter content low	0.82			Too acid	0.68
GbE:							
Gilpin	60	Fair		Poor		Poor	
		Droughty	0.42	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.00	Rock fragments	0.32
		Depth to bedrock	0.54	Low strength	0.78	Depth to bedrock	0.54
		Organic matter content low	0.82			Too acid	0.68
Berks	20	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.00	Rock fragments	0.00
		Depth to bedrock	0.97			Too acid	0.76
						Depth to bedrock	0.97
GhG:							
Gilpin	45	Fair		Poor		Poor	
		Droughty	0.18	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.21	Slope	0.00	Depth to bedrock	0.21
		Too acid	0.50	Low strength	0.78	Rock fragments	0.32
		Organic matter content low	0.82			Too acid	0.68
Highsplint	25	Fair		Poor		Poor	
		Too acid	0.26	Slope	0.00	Slope	0.00
		Organic matter content low	0.82			Rock fragments	0.00
						Hard to reclaim (rock fragments)	0.00
						Too acid	0.82
Berks	20	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.00	Rock fragments	0.00
		Depth to bedrock	0.84			Too acid	0.76
						Depth to bedrock	0.84

Table 16.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	Pct. of map unit	Source of reclamation material: Rating class and limiting features	Value	Roadfill source: Rating class and limiting features	Value	Topsoil source: Rating class and limiting features	Value
HgE:							
Highsplint	70	Fair		Poor		Poor	
		Too acid	0.26	Slope	0.00	Slope	0.00
		Organic matter content low	0.82			Rock fragments	0.00
						Hard to reclaim (rock fragments)	0.00
						Too acid	0.82
HxA:							
Holly, occasionally flooded	55	Fair		Poor		Poor	
		Organic matter content low	0.63	Wetness depth	0.00	Wetness depth	0.00
		Water erosion	0.90	Low strength	0.00		
Lobdell, occasionally flooded	25	Fair		Fair		Fair	
		Too acid	0.74	Wetness depth	0.29	Wetness depth	0.29
		Organic matter content low	0.92			Rock fragments	0.88
		Water erosion	0.99				
LlC:							
Lily	70	Fair		Poor		Fair	
		Too acid	0.50	Depth to bedrock	0.00	Too acid	0.50
		Droughty	0.73			Slope	0.84
		Organic matter content low	0.85			Depth to bedrock	0.92
		Depth to bedrock	0.92			Rock fragments	0.96
MoB:							
Monongahela	80	Fair		Poor		Fair	
		Organic matter content low	0.12	Low strength	0.00	Too clayey	0.48
		Too acid	0.50	Wetness depth	0.76	Rock fragments	0.50
		Too clayey	0.82			Wetness depth	0.76
		Water erosion	0.90			Too acid	0.88
PkC:							
Pipestem	85	Fair		Poor		Fair	
		Stone content	0.50	Low strength	0.00	Too clayey	0.41
		Too clayey	0.50	Stones	0.99	Hard to reclaim (rock fragments)	0.50
		Too acid	0.61			Rock fragments	0.61
						Slope	0.96
PmE:							
Pipestem	80	Fair		Poor		Poor	
		Stone content	0.11	Low strength	0.00	Slope	0.00
		Too clayey	0.50	Slope	0.08	Too clayey	0.41
		Too acid	0.61	Stones	0.57	Hard to reclaim (rock fragments)	0.50
						Rock fragments	0.86

Table 16.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	Pct. of map unit	Source of reclamation material: Rating class and limiting features	Value	Roadfill source: Rating class and limiting features	Value	Topsoil source: Rating class and limiting features	Value
PxA:							
Potomac, frequently flooded	60	Poor		Fair		Poor	
		Too sandy	0.00	Cobble content	0.97	Rock fragments	0.00
		Droughty	0.39			Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.78			Too sandy	0.00
		Too acid	0.84				
Nelse, frequently flooded	20	Fair		Good		Fair	
		Too sandy	0.22			Too sandy	0.22
		Too acid	0.99			Rock fragments	0.88
						Hard to reclaim (rock fragments)	0.98
W:							
Water	100	Not rated		Not rated		Not rated	

Table 17.—Ponds and Embankments

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
CaC:							
Cateache	75	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.65	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.03				
CbD:							
Cateache	75	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.65	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.03				
CbE:							
Cateache	75	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.65	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.03				
CeG:							
Cateache	60	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.66	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.03				
Pipestem	20	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.72				
ChA:							
Chavies, rarely flooded	75	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
CoA:							
Combs, occasionally flooded	85	Very limited		Not limited		Somewhat limited	
		Seepage	1.00			Depth to saturated zone	0.96
						Unstable excavation walls	0.10
CxA:							
Craigsville, rarely flooded	90	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Unstable excavation walls	1.00
						Depth to saturated zone	0.96
GaC:							
Gilpin	70	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.86	Depth to water	1.00
		Seepage	0.70	Piping	0.28		
		Depth to bedrock	0.11				

Table 17.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
GaD:							
Gilpin	70	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.86	Depth to water	1.00
		Seepage	0.70	Piping	0.29		
		Depth to bedrock	0.11				
GbE:							
Gilpin	60	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.86	Depth to water	1.00
		Seepage	0.70	Piping	0.28		
		Depth to bedrock	0.11				
Berks	20	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.61	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.61				
GhG:							
Gilpin	45	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.95	Depth to water	1.00
		Seepage	0.70	Piping	0.25		
		Depth to bedrock	0.23				
Highsplint	25	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.70				
Berks	20	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.74	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.74				
HgE:							
Highsplint	70	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.70				
HxA:							
Holly, occasionally flooded	55	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Depth to saturated zone	1.00	Unstable excavation walls	0.10
Lobdell, occasionally flooded	25	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Depth to saturated zone	1.00	Unstable excavation walls	0.10
				Piping	0.80		
LlC:							
Lily	70	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.68	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.68				
MoB:							
Monongahela	80	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Depth to saturated zone	0.95	Depth to water	1.00
		Slope	0.68				
				Piping	0.06		

Table 17.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
PkC:							
Pipestem	85	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.72				
PmE:							
Pipestem	80	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.72				
PxA:							
Potomac, frequently flooded	60	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Depth to water	1.00
Nelse, frequently flooded	20	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Depth to water	1.00
W:							
Water	100	Not rated		Not rated		Not rated	

Table 18.—Engineering Properties

(Absence of an entry indicates that data were not estimated)

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-25 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	cm				Pct	Pct					Pct	
CaC:												
Cateache--------	0-2	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	2-9	Channery silt loam	ML, MH, CL, GC	A-7-6, A-6	0	0-7	69-89	46-89	42-89	38-87	35-66	12-24
	9-75	Channery silty clay loam, very channery silt loam, silty clay loam	CL, GC	A-7-6, A-6	0	1-10	67-88	51-85	47-85	44-81	35-45	17-24
	75-92	Channery silty clay loam, silt loam, flaggy silty clay	CL, GC	A-7-6, A-6	0	7-31	77-95	46-91	41-91	37-91	34-53	17-32
	92-102	Bedrock			---	---	---	---	---	---	---	---
CbD:												
Cateache--------	0-2	Slightly decomposed plant material	PT	A-8	1-25	0	---	---	---	---	---	---
	2-9	Channery silt loam	ML, MH, CL, GC	A-7-6, A-6	0	0-7	69-89	46-89	42-89	38-87	35-66	12-24
	9-75	Channery silty clay loam, very channery silt loam, silty clay loam	CL, GC	A-7-6, A-6	0	1-10	67-88	51-85	47-85	44-81	35-45	17-24
	75-92	Channery silty clay loam, silt loam, flaggy silty clay	CL, GC	A-7-6, A-6	0	7-31	77-95	46-91	41-91	37-91	34-53	17-32
	92-102	Bedrock			---	---	---	---	---	---	---	---
CbE:												
Cateache--------	0-1	Slightly decomposed plant material	PT	A-8	1-25	0	---	---	---	---	---	---
	1-9	Channery silt loam	ML, MH, CL, GC	A-7-6, A-6	0	0-7	69-89	46-89	42-89	38-87	35-66	12-24
	9-75	Channery silty clay loam, very channery silt loam, silty clay loam	CL, GC	A-7-6, A-6	0	1-10	67-88	51-85	47-85	44-81	35-45	17-24
	75-92	Channery silty clay loam, silt loam, flaggy silty clay	CL, GC	A-7-6, A-6	0	7-31	77-95	46-91	41-91	37-91	34-53	17-32
	92-102	Bedrock			---	---	---	---	---	---	---	---

Table 18.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-25 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	cm				Pct	Pct					Pct	
CeG:												
Cateache--------	0-8	Channery silt loam	ML, MH, CL, GC	A-7-6, A-6	0	0-7	69-89	46-89	42-89	38-87	35-66	12-24
	8-74	Channery silty clay loam, very channery silt loam, silty clay loam	CL, GC	A-7-6, A-6	0	1-10	67-88	51-85	47-85	44-81	35-45	17-24
	74-91	Channery silty clay loam, silt loam, flaggy silty clay	CL, GC	A-7-6, A-6	0	7-31	77-95	46-91	41-91	37-91	34-53	17-32
	91-101	Bedrock			---	---	---	---	---	---	---	---
Pipestem--------	0-1	Slightly decomposed plant material	PT	A-8	25-43	0	---	---	---	---	---	---
	1-11	Flaggy silt loam, silt loam, channery silty clay loam	MH, ML, CL	A-7-6, A-6	0-31	4-34	67-95	66-95	63-95	58-93	40-70	15-23
	11-137	Channery silt loam, silty clay, stony silty clay loam	CL, CH, GC	A-7-6, A-6	0-34	4-38	59-96	58-96	54-96	49-96	34-59	17-32
	137-200	Channery silt loam, very flaggy silty clay, very stony silty clay loam	CL, CH, GC	A-7-6, A-6	3-43	6-36	48-96	47-96	44-96	40-96	34-54	17-32
ChA:												
Chavies, rarely flooded--------	0-2	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	2-28	Fine sandy loam	SM, ML	A-2-4, A-4	0	0	89-100	69-100	59-99	27-53	0-39	NP-9
	28-107	Fine sandy loam, sandy loam, loam	SC, CL	A-2-6, A-4	0	0	90-100	72-100	61-98	28-52	17-33	2-12
	107-165	Sandy loam, gravelly fine sandy loam, loam, loamy sand	SM, SC-SM	A-4, A-2-4, A-1-b	0	0-4	79-100	52-100	35-85	16-47	0-31	NP-12
CoA:												
Combs, occasionally flooded--------	0-25	Fine sandy loam	SM, SC-SM	A-2, A-4	0	0	91-100	70-100	59-98	25-49	23-44	2-12
	25-122	Fine sandy loam, loam, sandy loam	SM, SC-SM	A-4, A-2	0	0	91-100	68-100	58-98	25-49	17-33	2-12
	122-200	Cobbly sandy loam, sandy loam, fine sandy loam	SM, SC-SM	A-4, A-2	0	0-22	89-100	62-100	44-84	20-46	17-33	2-12

Table 18.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-25 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	cm				Pct	Pct					Pct	
CxA:												
Craigsville, rarely flooded-	0-5	Slightly decomposed plant material	PT	A-8	18-30	7-13	---	---	---	---	---	---
	5-8	Moderately decomposed plant material	PT	A-8	17-29	6-14	---	---	---	---	---	---
	8-21	Very gravelly loam, very gravelly sandy loam	SM, SC	A-2-4, A-1-a, A-4	0	0-8	58-92	16-84	11-73	5-42	0-41	NP-13
	21-60	Extremely gravelly loam, very gravelly sandy loam	SM, SC, GM	A-2-4, A-1-a	0	0-7	56-74	12-54	8-47	4-27	0-35	NP-13
	60-200	Extremely gravelly sandy loam, extremely gravelly loamy coarse sand	SM, GM, GC	A-2-4, A-1-a	0	0-14	54-74	8-54	4-35	1-17	0-30	NP-10
GaC:												
Gilpin----------	0-2	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	2-10	Loam	GC, GM, ML, CL	A-4, A-2	0	0-51	66-100	32-100	24-94	19-77	18-42	2-15
	10-32	Channery silt loam	GC, GM, ML, CL	A-4, A-2	0	0-51	66-100	32-100	26-100	20-84	0-44	NP-18
	32-63	Channery silty clay loam, channery silt loam, channery loam, silty clay loam	GC-GM, SC, CL, CL-ML	A-5, A-6, A-7, A-4	0	0-24	69-96	39-96	35-96	31-92	30-47	13-24
	63-76	Very channery silty clay loam, very channery silt loam, channery loam, channery silty clay	GC-GM, GC	A-4, A-6, A-1, A-2	0	0-23	48-71	24-71	21-71	19-71	30-51	13-30
	76-96	Bedrock			---	---	---	---	---	---	---	---

Table 18.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-25 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	cm				Pct	Pct					Pct	
GaD:												
Gilpin----------	0-2	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	2-8	Loam	GC, GM, ML, CL	A-4, A-2	0	0-51	66-100	32-100	24-94	19-77	18-42	2-15
	8-32	Channery silt loam	GC, GM, ML, CL	A-4, A-2	0	0-51	66-100	32-100	26-100	20-84	0-44	NP-18
	32-63	Channery silty clay loam, channery silt loam, channery loam, silty clay loam	GC-GM, SC, CL, CL-ML	A-5, A-6, A-7, A-4	0	0-24	69-96	39-96	35-96	31-92	30-47	13-24
	63-76	Very channery silty clay loam, very channery silt loam, channery loam, channery silty clay	GC-GM, GC	A-4, A-6, A-1, A-2	0	0-23	48-71	24-71	21-71	19-71	30-51	13-30
	76-96	Bedrock			---	---	---	---	---	---	---	---
GbE:												
Gilpin----------	0-3	Slightly decomposed plant material	PT	A-8	1-25	0	---	---	---	---	---	---
	3-8	Loam	GC, GM, ML, CL	A-4, A-2	0-4	0-51	66-100	32-100	24-94	19-77	18-42	2-15
	8-32	Channery silt loam	GC, GM, ML, CL	A-4, A-2	0	0-51	66-100	32-100	26-100	20-84	0-44	NP-18
	32-63	Channery silty clay loam, channery silt loam, channery loam, silty clay loam	GC-GM, SC, CL, CL-ML	A-5, A-6, A-7, A-4	0	0-24	69-96	39-96	35-96	31-92	30-47	13-24
	63-76	Very channery silty clay loam, very channery silt loam, channery loam, channery silty clay	GC-GM, GC	A-4, A-6, A-1, A-2	0	0-23	48-71	24-71	21-71	19-71	30-51	13-30
	76-96	Bedrock			---	---	---	---	---	---	---	---
Berks----------	0-3	Slightly decomposed plant material	PT	A-8	1-25	0	---	---	---	---	---	---
	3-13	Channery loam, channery silt loam	SM, GM	A-4, A-2	0	5-36	25-93	22-93	19-93	16-85	36-55	8-15
	13-24	Channery loam, channery silt loam	SC, SM, GC, GM	A-4, A-2	0	5-44	15-94	13-93	11-93	9-82	27-43	9-15
	24-85	Very channery loam, very channery silt loam	GC-GM, SC, GC	A-4, A-2	0	8-42	19-91	16-90	14-90	12-83	26-37	9-15
	85-94	Extremely channery loam, extremely channery silt loam	GC-GM, GC	A-2	0-23	7-65	9-81	6-80	6-80	5-77	27-37	11-18
	94-104	Bedrock			---	---	---	---	---	---	---	---

Table 18.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-25 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	cm				Pct	Pct					Pct	
GhG:												
Gilpin----------	0-5	Loam	GC, GM, ML, CL	A-4, A-2	0-4	0-51	66-100	32-100	24-94	19-77	18-42	2-15
	5-22	Channery silt loam	GC, GM, ML, CL	A-4, A-2	0	0-51	66-100	32-100	26-100	20-84	0-44	NP-18
	22-53	Channery silty clay loam, channery silt loam, channery loam, silty clay loam	GC-GM, SC, CL, CL-ML	A-5, A-6, A-7, A-4	0	0-24	69-96	39-96	36-96	31-93	30-47	13-24
	53-66	Very channery silty clay loam, very channery silt loam, channery loam, channery silty clay	GC-GM, GC	A-4, A-6, A-1, A-2	0	0-23	48-71	24-71	21-71	19-71	30-51	13-30
	66-86	Bedrock			---	---	---	---	---	---	---	---
Highsplint------	0-1	Slightly decomposed plant material	PT	A-8	25-43	0	---	---	---	---	---	---
	1-18	Channery loam, very channery silt loam	GM, ML	A-7-6, A-2-4, A-2-7	0	5-20	54-86	31-79	27-78	20-62	33-56	9-18
	18-27	Channery loam, very channery silt loam	GC, GM, ML, CL	A-6, A-2-4, A-2-6	0	6-25	61-86	43-79	36-77	28-61	27-42	9-18
	27-108	Very channery loam, very channery silt loam, very channery clay loam	GC, SC, CL	A-6, A-2-6, A-2-4, A-4	0	5-22	37-80	24-72	21-72	16-58	24-42	9-21
	108-135	Very channery loam, very channery silt loam	GC, SC	A-2-6, A-2-4, A-4	0	10-26	27-68	14-64	11-63	8-49	18-37	3-18
	135-165	Extremely channery loam, extremely channery fine sandy loam, very channery silt loam	GC, SC, CL	A-2-6, A-2-4, A-4	0-31	9-36	26-82	12-79	10-77	7-57	24-38	9-18
Berks----------	0-5	Channery loam, channery silt loam	SM, GM	A-4, A-2	0	5-36	25-93	22-93	19-93	16-85	36-55	8-15
	5-16	Channery loam, channery silt loam	SC, SM, GC, GM	A-4, A-2	0	5-44	15-94	13-93	11-93	9-82	27-43	9-15
	16-77	Very channery loam, very channery silt loam	GC-GM, SC, GC	A-4, A-2	0	8-42	19-91	16-90	14-90	12-83	26-37	9-15
	77-86	Extremely channery loam, extremely channery silt loam	GC-GM, GC	A-2	0-23	7-65	9-81	6-80	6-80	5-77	27-37	11-18
	86-96	Bedrock			---	---	---	---	---	---	---	---

Table 18.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-25 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	cm				Pct	Pct					Pct	
HgE:												
Highsplint------	0-3	Slightly decomposed plant material	PT	A-8	1-25	0	---	---	---	---	---	---
	3-18	Channery loam, very channery silt loam	GM, ML	A-7-6, A-2-4, A-2-7	0-3	0-17	52-87	36-81	31-80	23-63	33-56	9-18
	18-27	Channery loam, very channery silt loam	GC, GM, ML, CL	A-6, A-2-4, A-2-6	0	7-31	61-86	43-79	36-77	28-61	27-42	9-18
	27-108	Very channery loam, very channery silt loam, very channery clay loam	GC, SC, CL	A-6, A-2-6, A-2-4, A-4	0	6-27	37-80	24-72	20-72	16-58	24-42	9-21
	108-135	Very channery loam, very channery silt loam	GC, SC	A-2-6, A-2-4, A-4	0	11-34	27-68	14-64	12-63	9-49	24-37	9-18
	135-165	Extremely channery loam, extremely channery fine sandy loam, very channery silt loam	GC, SC, CL	A-2-6, A-2-4, A-4	0-43	11-45	26-82	12-79	10-77	7-57	24-38	9-18
HxA:												
Holly, occasionally flooded--------	0-15	Silt loam	ML	A-4	0	0	84-100	69-100	61-100	53-90	30-48	9-18
	15-74	Silt loam, loam, silty clay loam	SM, ML	A-6, A-4	0	0	78-100	63-100	55-100	48-100	26-50	9-28
	74-200	Silty clay, silt loam, silty clay loam	CL, ML, SM	A-6, A-2, A-4	0	0	68-100	49-100	36-100	33-98	36-58	18-36
Lobdell, occasionally flooded--------	0-25	Silt loam	CL, ML	A-6, A-4	0	0	85-100	70-100	62-100	54-90	30-48	9-18
	25-80	Loam, silt loam	CL, ML, SM, CL-ML	A-6, A-4	0	0	90-100	73-100	64-99	47-77	27-42	12-21
	80-130	Loam, silt loam, sandy loam, clay loam	CL, ML, SM, CL-ML	A-6, A-4	0	0	90-100	73-100	61-99	45-77	25-40	9-21
	130-200	Loam, silt loam, sandy loam, clay loam	CL, ML, SM, CL-ML	A-6, A-4	0	0	90-100	73-100	61-99	45-77	25-40	9-21

Table 18.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-25 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	cm				Pct	Pct					Pct	
LlC:												
Lily----------	0-2	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	2-5	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	5-11	Loam	ML, SM, CL-ML	A-4, A-5	0	0-6	88-100	71-100	62-100	36-71	29-54	5-11
	11-19	Channery sandy loam, loam, fine sandy loam	ML, CL, SC, SM	A-5, A-4	0	0-13	85-100	70-100	60-100	38-73	22-44	4-14
	19-78	Channery sandy loam, loam, fine sandy loam	SC-SM, CL, SC	A-4, A-6	0	0-11	86-100	72-100	58-100	39-74	27-39	10-19
	78-90	Channery sandy loam, loam, very channery fine sandy loam	GC, GC-GM, CL	A-4, A-2-4, A-1-b	0	2-35	70-97	41-96	31-96	15-53	16-28	2-12
	90-100	Bedrock			---	---	---	---	---	---	---	---
MoB:												
Monongahela-----	0-2	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	2-23	Silt loam	SC-SM, SM, CL-ML, ML	A-4	0	0-5	89-100	74-100	67-100	58-96	25-45	6-18
	23-64	Loam, silt loam, silty clay loam	ML, CL-ML, CL	A-6, A-4	0	0-12	89-100	70-100	52-100	36-82	16-44	2-25
	64-152	Gravelly clay loam, clay loam, sandy clay loam, loam	SC, SM, CL, ML	A-7, A-6, A-4	0	0-8	84-100	49-100	36-97	27-78	24-47	9-27
	152-162	Bedrock			---	---	---	---	---	---	---	---
PkC:												
Pipestem--------	0-1	Slightly decomposed plant material	PT	A-8	1-25	0	---	---	---	---	---	---
	1-11	Flaggy silt loam, silt loam, channery silty clay loam	MH, ML, CL	A-7-6, A-6	0-11	4-34	67-95	66-95	63-95	58-93	40-70	15-23
	11-137	Channery silt loam, silty clay, stony silty clay loam	CL, CH, GC	A-7-6, A-6	0-11	4-61	59-96	58-96	54-96	49-96	34-59	17-32
	137-200	Channery silt loam, very flaggy silty clay, very stony silty clay loam	CL, CH, GC	A-7-6, A-6	3-43	6-36	48-96	47-96	44-96	40-96	34-54	17-32

Table 18.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-25 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	cm				Pct	Pct					Pct	
PmE:												
Pipestem--------	0-1	Slightly decomposed plant material	PT	A-8	25-43	0	---	---	---	---	---	---
	1-11	Flaggy silt loam, silt loam, channery silty clay loam	MH, ML, CL	A-7-6, A-6	0-11	4-34	67-95	66-95	63-95	58-93	40-70	15-23
	11-137	Channery silt loam, silty clay, stony silty clay loam	CL, CH, GC	A-7-6, A-6	0-34	4-38	59-96	58-96	54-96	49-96	34-59	17-32
	137-200	Channery silt loam, very flaggy silty clay, very stony silty clay loam	CL, CH, GC	A-7-6, A-6	3-43	6-36	48-96	47-96	44-96	40-96	34-54	17-32
PxA:												
Potomac, frequently flooded--------	0-2	Slightly decomposed plant material	PT	A-8	25-43	26-60	---	---	---	---	---	---
	2-20	Gravelly sandy loam	SM, GM	A-2-4, A-2-5, A-5	0	6-27	49-93	45-93	30-77	14-43	0-41	NP-9
	20-200	Stratified very gravelly sand to very gravelly loamy sand, extremely gravelly sandy loam, very gravelly loamy sand, extremely gravelly sand	GM, GW-GM	A-1	0	7-43	47-78	8-78	6-72	2-31	15-15	NP-3
Nelse, frequently flooded--------	0-30	Fine sandy loam, loam, sandy loam	CL, CL-ML, ML	A-4	3-12	0-7	78-100	76-100	55-84	34-56	33-53	9-18
	30-74	Loamy sand, gravelly loamy sand, loamy fine sand	SM, SC-SM	A-2-4	0	0-19	95-100	69-100	52-83	17-33	0-26	NP-6
	74-200	Sand, stratified sand to loamy fine sand, very cobbly sand	SM, SC-SM	A-2-4	0	0-25	77-100	53-100	40-84	6-19	0-26	NP-6

Table 19.—Physical Soil Properties

(Sand, silt, and clay values are shown either as a range or as a representative value. Absence of an entry indicates that data were not estimated)

Map unit symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Shrink-swell potential	Organic matter
	Cm	Pct	Pct	Pct	g/cc	um/sec	cm/cm	Pct	Pct
CaC:									
Cateache--------	0-2	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	2-9	3-28	50-70	18-35	1.04-1.36	4.0-14.0	0.14-0.18	1.7-2.8	3.0-11
	9-75	5-20	48-65	25-35	1.22-1.69	4.0-14.0	0.12-0.16	1.1-1.7	0.6-1.4
	75-92	7-22	35-62	25-45	1.45-1.68	0.4-4.0	0.10-0.14	1.3-3.2	0.3-0.6
	92-102				---	0.4-14.1	---	---	---
CbD:									
Cateache--------	0-2	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	2-9	3-28	50-70	18-35	1.04-1.36	4.0-14.0	0.14-0.18	1.7-2.8	3.0-11
	9-75	5-20	48-65	25-35	1.22-1.69	4.0-14.0	0.12-0.16	1.1-1.7	0.6-1.4
	75-92	7-22	35-62	25-45	1.45-1.68	0.4-4.0	0.10-0.14	1.3-3.2	0.3-0.6
	92-102				---	0.4-14.1	---	---	---
CbE:									
Cateache--------	0-1	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	1-9	3-28	50-70	18-35	1.04-1.36	4.0-14.0	0.14-0.18	1.7-2.8	3.0-11
	9-75	5-20	48-65	25-35	1.22-1.69	4.0-14.0	0.12-0.16	1.1-1.7	0.6-1.4
	75-92	7-22	35-62	25-45	1.45-1.68	0.4-4.0	0.10-0.14	1.3-3.2	0.3-0.6
	92-102				---	0.4-14.1	---	---	---
CeG:									
Cateache--------	0-8	3-28	50-70	18-35	1.04-1.36	4.0-14.0	0.14-0.18	1.7-2.8	3.0-11
	8-74	5-20	48-65	25-35	1.22-1.69	4.0-14.0	0.12-0.16	1.1-1.7	0.6-1.4
	74-91	7-22	35-62	25-45	1.45-1.68	0.4-4.0	0.10-0.14	1.3-3.2	0.3-0.6
	91-101				---	0.4-14.1	---	---	---
Pipestem--------	0-1	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	1-11	6-15	55-66	23-34	1.27-1.50	14.1-42.3	0.13-0.20	0.4-2.9	4.0-13
	11-137	6-14	41-66	25-45	1.27-1.86	4.2-14.1	0.12-0.18	1.0-4.5	0.2-3.2
	137-200	8-16	48-63	25-45	1.47-1.70	4.2-14.1	0.09-0.15	1.0-4.5	0.1-1.0
ChA:									
Chavies, rarely flooded--------	0-2	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	2-28	35-80	10-35	2-15	1.20-1.40	14.0-42.0	0.11-0.18	0.0-2.9	3.0-6.0
	28-107	35-80	10-35	5-18	1.35-1.65	14.0-42.0	0.11-0.20	0.0-2.9	0.4-2.0
	107-165	35-85	10-35	2-18	1.30-1.50	14.0-42.0	0.08-0.18	0.0-2.9	0.3-1.0
CoA:									
Combs, occasionally flooded--------	0-25	45-70	20-52	5-18	1.20-1.50	4.2-42.3	0.12-0.20	0.0-2.9	3.0-7.0
	25-122	45-70	20-52	5-18	1.20-1.50	4.2-42.3	0.12-0.20	0.0-2.9	0.5-2.0
	122-200	50-80	15-40	5-18	1.20-1.50	4.2-42.3	0.12-0.20	0.0-2.9	0.5-2.0

Table 19.—Physical Soil Properties—Continued

Map unit symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Shrink-swell potential	Organic matter
	Cm	Pct	Pct	Pct	g/cc	um/sec	cm/cm	Pct	Pct
CxA:									
Craigsville, rarely flooded-	0-5	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	5-8	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	8-21	23-75	15-35	0-20	1.20-1.40	14.0-141.0	0.05-0.15	0.0-2.9	1.0-5.0
	21-60	30-75	15-35	0-20	1.30-1.60	14.0-141.0	0.05-0.15	0.0-2.9	0.3-2.0
	60-200	60-90	5-50	0-15	1.35-1.55	14.0-141.0	0.05-0.09	0.0-2.9	0.3-1.6
GaC:									
Gilpin----------	0-2	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	2-10	12-45	35-65	5-23	1.20-1.40	4.0-14.0	0.13-0.18	1.4-3.3	0.5-4.0
	10-32	12-45	35-65	7-27	1.20-1.40	4.0-14.0	0.13-0.18	1.4-3.3	0.7-3.5
	32-63	5-40	35-65	20-35	1.19-1.59	4.0-14.0	0.11-0.18	0.5-3.0	0.3-1.7
	63-76	5-30	35-65	20-42	1.39-1.65	2.8-14.0	0.08-0.13	0.7-3.0	0.3-0.8
	76-96				---	0.0-14.0	---	---	---
GaD:									
Gilpin----------	0-2	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	2-8	12-45	35-65	5-23	1.20-1.40	4.0-14.0	0.13-0.18	1.4-3.3	0.5-4.0
	8-32	12-45	35-65	7-27	1.20-1.40	4.0-14.0	0.13-0.18	1.4-3.3	0.7-3.5
	32-63	5-40	35-65	20-35	1.19-1.59	4.0-14.0	0.11-0.18	0.5-3.0	0.3-1.7
	63-76	5-30	35-65	20-42	1.39-1.65	2.8-14.0	0.08-0.13	0.7-3.0	0.3-0.8
	76-96				---	0.0-14.0	---	---	---
GbE:									
Gilpin----------	0-3	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	3-8	12-45	35-65	5-23	1.20-1.40	4.0-14.0	0.13-0.18	1.4-3.3	0.5-4.0
	8-32	12-45	35-65	7-27	1.20-1.40	4.0-14.0	0.13-0.18	1.4-3.3	0.7-3.5
	32-63	5-40	35-65	20-35	1.19-1.59	4.0-14.0	0.11-0.18	0.5-3.0	0.3-1.7
	63-76	5-30	35-65	20-42	1.39-1.65	2.8-14.0	0.08-0.13	0.7-3.0	0.3-0.8
	76-96				---	0.0-14.0	---	---	---
Berks----------	0-3	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	3-13	8-32	42-76	14-23	0.75-1.25	4.0-42.0	0.08-0.12	0.5-2.9	5.5-11
	13-24	11-43	42-72	14-23	1.00-1.30	4.0-42.0	0.08-0.12	0.5-2.1	1.5-5.0
	24-85	8-37	46-75	15-23	1.30-1.60	4.0-42.0	0.04-0.10	0.2-1.6	0.5-2.2
	85-94	5-30	46-75	17-26	1.30-1.70	14.0-42.0	0.04-0.10	0.2-1.2	0.2-1.2
	94-104				---	1.4-141.1	---	---	---
GhG:									
Gilpin----------	0-5	12-45	35-65	5-23	1.20-1.40	4.0-14.0	0.13-0.18	1.4-3.3	0.5-4.0
	5-22	12-45	35-65	7-27	1.20-1.40	4.0-14.0	0.13-0.18	1.4-3.3	0.7-3.5
	22-53	5-40	35-65	20-35	1.19-1.59	4.0-14.0	0.11-0.18	0.5-3.0	0.3-1.7
	53-66	5-30	35-65	20-42	1.39-1.65	2.8-14.0	0.08-0.13	0.7-3.0	0.3-0.8
	66-86				---	0.0-14.0	---	---	---
Highsplint------	0-1	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	1-18	22-53	35-53	14-27	1.04-1.12	14.1-141.1	0.09-0.16	1.3-2.7	3.9-9.5
	18-27	21-51	37-55	14-27	1.10-1.49	14.1-42.3	0.09-0.16	0.5-2.1	1.5-3.0
	27-108	22-53	36-55	14-30	1.25-1.68	4.2-14.1	0.08-0.12	0.2-2.2	0.3-1.7
	108-135	28-55	34-53	7-27	1.25-1.70	4.2-14.1	0.07-0.12	0.3-1.3	0.3-0.9
	135-165	27-61	23-54	14-27	1.37-1.80	4.2-14.1	0.04-0.11	0.3-1.3	0.2-1.0

Table 19.—Physical Soil Properties—Continued

Map unit symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Shrink-swell potential	Organic matter
	Cm	Pct	Pct	Pct	g/cc	um/sec	cm/cm	Pct	Pct
GhG:									
Berks----------	0-5	8-32	42-76	14-23	0.75-1.25	4.0-42.0	0.08-0.12	0.5-2.9	5.5-11
	5-16	11-43	42-72	14-23	1.00-1.30	4.0-42.0	0.08-0.12	0.5-2.1	1.5-5.0
	16-77	8-37	46-75	15-23	1.30-1.60	4.0-42.0	0.04-0.10	0.2-1.6	0.5-2.2
	77-86	5-30	46-75	17-26	1.30-1.70	14.0-42.0	0.04-0.10	0.2-1.2	0.2-1.2
	86-96				---	1.4-141.1	---	---	---
HgE:									
Highsplint------	0-3	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	3-18	22-53	35-53	14-27	1.04-1.12	14.1-141.1	0.09-0.16	1.3-2.7	3.9-9.5
	18-27	21-51	37-55	14-27	1.10-1.49	14.1-42.3	0.09-0.16	0.5-2.1	1.5-3.0
	27-108	22-53	36-55	14-30	1.25-1.68	4.2-14.1	0.08-0.12	0.2-2.2	0.3-1.7
	108-135	28-55	34-53	14-27	1.25-1.70	4.2-14.1	0.07-0.12	0.3-1.3	0.3-0.9
	135-165	27-61	23-54	14-27	1.37-1.80	4.2-14.1	0.04-0.11	0.3-1.3	0.2-1.0
HxA:									
Holly, occasionally flooded--------	0-15	0-50	50-88	15-27	1.20-1.40	4.0-14.0	0.20-0.24	0.0-2.9	2.5-5.5
	15-74	0-85	40-88	15-40	1.20-1.50	1.4-14.0	0.17-0.21	0.0-2.9	0.6-1.1
	74-200	0-40	40-88	20-50	1.20-1.45	4.0-42.0	0.10-0.20	0.0-2.9	0.4-0.8
Lobdell, occasionally flooded--------	0-25	0-50	50-88	15-27	1.20-1.40	4.0-14.0	0.20-0.24	0.0-2.9	2.5-5.5
	25-80	10-50	30-75	18-30	1.25-1.60	4.0-14.0	0.17-0.22	0.0-2.9	0.2-1.5
	80-130	20-65	25-65	15-30	1.20-1.60	4.0-42.0	0.12-0.18	0.0-2.9	0.1-0.3
	130-200	20-65	25-65	15-30	1.20-1.60	4.0-42.0	0.12-0.18	0.0-2.9	0.1-0.3
LlC:									
Lily----------	0-2	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	2-5	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	5-11	30-68	24-54	9-18	0.80-1.20	4.0-42.0	0.14-0.17	2.0-2.2	4.0-12
	11-19	28-64	28-54	8-21	1.20-1.30	14.0-42.0	0.09-0.17	0.2-1.1	1.5-6.5
	19-78	29-65	24-49	16-27	1.26-1.56	14.0-42.0	0.09-0.17	0.4-2.4	0.5-1.2
	78-90	31-70	19-35	5-18	1.40-1.70	14.0-42.0	0.06-0.16	0.4-1.1	0.2-0.3
	90-100				---	0.4-14.1	---	---	---
MoB:									
Monongahela-----	0-2	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	2-23	5-45	50-85	10-27	1.20-1.40	4.0-14.0	0.18-0.24	0.0-2.9	2.0-4.0
	23-64	15-50	32-70	5-35	1.30-1.50	4.0-14.0	0.14-0.18	0.0-2.9	0.0-0.5
	64-152	25-55	20-48	15-38	1.30-1.60	0.4-4.0	0.08-0.12	0.0-2.9	0.0-0.5
	152-162				---	0.4-14.1	---	---	---

Table 19.—Physical Soil Properties—Continued

Map unit symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Shrink-swell potential	Organic matter
	Cm	Pct	Pct	Pct	g/cc	um/sec	cm/cm	Pct	Pct
PkC:									
Pipestem--------	0-1	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	1-11	6-15	55-66	23-34	1.27-1.50	14.1-42.3	0.13-0.20	0.4-2.9	4.0-13
	11-137	6-14	41-66	25-45	1.27-1.86	4.2-14.1	0.12-0.18	1.0-4.5	0.2-3.2
	137-200	8-16	48-63	25-45	1.47-1.70	4.2-14.1	0.09-0.15	1.0-4.5	0.1-1.0
PmE:									
Pipestem--------	0-1	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	1-11	6-15	55-66	23-34	1.27-1.50	14.1-42.3	0.13-0.20	0.4-2.9	4.0-13
	11-137	6-14	41-66	25-45	1.27-1.86	4.2-14.1	0.12-0.18	1.0-4.5	0.2-3.2
	137-200	8-16	48-63	25-45	1.47-1.70	4.2-14.1	0.09-0.15	1.0-4.5	0.1-1.0
PxA:									
Potomac, frequently flooded--------	0-2	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	2-20	55-85	0-50	0-15	1.20-1.40	4.0-42.0	0.08-0.12	0.5-1.4	2.0-7.0
	20-200	70-100	0-20	0-20	1.30-1.60	42.0-141.0	0.03-0.06	0.0-2.9	0.2-1.0
Nelse, frequently flooded--------	0-30	35-65	15-40	8-20	1.20-1.40	4.0-14.0	0.12-0.22	0.0-2.9	4.0-8.0
	30-74	60-90	5-38	2-10	1.40-1.70	14.0-141.0	0.05-0.10	0.0-2.9	0.5-2.0
	74-200	80-95	0-18	2-10	1.40-1.70	14.0-141.0	0.05-0.10	0.0-2.9	0.5-2.0

Table 20.—Erosion Properties

(Entries under "Erosion factors" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer)

Map unit symbol and soil name	Depth (cm)	Erosion factors Kw	Kf	T	Wind erodibility group	Wind erodibility index
CaC:						
Cateache	0-2	---	---	3	7	38
	2-9	.20	.37			
	9-75	.20	.37			
	75-92	.20	.37			
	92-102	---	---			
CbD:						
Cateache	0-2	---	---	3	7	38
	2-9	.20	.37			
	9-75	.20	.37			
	75-92	.20	.37			
	92-102	---	---			
CbE:						
Cateache	0-1	---	---	3	7	38
	1-9	.20	.37			
	9-75	.20	.37			
	75-92	.20	.37			
	92-102	---	---			
CeG:						
Cateache	0-8	.20	.37	3	7	38
	8-74	.20	.37			
	74-91	.20	.37			
	91-101	---	---			
Pipestem	0-1	---	---	5	7	38
	1-11	.28	.28			
	11-137	.20	.37			
	137-200	.17	.43			
ChA:						
Chavies, rarely flooded	0-2	---	---	5	3	86
	2-28	.24	.24			
	28-107	.28	.28			
	107-165	.17	.17			
CoA:						
Combs, occasionally flooded	0-25	.20	.20	5	3	86
	25-122	.28	.28			
	122-200	.15	.24			
CxA:						
Craigsville, rarely flooded	0-5	---	---	3	6	48
	5-8	---	---			
	8-21	.05	.17			
	21-60	.05	.24			
	60-200	.02	.05			
GaC:						
Gilpin	0-2	---	---	3	5	56
	2-10	.37	.37			
	10-32	.24	.37			
	32-63	.28	.43			
	63-76	.10	.43			
	76-96	---	---			

Table 20.—Erosion Properties—Continued

Map unit symbol and soil name	Depth (cm)	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
GaD:						
Gilpin	0-2	---	---	3	5	56
	2-8	.37	.37			
	8-32	.24	.37			
	32-63	.28	.43			
	63-76	.10	.43			
	76-96	---	---			
GbE:						
Gilpin	0-3	---	---	3	5	56
	3-8	.37	.37			
	8-32	.24	.37			
	32-63	.28	.43			
	63-76	.10	.43			
	76-96	---	---			
Berks	0-3	---	---	2	7	38
	3-13	.15	.28			
	13-24	.17	.37			
	24-85	.17	.24			
	85-94	.10	.49			
	94-104	---	---			
GhG:						
Gilpin	0-5	.37	.37	3	5	56
	5-22	.24	.37			
	22-53	.28	.43			
	53-66	.10	.43			
	66-86	---	---			
Highsplint	0-1	---	---	4	6	48
	1-18	.10	.24			
	18-27	.15	.32			
	27-108	.15	.43			
	108-135	.10	.43			
	135-165	.10	.37			
Berks	0-5	.15	.28	2	7	38
	5-16	.17	.37			
	16-77	.17	.43			
	77-86	.10	.49			
	86-96	---	---			
HgE:						
Highsplint	0-3	---	---	4	6	48
	3-18	.10	.24			
	18-27	.15	.32			
	27-108	.15	.43			
	108-135	.10	.43			
	135-165	.10	.37			
HxA:						
Holly, occasionally flooded	0-15	.32	.32	5	6	48
	15-74	.43	.43			
	74-200	.24	.24			
Lobdell, occasionally flooded	0-25	.37	.37	5	6	48
	25-80	.37	.37			
	80-130	.37	.37			
	130-200	.37	.37			

Table 20.—Erosion Properties—Continued

Map unit symbol and soil name	Depth (cm)	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
LlC:						
Lily	0-2	---	---	2	5	56
	2-5	---	---			
	5-11	.24	.24			
	11-19	.32	.32			
	19-78	.32	.32			
	78-90	.24	.32			
	90-100	---	---			
MoB:						
Monongahela	0-2	---	---	4	5	56
	2-23	.43	.43			
	23-64	.43	.43			
	64-152	.32	.32			
	152-162	---	---			
PkC:						
Pipestem	0-1	---	---	5	6	48
	1-11	.28	.28			
	11-137	.20	.37			
	137-200	.17	.43			
PmE:						
Pipestem	0-1	---	---	5	7	38
	1-11	.28	.28			
	11-137	.20	.37			
	137-200	.17	.43			
PxA:						
Potomac, frequently flooded	0-2	---	---	5	5	56
	2-20	.10	.15			
	20-200	.02	.10			
Nelse, frequently flooded	0-30	.20	.20	2	3	86
	30-74	.20	.20			
	74-200	.02	.02			
W.						
Water						

Table 21.—Total Soil Carbon

(This table displays soil organic carbon (SOC) and soil inorganic carbon (SIC) in kilograms per square meter to a depth of 2 meters or to the representative top depth of any kind of bedrock or any cemented soil horizon. SOC and SIC are reported on a volumetric whole soil basis, corrected for representative rock fragments indicated in the database. SOC is converted from horizon soil organic matter of the fraction of the soil less than 2 mm in diameter. If soil organic matter indicated in the database is NULL, SOC is assumed to be zero. SIC is converted from horizon calcium carbonate content fraction of the soil less than 2 mm in diameter. If horizon calcium carbonate indicated in the database is NULL, SIC is assumed to be zero. A weighted average of all horizons is used in the calculations. Only major components of a map unit are displayed in this table)

Map unit symbol, component name, and component percent	SOC	SIC
	kg/m2	kg/m2
CaC:		
Cateache (75%)	9	0
CbD:		
Cateache (75%)	9	0
CbE:		
Cateache (75%)	9	0
CeG:		
Cateache (60%)	8	0
Pipestem (20%)	19	0
ChA:		
Chavies, rarely flooded (75%)	19	0
CoA:		
Combs, occasionally flooded (85%)	24	0
CxA:		
Craigsville, rarely flooded (90%)	18	0
GaC:		
Gilpin (70%)	7	0
GaD:		
Gilpin (70%)	7	0
GbE:		
Gilpin (60%)	7	0
Berks (20%)	11	0
GhG:		
Gilpin (45%)	4	0
Highsplint (25%)	10	0
Berks (20%)	8	0
HgE:		
Highsplint (70%)	10	0

Table 21.—Total Soil Carbon—Continued

Map unit symbol, component name, and component percent	SOC	SIC
	kg/m2	kg/m2
HxA:		
Holly, occasionally flooded (55%)	13	0
Lobdell, occasionally flooded (25%)	11	0
LlC:		
Lily (70%)	10	0
MoB:		
Monongahela (80%)	8	0
PkC:		
Pipestem (85%)	19	0
PmE:		
Pipestem (80%)	19	0
PxA:		
Potomac, frequently flooded (60%)	11	0
Nelse, frequently flooded (20%)	26	0
W.		
Water		

Table 22.—Chemical Soil Properties

(Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	cm	meq/100 g	meq/100 g	pH
CaC:				
Cateache	0-2	---	5.0-60.0	4.5-5.5
	2-9	---	4.0-10.0	4.5-6.1
	9-75	---	7.4-12.0	4.7-6.2
	75-92	---	8.1-17.3	4.6-6.2
	92-102	---	---	---
CbD:				
Cateache	0-2	---	5.0-60.0	4.5-5.5
	2-9	---	4.0-10.0	4.5-6.1
	9-75	---	7.4-12.0	4.7-6.2
	75-92	---	8.1-17.3	4.6-6.2
	92-102	---	---	---
CbE:				
Cateache	0-1	---	5.0-60.0	4.5-5.5
	1-9	---	4.0-10.0	4.5-6.1
	9-75	---	7.4-12.0	4.7-6.2
	75-92	---	8.1-17.3	4.6-6.2
	92-102	---	---	---
CeG:				
Cateache	0-8	---	4.0-10.0	4.5-6.1
	8-74	---	7.4-12.0	4.7-6.2
	74-91	---	8.1-17.3	4.6-6.2
	91-101	---	---	---
Pipestem	0-1	40.0-125.0	5.0-60.0	5.3-6.3
	1-11	---	5.2-9.3	5.0-5.7
	11-137	13.0-24.3	---	4.9-7.6
	137-200	12.9-23.9	---	5.1-7.8
ChA:				
Chavies, rarely flooded	0-2	40.0-125.0	5.0-60.0	5.3-6.3
	2-28	1.1-8.3	---	4.5-7.3
	28-107	2.7-9.8	---	4.5-7.3
	107-165	1.1-9.7	---	4.5-7.3
CoA:				
Combs, occasionally flooded	0-25	2.8-10.0	---	5.6-7.3
	25-122	2.7-9.8	---	5.6-7.3
	122-200	2.7-9.8	---	5.6-7.3
CxA:				
Craigsville, rarely flooded	0-5	---	5.0-60.0	3.8-5.2
	5-8	---	10.0-75.0	3.5-5.0
	8-21	4.0-16.5	3.0-12.4	4.5-5.5
	21-60	2.4-9.8	1.8-7.3	4.5-5.5
	60-200	0.7-7.1	0.5-5.3	4.5-5.5

Table 22.—Chemical Soil Properties—Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	cm	meq/100 g	meq/100 g	pH
GaC:				
Gilpin	0-2	---	5.0-60.0	4.1-5.5
	2-10	---	1.0-7.6	3.5-5.5
	10-32	---	0.0-8.7	3.5-5.5
	32-63	---	5.6-13.0	4.2-5.2
	63-76	---	6.1-16.0	4.4-5.0
	76-96	---	---	---
GaD:				
Gilpin	0-2	---	5.0-60.0	4.1-5.5
	2-8	---	1.0-7.6	3.5-5.5
	8-32	---	0.0-8.7	3.5-5.5
	32-63	---	5.6-13.0	4.2-5.2
	63-76	---	6.1-16.0	4.4-5.0
	76-96	---	---	---
GbE:				
Gilpin	0-3	---	5.0-60.0	4.1-5.5
	3-8	---	1.0-7.6	3.5-5.5
	8-32	---	0.0-8.7	3.5-5.5
	32-63	---	5.6-13.0	4.2-5.2
	63-76	---	6.1-16.0	4.4-5.0
	76-96	---	---	---
Berks	0-3	40.0-125.0	5.0-60.0	5.1-6.1
	3-13	---	3.0-5.7	4.2-6.1
	13-24	---	3.3-6.7	4.4-5.3
	24-85	---	3.9-7.6	4.4-5.2
	85-94	---	4.8-9.7	4.6-5.4
	94-104	---	---	---
GhG:				
Gilpin	0-5	---	1.0-7.6	3.5-5.5
	5-22	---	0.0-8.7	3.5-5.5
	22-53	---	5.6-13.0	4.2-5.2
	53-66	---	6.1-16.0	4.4-5.0
	66-86	---	---	---
Highsplint	0-1	40.0-125.0	5.0-60.0	5.1-6.1
	1-18	---	3.0-7.2	4.5-6.0
	18-27	---	3.5-8.0	4.0-5.5
	27-108	---	3.7-10.8	3.5-5.5
	108-135	---	1.8-9.6	3.5-5.5
	135-165	---	3.9-10.4	3.5-5.5
Berks	0-5	---	3.0-5.7	4.2-6.1
	5-16	---	3.3-6.7	4.4-5.3
	16-77	---	3.9-7.6	4.4-5.2
	77-86	---	4.8-9.7	4.6-5.4
	86-96	---	---	---
HgE:				
Highsplint	0-3	40.0-125.0	5.0-60.0	5.1-6.1
	3-18	10.4-19.0	4.0-15.1	4.5-6.0
	18-27	5.3-9.9	2.8-5.5	4.0-5.5
	27-108	4.9-9.7	2.5-6.3	3.5-5.5
	108-135	6.2-8.7	3.6-5.4	3.5-5.5
	135-165	5.6-8.6	3.9-6.0	3.5-5.5

Table 22.—Chemical Soil Properties—Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	cm	meq/100 g	meq/100 g	pH
HxA:				
Holly, occasionally flooded	0-15	8.2-14.8	---	5.6-7.3
	15-74	8.0-21.3	---	5.6-7.3
	74-200	14.2-26.4	---	5.6-7.8
Lobdell, occasionally flooded	0-25	8.2-14.8	---	5.1-7.3
	25-80	9.4-16.1	---	5.1-7.3
	80-130	7.8-15.7	---	5.6-7.3
	130-200	7.8-15.7	---	5.6-7.3
LlC:				
Lily	0-2	---	5.0-60.0	3.8-5.0
	2-5	---	10.0-75.0	3.5-4.8
	5-11	---	1.4-3.1	3.5-5.0
	11-19	---	1.3-3.8	3.5-5.0
	19-78	---	1.6-5.3	3.5-5.0
	78-90	---	0.9-3.7	3.5-5.0
	90-100	---	---	---
MoB:				
Monongahela	0-2	---	5.0-60.0	3.8-5.2
	2-23	---	1.7-4.9	4.5-5.5
	23-64	---	0.9-8.4	4.5-5.5
	64-152	---	2.9-9.2	4.5-5.5
	152-162	---	---	---
PkC:				
Pipestem	0-1	40.0-125.0	5.0-60.0	5.3-6.3
	1-11	---	5.2-9.3	5.0-5.7
	11-137	13.0-24.3	---	4.9-7.6
	137-200	12.9-23.9	---	5.1-7.8
PmE:				
Pipestem	0-1	40.0-125.0	5.0-60.0	5.3-6.3
	1-11	---	5.2-9.3	5.0-5.7
	11-137	13.0-24.3	---	4.9-7.6
	137-200	12.9-23.9	---	5.1-7.8
PxA:				
Potomac, frequently flooded	0-2	40.0-125.0	5.0-60.0	5.3-6.3
	2-20	6.8-12.8	4.5-6.0	5.1-7.8
	20-200	2.0-6.0	0.5-4.0	5.1-7.8
Nelse, frequently flooded	0-30	8.2-14.9	6.2-11.2	5.1-7.3
	30-74	1.8-8.2	---	5.5-7.3
	74-200	1.8-8.2	---	5.5-7.3

Table 23.—Water Features

(See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map unit symbol and soil name	Hydrologic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			cm	cm	cm				
CaC:									
Cateache	C								
		---	---	---	---	---	---	---	---
CbD:									
Cateache	C								
		---	---	---	---	---	---	---	---
CbE:									
Cateache	C								
		---	---	---	---	---	---	---	---
CeG:									
Cateache	C								
		---	---	---	---	---	---	---	---
Pipestem	B								
		---	---	---	---	---	---	---	---
ChA:									
Chavies, rarely flooded	A								
		January	---	---	---	---	None	Very brief	Rare
		February	---	---	---	---	None	Very brief	Rare
		March	---	---	---	---	None	Very brief	Rare
		April	---	---	---	---	None	Very brief	Rare
		May	---	---	---	---	None	Very brief	Rare
		November	---	---	---	---	None	Very brief	Rare
		December	---	---	---	---	None	Very brief	Rare
CoA:									
Combs, occasionally flooded	A								
		January	137	>200	---	---	None	Brief	Occasional
		February	137	>200	---	---	None	Brief	Occasional
		March	137	>200	---	---	None	Brief	Occasional
		April	137	>200	---	---	None	Brief	Occasional
		May	137	>200	---	---	None	Brief	Occasional
		November	137	>200	---	---	None	Brief	Occasional
		December	137	>200	---	---	None	Brief	Occasional

Table 23.—Water Features—Continued

Map unit symbol and soil name	Hydrologic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			cm	cm	cm				
CxA:									
Craigsville, rarely flooded	A								
		January	137	>200	---	---	None	Very brief	Rare
		February	137	>200	---	---	None	Very brief	Rare
		March	137	>200	---	---	None	Very brief	Rare
		April	137	>200	---	---	None	Very brief	Rare
		May	137	>200	---	---	None	Very brief	Rare
		November	137	>200	---	---	None	Very brief	Rare
		December	137	>200	---	---	None	Very brief	Rare
GaC:									
Gilpin	C								
		---	---	---	---	---	---	---	---
GaD:									
Gilpin	C								
		---	---	---	---	---	---	---	---
GbE:									
Gilpin	C								
		---	---	---	---	---	---	---	---
Berks	B								
		---	---	---	---	---	---	---	---
GhG:									
Gilpin	C								
		---	---	---	---	---	---	---	---
Highsplint	B								
		---	---	---	---	---	---	---	---
Berks	B								
		---	---	---	---	---	---	---	---
HgE:									
Highsplint	B								
		---	---	---	---	---	---	---	---

Table 23.—Water Features—Continued

Map unit symbol and soil name	Hydrologic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			cm	cm	cm				
HxA:									
Holly, occasionally flooded	D								
		January	8	>200	3-15	Long	Occasional	Brief	Occasional
		February	8	>200	3-15	Long	Occasional	Brief	Occasional
		March	8	>200	3-15	Long	Occasional	Brief	Occasional
		April	8	>200	3-15	Long	Occasional	Brief	Occasional
		May	8	>200	3-15	Long	Occasional	Brief	Occasional
		June	8	>200	---	---	---	---	---
		July	8	>200	---	---	---	---	---
		August	8	>200	---	---	---	---	---
		September	8	>200	---	---	---	---	---
		October	8	>200	---	---	---	---	---
		November	8	>200	3-15	Long	Occasional	Brief	Occasional
		December	8	>200	3-15	Long	Occasional	Brief	Occasional
Lobdell, occasionally flooded	C								
		January	53	>200	---	---	None	Brief	Occasional
		February	53	>200	---	---	None	Brief	Occasional
		March	53	>200	---	---	None	Brief	Occasional
		April	53	>200	---	---	None	Brief	Occasional
		May	53	>200	---	---	None	Brief	Occasional
		November	53	>200	---	---	None	Brief	Occasional
		December	53	>200	---	---	None	Brief	Occasional
LlC:									
Lily	B								
		---	---	---	---	---	---	---	---
MoB:									
Monongahela	C								
		January	69	122	---	---	None	---	None
		February	69	122	---	---	None	---	None
		March	69	122	---	---	None	---	None
		April	69	122	---	---	None	---	None
		December	69	122	---	---	None	---	None
PkC:									
Pipestem	B								
		---	---	---	---	---	---	---	---
PmE:									
Pipestem	B								
		---	---	---	---	---	---	---	---

Table 23.—Water Features—Continued

Map unit symbol and soil name	Hydrologic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			cm	cm	cm				
PxA:									
Potomac, frequently flooded	A								
		January	---	---	---	---	None	Brief	Frequent
		February	---	---	---	---	None	Brief	Frequent
		March	---	---	---	---	None	Brief	Frequent
		April	---	---	---	---	None	Brief	Frequent
		May	---	---	---	---	None	Brief	Frequent
		November	---	---	---	---	None	Brief	Frequent
		December	---	---	---	---	None	Brief	Frequent
Nelse, frequently flooded	B								
		January	153	>200	---	---	None	Brief	Frequent
		February	153	>200	---	---	None	Brief	Frequent
		March	153	>200	---	---	None	Brief	Frequent
		April	153	>200	---	---	None	Brief	Frequent
		May	153	>200	---	---	None	Brief	Frequent
		June	160	>200	---	---	None	---	---
		July	160	>200	---	---	None	---	---
		August	160	>200	---	---	None	---	---
		September	160	>200	---	---	None	---	---
		October	160	>200	---	---	None	---	---
		November	153	>200	---	---	None	Brief	Frequent
		December	153	>200	---	---	None	Brief	Frequent

Table 24.—Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that data were not estimated)

Map unit symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		cm				
CaC:						
Cateache	Paralithic bedrock	51-102	Moderately cemented	Moderate	Moderate	Moderate
CbD:						
Cateache	Paralithic bedrock	51-102	Moderately cemented	Moderate	Moderate	Moderate
CbE:						
Cateache	Paralithic bedrock	51-102	Moderately cemented	Moderate	Moderate	Moderate
CeG:						
Cateache	Paralithic bedrock	51-102	Moderately cemented	Moderate	Moderate	Moderate
Pipestem	---	---	---	Moderate	Moderate	Moderate
ChA:						
Chavies, rarely flooded	---	---	---	Moderate	Low	Moderate
CoA:						
Combs, occasionally flooded	---	---	---	Moderate	Moderate	Moderate
CxA:						
Craigsville, rarely flooded	---	---	---	Moderate	Moderate	High
GaC:						
Gilpin	Paralithic bedrock	51-102	Moderately cemented	Moderate	Moderate	High
GaD:						
Gilpin	Paralithic bedrock	51-102	Moderately cemented	Moderate	Moderate	High
GbE:						
Gilpin	Paralithic bedrock	51-102	Moderately cemented	Moderate	Moderate	High
Berks	Lithic bedrock	51-102	Indurated	Moderate	Moderate	High

Table 24.—Soil Features—Continued

Map unit symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		cm				
GhG:						
Gilpin	Paralithic bedrock	51-102	Moderately cemented	Moderate	Moderate	High
Highsplint	---	---	---	Moderate	Moderate	High
Berks	Lithic bedrock	51-102	Indurated	Moderate	Moderate	High
HgE:						
Highsplint	---	---	---	Moderate	Moderate	High
HxA:						
Holly, occasionally flooded	---	---	---	High	High	Low
Lobdell, occasionally flooded	---	---	---	Moderate	High	Moderate
LlC:						
Lily	Lithic bedrock	51-102	Indurated	Moderate	Moderate	High
MoB:						
Monongahela	Fragipan Lithic bedrock	64 152	Noncemented Indurated	Moderate	High	Moderate
PkC:						
Pipestem	---	---	---	Moderate	Moderate	Moderate
PmE:						
Pipestem	---	---	---	Moderate	Moderate	Moderate
PxA:						
Potomac, frequently flooded	---	---	---	Low	Low	Low
Nelse, frequently flooded	---	---	---	Low	Low	Moderate

Table 25.—Taxonomic Classification of the Soils

(An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series)

Soil name	Family or higher taxonomic class
Berks	Loamy-skeletal, mixed, active, mesic Typic Dystrudepts
Cateache	Fine-loamy, mixed, active, mesic Ultic Hapludalfs
Chavies	Coarse-loamy, mixed, active, mesic Ultic Hapludalfs
Combs	Coarse-loamy, mixed, active, mesic Fluventic Hapludolls
Craigsville	Loamy-skeletal, mixed, superactive, mesic Fluventic Dystrudepts
Gilpin	Fine-loamy, mixed, active, mesic Typic Hapludults
Highsplint	Loamy-skeletal, mixed, active, mesic Typic Dystrudepts
Holly	Fine-loamy, mixed, active, nonacid, mesic Fluvaquentic Endoaquepts
Lily	Fine-loamy, siliceous, semiactive, mesic Typic Hapludults
Lobdell	Fine-loamy, mixed, active, mesic Fluvaquentic Eutrudepts
Monongahela	Fine-loamy, mixed, semiactive, mesic Typic Fragiudults
*Nelse	Sandy, mixed, mesic Mollic Udifluvents
Pipestem	Fine, mixed, active, mesic Dystric Eutrudepts
Potomac	Sandy-skeletal, mixed, mesic Typic Udifluvents

Table 26.—Soil Classification Key

(An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series)

```
ORDER
   Suborder
      Great Group
         Subgroup
            Series or Higher Category
```

```
ALFISOLS
   Udalfs
      Fragiudalfs
         Oxyaquic Fragiudalfs
            Hustontown--------------------Fine-loamy, mixed, semiactive, mesic Aquic Fragiudalfs
      Hapludalfs
         Typic Hapludalfs
            Kanawha-----------------------Fine-loamy, mixed, active, mesic Typic Hapludalfs
         Ultic Hapludalfs
            Chavies-----------------------Coarse-loamy, mixed, active, mesic Ultic Hapludalfs
            Cateache----------------------Fine-loamy, mixed, active, mesic Ultic Hapludalfs

ENTISOLS
   Fluvents
      Udifluvents
         Typic Udifluvents
            Yeager------------------------Sandy, mixed, mesic Typic Udifluvents
            Potomac-----------------------Sandy-skeletal, mixed, mesic Typic Udifluvents
         Mollic Udifluvents
           *Nelse-------------------------Sandy, mixed, mesic Mollic Udifluvents

INCEPTISOLS
   Aquepts
      Endoaquepts
         Fluvaquentic Endoaquepts
            Holly-------------------------Fine-loamy, mixed, active, nonacid, mesic Fluvaquentic
                                           Endoaquepts
   Udepts
      Dystrudepts
         Lithic Dystrudepts
            Weikert-----------------------Loamy-skeletal, mixed, active, mesic Lithic Dystrudepts
         Fluventic Dystrudepts
            Pope--------------------------Coarse-loamy, mixed, active, mesic Fluventic Dystrudepts
            Craigsville-------------------Loamy-skeletal, mixed, superactive, mesic Fluventic
                                           Dystrudepts
         Ruptic-Ultic Dystrudepts
            Litz--------------------------Loamy-skeletal, mixed, active, mesic Ruptic-Ultic Dystrudepts
         Typic Dystrudepts
            Berks-------------------------Loamy-skeletal, mixed, active, mesic Typic Dystrudepts
            Highsplint--------------------Loamy-skeletal, mixed, active, mesic Typic Dystrudepts
      Eutrudepts
         Fluvaquentic Eutrudepts
            Middlebury--------------------Coarse-loamy, mixed, superactive, mesic Fluvaquentic
                                           Eutrudepts
            Lobdell-----------------------Fine-loamy, mixed, active, mesic Fluvaquentic Eutrudepts
      Dystric Fluventic Eutrudepts
            Grigsby-----------------------Coarse-loamy, mixed, active, mesic Dystric Fluventic
                                           Eutrudepts
      Dystric Eutrudepts
            Pipestem----------------------Fine, mixed, active, mesic Dystric Eutrudepts

MOLLISOLS
   Udolls
      Hapludolls
         Fluventic Hapludolls
             Combs------------------------Coarse-loamy, mixed, active, mesic Fluventic Hapludolls
```

Table 26.—Soil Classification Key—Continued

```
ORDER
   Suborder
      Great Group
         Subgroup
            Series or Higher Category

ULTISOLS
   Udults
      Fragiudults
         Typic Fragiudults
            Monongahela-------------------Fine-loamy, mixed, semiactive, mesic Typic Fragiudults
           *Laidig------------------------Fine-loamy, siliceous, semiactive, mesic Typic Fragiudults
     Hapludults
         Typic Hapludults
            Gilpin------------------------Fine-loamy, mixed, active, mesic Typic Hapludults
            Pineville---------------------Fine-loamy, mixed, active, mesic Typic Hapludults
            Lily--------------------------Fine-loamy, siliceous, semiactive, mesic Typic Hapludults
            Macove------------------------Loamy-skeletal, mixed, active, mesic Typic Hapludults
        Aquic Hapludults
            Cotaco------------------------Fine-loamy, mixed, semiactive, mesic Aquic Hapludults
```

Appendices

Appendix 1.—Vegetation Community Types in Bluestone National Scenic River

(This table shows the vegetation community types in Bluestone National Scenic River [BLUE], their corresponding U.S. National Vegetation Classification [USNVC] association names and element codes, and their global conservation ranks)

BLUE community type name	USNVC association name	USNVC element code	Global conservation rank
UPLAND FORESTS AND WOODLANDS:			
Calcareous Oak Forest	Quercus muehlenbergii – Quercus (alba, rubra) – Carya cordiformis / Viburnum prunifolium Forest	CEGL004793	G3G4
Eastern Hemlock – American Basswood Forest	Tsuga canadensis – (Fagus grandifolia, Tilia americana var. heterophylla) / Magnolia tripetala Forest	CEGL008407	G4
Eastern Hemlock – Chestnut Oak Forest	Tsuga canadensis – Quercus prinus – Betula lenta Forest	CEGL006923	G3
Eastern Hemlock – Sweet Birch – Tuliptree / Great Laurel Forest	Liriodendron tulipifera – Betula lenta – Tsuga Canadensis / Rhododendron maximum Forest	CEGL007543	G5
Oak - Eastern White Pine / Ericad Forest Great Laurel Forest	Pinus strobis – Quercus alba – Quercus prinus / Vaccinium stamineum Forest	CEGL008539	G4
Oak – Hickory – Sugar Maple Forest	Quercus prinus – Carya ovata – Quercus rubra / Acer saccharum Forest	CEGL007268	G4?
Successional Black Locust Woodland	Robinia pseudoacacia Forest	CEGL007279	GNA
Successional Eastern White Pine - Tuliptree Forest	Pinus strobis Successional Forest	CEGL007944	GNA
Successional Tuliptree / Northern Spicebush Forest	Liriodendron tulipifera / (Cercis canadensis) / (Lindera benzoin) Forest	CEGL007220	GNA
Successional Virgin Pine Forest	Pinus virginiana Successional Forest	CEGL002591	GNA
Sugar Maple – Yellow Buckeye – American Basswood Forest	Liriodendron tulipifera – Tilia americana var. heterophylla - Aesculus flava – Acer saccharum / (Magnolia tripetala) Forest	CEGL005222	G4?
Virginia Pine – Oak Shale Woodland	Quercus prinus – Pinus virginiana – (Pinus pungens) / Schizachyrium scoparium – Dichanthelium depauperatum Woodland	CEGL008540	G2?

Appendix 1.—Vegetation Community Types in Bluestone National Scenic River—Continued

BLUE community type name	USNVC association name	USNVC element code	Global conservation rank
RIPARIAN COMMUNITIES:			
Eastern Hemlock Floodplain Forest	Tsuga canadensis - Quercus rubra - (Platanus occidentalis, Betula nigra) / Rhododendron maximum / A nemone quinquefolia Forest	CEGL006620	GNR
Oak - Hickory Floodplain Forest	Quercus (rubra, velutina, alba) / Carpinus caroliniana - (Halesia tetraptera) / Maianthemum racemosum Forest	CEGL006462	GNR
River Birch Backwater Floodplain Forest	Betula nigra - Platanus occidentalis Forest	CEGL002086	G5
Riverbank Tall Herbs	Verbesina alternifolia - Elymus riparius - Solidago gigantea (Teucrium canadense) Herbaceous Vegetation	CEGL006480	GNR
Successional Black Walnut Floodplain Forest	Juglans nigra / Verbesina alternifolia Forest	CEGL007879	GNA
Successional Box-elder Floodplain Forest	Acer negundo Forest	CEGL005033	G4G5
Successional Eastern Red-cedar Woodland	Juniperus virginiana Forest	CEGL006024	GNA
Sycamore - Ash Floodplain Forest	Plantanus occidentalis - Fraxinus pennsylvanica / Carpinus caroliniana / Verbesina alternifolia Forest	CEGL006458	GNR
Sycamore - River Birch Riverscour Woodland	Plantanus occidentalis - Betula nigra / Cornus amomum / (Andropogon gerardii, Chasmanthium latifolium) Temporarily Flooded Woodland	CEGL003725	GNR
Sycamore - Yellow Buckeye Floodplain Forest	Platanus occidentalis / Aesculus flava Forest	CEGL006466	GNR

Appendix 2.—Index of Common and Scientific Plant Names and Plant Symbols Sorted by Common Name

(Plants displayed occur within the National Soils Information System (NASIS) plant tables used for the soil survey area. The scientific and common names are referenced at the USDA PLANTS database: plants.usda.gov)

Local common name	Scientific name	Plant symbol
American basswood	Tilia americana	TIAM
American beech	Fagus grandifolia	FAGR
American elm	Ulmus americana	ULAM
American hornbeam	Carpinus caroliniana	CACA18
American sycamore	Platanus occidentalis	PLOC
black cherry	Prunus serotina	PRSE2
black locust	Robinia pseudoacacia	ROPS
black oak	Quercus velutina	QUVE
black walnut	Juglans nigra	JUNI
blackgum	Nyssa sylvatica	NYSY
bloodroot	Sanguinaria canadensis	SACA13
blue cohosh	Caulophyllum thalictroides	CATH2
blue mistflower	Conoclinium coelestinum	COCO13
boxelder	Acer negundo	ACNE2
brackenfern	Pteridium aquilinum	PTAQ
Canada wildrye	Elymus canadensis	ELCA4
Carolina silverbell	Halesia carolina	HACA3
cattail	Typha latifolia	TYLA
chestnut oak	Quercus prinus	QUPR2
Christmas fern	Polystichum acrostichoides	POAC4
clover	Trifolium	TRIFO
common hackberry	Celtis occidentalis	CEOC
cucumbertree	Magnolia acuminata	MAAC
deertongue	Dichanthelium clandestinum	DICL
eastern poison ivy	Toxicodendron radicans	TORA2
eastern poison ivy	Toxicodendron radicans ssp. radicans	TORAR
eastern redbud	Cercis canadensis	CECA4
eastern white pine	Pinus strobus	PIST
flowering dogwood	Cornus florida	COFL2
grass		2GP
grass, annual		2GA
green ash	Fraxinus pennsylvanica	FRPE
greenbrier	Smilax rotundifolia	SMRO
hawthorn	Crataegus	CRATA
hickory	Carya	CARYA
Indian woodoats	Chasmanthium latifolium	CHLA5
ironwood	Eusideroxylon	EUSID
Japanese knotweed	Polygonum cuspidatum	POCU6
maidenfern	Adiantum pedatum	ADPE
mayapple	Podophyllum peltatum	POPE
mockernut hickory	Carya alba	CAAL27
mountain laurel	Kalmia latifolia	KALA
northern red oak	Quercus rubra	QURU
northern spicebush	Lindera benzoin	LIBE3
pawpaw	Asimina	ASIMI
pin oak	Quercus palustris	QUPA2
post oak	Quercus stellata	QUST
red maple	Acer rubrum	ACRU
rhododendron	Rhododendron	RHODO
river birch	Betula nigra	BENI
sassafras	Sassafras albidum	SAAL5
scarlet oak	Quercus coccinea	QUCO2
sedges	Carex	CAREX
shagbark hickory	Carya ovata	CAOV2
silver maple	Acer saccharinum	ACSA2
slippery elm	Ulmus rubra	ULRU
sourwood	Oxydendrum arboreum	OXAR

Appendix 2.—Index of Common and Scientific Plant Names and Plant Symbols Sorted by Common Name—Continued

Local common name	Scientific name	Plant symbol
southern arrowwood	Viburnum dentatum	VIDE
sphagnum	Sphagnum capillifolium	SPCA70
spiderwort	Tradescantia	TRADE
stinging nettle	Urtica dioica	URDI
stinging nettle	Urtica dioica ssp. holosericea	URDIH
sugar maple	Acer saccharum	ACSA3
sweet birch	Betula lenta	BELE
thoroughwort	Eupatorium	EUPAT
tree of heaven	Ailanthus altissima	AIAL
trillium	Trillium	TRILL
trout lily	Erythronium americanum	ERAM5
Virginia creeper	Parthenocissus quinquefolia	PAQU2
Virginia pine	Pinus virginiana	PIVI2
Virginia wildrye	Elymus virginicus	ELVI3
white ash	Fraxinus americana	FRAM2
white baneberry	Actaea pachypoda	ACPA
white oak	Quercus alba	QUAL
white snakeroot	Ageratina altissima	AGAL5
wingstem	Verbesina alternifolia	VEAL
woodland sunflower	Helianthus divaricatus	HEDI2
yellow buckeye	Aesculus flava	AEFL
yellow-poplar	Liriodendron tulipifera	LITU

Appendix 3.—Index of Common and Scientific Plant Names and Plant Symbols Sorted by Plant Symbol

(Plants displayed occur within the National Soils Information System (NASIS) plant tables used for the soil survey area. The scientific and common names are referenced at the USDA PLANTS database: plants.usda.gov)

Local common name	Scientific name	Plant symbol
grass, annual		2GA
grass		2GP
boxelder	Acer negundo	ACNE2
white baneberry	Actaea pachypoda	ACPA
red maple	Acer rubrum	ACRU
silver maple	Acer saccharinum	ACSA2
sugar maple	Acer saccharum	ACSA3
maidenfern	Adiantum pedatum	ADPE
yellow buckeye	Aesculus flava	AEFL
white snakeroot	Ageratina altissima	AGAL5
tree of heaven	Ailanthus altissima	AIAL
pawpaw	Asimina	ASIMI
sweet birch	Betula lenta	BELE
river birch	Betula nigra	BENI
mockernut hickory	Carya alba	CAAL27
American hornbeam	Carpinus caroliniana	CACA18
shagbark hickory	Carya ovata	CAOV2
sedges	Carex	CAREX
hickory	Carya	CARYA
blue cohosh	Caulophyllum thalictroides	CATH2
eastern redbud	Cercis canadensis	CECA4
common hackberry	Celtis occidentalis	CEOC
Indian woodoats	Chasmanthium latifolium	CHLA5
blue mistflower	Conoclinium coelestinum	COCO13
flowering dogwood	Cornus florida	COFL2
hawthorn	Crataegus	CRATA
deertongue	Dichanthelium clandestinum	DICL
Canada wildrye	Elymus canadensis	ELCA4
Virginia wildrye	Elymus virginicus	ELVI3
trout lily	Erythronium americanum	ERAM5
thoroughwort	Eupatorium	EUPAT
ironwood	Eusideroxylon	EUSID
American beech	Fagus grandifolia	FAGR
white ash	Fraxinus americana	FRAM2
green ash	Fraxinus pennsylvanica	FRPE
Carolina silverbell	Halesia carolina	HACA3
woodland sunflower	Helianthus divaricatus	HEDI2
black walnut	Juglans nigra	JUNI
mountain laurel	Kalmia latifolia	KALA
northern spicebush	Lindera benzoin	LIBE3
yellow-poplar	Liriodendron tulipifera	LITU
cucumbertree	Magnolia acuminata	MAAC
blackgum	Nyssa sylvatica	NYSY
sourwood	Oxydendrum arboreum	OXAR
Virginia creeper	Parthenocissus quinquefolia	PAQU2
eastern white pine	Pinus strobus	PIST
Virginia pine	Pinus virginiana	PIVI2
American sycamore	Platanus occidentalis	PLOC
Christmas fern	Polystichum acrostichoides	POAC4
Japanese knotweed	Polygonum cuspidatum	POCU6
mayapple	Podophyllum peltatum	POPE
black cherry	Prunus serotina	PRSE2
brackenfern	Pteridium aquilinum	PTAQ
white oak	Quercus alba	QUAL
scarlet oak	Quercus coccinea	QUCO2
pin oak	Quercus palustris	QUPA2
chestnut oak	Quercus prinus	QUPR2

Appendix 3.—Index of Common and Scientific Plant Names and Plant Symbols Sorted by Plant Symbol—Continued

Local common name	Scientific name	Plant symbol
northern red oak	Quercus rubra	QURU
post oak	Quercus stellata	QUST
black oak	Quercus velutina	QUVE
rhododendron	Rhododendron	RHODO
black locust	Robinia pseudoacacia	ROPS
sassafras	Sassafras albidum	SAAL5
bloodroot	Sanguinaria canadensis	SACA13
greenbrier	Smilax rotundifolia	SMRO
sphagnum	Sphagnum capillifolium	SPCA70
American basswood	Tilia americana	TIAM
eastern poison ivy	Toxicodendron radicans	TORA2
eastern poison ivy	Toxicodendron radicans ssp. radicans	TORAR
spiderwort	Tradescantia	TRADE
clover	Trifolium	TRIFO
trillium	Trillium	TRILL
cattail	Typha latifolia	TYLA
American elm	Ulmus americana	ULAM
slippery elm	Ulmus rubra	ULRU
stinging nettle	Urtica dioica	URDI
stinging nettle	Urtica dioica ssp. holosericea	URDIH
wingstem	Verbesina alternifolia	VEAL
southern arrowwood	Viburnum dentatum	VIDE

Appendix 4.—Lab Sampled Pedons

(The pedons listed below were analyzed by the Kellogg Soil Survey Laboratory, Natural Resources Conservation Service, Lincoln, Nebraska. The results of physical and chemical analyses of these pedons are available on the Internet at http://ssldata.nrcs.usda.gov/)

Correlated name	Pedon type	Sampled as name	User site ID	User pedon ID	Lab source	Lab pedon number
		Berks	83KY195005	83KY195005	SSL	83P0668
		Berks	83KY195006	83KY195006	SSL	83P0669
		Berks	83KY195009	83KY195009	SSL	83P0672
		Berks	86WV005006	86WV005006	SSL	86P0692
		Berks	86WV047002	86WV047002	SSL	86P0685
Berks	Within range of map unit	Berks	86WV005006	86WV005006	SSL	86P0692
Berks	Within range of series	Berks	86WV047002	86WV047002	SSL	86P0685
Berks	Within range of map unit	Berks	S02WV019001	S02WV019001	NSSL	02N1119
Berks	Within range of map unit	Berks	S02WV019004	S02WV019004	NSSL	02N1122
Berks	Within range of map unit	Berks	S02WV019010	S02WV019010	NSSL	02N1128
Berks	Modal pedon for series	Berks	S02WV019012 Berks	S02WV019012 Berks	NSSL	02N1130
Cateache	Typical pedon for series	Cateache	S03WV089006 CATEACHE REV	03NPSWV089006 CATEACHE	NSSL	04N0131
Highsplint	Modal pedon for series	Highsplint	S02WV019013 HIGHSPLINT	02NPSWV019013 HIGHSPLINT	NSSL	02N1131
Laidig	Taxadjunct to the series	Laidig	S06WV019004 LAIDIG REV	06NPSWV019004 LAIDIG	NSSL	06N0901
Pipestem	Typical pedon for series	Shouns	S03WV081001 PIPESTEM	03NPSWV081001 PIPESTEM	NSSL	04N0121

NRCS Accessibility Statement

The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

Nondiscrimination Statement

Nondiscrimination Policy

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To File an Employment Complaint

If you wish to file an employment complaint, you must contact your agency's EEO Counselor (http://directives.sc.egov.usda.gov/33081.wba) within 45 days of the date of the alleged discriminatory act, event, or personnel action. Additional information can be found online at http://www.ascr.usda.gov/complaint_filing_file.html.

To File a Program Complaint

If you wish to file a Civil Rights program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, found online at http://www.ascr.usda.gov/complaint_filing_cust.html or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter by mail to U.S. Department of Agriculture; Director, Office of Adjudication; 1400 Independence Avenue, S.W.; Washington, D.C. 20250-9419; by fax to (202) 690-7442; or by email to program.intake@usda.gov.

Persons with Disabilities

If you are deaf, are hard of hearing, or have speech disabilities and you wish to file either an EEO or program complaint, please contact USDA through the Federal Relay Service at (800) 877-8339 or (800) 845-6136 (in Spanish).

If you have other disabilities and wish to file a program complaint, please see the contact information above. If you require alternative means of communication for program information (e.g., Braille, large print, audiotape, etc.), please contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

Supplemental Nutrition Assistance Program

For additional information dealing with Supplemental Nutrition Assistance Program (SNAP) issues, call either the USDA SNAP Hotline Number at (800) 221-5689, which is also in Spanish, or the State Information/Hotline Numbers (http://directives.sc.egov.usda.gov/33085.wba).

All Other Inquiries

For information not pertaining to civil rights, please refer to the listing of the USDA Agencies and Offices (http://directives.sc.egov.usda.gov/33086.wba).