United States Department of Agriculture

Natural Resources Conservation Service

United States Department of the Interior

National Park Service

Soil Survey of Gauley River National Recreation Area, West Virginia

How To Use This Soil Survey

General Soil Map

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

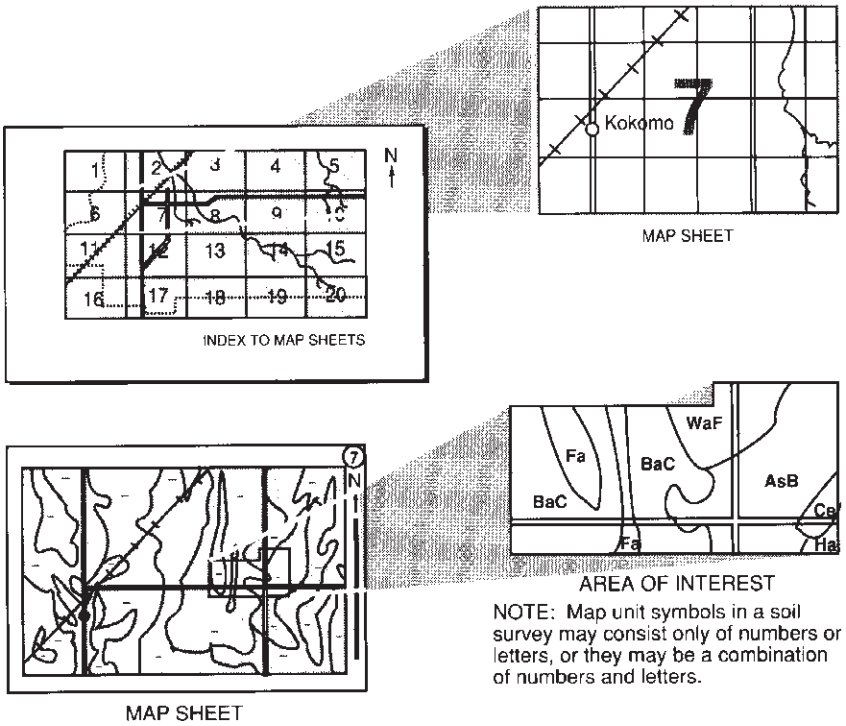
Detailed Soil Maps

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

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

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page 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

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Literature Citation

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Cover Caption

Cliffs formed by the Lower Nuttall sandstone. These cliffs make up the Rock outcrop component of map unit LmF (Layland-Rock outcrop complex, 35 to 70 percent slopes, very rubbly).

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Preface

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 Gauley River National Recreation Area, West Virginia.

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. Broad areas of soils are shown on the general soil map. 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 National Park Service headquarters in Glen Jean, West Virginia.

Soil Survey of Gauley River National Recreation Area, West Virginia

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United States Department of Agriculture, Natural Resources Conservation Service, and United States Department of the Interior, National Park Service

Gauley River National Recreation Area is located in parts of Nicholas and Fayette Counties, West Virginia (fig. 1). This park was created in 1988 and encompasses over 11,000 acres of land along the Gauley and Meadow Rivers. The 25 miles of the free-flowing Gauley River and the 6 miles of the Meadow River pass through scenic gorges and valleys containing a wide variety of natural and cultural features. The Gauley River contains several class V+ rapids, making it one of the most adventurous whitewater boating rivers in the East.

General Nature of the Survey Area

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

History

The Gauley River flows through some of the most rugged terrain in central West Virginia. Settlement of the area began in the 1770s. This led to increasing tension with the Native Americans living in the area. In 1792, two young daughters of Henry Morris were killed while going to herd cows near their home in Lockwood. A militia was raised, but no trace of the attackers was ever found. This was one of the last attacks by Native Americans in the area, but this would not be the last blood spilled along the Gauley.

In September 1861, the Civil War's Battle of Carnifex Ferry was fought (fig. 2). Union troops engaged Confederate soldiers and forced them to evacuate an entrenched position on the Henry Patterson Farm, which overlooked the ferry. The Confederates retreated across the river and fell back, following the Meadow River upstream to Meadow Bluff near Lewisburg. The battle represented the failure of a Confederate drive to regain control of the Kanawha Valley. As a result, the movement for West Virginia statehood proceeded without serious threat from the Confederates.

In the late 1800s, timber cutting began on a large scale. This led to the establishment of railroad lines throughout the survey area. In the early 1900s, the great expansion of the coal industry led to further expansion of the rail lines.

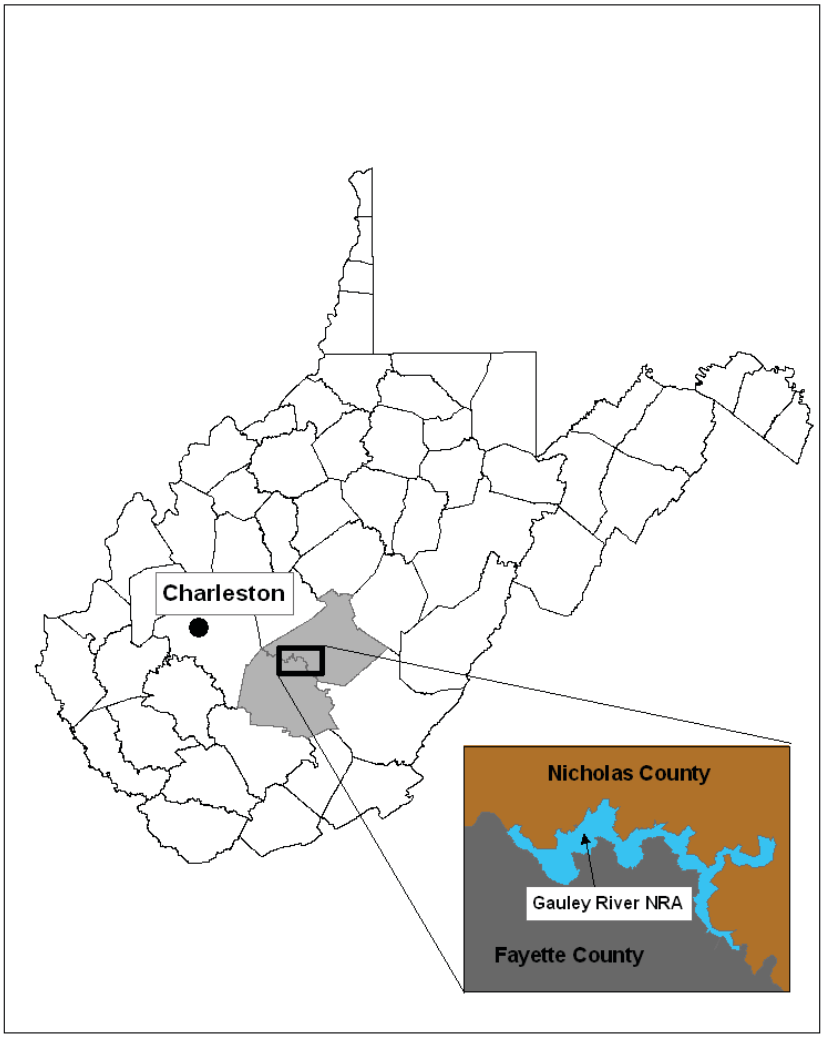

Figure 1.—Location of Gauley River National Recreation Area near Summersville, West Virginia.

In 1905, the Cherry River Paper Company, the William F. Mosser Company (a tannery), and other industries began operations at Richwood. This led to 21 years of industrial pollution in the Gauley River. The pollution became so bad that the river became known as the River of Ink. In 1927, the West Virginia State Wildlife League successfully obtained funds to clean up the river.

By 1965, Summersville Dam was completed. The dam controlled flooding downstream and created Summersville Lake. The lake boasts 51 miles of shoreline and is a popular location for boaters and fishing enthusiasts. The lake also helps support the whitewater rafting industry. Over 60,000 whitewater enthusiasts come to the Gauley River every fall to paddle what is considered by many to be the one of the best whitewater rivers in the country. Gauley Season begins the first weekend after Labor Day and continues for 6 weekends. The Gauley River drops more than 668 feet through 28 miles of rugged terrain. This complex stretch of whitewater features more than 100 rapids with a steep gradient, technical runs, and an incredible volume of water, which produce huge waves. This river's vigorous rapids, scenic quality, and remote location combine to make it one of the premier whitewater runs in the world (http://www.nps.gov/gari/historyculture/index.htm).

Figure 2.—A view of the confluence of the Gauley and Meadow Rivers near the site of Carnifex Ferry.

Environment

The Gauley River Basin is part of the unglaciated Allegheny Plateau where the age of the rock strata exceeds 300 million years. The high knobs and ridges are deeply dissected by streams that create narrow canyons with steep slopes.

The Gauley River begins in Pocahontas County, West Virginia, at an elevation of about 4,600 feet. It flows generally west-southwest and drains 1,422 square miles. The Gauley meets the New River at Gauley Bridge and forms the Kanawha River, a major tributary of the Ohio River. Downstream from Summersville Dam, where the boundary of the recreation area begins, the river has cut a gorge which is 500 feet deep. The Gauley River flows through the gorge for approximately 24 miles with a stream gradient of 28 feet per mile. Within the gorge, the river is characterized by alternating pools and rapids with torrential water, boulders, and exposed bedrock.

Vegetation is diverse and abundant. Extremes in topography, elevation, and microclimate have caused tremendous variation in plant life. Most of the recreation area is below 2,000 feet in elevation and forested. The forest cover is classified as the central hardwood forest type. Tree species in this forest type include northern red oak, white oak, American beech, yellow-poplar, hemlock, and dogwood. The diverse vegetation supports a wide variety of wildlife species.

Rare and threatened species inhabit the recreation area. They include one federally threatened plant species (Virginia spiraea) and five category 2 species (Barbara's buttons, Allegheny woodrat, cerulean warbler, eastern hellbender, and finescale saddled darter). Category 2 species may be proposed for threatened or endangered status, but more data is required to confirm the need for such protection. State-listed species of concern found within the recreation area include nine plant, one bird, one butterfly, one fish, and two amphibian species (http://www.nps.gov/gari/naturescience/index.htm).

Climate

Weather in the Gauley River area is seasonal, and the climate generally mild. Winter can bring significant snowfall, but it is usually short-lived. Summers can be warm and humid.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Summersville Lake 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 0.05 degree C (32.1 degrees F) and the average daily minimum temperature is -5.38 degrees C (22.3 degrees F). The lowest temperature on record, which occurred at Summersville Lake on January 21, 1985, is -28.8 degrees C (-20 degrees F). In summer, the average temperature is 20.4 degrees C (68.8 degrees F) and the average daily maximum temperature is 26.4 degrees C (79.6 degrees F). The highest recorded temperature, which occurred at Summersville Lake on August 16, 1988, is 34.4 degrees C (94 degrees F).

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 (4.4 degrees C or 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 1,207 millimeters (47.52 inches). Of this, 668.8 millimeters (26.33 inches), or about 55 percent, usually falls in May through October. The growing season for most crops falls within this period. The heaviest 1-day rainfall during the period of record was 131 millimeters (5.16 inches), recorded at Summersville Lake on July 2, 1986. Thunderstorms occur on about 46 days each year, and most occur in July.

The average seasonal snowfall is 1,094.4 millimeters (43.1 inches). The greatest snow depth at any one time during the period of record was 482.6 millimeters (19 inches), recorded on January 1, 1968. On an average, 36 days per year have at least 25.4 millimeters (1 inch) of snow on the ground. The heaviest 1-day snowfall on record (the famous Storm of the Century) was 381 millimeters (15 inches), recorded on March 12, 1993.

The average relative humidity in mid-afternoon is about 57 percent. Humidity is higher at night, and the average at dawn is about 81 percent. The sun shines 57 percent of the time in summer and 36 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 7.1 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 within Gauley River National Recreation Area. A scoping meeting was held in 2006 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 Gauley River National Recreation Area soil survey was initiated in 2006. It includes part of two existing soil surveys: the soil survey of Fayette and Raleigh Counties, West Virginia and the soil survey of Nicholas County, West Virginia. Fieldwork for the project commenced in 2007 and ended in 2010 and concentrated on areas of concern pointed out by park staff. In some instances, because data was clipped from more than one county-based set of soil maps, some same-named detailed soil map units may have more than one map symbol and their properties may vary.

Figure 3.—Soil scientists use amoozemeters to collect field data on saturated hydraulic conductivity.

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

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

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were

Figure 4.—Soil scientists preparing soil samples for bulk density analysis.

formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

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

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted 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 (fig. 3). After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units).

Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil Taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests (fig. 4). 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. They identified each of these bodies as a specific map unit.

General Soil Map Units

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

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

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

1. Rubble land-Pope-Cottonbend

Rubble land and nearly level to strongly sloping, well drained soils that formed in alluvium washed from acid upland soils; on flood plains and terraces of the Gauley and Meadow Rivers

In this map unit, the landscape is characterized by a narrow, rugged riparian zone along the swift-flowing Gauley and Meadow Rivers and a broad, ancient alluvial terrace high above the Gauley River. The riparian zone is commonly covered with boulders and stones. The alluvial parent materials that form the soils in this map unit have washed from upland soils that are acid. Slopes range from 0 to 15 percent.

This map unit makes up about 8 percent of the survey area. It is about 35 percent Rubble land, 25 percent Pope soils, 10 percent Cottonbend soils, and 30 percent soils and miscellaneous areas of minor extent.

The Rubble land consists of sandstone boulders and stones which have toppled into the riparian zone from the nearly continuous line of sheer cliffs along the valley walls of the gorges of the Gauley and Meadow Rivers. Many of the boulders are huge, commonly the size of a house. The boulders and stones have formed the rapids for which the Gauley and Meadow Rivers are famous. Most areas of Rubble land support little or no vegetation because there is no soil development.

The Pope soils are very deep, well drained, and nearly level. They are on small, narrow flood-plain bottoms along the rivers and along Peters Creek. The soils are subject to occasional or rare flooding. They formed in medium to coarse textured, acid alluvium. They have a dark brown, coarse textured surface horizon; a yellowish brown to strong brown, coarse textured subsoil that is weakly developed; and a yellowish brown, coarse textured substratum that has a high rock fragment content. They have medium natural fertility but, because of their relatively coarse textures, have a low water-holding capacity which limits their productivity.

The Cottonbend soils are very deep, well drained, and gently sloping to strongly sloping. They only occur on a terrace high above the Gauley River at a site known as Koontz Bend. Kootz Bend, an ancient landform, was the flood plain of the Gauley River eons ago. The Gauley River flood plain is presently almost 200 feet lower in elevation than site of the Cottonbend soils. The geologic strata under the site are dominated by the massive Lower Nuttall sandstone, a very hard bedrock that is resistant to weathering. It took a very long time for the Gauley River to cut 200 feet through this stratum to its present elevation. Cottonbend soils formed in medium to coarse textured alluvium. They have a thick, dark brown, medium textured surface horizon and a medium textured, well developed subsoil that grades from strong brown to red. Because these soils are very old and weathered, they have low natural fertility.

The minor components of this map unit include Craigsville and Allegheny soils and Typic Haplorthods. The very deep, well drained Craigsville soils are intermingled on the landscape with the Pope soils. They most commonly occur on the margins of the outside bends of rivers and on small islands. The very deep, well drained Allegheny soils are on the Koontz Bend terrace. The very deep, well drained Typic Haplorthods are on an island in the Meadow River under a heavy canopy of eastern hemlock and rhododendron. Also included are small areas of Riverwash, which exhibit little soil development and support little or no vegetation, and Water (the Gauley and Meadow Rivers).

Most of this map unit is forested. A few areas that were cleared and used for agriculture in the past have reverted back to forest. Areas of the Pope and Cottonwood soils and minor Craigsville soils are classified as prime farmland. The main soil limitations are the boulders and stones and flooding in the riparian zone.

2. Highsplint-Berks-Clifftop

Moderately steep to very steep, well drained soils that formed in materials derived from the Kanawha Formation of the Pottsville Group

In this map unit, the landscape is characterized by rugged, steep and very steep mountain slopes with narrow ridgetops and moderately steep and steep footslopes. It is underlain by interbedded layers of siltstone, shale, sandstone, coal, and thin beds of limestone (members of the Kanawha Formation). The soils are in the Gauley River gorge and on surrounding uplands in the western part of the survey area. They generally have medium natural fertility and, under good management, are capable of producing high-quality timber. Slopes range from 15 to 80 percent.

This map unit makes up about 28 percent of the survey area. It is about 30 percent Highsplint soils, 23 percent Berks soils, 15 percent Clifftop soils, and 32 percent soils of minor extent.

The Highsplint soils are very deep, well drained, and moderately steep to very steep. They formed in colluvium derived from interbedded shale, siltstone, and sandstone and are on linear to concave portions of backslopes. The soils have a very dark grayish brown to dark yellowish brown, medium textured surface horizon and a yellowish brown to dark yellowish brown, medium textured subsoil that is weakly developed and has a relatively high rock fragment content.

The Berks soils are moderately deep, well drained, and very steep. They formed in residuum derived from interbedded shale, siltstone, and sandstone. The soils are on convex portions of backslopes. They have a thin, dark brown to dark yellowish brown, medium textured surface horizon and a yellowish brown, medium textured subsoil that is weakly developed and has a high rock fragment content. Hard bedrock is at a depth of 51 to 102 centimeters (20 to 40 inches). Because of the high rock fragment content, these soils have a low water-holding capacity which limits their productivity.

The Clifftop soils are moderately deep, well drained, and moderately steep or steep. They formed in acid residuum derived mainly from interbedded shale and

siltstone. The soils are on linear to convex portions of backslopes. They have a brown to dark yellowish brown, medium textured surface layer and a yellowish brown to strong brown, medium textured, well developed subsoil that has been enriched with translocated clay. Weathered bedrock is at a depth of 51 to 102 centimeters (20 to 40 inches).

The minor components of this map unit include Sharondale and Dekalb soils. The very deep, well drained Sharondale soils formed in colluvium and are in cool, north-facing mountain coves. These soils have thick, dark brown surface horizons and high natural fertility. This allows them to support abundant and diverse flora, including excellent stands of hardwood trees. The moderately deep, well drained Dekalb soils are on narrow ridgetops which are underlain by acid sandstone.

This map unit is forested. It contains no areas of prime farmland. The main soil limitations are the slope, slippage potential, and depth to bedrock.

3. Layland-Laidig-Rock outcrop

Very steep and steep, well drained soils that formed in materials derived from the New River Formation of the Pottsville Group and areas of Rock outcrop; on backslopes and footslopes of the gorges of the Gauley and Meadow Rivers

In this map unit, the landscape is characterized by very steep, rugged backslopes and steep footslopes of the gorges of the Gauley and Meadow Rivers. It is underlain by interbedded layers of sandstone, shale, siltstone, and coal of the New River Formation. Sandstone cliffs formed by the Lower Nuttall sandstone are a prominent feature of this landscape. Below the Lower Nuttall cliffs, stones and boulders cover up to 90 percent of the soil surface. The soils are acid have low natural fertility. Slopes range from 3 to 35 percent on the footslopes and up to 70 percent on the very steep backslopes of the river gorges.

This map unit makes up about 51 percent of the survey area. It is about 56 percent Layland soils, 17 percent Laidig soils, 6 percent Rock outcrop, and 21 percent soils and miscellaneous areas of minor extent.

The Layland soils are very deep and well drained. They are on very steep, slightly convex to linear portions of backslopes above the Lower Nuttall cliffs and on moderately steep, linear portions of footslopes below the cliffs. The soils formed in acid colluvium derived mainly from interbedded sandstone, shale, and siltstone. Where these soils occur above the Lower Nuttall cliffs, 1 to 50 percent of the surface is covered by stones. Below the cliffs, 50 to 90 percent of the surface is covered with stones and large boulders. The soils have a very dark grayish brown to brown, medium textured surface layer and a yellowish brown, medium textured subsoil that is weakly developed. These soils have a high content of sandstone stones, cobbles, and channers which generally increase in amount as depth increases.

The Laidig soils are very deep and well drained. They are on steep, linear to concave portions of backslopes above the Lower Nuttall cliffs and on gently sloping to moderately steep, concave footslopes below the cliffs. The soils formed in acid colluvium derived mainly from interbedded sandstone, shale, and siltstone. Where these soils occur above the Lower Nuttall cliffs, 1 to 50 percent of the surface is covered by stones. Below the cliffs, 50 to 90 percent of the surface is covered with stones and large boulders. The soils have a very dark grayish brown, medium textured surface layer and a yellowish brown, medium textured, well developed subsoil that has been enriched with translocated clay. In the lower part of the subsoil, below a depth of 76 centimeters (30 inches), these soils have a very firm, dense layer called a fragipan. This layer is slowly permeable and restricts the passage of plant roots and water through the soil profile.

The Rock outcrop is mainly the outcropping of the Lower Nuttall sandstone, a stratum of the New River Formation. This outcrop forms a nearly continuous line of

sheer cliffs almost 100 feet tall along the backslopes of the gorges of the Gauley and Meadow Rivers. The Lower Nuttall sandstone, as it is expressed in the survey area, is massive, hard, resistant to weathering, and highly siliceous.

The minor soils of this map unit include Dekalb, Clifftop, and Guyandotte soils. The moderately deep, well drained Dekalb soils formed in residuum derived mainly from acid sandstone, are on convex shoulder slopes and backslopes, and are commonly associated with Rock outcrop. The moderately deep, well drained Clifftop soils formed in residuum derived mainly from acid shale and siltstone and are on convex upper backslopes and shoulder slopes, above the Lower Nuttall cliffs. The very deep, well drained Guyandotte soils formed in acid colluvium and are on cool, north-facing slopes.

This map unit is forested. The main limitations of the soils for most uses are the slope, boulders and stones, cliffs (Rock outcrop), a high slippage potential, and the restricted permeability of the Laidig soils.

4. Clifftop-Nallen-Laidig

Gently sloping to moderately steep, well drained soils that formed in materials derived from the Pottsville Group; on summits and footslopes

In this map unit, the landscape is characterized by gently sloping to moderately steep, linear to convex summits and concave footslopes on the uplands surrounding the gorges of the Gauley and Meadow Rivers. It is underlain by interbedded layers of acid sandstone, siltstone, and shale and coal members of both the Kanawha and New River Formations of the Pottsville Group. The soils are acid and have low natural fertility. Slopes range from 3 to 35 percent.

This map unit makes up about 10 percent of the survey area. It is about 41 percent Clifftop soils, 22 percent Nallen soils, 12 percent Laidig soils, and 25 percent soils and miscellaneous areas of minor extent.

The Clifftop soils are moderately deep, well drained, and gently sloping to moderately steep. They formed in acid residuum derived mainly from interbedded shale, siltstone, and fine grained sandstone. The soils are on convex summits and shoulder slopes. They have a brown, medium textured surface layer and a yellowish brown, medium textured, well developed subsoil that has been enriched with translocated clay and has a relatively low rock fragment content. Weathered bedrock is at a depth of 51 to 102 centimeters (20 to 40 inches).

The Nallen soils are moderately deep, well drained, and gently sloping to moderately steep. They formed in residuum derived mainly from acid sandstone. The soils are located on convex summits. They have a very dark grayish brown, medium textured surface layer and a yellowish brown, medium to coarse textured, moderately well developed subsoil that has been slightly enriched with translocated clay and has a relatively low rock fragment content. Bedrock is at a depth of 51 to 102 centimeters (20 to 40 inches).

The Laidig soils are very deep, well drained, and dominantly gently sloping to moderately steep. They formed in acid colluvium derived mainly from interbedded sandstone, shale, and siltstone. The soils are on concave footslopes. They have a very dark grayish brown, medium textured surface layer and a yellowish brown, medium textured, well developed subsoil that has been enriched with translocated clay. In the lower part of the subsoil, below a depth of 76 centimeters (30 inches), the Laidig soils have a very firm, dense layer called a fragipan. This layer is slowly permeable and restricts the passage of plant roots and water through the soil profile.

The minor soils of this map unit include Dekalb, Fenwick, and Buchanan soils. The moderately deep, well drained Dekalb soils are on shoulder slopes and summits. The moderately deep, moderately well drained Fenwick soils are on broad, gently sloping to strongly sloping summits. The very deep, moderately well drained Buchanan soils

are on concave footslopes. Also included are miscellaneous areas of Rock outcrop, which are mostly associated with the Dekalb soils and are common on shoulder slopes.

Most of this map unit is forested. Some areas have been cleared and are used for agriculture or housing or are idle. The main limitations of the soils are the slope, depth to bedrock, surface stoniness, and the restricted permeability of the Laidig soils. Some gently sloping areas of the Clifftop and Nallen soils are classified as prime farmland.

5. Lithic Udorthents-Udorthents

Nearly level to very steep anthropogenic soils that formed in human-transported materials (HTM)

In this map unit, the landscape has been drastically disturbed by humans. The unit includes road and railroad grades and right-of-ways, the spillway of the Summersville Dam, and other areas where the soils and/or underlying bedrock have been excavated or placed as fill material. The parent materials of the soils are highly variable and may consist of one or more of the following materials: excavated and transported native soil materials, the substratum of native soils that have been exposed by excavation, and crushed and weathered bedrock, either of local origin or transported. These soils are young and have not been subjected to the soil-forming processes long enough for distinctive horizons to form; their physical and chemical properties are highly variable. Slopes range from 0 to 100 percent.

This map unit makes up about 3 percent of the survey area. It is about 61 percent Lithic Udorthents, 32 percent Udorthents, and 7 percent miscellaneous areas of minor extent.

The Lithic Udorthents are in areas that have been excavated (cut) without filling. They are most extensive in the area that was excavated for the spillway of the Summersville Dam. The soils are gently sloping to very steep, are typically less than 51 centimeters (20 inches) deep to bedrock, and have a low water-holding capacity.

The Udorthents are in areas that have been disturbed by excavation, grading, filling, dumping, or a combination of these activities. They are used for building sites, road beds, railroad grades, parking lots, and river access areas. The parent material is highly variable but commonly consists of a mixture of native soils and excavated bedrock from local sources. The soils are generally well drained, are deep or very deep to bedrock, and have a high rock fragment content. They are commonly highly compacted by earth-moving machinery.

The minor components of this map unit include areas of Rock outcrop and Urban land. The Rock outcrop has been exposed by excavation and forms highwalls along railroad right-of-ways and road cuts. The Urban land is any area that has been paved (roads) or is otherwise impervious to water.

Many areas of this map unit support non-native plant species. Because the properties of the soils are so variable, an onsite investigation is required to determine their suitability for use and management.

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, Allegheny loam, 8 to 15 percent slopes, is a phase of the Allegheny 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. Laidig-Clifftop complex, 15 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 acres, hectares, and proportionate extent of each map unit in the park. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

AgC—Allegheny loam, 8 to 15 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 302 to 328 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the Allegheny Soil

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

Setting
Landform: High stream terraces in river valleys
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 8 to 15 percent
Parent material: Fine-loamy alluvium

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 (K_{sat}): Moderately high
Natural drainage class: Well drained

Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 26.3 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 3e
West Virginia grassland suitability group (WVGSG): Acid Loams (AL3)
Dominant vegetation map class(es):
Successional (Virginia, Pitch) Pine Forest
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 1 centimeter; slightly decomposed plant material
Oe—1 to 4 centimeters; moderately decomposed plant material
A—4 to 26 centimeters; loam
BE—26 to 42 centimeters; loam
Bt—42 to 165 centimeters; clay loam

Minor Components

Cotaco soils
Percent of map unit: 10 percent
Slope: 8 to 15 percent
Landform: High stream terraces in river valleys of mountains
Hydric soil status: No

Clifftop soils
Percent of map unit: 8 percent
Slope: 8 to 15 percent
Landform: Ridges
Hydric soil status: No

Knowlton soils
Percent of map unit: 2 percent
Slope: 0 to 3 percent
Landform: Depressions on high stream terraces
Hydric soil status: Yes

BhG—Berks-Highsplint-Sharondale complex, 35 to 80 percent slopes, very stony

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 125—Cumberland Plateau and Mountains and
127—Eastern Allegheny Plateau and Mountains
Elevation: 211 to 558 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Berks and similar soils: 35 percent
Highsplint and similar soils: 30 percent

Sharondale and similar soils: 20 percent
Dissimilar minor components: 15 percent

Description of the Berks Soil

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

Setting
Landform: Convex mountain slopes
Landform position (two-dimensional): Summit, shoulder, and backslope
Landform position (three-dimensional): Mountaintop and mountain flank
Down-slope shape: Convex
Across-slope shape: Convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 35 to 80 percent
Parent material: Residuum weathered from interbedded sedimentary rock, mainly shale members of the Kanawha Formation of the Pottsville Group

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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Moderate (about 7.5 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
Oak - Hickory Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 2 centimeters; slightly decomposed plant material
A—2 to 19 centimeters; channery silt loam
BA—19 to 28 centimeters; channery silt loam
Bw—28 to 76 centimeters; very channery silt loam
C—76 to 98 centimeters; extremely channery silt loam
R—98 to 108 centimeters; bedrock

Description of the 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 80 percent
Parent material: Very stony colluvium derived from interbedded sedimentary rock, mainly members of the Kanawha Formation of the Pottsville Group

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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 15.8 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Sugar Maple - Yellow Buckeye - American Basswood 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 4 centimeters; moderately decomposed plant material
A—4 to 22 centimeters; channery loam and very channery loam
BA—22 to 31 centimeters; very channery loam
Bw—31 to 120 centimeters; very channery loam
BC—120 to 140 centimeters; extremely channery loam
C—140 to 165 centimeters; extremely channery loam

Description of the Sharondale Soil

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

Setting
Landform: North-facing mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountain flank
Down-slope shape: Linear
Across-slope shape: Concave
Aspect (representative): North
Aspect range: Northwest to east (clockwise)
Slope range: 35 to 80 percent

Parent material: Very stony colluvium derived from interbedded sedimentary rock, mainly members of the Kanawha Formation of the Pottsville Group

Properties and Qualities
Depth to restrictive feature: 152 to 251 centimeters to lithic bedrock
Shrink-swell potential: Low (about 2.7 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 (K_{sat}): High
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 20.0 centimeters)

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

Representative Profile
Oi—0 to 5 centimeters; slightly decomposed plant material
A—5 to 38 centimeters; channery loam
AB—38 to 51 centimeters; channery loam
Bw—51 to 160 centimeters; very channery loam
BC+C—160 to 218 centimeters; very channery loam
R—218 to 228 centimeters; bedrock

Minor Components

Matewan soils
Percent of map unit: 9 percent
Slope: 35 to 80 percent
Landform: Mountain slopes
Hydric soil status: No

Clifftop soils
Percent of map unit: 5 percent
Slope: 35 to 80 percent
Landform: Convex mountain slopes
Hydric soil status: No

Rock outcrop
Percent of map unit: 1 percent
Landform: Sandstone cliffs
Dominant vegetation map class(es):
Cliff Face
Hydric soil status: No

BuC—Buchanan loam, 8 to 15 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains and
125—Cumberland Plateau and Mountains
Elevation: 238 to 489 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the Buchanan Soil

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

Setting
Landform: Drainageways and footslopes on mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Aspect (representative): South
Aspect range: All aspects
Slope range: 8 to 15 percent
Parent material: Loamy colluvium derived from sandstone and siltstone

Properties and Qualities
Depth to restrictive feature: 51 to 91 centimeters to a 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 (K_{sat}): Moderately low
Natural drainage class: Moderately well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table (depth, kind): About 41 to 76 centimeters, perched (see table 25)
Available water capacity (entire profile): Very high (about 21.2 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 3e
West Virginia grassland suitability group (WVGSG): Acid Loams (AL2)
Dominant vegetation map class(es):
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Developed Area
Oak - Hickory Forest
Hydric soil status: No
Hydrologic soil group: C

Representative Profile
Oe—0 to 3 centimeters; moderately decomposed plant material
A+E—3 to 20 centimeters; fine sandy loam
Bt—20 to 53 centimeters; channery loam
Btx—53 to 152 centimeters; channery loam
C—152 to 165 centimeters; very channery sandy loam

Minor Components

Laidig soils
Percent of map unit: 10 percent
Slope: 8 to 15 percent
Landform: Drainageways and footslopes on mountain slopes
Hydric soil status: No

Clifftop soils
Percent of map unit: 5 percent
Slope: 8 to 15 percent
Landform: Ridges
Hydric soil status: No

Morehead soils
Percent of map unit: 5 percent
Slope: 0 to 3 percent
Landform: Low stream terraces
Hydric soil status: No

CIB—Clifftop channery silt loam, 3 to 8 percent slopes

Map Unit Setting

Landscape: Mountains (fig. 5)
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 382 to 591 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the Clifftop Soil

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

Setting
Landform: 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: 3 to 8 percent
Parent material: Acid fine-loamy residuum weathered from shale and siltstone

Figure 5.—Hayland in an area of Clifftop channery silt loam, 3 to 8 percent slopes. This map unit qualifies as prime farmland.

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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 13.0 centimeters)

Interpretive Groups

Land capability subclass (nonirrigated): 2e
West Virginia grassland suitability group (WVGSG): Acid Loams (AL3)
Dominant vegetation map class(es):
- Eastern Hemlock Plateau Forest
- Oak - Hickory Forest
- Developed Area
- Eastern Hemlock - Oak - Sweet Birch / Great Laurel 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; channery silt loam
BA—8 to 20 centimeters; silt loam
Bt—20 to 74 centimeters; channery silty clay loam
BC—74 to 91 centimeters; very channery silty clay loam
Cr—91 to 101 centimeters; bedrock

Minor Components

Nallen soils
Percent of map unit: 10 percent
Slope: 3 to 8 percent
Landform: Ridges
Hydric soil status: No

Dekalb soils
Percent of map unit: 5 percent
Slope: 4 to 12 percent
Landform: Ridges
Hydric soil status: No

Cookport soils
Percent of map unit: 3 percent
Slope: 3 to 8 percent
Landform: Broad ridges
Hydric soil status: No

Fenwick soils
Percent of map unit: 2 percent
Slope: 3 to 8 percent
Landform: Broad ridges
Hydric soil status: No

CIC—Clifftop channery silt loam, 8 to 15 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 356 to 591 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the Clifftop Soil

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

Setting
Landform: 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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 13.0 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 3e
West Virginia grassland suitability group (WVGSG): Acid Loams (AL3)
Dominant vegetation map class(es):
Eastern Hemlock Plateau Forest
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Oak - Hickory Forest
Developed Area
Hydric soil status: No
Hydrologic soil group: C

Representative Profile
Oi—0 to 3 centimeters; slightly decomposed plant material
A—3 to 8 centimeters; channery silt loam
BA—8 to 20 centimeters; silt loam
Bt—20 to 74 centimeters; channery silty clay loam
BC—74 to 91 centimeters; very channery silty clay loam
Cr—91 to 101 centimeters; bedrock

Minor Components

Nallen soils
Percent of map unit: 10 percent
Slope: 8 to 15 percent
Landform: Ridges
Hydric soil status: No

Dekalb soils
Percent of map unit: 5 percent
Slope: 8 to 15 percent
Landform: Ridges
Hydric soil status: No

Fenwick soils
Percent of map unit: 3 percent
Slope: 8 to 15 percent
Landform: Broad ridges
Hydric soil status: No

Cookport soils
Percent of map unit: 2 percent
Slope: 3 to 8 percent
Landform: Broad ridges
Hydric soil status: No

CID—Clifftop channery silt loam, 15 to 25 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 125—Cumberland Plateau and Mountains and 127—Eastern Allegheny Plateau and Mountains
Elevation: 319 to 551 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the Clifftop Soil

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

Setting
Landform: 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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 13.0 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 4e
West Virginia grassland suitability group (WVGSG): Acid Loams (AL3)

Dominant vegetation map class(es):
Eastern Hemlock Plateau Forest
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Oak - Hickory Forest
Developed Area
Hydric soil status: No
Hydrologic soil group: C

Representative Profile
Oi—0 to 3 centimeters; slightly decomposed plant material
A—3 to 8 centimeters; channery silt loam
BA—8 to 20 centimeters; silt loam
Bt—20 to 74 centimeters; channery silty clay loam
BC—74 to 91 centimeters; very channery silty clay loam
Cr—91 to 101 centimeters; bedrock

Minor Components

Nallen soils
Percent of map unit: 10 percent
Slope: 15 to 25 percent
Landform: Ridges
Hydric soil status: No

Dekalb soils
Percent of map unit: 5 percent
Slope: 15 to 25 percent
Landform: Ridges
Hydric soil status: No

Laidig soils
Percent of map unit: 5 percent
Slope: 15 to 35 percent
Landform: Drainageways and footslopes on mountain slopes
Hydric soil status: No

Layland soils
Percent of map unit: 5 percent
Slope: 15 to 25 percent
Landform: Mountain slopes
Hydric soil status: No

CIE—Clifftop channery silt loam, 25 to 35 percent slopes

Map Unit Setting

Landscape: Mountains (fig. 6)
Major land resource area(s): 125—Cumberland Plateau and Mountains and
127—Eastern Allegheny Plateau and Mountains
Elevation: 221 to 571 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Figure 6.—A stand of hardwood trees in an area of Clifftop channery silt loam, 25 to 35 percent slopes.

Description of the Clifftop Soil

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

Setting
Landform: Convex mountain slopes
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: Acid fine-loamy residuum weathered from shale and siltstone

Properties and Qualities
Depth to restrictive feature: 51 to 102 centimeters to paralithic bedrock (fig. 7)
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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None

Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 13.0 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 6e
West Virginia grassland suitability group (WVGSG): Acid Hills (AH3)
Dominant vegetation map class(es):
Oak - Hickory Forest
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Oak - Hickory - Sugar Maple Forest
Sugar Maple - Yellow Buckeye - American Basswood Forest Eastern Hemlock Plateau 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; channery silt loam
BA—8 to 20 centimeters; silt loam
Bt—20 to 74 centimeters; channery silty clay loam
BC—74 to 91 centimeters; very channery silty clay loam
Cr—91 to 99 centimeters; bedrock

Figure 7.—A tree throw in an area of Clifftop channery silt loam, 25 to 35 percent slopes. Because the bedrock limits rooting depth, tree throws are common in areas of moderately deep soils on steep slopes.

Minor Components

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

Dekalb soils
Percent of map unit: 10 percent
Slope: 25 to 45 percent
Landform: Mountain slopes
Hydric soil status: No

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

CmC—Clifftop channery silt loam, 3 to 15 percent slopes, very stony

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 321 to 455 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the Clifftop Soil

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

Setting
Landform: 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: 3 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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 13.0 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 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; channery silt loam
BA—8 to 20 centimeters; silt loam
Bt—20 to 74 centimeters; channery silty clay loam
BC—74 to 91 centimeters; very channery silty clay loam
Cr—91 to 101 centimeters; bedrock

Minor Components

Dekalb soils
Percent of map unit: 10 percent
Slope: 3 to 15 percent
Landform: Ridges
Dominant vegetation map class(es):
Oak / Ericad Forest
Hydric soil status: No

Cookport soils
Percent of map unit: 5 percent
Slope: 3 to 8 percent
Landform: Broad ridges
Hydric soil status: No

Fenwick soils
Percent of map unit: 5 percent
Slope: 3 to 8 percent
Landform: Broad ridges
Hydric soil status: No

Nallen soils
Percent of map unit: 5 percent
Slope: 3 to 15 percent
Landform: Ridges
Hydric soil status: No

CwB—Cottonbend loam, 3 to 8 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 342 to 349 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the Cottonbend Soil

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

Setting
Landform: High stream terraces in river valleys of mountains
Landform position (three-dimensional): Tread
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 3 to 8 percent
Parent material: Very old alluvium derived from 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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 25.5 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 2e
West Virginia grassland suitability group (WVGSG): Acid Loams (AL3)
Dominant vegetation map class(es):
Successional (Virginia, Pitch) Pine Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 1 centimeter; slightly decomposed plant material
A—1 to 8 centimeters; loam
Ap—8 to 20 centimeters; loam

Bt1—20 to 61 centimeters; loam
Bt2+Bt3—61 to 102 centimeters; loam
Bt4—102 to 128 centimeters; loam
Bt5—128 to 200 centimeters; loam

Minor Components

Clifftop soils
Percent of map unit: 5 percent
Slope: 3 to 8 percent
Landform: Ridges
Hydric soil status: No

Cotaco soils
Percent of map unit: 5 percent
Slope: 3 to 8 percent
Landform: High stream terraces in river valleys of mountains
Hydric soil status: No

CwC—Cottonbend loam, 8 to 15 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 325 to 359 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Cottonbend and simlar soils: 90 percent
Dissimilar minor components: 10 percent

Description of the Cottonbend Soil

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

Setting
Landform: High stream terraces in river valleys of mountains
Landform position (three-dimensional): Tread
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 8 to 15 percent
Parent material: Very old alluvium derived from 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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 25.5 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 3e
West Virginia grassland suitability group (WVGSG): Acid Loams (AL3)
Dominant vegetation map class(es):
Successional (Virginia, Pitch) Pine Forest
Eastern Hemlock Plateau Forest
Successional Tuliptree Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 1 centimeter; slightly decomposed plant material
A—1 to 8 centimeters; loam
Ap—8 to 20 centimeters; loam
Bt1—20 to 61 centimeters; loam
Bt2+Bt3—61 to 102 centimeters; loam
Bt4—102 to 128 centimeters; loam
Bt5—128 to 200 centimeters; loam

Minor Components

Clifftop soils
Percent of map unit: 5 percent
Slope: 8 to 15 percent
Landform: Ridges
Hydric soil status: No

Cotaco soils
Percent of map unit: 5 percent
Slope: 8 to 15 percent
Landform: High stream terraces in river valleys of mountains
Hydric soil status: No

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

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 327 to 603 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the Dekalb Soil

Classification
Loamy-skeletal, siliceous, semiactive, mesic Typic Dystrudepts

Setting
Landform: 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: 3 to 15 percent
Parent material: Acid 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 (K_{sat}): High
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Moderate (about 8.1 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Very Rocky, Acid Soils (RA3)
Dominant vegetation map class(es):
- Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
- Eastern Hemlock Plateau Forest
- Oak - Hickory Forest

Hydric soil status: No
Hydrologic soil group: A

Representative Profile
Oi—0 to 1 centimeter; slightly decomposed plant material
Oe—1 to 3 centimeters; moderately decomposed plant material
A—3 to 8 centimeters; highly organic very channery sandy loam
BA—8 to 20 centimeters; very channery sandy loam
Bw—20 to 65 centimeters; very channery loam
BC—65 to 80 centimeters; extremely channery loam

Minor Components

Fenwick soils
Percent of map unit: 10 percent
Slope: 3 to 15 percent
Landform: Broad ridges
Hydric soil status: No

Nallen soils
Percent of map unit: 10 percent

Slope: 3 to 15 percent
Landform: Ridges
Hydric soil status: No

DrE—Dekalb-Rock outcrop complex, 15 to 35 percent slopes, extremely stony

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 125—Cumberland Plateau and Mountains and 127—Eastern Allegheny Plateau and Mountains
Elevation: 331 to 610 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Dekalb and similar soils: 55 percent
Rock outcrop: 15 percent
Dissimilar minor components: 30 percent

Description of the Dekalb Soil

Classification
Loamy-skeletal, siliceous, semiactive, mesic Typic Dystrudepts

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder
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: 15 to 35 percent
Parent material: Acid 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 (K_{sat}): High
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Moderate (about 8.1 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)

Dominant vegetation map class(es):
Oak - Hickory Forest
Oak - Hickory - Sugar Maple Forest
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Hydric soil status: No
Hydrologic soil group: A

Representative Profile
Oi—0 to 1 centimeter; slightly decomposed plant material
Oe—1 to 3 centimeters; moderately decomposed plant material
A—3 to 8 centimeters; highly organic very channery sandy loam
BA—8 to 20 centimeters; very channery sandy loam
Bw—20 to 65 centimeters; very channery loam
BC—65 to 80 centimeters; extremely channery loam
R—80 to 90 centimeters; bedrock

Description of Rock Outcrop

Setting
Landform: Sandstone cliffs
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountain flank
Aspect (representative): Southwest
Aspect range: All aspects
Parent material: Sandstone

Interpretive Groups
Land capability subclass (nonirrigated): 8s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Cliff Face
Hydric soil status: No

Minor Components

Clifftop soils
Percent of map unit: 10 percent
Slope: 25 to 35 percent
Landform: Convex mountain slopes
Hydric soil status: No

Nallen soils
Percent of map unit: 10 percent
Slope: 25 to 35 percent
Landform: Mountain slopes
Hydric soil status: No

Layland soils
Percent of map unit: 5 percent
Slope: 15 to 35 percent
Landform: Areas below rock outcrop on mountain slopes
Dominant vegetation map class(es):
Oak / Great Laurel Forest
Hydric soil status: No

Totz soils
Percent of map unit: 5 percent
Slope: 3 to 25 percent

Landform: Areas near rock outcrop on mountain slopes
Dominant vegetation map class(es):
Cliff Top Virginia Pine Forest
Hydric soil status: No

FeB—Fenwick silt loam, 3 to 8 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 411 to 530 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the Fenwick Soil

Classification
Fine-loamy, mixed, semiactive, mesic Aquic Hapludults

Setting
Landform: Broad ridges
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 3 to 8 percent
Parent material: Residuum weathered from sandstone and shale

Properties and Qualities
Depth to restrictive feature: 51 to 109 centimeters to lithic 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 (K_{sat}): Moderately high
Natural drainage class: Moderately well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table (depth, kind): About 41 to 91 centimeters, perched (see table 25)
Available water capacity (entire profile): Very high (about 12.7 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 2e
West Virginia grassland suitability group (WVGSG): Acid Loams (AL3)
Dominant vegetation map class(es):
Eastern Hemlock Plateau Forest
Successional (Virginia, Pitch) Pine Forest
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest

Hydric soil status: No
Hydrologic soil group: C

Representative Profile
Oe—0 to 3 centimeters; moderately decomposed plant material
A—3 to 8 centimeters; silt loam
AB—8 to 23 centimeters; silt loam
Bt—23 to 66 centimeters; loam
BC—66 to 86 centimeters; loam
C—86 to 99 centimeters; loam
R—99 to 109 centimeters; bedrock

Minor Components

Clifftop soils
Percent of map unit: 5 percent
Slope: 3 to 8 percent
Landform: Ridges
Hydric soil status: No

Dekalb soils
Percent of map unit: 5 percent
Slope: 3 to 15 percent
Landform: Ridges
Hydric soil status: No

Laidig soils
Percent of map unit: 5 percent
Slope: 3 to 15 percent
Landform: Drainageways and footslopes on mountain slopes
Hydric soil status: No

FeC—Fenwick silt loam, 8 to 15 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 403 to 586 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the Fenwick Soil

Classification
Fine-loamy, mixed, semiactive, mesic Aquic Hapludults

Setting
Landform: Broad ridges
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: Residuum weathered from sandstone and shale

Properties and Qualities
Depth to restrictive feature: 51 to 109 centimeters to lithic 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 (K_{sat}): Moderately high
Natural drainage class: Moderately well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table (depth, kind): About 41 to 91 centimeters, perched (see table 25)
Available water capacity (entire profile): Very high (about 12.7 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 3e
West Virginia grassland suitability group (WVGSG): Acid Loams (AL3)
Dominant vegetation map class(es):
Successional (Virginia, Pitch) Pine Forest
Successional Tuliptree Forest
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Hydric soil status: No
Hydrologic soil group: C

Representative Profile
Oe—0 to 3 centimeters; moderately decomposed plant material
A—3 to 8 centimeters; silt loam
AB—8 to 23 centimeters; silt loam
Bt—23 to 66 centimeters; loam
BC—66 to 86 centimeters; loam
C—86 to 99 centimeters; loam
R—99 to 109 centimeters; bedrock

Minor Components

Clifftop soils
Percent of map unit: 5 percent
Slope: 8 to 15 percent
Landform: Ridges
Hydric soil status: No

Dekalb soils
Percent of map unit: 5 percent
Slope: 8 to 20 percent
Landform: Ridges
Hydric soil status: No

Laidig soils
Percent of map unit: 5 percent
Slope: 8 to 20 percent
Landform: Drainageways and footslopes 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(s): 125—Cumberland Plateau and Mountains and 127—Eastern Allegheny Plateau and Mountains
Elevation: 320 to 352 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the 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, mainly members of the Kanawha Formation of the Pottsville Group

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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present 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):
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Sugar Maple - Yellow Buckeye - American Basswood 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 4 centimeters; moderately decomposed plant material
A—4 to 22 centimeters; channery loam and very channery loam
BA—22 to 31 centimeters; very channery loam
Bw—31 to 120 centimeters; very channery loam
BC—120 to 140 centimeters; extremely channery loam
C—140 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 - Hickory Forest
Hydric soil status: No

Clifftop soils
Percent of map unit: 3 percent
Slope: 25 to 35 percent
Landform: Mountain slopes
Dominant vegetation map class(es):
Oak - Hickory Forest
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

LaC—Laidig channery loam, 3 to 15 percent slopes, rubbly

Map Unit Setting

Landscape: Mountains (fig. 8)
Major land resource area(s): 125—Cumberland Plateau and Mountains and 127—Eastern Allegheny Plateau and Mountains
Elevation: 327 to 578 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Figure 8.—A representative area of Laidig channery loam, 3 to 15 percent slopes, rubbly. Eastern hemlock and rhododendron are common in areas of Laidig soils.

Map Unit Composition

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

Description of the Laidig Soil

Classification

Fine-loamy, siliceous, semiactive, mesic Typic Fragiudults

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountain base
Down-slope shape: Linear and concave
Across-slope shape: Concave and linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 3 to 15 percent
Parent material: Rubbly colluvium derived from interbedded sedimentary rock

Properties and Qualities

Depth to restrictive feature: 76 to 127 centimeters to a fragipan
Shrink-swell potential: Low (about 1.2 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 (K_{sat}): Moderately low
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table (depth, kind): About 76 to 117 centimeters, perched (see table 25)
Available water capacity (entire profile): Very high (about 23.4 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Very Rocky, Acid Soils (RA3)
Dominant vegetation map class(es):
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Sugar Maple - Yellow Buckeye - American Basswood Forest
Eastern Hemlock Plateau Forest
Hydric soil status: No
Hydrologic soil group: C

Representative Profile
Oi—0 to 2 centimeters; stony slightly decomposed plant material
A—2 to 9 centimeters; gravelly highly organic loam
A/B—9 to 19 centimeters; gravelly loam
Bt1—19 to 80 centimeters; gravelly loam
Bt2—80 to 122 centimeters; gravelly loam
Btx—122 to 200 centimeters; gravelly loam

Minor Components

Layland soils
Percent of map unit: 13 percent
Slope: 15 to 35 percent
Landform: Areas below rock outcrop on mountain slopes
Hydric soil status: No

Atkins soils
Percent of map unit: 5 percent
Slope: 0 to 3 percent
Landform: Flood plains in mountain valleys
Dominant vegetation map class(es):
Forest Seep
Hydric soil status: Yes

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

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

Rock outcrop
Description: Sandstone outcrops on mountain slopes
Percent of map unit: 2 percent

Dominant vegetation map class(es):
Cliff Face
Hydric soil status: No

LbC—Laidig channery loam, 3 to 15 percent slopes, very rubbly

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 252 to 468 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the Laidig Soil

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

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountain base
Down-slope shape: Linear and concave
Across-slope shape: Concave and linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 3 to 15 percent
Parent material: Very rubbly colluvium derived from interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: 76 to 127 centimeters to a fragipan
Shrink-swell potential: Low (about 1.2 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 (K_{sat}): Moderately low
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table (depth, kind): About 76 to 117 centimeters, perched (see table 25)
Available water capacity (entire profile): Very high (about 23.4 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)

Dominant vegetation map class(es):
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Oak - Hickory - Sugar Maple Forest
Oak - Hickory Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 2 centimeters; extremely bouldery slightly decomposed plant material
A—2 to 9 centimeters; gravelly highly organic loam
A/B—9 to 19 centimeters; gravelly loam
Bt1—19 to 80 centimeters; gravelly loam
Bt2—80 to 122 centimeters; gravelly loam
Btx—122 to 200 centimeters; gravelly loam

Minor Components

Layland soils
Percent of map unit: 13 percent
Slope: 3 to 15 percent
Landform: Areas below rock outcrop on mountain slopes
Hydric soil status: No

Philo soils
Percent of map unit: 5 percent
Slope: 1 to 3 percent
Landform: Nearly level flood plains
Hydric soil status: No

Pope soils
Percent of map unit: 5 percent
Slope: 1 to 3 percent
Landform: Flood plains
Hydric soil status: No

Rock outcrop
Percent of map unit: 2 percent
Landform: Sandstone cliffs
Dominant vegetation map class(es):
Cliff Face
Hydric soil status: No

LcE—Laidig-Clifftop complex, 15 to 35 percent slopes, very stony

Map Unit Setting

Landscape: Mountains (fig. 9)
Major land resource area(s): 125—Cumberland Plateau and Mountains and 127—Eastern Allegheny Plateau and Mountains
Elevation: 212 to 613 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Laidig and similar soils: 45 percent

Figure 9.—Rhododendron is a common component of the understory in areas of map unit LcE, Laidig-Clifftop complex, 15 to 35 percent slopes, very stony.

Clifftop and similar soils: 25 percent
Dissimilar minor components: 30 percent

Description of the Laidig Soil

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

Setting
Landform: Drainageways and footslopes on mountain slopes (fig. 10)
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountain flank
Down-slope shape: Linear and concave
Across-slope shape: Concave and linear
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: 76 to 127 centimeters to a fragipan
Shrink-swell potential: Low (about 1.2 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 (K_{sat}): Moderately low
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None

Figure 10.—A landslide in an area of Laidig soils. Laidig soils on slopes of more than 25 percent have a high potential for landslides.

Seasonal water table (depth, kind): About 76 to 117 centimeters, perched (see table 25)
Available water capacity (entire profile): Very high (about 23.4 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 6s
West Virginia grassland suitability group (WVGSG): Very Rocky, Acid Soils (RA3)
Dominant vegetation map class(es):
Eastern Hemlock - Oak - Sweet Birch / Great Laurel 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; gravelly highly organic loam
A/B—9 to 19 centimeters; gravelly loam
Bt1—19 to 80 centimeters; gravelly loam

Bt2—80 to 122 centimeters; gravelly loam
Btx—122 to 200 centimeters; gravelly loam

Description of the Clifftop Soil

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

Setting
Landform: Convex mountain slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Upper third of mountain flank
Down-slope shape: Convex and linear
Across-slope shape: Linear and convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 15 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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 13.0 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 6s
West Virginia grassland suitability group (WVGSG): Very Rocky, Acid Soils (RA3)
Dominant vegetation map class(es):
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Eastern Hemlock Plateau 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; channery silt loam
BA—8 to 20 centimeters; silt loam
Bt—20 to 74 centimeters; channery silty clay loam
BC—74 to 91 centimeters; very channery silty clay loam
Cr—91 to 101 centimeters; bedrock

Minor Components

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

Nallen soils
Percent of map unit: 10 percent
Slope: 25 to 35 percent
Landform: Mountain slopes
Hydric soil status: No

Buchanan soils
Percent of map unit: 5 percent
Slope: 8 to 15 percent
Landform: Drainageways and footslopes on mountain slopes
Hydric soil status: No

LdF—Layland-Clifftop complex, 35 to 70 percent slopes, very stony

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 257 to 586 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Layland and simlar soils: 60 percent
Clifftop and similar soils: 20 percent
Dissimilar minor components: 20 percent

Description of the Layland Soil

Classification
Loamy-skeletal, siliceous, semiactive, mesic Typic Dystrudepts

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Upper third of mountain flank
Down-slope shape: Concave and linear
Across-slope shape: Linear, concave, and convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 35 to 70 percent
Parent material: Very stony colluvium derived from sandstone and siltstone

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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None

Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 21.0 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Very Rocky, Acid Soils (RA3)
Dominant vegetation map class(es):
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Oak / Great Laurel Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 3 centimeters; slightly decomposed plant material
Oe—3 to 5 centimeters; moderately decomposed plant material
A—5 to 15 centimeters; gravelly loam
BA—15 to 23 centimeters; gravelly loam
Bw—23 to 117 centimeters; very gravelly loam
BC—117 to 145 centimeters; very gravelly loam
C—145 to 200 centimeters; very gravelly loam

Description of the Clifftop Soil

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

Setting
Landform: Convex mountain slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Upper third of mountain flank and side slope
Down-slope shape: Convex
Across-slope shape: Convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 35 to 70 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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 13.0 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Very Rocky, Acid Soils (RA3)
Dominant vegetation map class(es):
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Oak / Great Laurel 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; channery silt loam
BA—8 to 20 centimeters; silt loam
Bt—20 to 74 centimeters; channery silty clay loam
BC—74 to 91 centimeters; very channery silty clay loam
Cr—91 to 101 centimeters; bedrock

Minor Components

Nallen soils
Percent of map unit: 10 percent
Slope: 25 to 70 percent
Landform: Mountain slopes
Hydric soil status: No

Dekalb soils
Percent of map unit: 5 percent
Slope: 35 to 70 percent
Landform: Mountain slopes
Hydric soil status: No

Laidig soils
Percent of map unit: 5 percent
Slope: 15 to 35 percent
Landform: Drainageways and footslopes on mountain slopes
Hydric soil status: No

LhE—Layland-Laidig complex, 15 to 35 percent slopes, rubbly

Map Unit Setting

Landscape: Mountains (fig. 11)
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains and 125—Cumberland Plateau and Mountains
Elevation: 229 to 589 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Layland and similar soils: 60 percent
Laidig and similar soils: 25 percent
Dissimilar minor components: 15 percent

Description of the Layland Soil

Classification
Loamy-skeletal, siliceous, semiactive, mesic Typic Dystrudepts

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Backslope and footslope
Landform position (three-dimensional): Mountain base and mountain flank

Figure 11.—A young stand of eastern hemlock in an area of Layland-Laidig complex, 15 to 35 percent slopes, rubbly.

Down-slope shape: Concave and linear
Across-slope shape: Linear, concave, and convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 15 to 35 percent
Parent material: Rubbly, acid 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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 21.0 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Very Rocky, Acid Soils (RA3)

Dominant vegetation map class(es):
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Eastern Hemlock Plateau Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 3 centimeters; stony slightly decomposed plant material
Oe—3 to 5 centimeters; stony moderately decomposed plant material
A—5 to 15 centimeters; gravelly loam
BA—15 to 23 centimeters; gravelly loam
Bw—23 to 117 centimeters; very gravelly loam
BC—117 to 145 centimeters; very gravelly loam
C—145 to 200 centimeters; very gravelly loam

Description of the Laidig Soil

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

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

Properties and Qualities
Depth to restrictive feature: 76 to 127 centimeters to a fragipan
Shrink-swell potential: Low (about 1.2 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 (K_{sat}): Moderately low
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table (depth, kind): About 76 to 117 centimeters, perched (see table 25)
Available water capacity (entire profile): Very high (about 23.4 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Very Rocky, Acid Soils (RA3)
Dominant vegetation map class(es):
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Eastern Hemlock Plateau Forest
Hydric soil status: No
Hydrologic soil group: C

Representative Profile
Oi—0 to 2 centimeters; stony slightly decomposed plant material

A—2 to 9 centimeters; gravelly highly organic loam
A/B—9 to 19 centimeters; gravelly loam
Bt1—19 to 80 centimeters; gravelly loam
Bt2—80 to 122 centimeters; gravelly loam
Btx—122 to 200 centimeters; gravelly loam

Minor Components

Dekalb soils
Percent of map unit: 10 percent
Slope: 35 to 70 percent
Landform: Mountain slopes
Hydric soil status: No

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

Rock outcrop
Description: Sandstone outcrops on mountain slopes
Percent of map unit: 2 percent
Dominant vegetation map class(es):
Cliff Face
Hydric soil status: No

LkE—Layland-Laidig complex, 15 to 35 percent slopes, very rubbly

Map Unit Setting

Landscape: Mountains (fig. 12)
Major land resource area(s): 125—Cumberland Plateau and Mountains and 127—Eastern Allegheny Plateau and Mountains
Elevation: 214 to 556 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Layland and similar soils: 55 percent
Laidig and similar soils: 30 percent
Dissimilar minor components: 15 percent

Description of the Layland Soil

Classification
Loamy-skeletal, siliceous, semiactive, mesic Typic Dystrudepts

Setting
Landform: Areas below rock outcrop on mountain slopes
Landform position (two-dimensional): Backslope and footslope
Landform position (three-dimensional): Mountain base and lower third of mountain flank
Down-slope shape: Concave and linear
Across-slope shape: Linear, concave, and convex

Figure 12.—Typical landscape of Layland-Laidig complex, 15 to 35 percent slopes, very rubbly. Stones and boulders cover 50 to 90 percent of the surface.

Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 15 to 35 percent
Parent material: Very rubbly colluvium derived from sandstone and siltstone

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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 21.0 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Hydric soil status: No
Hydrologic soil group: A

Representative Profile
Oi—0 to 3 centimeters; extremely bouldery slightly decomposed plant material
Oe—3 to 5 centimeters; extremely bouldery moderately decomposed plant material
A—5 to 15 centimeters; gravelly loam
BA—15 to 23 centimeters; gravelly loam
Bw—23 to 117 centimeters; very gravelly loam
BC—117 to 145 centimeters; very gravelly loam
C—145 to 200 centimeters; very gravelly loam

Description of the Laidig Soil

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

Setting
Landform: Drainageways and footslopes on mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountain flank and mountain base
Down-slope shape: Linear and concave
Across-slope shape: Concave and linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 15 to 35 percent
Parent material: Very rubbly colluvium derived from interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: 76 to 127 centimeters to a fragipan
Shrink-swell potential: Low (about 1.2 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 (K_{sat}): Moderately low
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table (depth, kind): About 76 to 117 centimeters, perched (see table 25)
Available water capacity (entire profile): Very high (about 23.4 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 2 centimeters; extremely bouldery slightly decomposed plant material
A—2 to 9 centimeters; gravelly highly organic loam
A/B—9 to 19 centimeters; gravelly loam
Bt1—19 to 80 centimeters; gravelly loam
Bt2—80 to 122 centimeters; gravelly loam
Btx—122 to 200 centimeters; gravelly loam

Minor Components

Buchanan soils
Percent of map unit: 9 percent
Slope: 8 to 15 percent
Landform: Drainageways and footslopes on mountain slopes
Hydric soil status: No

Craigsville soils
Percent of map unit: 2 percent
Slope: 0 to 3 percent
Landform: Flood plains in river valleys
Dominant vegetation map class(es):
Eastern Hemlock Floodplain Forest
(Virginia, Pitch) Pine Floodplain Forest
Hydric soil status: No

Pope soils
Percent of map unit: 2 percent
Slope: 0 to 3 percent
Landform: Flood plains
Dominant vegetation map class(es):
Eastern Hemlock Floodplain Forest
Hydric soil status: No

Riverwash
Description: Water-deposited sand, gravel, and cobbles along the rivers
Percent of map unit: 1 percent
Slope: 0 to 3 percent
Dominant vegetation map class(es):
American Sycamore - River Birch Riverscour Woodland
Hydric soil status: No

Rock outcrop
Description: Sandstone outcrops on mountain slopes
Percent of map unit: 1 percent
Dominant vegetation map class(es):
Cliff Face
Hydric soil status: No

LmF—Layland-Rock outcrop complex, 35 to 70 percent slopes, very rubbly

Map Unit Setting

Landscape: Mountains (fig. 13)
Major land resource area(s): 125—Cumberland Plateau and Mountains and
127—Eastern Allegheny Plateau and Mountains
Elevation: 212 to 600 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Layland and similar soils: 60 percent

Figure 13.—Typical landscape of Layland-Rock outcrop complex, 35 to 70 percent slopes, very rubbly. The Lower Nuttall sandstone forms the prominent cliffs (Rock outcrop) on both sides of the Gauley River.

Rock outcrop: 10 percent
Dissimilar minor components: 30 percent

Description of the Layland Soil

Classification
Loamy-skeletal, siliceous, semiactive, mesic Typic Dystrudepts

Setting
Landform: Areas below rock outcrop on mountain slopes (fig. 14)
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountain flank
Down-slope shape: Concave and linear
Across-slope shape: Linear, concave, and convex
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 35 to 70 percent
Parent material: Very rubbly colluvium derived from sandstone and siltstone

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

Figure 14.—The Layland soil in Layland-Rock outcrop complex, 35 to 70 percent slopes, very rubbly, is covered with rubble consisting of stones and boulders. Some of the boulders are huge, 12 meters (40 feet) or more in diameter.

Hydrologic Properties

Slowest capacity to transmit water (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 21.0 centimeters)

Interpretive Groups

Land capability subclass (nonirrigated): 7s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Sugar Maple - Yellow Buckeye - American Basswood Forest
Oak / Great Laurel Forest
Hydric soil status: No
Hydrologic soil group: A

Representative Profile

Oi—0 to 3 centimeters; extremely bouldery slightly decomposed plant material
Oe—3 to 5 centimeters; extremely bouldery moderately decomposed plant material
A—5 to 15 centimeters; gravelly loam
BA—15 to 23 centimeters; gravelly loam
Bw—23 to 117 centimeters; very gravelly loam
BC—117 to 145 centimeters; very gravelly loam
C—145 to 200 centimeters; very gravelly loam

Description of Rock Outcrop

Setting
Landform: Sandstone escarpments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountain flank
Aspect (representative): South
Aspect range: All aspects
Parent material: The Lower Nuttall sandstone of the New River Formation of the Pottsville Group

Interpretive Groups
Land capability subclass (nonirrigated): 8s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Cliff Face
Hydric soil status: No

Minor Components

Laidig soils
Percent of map unit: 10 percent
Slope: 15 to 35 percent
Landform: Drainageways and footslopes on mountain slopes
Hydric soil status: No

Clifftop soils
Percent of map unit: 5 percent
Slope: 35 to 70 percent
Landform: Convex mountain slopes
Hydric soil status: No

Dekalb soils
Percent of map unit: 5 percent
Slope: 55 to 80 percent
Landform: Mountain slopes
Hydric soil status: No

Guyandotte soils
Percent of map unit: 5 percent
Slope: 35 to 55 percent
Landform: North-facing mountain slopes
Hydric soil status: No

Rubble land
Description: Boulder and stone topple deposits along rivers
Percent of map unit: 4 percent
Slope: 35 to 70 percent
Hydric soil status: No

Totz soils (fig. 15)
Percent of map unit: 1 percent
Slope: 3 to 25 percent
Landform: Areas near rock outcrop on mountain slopes
Dominant vegetation map class(es):
Cliff Top Virginia Pine Forest
Hydric soil status: No

Figure 15.—An area of the shallow, excessively drained Totz soils that formed on top of the Lower Nuttall sandstone cliffs. Totz soils are a minor component of map unit LmF. Virginia pine is a common tree on these very droughty soils.

LuC—Lithic Udorthents, leveled land, 0 to 15 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 301 to 377 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Lithic Udorthents and similar soils: 85 percent
Dissimilar minor components: 15 percent

Description of the Lithic Udorthents

Classification
Lithic Udorthents

General
Lithic Udorthents, leveled land consists of soils that have been drastically disturbed by humans with the use of heavy machinery. These soils are in areas where the native soils have been excavated and the underlying bedrock exposed or nearly exposed. In the park, they are in the area that was excavated for construction of the spillway for the Summersville Dam. The soils formed in materials weathered from the exposed bedrock and/or bedrock materials that have been crushed and worked by heavy machinery or formed in the remnant substratum of the original native soil. They are typically less than 50 centimeters deep; are loamy in the fine-earth fraction; contain

more than 35 percent rock fragments, by volume, in the soil profile; and have a low water-holding capacity. Soil properties such as texture, bulk density, soil reaction (pH), and saturated hydraulic conductivity are highly variable. Because the soil properties are highly variable, an onsite investigation is required to determine the suitability of these soils for use and management.

Setting
Landform: Drastically disturbed areas on mountain slopes
Down-slope shape: Linear
Across-slope shape: Linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 0 to 15 percent
Parent material: Cut and fill materials derived from native soils and interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: 10 to 50 centimeters to lithic bedrock
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Natural drainage class: Somewhat excessively drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very low (about 1.5 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 8s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Successional (Virginia, Pitch) Pine Forest
Disturbed Area
Hydric soil status: No
Hydrologic soil group: D

Representative Profile
A—0 to 10 centimeters; very gravelly loam
C—10 to 22 centimeters; extremely gravelly sandy loam
R—22 to 32 centimeters; bedrock

Minor Components

Udorthents
Percent of map unit: 10 percent
Slope: 0 to 15 percent
Hydric soil status: No

Rock outcrop
Description: Bedrock exposed during construction practices
Percent of map unit: 5 percent
Hydric soil status: No

LxG—Lithic Udorthents-Rock outcrop complex, cut land, 5 to 100 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 125—Cumberland Plateau and Mountains
Elevation: 301 to 377 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Lithic Udorthents and similar soils: 50 percent
Rock outcrop: 40 percent
Dissimilar minor components: 10 percent

Description of the Lithic Udorthents

Classification
Lithic Udorthents

General
Lithic Udorthents, cut land consists of soils that have been drastically disturbed by humans with the use of heavy machinery. These soils are in areas where the native soils and the underlying bedrock have been excavated (cut). In the park, they are in areas that have been excavated for the construction of highways and railroads. They formed in materials weathered from the exposed bedrock and/or bedrock materials that have been crushed and worked by heavy machinery or formed in the remnant substratum of the original native soil. These soils are typically less than 50 centimeters deep; are loamy in the fine-earth fraction; contain more than 35 percent rock fragments, by volume, in the soil profile; and have a low water-holding capacity. Soil properties such as texture, bulk density, soil reaction (pH), and saturated hydraulic conductivity are highly variable. Because the soil properties are highly variable, an onsite investigation is required to determine the suitability of these soils for use and management.

Setting
Landform: Drastically disturbed areas on mountain slopes
Down-slope shape: Linear
Across-slope shape: Linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 5 to 100 percent
Parent material: Cut and fill materials derived from native soils and interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: 10 to 50 centimeters to lithic bedrock
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Natural drainage class: Somewhat excessively drained
Flooding frequency: None
Ponding frequency: None

Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very low (about 1.5 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 8s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Successional (Virginia, Pitch) Pine Forest
Disturbed Area
Hydric soil status: No
Hydrologic soil group: D

Representative Profile
A—0 to 10 centimeters; very gravelly loam
C—10 to 22 centimeters; extremely gravelly sandy loam
R—22 to 32 centimeters; bedrock

Description of Rock Outcrop

General
Rock outcrop consists of native bedrock exposed along excavations made to create road beds and related projects

Interpretive Groups
Land capability subclass (nonirrigated): 8s

Minor Components

Udorthents
Description: Earthy materials, graded and nongraded, that have been exposed during construction practices
Percent of map unit: 10 percent
Slope: 5 to 100 percent

NaB—Nallen loam, 3 to 8 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 523 to 528 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the Nallen Soil

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

Setting
Landform: 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: 3 to 8 percent
Parent material: Acid coarse-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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): High (about 10.2 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 2e
West Virginia grassland suitability group (WVGSG): Acid Loams (AL3)
Dominant vegetation map class(es):
Eastern Hemlock Plateau Forest
Oak - Hickory Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 3 centimeters; slightly decomposed plant material
Oe—3 to 4 centimeters; moderately decomposed plant material
A—4 to 13 centimeters; loam
BA—13 to 23 centimeters; loam
Bt—23 to 48 centimeters; loam
BC+C—48 to 86 centimeters; channery sandy loam
R—86 to 96 centimeters; bedrock

Minor Components

Dekalb soils
Percent of map unit: 10 percent
Slope: 3 to 9 percent
Landform: Ridges
Hydric soil status: No

Clifftop soils
Percent of map unit: 5 percent
Slope: 3 to 8 percent
Landform: Ridges
Hydric soil status: No

Fenwick soils
Percent of map unit: 5 percent
Slope: 3 to 8 percent
Landform: Broad ridges
Hydric soil status: No

Figure 16.—A typical area of Nallen loam, 8 to 15 percent slopes, on a summit underlain by the Upper Nuttall sandstone. Ericaceous plants, such as mountain laurel, are a common understory plant on the acid Nallen soils.

NaC—Nallen loam, 8 to 15 percent slopes

Map Unit Setting

Landscape: Mountains (fig. 16)
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 325 to 584 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the Nallen Soil

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

Setting
Landform: 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 coarse-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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): High (about 10.2 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 3e
West Virginia grassland suitability group (WVGSG): Acid Loams (AL3)
Dominant vegetation map class(es):
Eastern Hemlock Plateau Forest
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Oak - Hickory Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 3 centimeters; slightly decomposed plant material
Oe—3 to 4 centimeters; moderately decomposed plant material
A—4 to 13 centimeters; loam
BA—13 to 23 centimeters; loam
Bt—23 to 48 centimeters; loam
BC+C—48 to 86 centimeters; channery sandy loam
R—86 to 96 centimeters; bedrock

Minor Components

Dekalb soils
Percent of map unit: 10 percent
Slope: 8 to 15 percent
Landform: Ridges
Hydric soil status: No

Clifftop soils
Percent of map unit: 5 percent
Slope: 8 to 15 percent
Landform: Ridges
Hydric soil status: No

Cookport soils
Percent of map unit: 5 percent
Slope: 3 to 8 percent
Landform: Broad ridges
Hydric soil status: No

Fenwick soils
Percent of map unit: 5 percent

Slope: 3 to 8 percent
Landform: Broad ridges
Hydric soil status: No

NaD—Nallen loam, 15 to 25 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 125—Cumberland Plateau and Mountains and 127—Eastern Allegheny Plateau and Mountains
Elevation: 297 to 569 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the Nallen Soil

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

Setting
Landform: 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: 15 to 25 percent
Parent material: Acid coarse-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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): High (about 10.2 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 4e
West Virginia grassland suitability group (WVGSG): Acid Loams (AL3)
Dominant vegetation map class(es):
Oak - Hickory Forest

Eastern Hemlock Plateau Forest
Oak / Great Laurel Forest
Hydric soil status: No
Hydrologic soil group: B

Representative Profile
Oi—0 to 3 centimeters; slightly decomposed plant material
Oe—3 to 4 centimeters; moderately decomposed plant material
A—4 to 13 centimeters; loam
BA—13 to 23 centimeters; loam
Bt—23 to 48 centimeters; loam
BC+C—48 to 86 centimeters; channery sandy loam
R—86 to 96 centimeters; bedrock

Minor Components

Clymer soils
Percent of map unit: 10 percent
Slope: 15 to 25 percent
Landform: Ridges
Hydric soil status: No

Clifftop soils
Percent of map unit: 5 percent
Slope: 15 to 35 percent
Landform: Ridges
Hydric soil status: No

Dekalb soils
Percent of map unit: 5 percent
Slope: 15 to 35 percent
Landform: Ridges
Hydric soil status: No

Fenwick soils
Percent of map unit: 5 percent
Slope: 8 to 15 percent
Landform: Broad ridges
Hydric soil status: No

PsA—Pope sandy loam, 0 to 3 percent slopes, rarely flooded

Map Unit Setting

Landscape: Mountains (fig. 17)
Major land resource area(s): 125—Cumberland Plateau and Mountains and 127—Eastern Allegheny Plateau and Mountains
Elevation: 213 to 374 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Figure 17.—Old foundation stones in an area of Pope sandy loam, 0 to 3 percent slopes, rarely flooded, near the old Carnifex Ferry site at the confluence of the Gauley and Meadow Rivers.

Description of the Pope Soil

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

Setting
Landform: Flood plains 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: 0 to 3 percent
Parent material: Coarse-loamy 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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: Rare (see table 25)
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 27.3 centimeters)

Figure 18.—A ponded area of Atkins soil in an area of Pope sandy loam, 0 to 3 percent slopes, rarely flooded, near the old Carnifex Ferry site at the confluence of the Gauley and Meadow Rivers. Atkins soils are a minor component of the map unit. They have a hydric soil status.

Interpretive Groups
Land capability subclass (nonirrigated): 1
West Virginia grassland suitability group (WVGSG): Acid Loams (AL3)
Dominant vegetation map class(es):
Successional Tuliptree Forest
Eastern Hemlock Floodplain Forest
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Oak - Hickory Floodplain Forest
Disturbed Area
(Virginia, Pitch) Pine Floodplain Forest
Hydric soil status: No
Hydrologic soil group: A

Representative Profile
Oi—0 to 3 centimeters; slightly decomposed plant material
Oe—3 to 5 centimeters; moderately decomposed plant material
A—5 to 18 centimeters; sandy loam
Bw—18 to 81 centimeters; sandy loam
C—81 to 200 centimeters; very gravelly sandy loam

Minor Components

Atkins soils (fig. 18)
Percent of map unit: 5 percent

Slope: 0 to 3 percent
Landform: Nearly level flood plains
Hydric soil status: Yes

Philo soils
Percent of map unit: 5 percent
Slope: 0 to 3 percent
Landform: Nearly level flood plains
Hydric soil status: No

Riverwash
Description: Water-deposited sand, gravel, and cobbles along rivers
Percent of map unit: 5 percent
Slope: 0 to 3 percent
Dominant vegetation map class(es):
American Sycamore - River Birch Riverscour Woodland
Hydric soil status: No

PvA—Pope-Craigsville complex, 0 to 3 percent slopes, occasionally flooded

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 125—Cumberland Plateau and Mountains and 127—Eastern Allegheny Plateau and Mountains
Elevation: 211 to 515 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Pope and similar soils: 50 percent
Craigsville and similar soils: 30 percent
Dissimilar minor components: 20 percent

Description of the Pope Soil

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

Setting
Landform: Flood plains 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: 0 to 3 percent
Parent material: Coarse-loamy 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 (K_{sat}): Moderately high
Natural drainage class: Well drained
Flooding frequency: Occasional (see table 25)
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 27.3 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 2w
West Virginia grassland suitability group (WVGSG): Acid Loams (AL3)
Dominant vegetation map class(es):
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Eastern Hemlock Floodplain Forest
Riparian Zone
American Sycamore - Tuliptree - Sweetgum Floodplain Forest
(Virginia, Pitch) Pine Floodplain Forest
Hydric soil status: No
Hydrologic soil group: A

Representative Profile
Oi—0 to 3 centimeters; slightly decomposed plant material
Oe—3 to 5 centimeters; moderately decomposed plant material
A—5 to 18 centimeters; sandy loam
Bw—18 to 81 centimeters; sandy loam
C—81 to 200 centimeters; very gravelly sandy loam

Description of the Craigsville Soil

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

Setting
Landform: Flood plains 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: 0 to 3 percent
Parent material: Skeletal loamy 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 (K_{sat}): High
Natural drainage class: Well drained
Flooding frequency: Occasional (see table 25)
Ponding frequency: None

Seasonal water table (depth, kind): About 102 to 152 centimeters (see table 25)
Available water capacity (entire profile): Very high (about 15.2 centimeters)

Interpretive Groups
Land capability subclass (nonirrigated): 2w
West Virginia grassland suitability group (WVGSG): Acid Loams (AL3)
Dominant vegetation map class(es):
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Eastern Hemlock Floodplain Forest
Riparian Zone
American Sycamore - Tuliptree - Sweetgum Floodplain Forest
(Virginia, Pitch) Pine Floodplain 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

Philo soils
Percent of map unit: 10 percent
Slope: 0 to 3 percent
Landform: Nearly level flood plains
Hydric soil status: No

Riverwash
Description: Water-deposited sand, gravel, and cobbles along rivers
Percent of map unit: 5 percent
Slope: 0 to 3 percent
Dominant vegetation map class(es):
American Sycamore - River Birch Riverscour Woodland
American Water-willow Cobble Bar
Hydric soil status: No

Atkins soils
Percent of map unit: 5 percent
Slope: 0 to 3 percent
Landform: Nearly level flood plains
Dominant vegetation map class(es):
Back Channel
Hydric soil status: Yes

Rw—Riverwash, frequently flooded

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 211 to 511 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Riverwash: 95 percent
Dissimilar minor components: 5 percent

Description of Riverwash

General

Riverwash consists of unstabilized sandy, silty, gravelly, or cobbly sediments that are frequently flooded, washed, and reworked by the river. Most areas support little or no vegetation.

Setting

Landform: Sand and cobble bars along rivers on high-energy flood plains in river valleys
Landform position (two-dimensional): Toeslope
Down-slope shape: Linear
Across-slope shape: Linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 0 to 3 percent
Parent material: Sandy and gravelly alluvium derived from interbedded sedimentary rock

Properties and Qualities

Depth to restrictive feature: None within a depth of 150 centimeters
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Interpretive Groups

Land capability subclass (nonirrigated): 8w
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Riparian Zone
River
Hydric soil status: No

Minor Components

Rubble land

Description: Boulder and stone topple deposits along rivers
Percent of map unit: 5 percent
Hydric soil status: No

ThB—Typic Haplorthods, 0 to 8 percent slopes, rubbly, rarely flooded

Map Unit Setting

Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 412 to 418 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Typic Haplorthods and simlar soils: 80 percent
Dissimilar minor components: 20 percent

Description of the Typic Haplorthods

Classification
Loamy-skeletal, siliceous, active, mesic Typic Haplorthods

Setting
Landform: Islands in river valleys
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear and concave
Across-slope shape: Concave
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 0 to 8 percent
Parent material: Acid, stony alluvium derived from sandstone

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 (K_{sat}): Moderately high
Natural drainage class: Somewhat excessively drained
Flooding frequency: Rare (see table 25)
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very high (about 12.2 centimeters)

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

Representative Profile
Oi—0 to 2 centimeters; stony slightly decomposed plant material
Oe—2 to 4 centimeters; stony moderately decomposed plant material
A—4 to 13 centimeters; highly organic sandy loam
E—13 to 33 centimeters; loamy sand
Bhs—33 to 43 centimeters; sandy loam
Bs—43 to 92 centimeters; extremely stony sandy loam
C—92 to 165 centimeters; extremely stony loamy sand

Minor Components

Craigsville soils
Percent of map unit: 10 percent
Slope: 0 to 8 percent

Landform: Flood plains in river valleys
Hydric soil status: No

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

Riverwash
Description: Water-deposited sand, gravel, and cobbles along rivers
Percent of map unit: 5 percent
Slope: 0 to 3 percent
Dominant vegetation map class(es):
Riparian zone
Hydric soil status: No

UgC—Udorthents, graded, 0 to 15 percent slopes

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 303 to 580 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the Udorthents

Classification
Udorthents

General
Udorthents, graded are soils that have been drastically disturbed by humans with the use of heavy machinery. In the park, these soils typically are areas that have been filled and graded for road beds, building sites, parking areas, and river access areas. The soils are typically derived from a mixture of excavated and graded native soils and crushed bedrock. Construction materials, such as chunks of concrete, are part of the soil mixture in some areas. These soils are typically more than 150 centimeters deep, are loamy in the fine-earth fraction, and contain more than 35 percent rock fragments, by volume, throughout. Rock fragments in the soil profile consist of sandstone, siltstone, shale, coal, or limestone in various proportions. Soil properties such as texture, bulk density, soil reaction (pH), saturated hydraulic conductivity, and available water capacity are highly variable. Because the soil properties are highly variable, an onsite investigation is required to determine the suitability of these soils for use and management.

Setting
Down-slope shape: Linear
Across-slope shape: Linear
Aspect (representative): Southwest
Aspect range: All aspects

Slope range: 0 to 15 percent
Parent material: Cut and fill materials derived from native soils and interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: None within a depth of 150 centimeters
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters

Interpretive Groups
Land capability subclass (nonirrigated): 7e
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Disturbed Area
Developed Area
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Hydric soil status: No

Representative Profile
A—0 to 4 centimeters; very channery silt loam
AC—4 to 27 centimeters; very channery silt loam
C—27 to 165 centimeters; extremely channery silt loam

Minor Components

Lithic Udorthents
Description: Drastically disturbed areas on mountain slopes
Percent of map unit: 5 percent
Slope: 0 to 15 percent
Hydric soil status: No

Rock outcrop
Description: Bedrock exposed during construction activities
Percent of map unit: 5 percent
Hydric soil status: No

Urban land
Description: Areas that have been paved with asphalt or concrete and are impervious to water
Percent of map unit: 5 percent
Slope: 0 to 15 percent
Dominant vegetation map class(es):
Road
Hydric soil status: No

UgF—Udorthents, graded, 15 to 55 percent slopes

Map Unit Setting

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

Elevation: 302 to 560 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

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

Description of the Udorthents

Classification
Udorthents

General
Udorthents, graded are soils that have been drastically disturbed by humans with the use of heavy machinery. In the survey area, these soils typically are in areas that have been filled and graded for road beds and building sites and that have been disturbed for bridge construction. The soils are typically derived from a mixture of excavated and graded native soils and crushed bedrock. Construction materials, such as chunks of concrete, are part of the soil mixture in some areas. These soils are typically more than 150 centimeters deep, are loamy in the fine-earth fraction, and contain more than 35 percent rock fragments, by volume, throughout. Rock fragments in the soil profile consist of sandstone, siltstone, shale, coal, or limestone in various proportions. Soil properties such as texture, bulk density, soil reaction (pH), saturated hydraulic conductivity, and available water capacity are highly variable. Because the soil properties are highly variable, an onsite investigation is required to determine the suitability of these soils for use and management.

Setting
Down-slope shape: Linear
Across-slope shape: Linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 15 to 55 percent
Parent material: Cut and fill materials derived from native soils and interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: None within a depth of 150 centimeters
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters

Interpretive Groups
Land capability subclass (nonirrigated): 8e
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Disturbed Area
Eastern Hemlock - Oak - Sweet Birch / Great Laurel Forest
Successional (Virginia, Pitch) Pine Forest

Developed Area
Road
Hydric soil status: No

Representative Profile
A—0 to 4 centimeters; very channery silt loam
AC—4 to 27 centimeters; very channery silt loam
C—27 to 165 centimeters; extremely channery silt loam

Minor Components

Lithic Udorthents
Description: Drastically disturbed areas on mountain slopes
Percent of map unit: 10 percent
Slope: 15 to 55 percent
Hydric soil status: No

Rock outcrop
Description: Bedrock exposed during construction activities
Percent of map unit: 5 percent
Hydric soil status: No

Ur—Udorthents, railroad grade

Map Unit Setting

Major land resource area(s): 125—Cumberland Plateau and Mountains and 127—Eastern Allegheny Plateau and Mountains
Elevation: 215 to 518 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Udorthents and similar soils: 93 percent
Dissimilar minor components: 7 percent

Description of the Udorthents

Classification
Udorthents

General
Udorthents, railroad grade includes the rail bed and the fill which was used to create the grade. The rail bed is nearly level and is composed of crushed stone. The outslopes of the fill are typically steep or very steep. The soils on the outslopes are typically derived from a mixture of excavated and graded native soils and crushed bedrock. These soils are typically more than 150 centimeters deep and have more than 35 percent rock fragments throughout. Rock fragments in the soil consist of sandstone, siltstone, shale, coal, or limestone in various proportions. Soil properties such as texture, bulk density, soil reaction (pH), saturated hydraulic conductivity, and available water capacity are highly variable. Because the soil properties are highly variable, an onsite investigation is required to determine the suitability of these soils for use and management. In areas where the rails are active and the rail grades are being maintained, the growth of vegetation is suppressed with herbicides. Where the rails have been abandoned, the rail grades support a variety of trees, shrubs, grasses, herbs, and forbs. They also provide a media for the growth of invasive species.

Setting
Down-slope shape: Linear
Across-slope shape: Linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 0 to 70 percent
Parent material: Cut and fill materials derived from native soils and interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: None within a depth of 150 centimeters
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Natural drainage class: Excessively drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters

Interpretive Groups
Land capability subclass (nonirrigated): 8e
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Railroad
Hydric soil status: No

Minor Components

Rock outcrop
Description: Near vertical high walls of rock, either natural or exposed during railway construction
Percent of map unit: 5 percent
Hydric soil status: No

Urban land
Description: Areas that are covered with asphalt, concrete, and other impervious materials
Percent of map unit: 1 percent
Hydric soil status: No

Endoaquepts
Percent of map unit: 1 percent
Slope: 0 to 3 percent
Landform: Closed depressions located behind the rail beds on mountain slopes
Hydric soil status: Yes

Uu—Udorthents-Urban land complex, highways

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 533 to 571 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Udorthents and similar soils: 70 percent
Urban land: 25 percent
Dissimilar minor components: 5 percent

Description of the Udorthents

Classification
Udorthents

General
Udorthents are soils that have been drastically disturbed by humans with the use of heavy machinery. In the park, these soils typically are in areas that have been filled and graded for road beds along divided highways, such as U.S. Routes 19 and 64. The soils are typically derived from a mixture of excavated and graded native soils and crushed bedrock. These soils are typically more than 150 centimeters deep, are loamy in the fine-earth fraction, and have more than 35 percent rock fragments throughout. Rock fragments in the soil profile consist of sandstone, siltstone, shale, coal, or limestone in various proportions. Soil properties such as texture, bulk density, soil reaction (pH), saturated hydraulic conductivity, and available water capacity are highly variable. Because the soil properties are highly variable, an onsite investigation is required to determine the suitability of these soils for use and management.

Setting
Down-slope shape: Linear
Across-slope shape: Linear
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 0 to 7 percent
Parent material: Cut and fill materials derived from native soils and interbedded sedimentary rock

Properties and Qualities
Depth to restrictive feature: None within a depth of 150 centimeters
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters

Interpretive Groups
Land capability subclass (nonirrigated): 7e
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Disturbed Area
Hydric soil status: No

Representative Profile
A—0 to 4 centimeters; very channery silt loam
AC—4 to 27 centimeters; very channery silt loam
C—27 to 165 centimeters; extremely channery silt loam

Description of Urban Land

Setting
Description: Areas that have been paved with asphalt or concrete and are impervious to water
Aspect (representative): Southwest
Aspect range: All aspects
Slope range: 0 to 7 percent

Interpretive Groups
Land capability subclass (nonirrigated): 8s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Road
Hydric soil status: No

Minor Components

Rock outcrop
Description: Bedrock exposed during construction practices
Percent of map unit: 5 percent
Hydric soil status: No

W—Water

Map Unit Setting

Landscape: Mountains
Major land resource area(s): 125—Cumberland Plateau and Mountains and 127—Eastern Allegheny Plateau and Mountains
Elevation: 211 to 511 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Water: 90 percent
Dissimilar minor components: 10 percent

Description of Water

In the survey area, Water consists of the Gauley and Meadow Rivers, their major tributaries, and a few ponds. No interpretations are given.

Minor Components

Rubble land
Description: Rubble land consists of areas of stones and boulders that have accumulated at the base of the slope along the river; the stones and boulders have broken off the cliff, which is formed by the Lower Nuttall sandstone, and toppled into the rivers; areas of Rubble land support little or no vegetation
Percent of map unit: 9 percent
Dominant vegetation map class(es):
Riparian zone
Hydric soil status: No

Rock outcrop
Percent of map unit: 1 percent
Hydric soil status: No

Wr—Water-Rubble land complex

Major land resource area(s): 127—Eastern Allegheny Plateau and Mountains
Elevation: 339 to 488 meters
Mean annual precipitation: 1,052 to 1,346 millimeters
Mean annual air temperature: 5 to 17 degrees C
Frost-free period: 147 to 178 days

Map Unit Composition

Water: 75 percent
Rubble land: 25 percent

Description of Water

In the survey area, Water consists of the Gauley and Meadow Rivers. No interpretations are given.

Description of Rubble Land

General

Rubble land consists of areas where a mixture of sandstone stones and boulders have accumulated at the base of the slope along the river. The stones and boulders have broken off the cliff, which is formed by the Lower Nuttall sandstone, and toppled into the rivers. Areas of Rubble land support little or no vegetation.

Properties and Qualities

Depth to restrictive feature: None within a depth of 150 centimeters
Salinity maximum based on representative value: Nonsaline
Sodicity maximum: Not sodic
Calcium carbonate equivalent percent: No carbonates

Hydrologic Properties

Flooding frequency: Frequent (see table 25)
Ponding frequency: None
Seasonal water table: Not present within a depth of 160 centimeters

Interpretive Groups

Land capability subclass (nonirrigated): 8s
West Virginia grassland suitability group (WVGSG): Not Suited (NS)
Dominant vegetation map class(es):
Riparian Zone
Hydric soil status: No

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in New River Gorge National 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 survey area 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; Hurt and others, 2002).

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 each 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 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 a phase of a soil series that normally is 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 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 in this survey area 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 made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units 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 (K_{sat}) 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 (K_{sat}) 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, and West Virginia Grassland Suitability Class

Table 8 displays information about the relationships between soils and landscapes, landforms, parent materials, and the West Virginia grassland suitability class.

Percent of the 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 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 indicate groupings of soils which have similar capabilities for growing adapted herbaceous species and have similar responses to management. These groupings, when combined with climate and aspect, reflect the productive potential of soils and provide a guide to conservation and management decisions when permanent grassland is the land use objective. More information about West Virginia grassland suitability classes can be found in appendix 1.

Forest Productivity

Table 9 can help forestland owners or managers plan the use of soils for wood crops. It shows the potential productivity of the soils for wood crops.

Potential productivity of *characteristic trees* on a soil is expressed as a site index and as a volume number. Characteristic trees and other typical plant species are listed by common name in table 10 and by scientific name in table 11.

The *site index base age* indicates the age used for the site curves.

The *site index* is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forestland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index 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 (CMAI), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

Vegetation Map Classes

Dominant vegetation map classes are assigned to components of soil map units and are listed in the map unit descriptions under the heading "Interpretive

Groups." The soil components are correlated with the vegetation map classes which are published in "Vegetation Classification and Mapping of Gauley River National Recreation Area, West Virginia" (Technical Report NPS/NER/NRTR 2010/148). Appendix 2 is a complete copy of this report. The report is also available on the Internet at http://www.nps.gov/nero/science/FINAL/GARI_veg_map/GARI_veg_map.html.

All major soil components and miscellaneous land types (such as Rock outcrop) are correlated to one or more vegetation map classes. Each vegetation map class that is listed in the map unit description provides coverage of at least 15 percent of the total acreage of the soil map unit. For soil complexes, different vegetation classes were often correlated with different soil components, in accordance with the data. In a few soil map units, components of minor extent are correlated with a vegetation map class if the data indicates the existence of a unique relationship.

The U.S. National Vegetation Classification (USNVC) was used as the standard for vegetation classification (see appendix 2, pages 29-32). Map classes were also assigned to aquatic areas, disturbed areas, and cultural and transportation features. Other information on vegetation map classes can be found in appendix 2.

Land Management

In table 12, 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 for 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.

Part I (Planting)

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.

Part II (Hazard of Erosion and Suitability for Roads)

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.

Part III (Site Preparation)

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.

Part IV (Site Restoration)

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 survey area are rated in table 13, 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 13 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 14 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 15 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 16 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 (K_{sat}), 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 (K_{sat}), depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Saturated hydraulic conductivity (K_{sat}) 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 K_{sat} 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 17 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 18 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 as a potential source.

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 19 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 (K_{sat}) 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, K_{sat} 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.

Engineering Properties

Table 20 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 250 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 21 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. If a range is not present, a singular representative value is shown.

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 (K_{sat}), 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 (K_{sat}) refers to the ability of a soil to transmit water or air. The estimates in the table indicate the rate of water movement, in micrometers per second, 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 of the soil to expand and contract with a loss or gain in moisture. Linear extensibility is used to determine the shrink-swell potential of soils. Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. 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. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

The shrink-swell potential is *low* if the soil has a linear extensibility of less than 3 percent; *moderate* if 3 to 6 percent; *high* if 6 to 9 percent; and *very high* if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

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 22 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. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) 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 K_{sat}. 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 23 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 24 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. 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 25 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 25 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 26 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 kind and thickness of the restrictive layer, both of which significantly affect the ease of excavation. If no restriction exists the table reports *No restriction*. *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 (K_{sat}), 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 names for the orders and taxonomic soil properties relate to Greek, Latin, or other root words that reveal something about the soil. 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 Inceptisol.

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 Udept (*Ud*, meaning humid, plus *ept*, from Inceptisol).

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 Dystrudepts (*Dystr*, meaning infertile, plus *udept*, the suborder of the Inceptisols that has a udic moisture regime).

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

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 loamy-skeletal, siliceous, semiactive, mesic Typic Dystrudepts.

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.

Most parks are mapped to the series level. The names of soil series are selected by the soil scientists during the course of mapping. The series names are commonly geographic place names or are coined. Because of access limitations and soil

variability, soils in some remote areas are classified at the great group or subgroup level.

Table 27 indicates the order, suborder, great group, subgroup, and family of the soil series in the park. Table 28 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.

Allegheny Series

The Allegheny series consists of very deep, well drained soils that formed in alluvium from interbedded Pennsylvanian-age sandstone, shale, and siltstone. Allegheny soils are on high stream terraces in river valleys. Slopes range from 8 to 15 percent. The mean annual precipitation is about 1,207 millimeters (47.5 inches), and the mean annual air temperature is about 10.6 degrees C (51 degrees F).

Taxonomic Classification

Fine-loamy, mixed, semiactive, mesic Typic Hapludults

Typical Pedon

Allegheny loam; Fayette County, West Virginia; on a 9 percent slope in a forested area on Koontz Bend of the Gauley River, about 1.77 kilometers (1.1 miles) northeast of the mouth of Peters Creek; at an elevation of 323 meters (1,060 feet); lat. 38 degrees 14 minutes 19 seconds N. and long. 81 degrees 02 minutes 09 seconds W.; NAD83; Ansted, West Virginia USGS topographic quadrangle. (When described, the soil was moist throughout.)

Oi—0 to 1 centimeter (0 to 0.4 inch); slightly decomposed plant material; abrupt irregular boundary.

Oe—1 to 4 centimeters (0.4 inch to 2 inches); moderately decomposed plant material; loose; abrupt smooth boundary.

A—4 to 7 centimeters (2 to 3 inches); dark brown (10YR 3/3), broken face, loam; weak fine granular structure; very friable; many very fine to medium roots; very strongly acid, pH 4.8 by Hellige-Truog; abrupt wavy boundary.

Ap—7 to 26 centimeters (3 to 10 inches); brown (10YR 4/3), broken face, loam; moderate medium granular structure; very friable; common very fine to coarse roots; very strongly acid, pH 4.9 by Hellige-Truog; abrupt smooth boundary.

BE—26 to 42 centimeters (10 to 17 inches); yellowish brown (10YR 5/4), broken face, loam; weak medium subangular blocky structure; friable; common very fine to very coarse roots; 3 percent nonflat subrounded very strongly cemented sandstone gravel; very strongly acid, pH 4.6 by Hellige-Truog; clear wavy boundary.

Bt1—42 to 73 centimeters (17 to 29 inches); brownish yellow (10YR 6/6), broken face, loam; 25 percent clay; moderate medium subangular blocky structure; friable; 10 percent clay films on all faces of peds; very strongly acid, pH 4.5 by Hellige-Truog; clear wavy boundary.

Bt2—73 to 87 centimeters (29 to 34 inches); yellowish brown (10YR 5/6), broken face, clay loam; 32 percent clay; moderate medium subangular blocky structure; friable; 30 percent clay films on all faces of peds; extremely acid, pH 4.3 by Hellige-Truog; clear wavy boundary.

Bt3—87 to 127 centimeters (34 to 50 inches); yellowish brown (10YR 5/6), broken face, clay loam; 36 percent clay; moderate coarse subangular blocky structure; firm; 55 percent clay films on all faces of peds; extremely acid, pH 4.1 by Hellige-Truog; gradual wavy boundary.

Bt4—127 to 165 centimeters (50 to 65 inches); strong brown (7.5YR 5/6), broken face, clay loam; 28 percent clay; weak coarse subangular blocky structure; firm; 45 percent clay films on all faces of peds; extremely acid, pH 4.0 by Hellige-Truog.

Range in Characteristics

Solum thickness: 102 to 203 centimeters (30 to 72 inches)
Depth to bedrock: More than 152 centimeters (60 inches)
Rock fragment content: 0 to 15 percent of the A horizon, 0 to 30 percent of the Bt horizon, and 0 to 35 percent of the BC and C horizons; mostly sandstone gravel or channers
Soil reaction: Strongly acid to extremely acid

The A horizon (if it occurs) has hue of 7.5YR to 2.5Y, value of 3, and chroma of 1 to 3. It is loam, fine sandy loam, or silt loam.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is loam, fine sandy loam, or silt loam. Some pedons have thin A horizons that include value of 3 and chroma of 1 to 3.

The BA or BE horizon (if it occurs) has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. Texture is sandy loam, loam, or silt loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is clay loam, sandy clay loam, loam, fine sandy loam, silt loam, or silty clay loam. Faint mottles in shades of brown, red, or yellow are common in the lower part of the horizon.

The BC horizon (if it occurs) generally has colors and textures similar to those of the lower Bt horizon. Iron-manganese concretions and iron masses in shades of brown, red, or yellow increase in number as depth increases. Some horizons are variegated without dominant hue or chroma.

The C horizon (if it occurs) has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8 and may be variegated. It ranges from sand to clay loam and may be stratified. Iron masses, nodules, concretions, and iron depletions in shades of black, brown, yellow, gray, or olive are common throughout the horizon.

Some pedons have a 2BC or 2C horizon. This horizon has 35 to 80 percent gravel and cobbles and/or strongly contrasting particle size compared to overlying horizons.

Berks Series

The Berks series consists of moderately deep, well drained soils that formed in residuum weathered from interbedded Pennsylvanian-age shale, siltstone, and fine grained sandstone (Kanawha Formation) (fig. 19). Berks soils are on convex mountain slopes. Slopes range from 35 to 80 percent. The mean annual precipitation is about 1,207 millimeters (47.5 inches), and the mean annual air temperature is about 10.6 degrees C (51 degrees F).

Taxonomic Classification

Loamy-skeletal, mixed, active, mesic Typic Dystrudepts

Figure 19.—A representative profile of the Berks series. Berks soils are 51 to 102 centimeters (20 to 40 inches) deep to bedrock. In this photo, fractured siltstone bedrock occurs at a depth of approximately 80 centimeters (31 inches). The photo is from Pocahontas County, West Virginia. Scale is in centimeters.

Typical Pedon

Berks channery silt loam; Fayette County, West Virginia; on a 51 percent slope in a forested area, about 724 meters (2,375 feet) southeast of the confluence of Peters Creek and the Gauley River; at an elevation of 463 meters (1,519 feet); lat. 38 degrees 13 minutes 08 seconds N. and long. 81 degrees 02 minutes 35 seconds W.; NAD83; Ansted, West Virginia USGS topographic quadrangle. (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 flat subangular 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 fine, common medium, common coarse, common very coarse, and common very fine 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, common coarse, and few very fine roots throughout; 10 percent flat subangular strongly cemented shale flagstones and 25 percent flat subangular 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 and moist, very channery silt loam; 22 percent clay; weak medium subangular blocky structure; friable; few fine, few medium, and few coarse roots throughout; 40 percent flat subangular 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) mottles; weak coarse subangular blocky structure; friable; 10 percent flat subangular strongly cemented shale flagstones and 35 percent flat subangular 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 flat subangular 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 A horizon, 15 to 75 percent in individual subhorizons of B horizons, and 35 to 90 percent in the C horizon; average volume in the particle-size control section is more than 35 percent

Soil reaction: Extremely acid to slightly acid throughout the profile

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

The B horizons have 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 the soil. Texture of the fine-earth fraction is loam, silt loam, or silty clay loam. The horizons contain 5 to 32 percent clay and 40 to 60 percent silt. Structure is weak or moderate fine or medium subangular blocky in a Bw horizon and is usually obscured by rock fragments in a CB horizon.

The C horizon (if it occurs) has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 8. Texture of the fine-earth fraction is loam or silt loam.

Buchanan Series

The Buchanan series consists of very deep, somewhat poorly drained and moderately well drained soils that formed in colluvium derived from Pennsylvanian-age sandstone, siltstone, and shale (fig. 20). Buchanan soils are on mountain footslopes and in drainageways. Slopes range from 8 to 15 percent. The mean annual precipitation is about 1,207 millimeters (47.5 inches), and the mean annual air temperature is about 10.6 degrees C (51 degrees F).

Taxonomic Classification

Fine-loamy, mixed, semiactive, mesic Aquic Fragiudults

Typical Pedon

Buchanan loam; Nicholas County, West Virginia; on a 8 percent slope in a forested area along County Route 22/1, about 2.95 kilometers (1.8 miles) southwest of Keslers Cross Lanes and 1.01 kilometers (0.63 mile) northeast of the confluence of Meadow Creek and the Gauley River; at an elevation of 467 meters (1,532 feet); lat. 38 degrees 13 minutes 27 seconds N. and long. 80 degrees 57 minutes 57 seconds W.; NAD83; Summersville Dam, West Virginia USGS topographic quadrangle: (When described, the soil was moist throughout.)

A—0 to 12 centimeters (0 to 5 inches); dark brown (10YR 3/3), broken face, loam; weak fine granular structure; very friable; many fine and very fine roots; 3 percent nonflat subangular very strongly cemented sandstone gravel and 8 percent flat subangular very strongly cemented sandstone channers; very strongly acid, pH 4.5 by Hellige-Truog; abrupt wavy boundary.

BA—12 to 20 centimeters (5 to 8 inches); dark yellowish brown (10YR 4/4), broken face, loam; weak medium subangular blocky structure; very friable; few very fine to medium roots; 3 percent nonflat subangular very strongly cemented sandstone gravel; very strongly acid, pH 4.5 by Hellige-Truog; clear wavy boundary.

Bt1—20 to 40 centimeters (8 to 16 inches); yellowish brown (10YR 5/6), broken face, loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; 10 percent clay films on vertical faces of peds; extremely acid, pH 4.3 by Hellige-Truog; clear smooth boundary.

Bt2—40 to 65 centimeters (16 to 26 inches); brownish yellow (10YR 6/6), broken face, loam; moderate medium subangular blocky structure; friable; few very fine to coarse roots throughout; 15 percent clay films on vertical faces of peds; 1 percent fine prominent strong brown (7.5YR 4/6) masses of oxidized iron in matrix surrounding redoximorphic depletions and 2 percent medium prominent light gray (10YR 7/2) iron depletions infused into matrix along faces of peds; 5 percent nonflat subangular very strongly cemented sandstone gravel; very strongly acid, pH 4.6 by Hellige-Truog; clear smooth boundary.

Btx1—65 to 98 centimeters (26 to 39 inches); brownish yellow (10YR 6/8), broken face, loam; weak very coarse prismatic structure parting to moderate coarse platy;

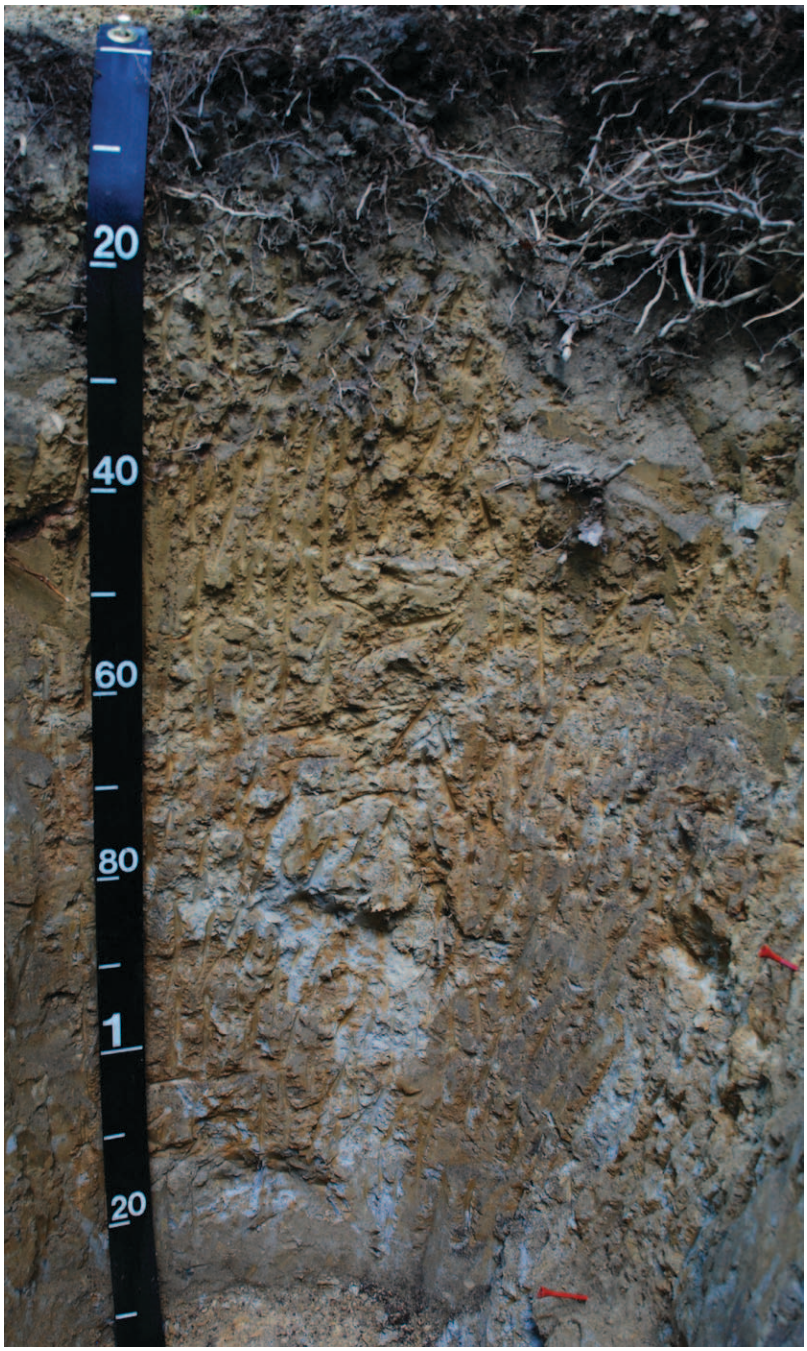

Figure 20.—A representative profile of the Buchanan series. Buchanan soils have a dense layer in the subsoil called a fragipan (Btx horizon) which impedes root penetration and the movement of water downward through the soil profile. In this photo, the fragipan begins at a depth of 55 centimeters (22 inches). The photo is from Monongalia County, West Virginia. Scale is in centimeters.

firm; brittle; few very fine roots between peds; 15 percent clay films on vertical faces of peds; 3 percent fine prominent strong brown (7.5YR 5/8) masses of oxidized iron in matrix surrounding redoximorphic depletions and 4 percent coarse prominent light gray (10YR 7/2) iron depletions between peds; 9 percent nonflat

subangular very strongly cemented sandstone gravel; very strongly acid, pH 4.5 by Hellige-Truog; clear smooth boundary.

Btx2—98 to 165 centimeters (39 to 65 inches); light yellowish brown (10YR 6/4), broken face, clay loam; moderate very coarse prismatic structure parting to moderate coarse platy; very firm; brittle; 10 percent clay films on vertical faces of peds; 15 percent fine prominent strong brown (7.5YR 5/8) masses of oxidized iron in matrix surrounding redoximorphic depletions and 20 percent very coarse prominent light gray (10YR 7/2) iron depletions between peds; 10 percent nonflat subangular very strongly cemented sandstone gravel; very strongly acid, pH 4.5 by Hellige-Truog.

Range in Characteristics

Solum thickness: 102 to 203 centimeters (40 to 80 inches)
Depth to bedrock: More than 152 centimeters (60 inches)
Depth to the fragipan: 51 to 91 centimeters (20 to 36 inches)
Rock fragments: 0 to 40 percent in individual horizons above the fragipan and 5 to 60 percent in the fragipan and C horizon; typically 10 to 15 percent of the soil, by volume, with higher amounts in the surface layer; channers, gravel, cobbles, and stones; subrounded and flat subangular hard sandstone and shale
Soil reaction: Extremely acid to strongly acid throughout the profile

The A horizon has hue of 10YR or 7.5YR, value of 3 to 6, and chroma of 1 to 4. Texture of the fine-earth fraction is fine sandy loam, sandy loam, silt loam, or loam.

An E horizon occurs in some pedons. It has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. Texture of the fine-earth fraction is sandy loam, silt loam, or loam.

A BE or BA horizon occurs in some pedons. This horizon has hue of 10YR or 7.5YR and value and chroma of 5 or 6. Texture of the fine-earth fraction is silt loam or loam.

The Bt horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 3 to 6. It has low-chroma redoximorphic features in the lower part. Texture of the fine-earth fraction is silt loam, loam, clay loam, or sandy clay loam. The horizon has 18 to 30 percent clay and more than 20 percent sand. It has few to many clay films.

The Btx horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 3 to 6. It has few to many redoximorphic concentrations and depletions. Texture of the fine-earth fraction is silt loam, loam, clay loam, or sandy clay loam. The horizon has weak or moderate prismatic structure parting to platy or blocky structure and is firm or very firm and brittle.

The C horizon (if it occurs) has hue of 2.5Y to 5YR, value of 4 to 6, and chroma of 1 to 6. Texture of the fine-earth fraction is sandy loam, silt loam, loam, clay loam, or sandy clay loam.

Clifftop Series

The Clifftop series consists of moderately deep, well drained soils that formed in residuum from Pennsylvanian-age acid shale, siltstone, and fine grained sandstone (fig. 21). Clifftop soils are on mountain ridges and slopes. Slopes range from 3 to 70 percent. The mean annual precipitation is about 1,207 millimeters (47.5 inches), and the mean annual air temperature is about 10.6 degrees C (51 degrees F).

Taxonomic Classification

Fine-loamy, mixed, semiactive, mesic Typic Hapludults

Figure 21.—A representative profile of the Clifftop series. Clifftop soils are 51 to 102 centimeters (20 to 40 inches) deep to bedrock. In this photo, fractured fine grained sandstone bedrock occurs at a depth of approximately 60 centimeters (24 inches). The photo is from Preston County, West Virginia. Scale is in centimeters.

Typical Pedon

Clifftop channery silt loam; Fayette County, West Virginia; on a 10 percent slope in a hayfield about 270 meters (885 feet) southeast of the end of County Route 3/2 (White Road) and 1,046 meters (3,432 feet) southwest of the confluence of Masons Branch and the Gauley River; the site is underlain by the Upper Nuttall sandstone; at an elevation of 427 meters (1,401 feet); lat. 38 degrees 13 minutes 06.4 seconds N. and long. 81 degrees 00 minutes 04.8 seconds W.; NAD83; Ansted, West Virginia USGS topographic quadrangle. (When described, the soil was moist throughout.)

Ap—0 to 18 centimeters (0 to 7 inches); brown (10YR 4/3), broken face, channery silt loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; common fine and many very fine roots; 15 percent flat subrounded moderately

cemented acid shale channers 2 to 150 millimeters in size; strongly acid, pH 5.2 by Hellige-Truog; abrupt smooth boundary.

BA—18 to 28 centimeters (7 to 11 inches); dark yellowish brown (10YR 4/4), broken face, silt loam; 20 percent clay; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine and common very fine roots; 5 percent flat subrounded moderately cemented acid shale channers 2 to 150 millimeters in size; very strongly acid, pH 4.9 by Hellige-Truog; clear wavy boundary.

Bt—28 to 51 centimeters (11 to 20 inches); yellowish brown (10YR 5/4), broken face, loam; 23 percent clay; 10 percent coarse prominent brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine and few very fine roots; 10 percent flat subrounded moderately cemented acid shale channers 2 to 150 millimeters in size; very strongly acid, pH 4.8 by Hellige-Truog; clear wavy boundary.

BC—51 to 61 centimeters (20 to 24 inches); yellowish brown (10YR 5/4), broken face, channery loam; 19 percent clay; 15 percent coarse prominent brownish yellow (10YR 6/8) mottles; weak coarse subangular blocky structure; firm, slightly sticky, slightly plastic; 20 percent flat subrounded moderately cemented acid shale channers 2 to 150 millimeters in size; very strongly acid, pH 4.6 by Hellige-Truog; gradual wavy boundary.

Cr—61 centimeters (24 inches); light yellowish brown (2.5Y 6/3) moderately cemented acid shale bedrock; moderate excavation difficulty.

Range in Characteristics

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

Content of rock fragments: 0 to 25 percent in the upper part of the solum and 15 to 65 percent in the BC and C horizons

Soil reaction: Strongly acid to extremely acid throughout the profile

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 to 4. Texture of the fine-earth fraction is silt loam or loam.

The BA horizon (or similar transitional horizon) has hue of 7.5YR to 2.5Y, value of 3 to 6 (6 or more dry), and chroma of 3 to 6. Texture of the fine-earth fraction is silt loam or loam.

The E horizon (if it occurs) has hue of 10YR to 2.5Y, value of 4 to 6 (6 or more dry), and chroma of 2 to 6. Texture of the fine-earth fraction is silt loam or loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. Texture of the fine-earth fraction is silt loam, silty clay loam, clay loam, or loam.

The BC horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. Texture of the fine-earth fraction is silt loam, silty clay loam, clay loam, or loam.

The C horizon (if it occurs) has hue of 7.5YR to 2.5Y and value and chroma of 4 to 8. Texture of the fine-earth fraction is silt loam, silty clay loam, silty clay, clay loam, or loam. Lithochromic colors in shades of yellowish brown, gray, and reddish brown may occur.

Cottonbend Series

The Cottonbend series consists of very deep, well drained soils that formed in old alluvium derived mainly from Pennsylvanian-age sandstone, siltstone, and shale. Cottonbend soils are on high stream terraces in river valleys. Slopes range from 3 to 15 percent. The mean annual precipitation is about 1,207 millimeters (47.5 inches), and the mean annual air temperature is about 10.6 degrees C (51 degrees F).

Taxonomic Classification

Fine-loamy, siliceous, semiactive, mesic Typic Paleudults

Typical Pedon

Cottonbend loam; Fayette County, West Virginia; on a 3 percent slope in a forested area on Koontz Bend of the Gauley River, about 381 meters (1,250 feet) west-southwest (bearing 258 degrees) of the confluence of Bucklick Branch and the Gauley River; at an elevation of 347 meters (1,138 feet); lat. 38 degrees 14 minutes 08 seconds N. and long. 81 degrees 01 minute 54 seconds W.; NAD83; Ansted, West Virginia USGS topographic quadrangle. (When described, the soil was moist throughout.)

Oi—0 to 1 centimeter (0 to 0.4 inch); slightly decomposed plant material; abrupt wavy boundary.

A—1 to 8 centimeters (0.4 inch to 3 inches); dark brown (10YR 3/3), broken face, loam; 10 percent clay; moderate medium granular structure; very friable; many very fine to medium and common coarse to very coarse roots throughout; strongly acid, pH 5.5 by Hellige-Truog; clear wavy boundary.

Ap—8 to 20 centimeters (3 to 8 inches); brown (10YR 4/3), broken face, loam; 10 percent clay; moderate coarse and moderate medium subangular blocky structure; friable; many very fine, many medium, and common coarse roots throughout; strongly acid, pH 5.5 by Hellige-Truog; abrupt smooth boundary.

Bt1—20 to 61 centimeters (8 to 24 inches); yellowish brown (10YR 5/6), broken face, loam; 17 percent clay; weak medium subangular blocky structure; friable; common very fine and medium roots throughout; 3 percent faint clay films on all faces of peds; very strongly acid, pH 4.5 by Hellige-Truog; clear wavy boundary.

Bt2—61 to 77 centimeters (24 to 30 inches); strong brown (7.5YR 5/6), broken face, loam; 20 percent clay; moderate medium subangular blocky structure parting to moderate fine granular and moderate medium subangular blocky structure parting to moderate medium granular; firm; common medium and common very fine roots throughout; 10 percent distinct clay films on all faces of peds; extremely acid, pH 4.0 by Hellige-Truog; clear smooth boundary.

Bt3—77 to 102 centimeters (30 to 40 inches); strong brown (7.5YR 5/6), broken face, loam; 23 percent clay; moderate coarse subangular blocky structure parting to moderate medium granular and moderate medium subangular blocky structure parting to moderate medium granular; firm; common very fine to coarse roots throughout; 7 percent distinct clay films on all faces of peds; extremely acid, pH 4.0 by Hellige-Truog; clear smooth boundary.

Bt4—102 to 128 centimeters (40 to 50 inches); reddish brown (2.5YR 5/4), broken face, loam; 21 percent clay; moderate medium granular and moderate coarse subangular blocky structure; friable; common very fine and medium roots throughout; 20 percent distinct clay films on all faces of peds; extremely acid, pH 3.6 by Hellige-Truog; clear smooth boundary.

Bt5—128 to 230 centimeters (50 to 91 inches); red (2.5YR 4/6), broken face, loam; 20 percent clay; moderate coarse platy structure parting to weak coarse subangular blocky and moderate medium platy structure parting to weak coarse subangular blocky; friable; common very fine and medium roots throughout; 45 percent distinct clay films on all faces of peds; extremely acid, pH 3.6 by Hellige-Truog; gradual wavy boundary.

BC—230 to 332 centimeters (91 to 131 inches); red (2.5YR 4/8), broken face, sandy loam; 8 percent clay; weak coarse platy structure; very friable; common very coarse roots between peds and common very fine to medium roots throughout; extremely acid, pH 3.6 by Hellige-Truog; gradual wavy boundary.

CB1—332 to 367 centimeters (131 to 144 inches); yellowish red (5YR 4/6), broken face, loamy sand; 5 percent clay; massive; extremely acid, pH 3.6 by Hellige-Truog; diffuse wavy boundary.

CB2—367 to 440 centimeters (144 to 173 inches); yellowish red (5YR 4/6), broken face, gravelly loamy sand with gravel; massive; extremely acid, pH 3.6 by Hellige-Truog; gradual wavy boundary.

C—440 to 465 centimeters (173 to 183 inches); strong brown (7.5YR 5/6), broken face, loamy sand with paragravel; massive; extremely acid, pH 3.6 by Hellige-Truog.

Range in Characteristics

Solum thickness: More than 203 centimeters (72 inches)

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

Rock fragments: 0 to 35 percent in the upper part of the solum and 0 to 60 percent below a depth of about 24 inches; gravel and cobbles; mostly well rounded sandstone, siltstone, and shale

Soil reaction: Extremely acid to strongly acid throughout the profile

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. Some pedons have a thin Ap horizon with value of 3. Texture is loam, silt loam, or fine sandy loam.

The E or BE horizon (if it occurs) has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. Texture is loam, sandy loam, or fine sandy loam.

The upper part of the Bt horizon (above a depth of about 24 inches) has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. Texture is dominantly sandy clay loam, loam, clay loam, or, rarely, silty clay loam.

The lower part of the Bt horizon (below a depth of about 24 inches) has hue of 2.5YR to 10YR, value of 4 or 5, and chroma of 4 to 8. Soft iron masses in shades or brown or red are common throughout. Texture is loam, clay loam, sandy clay loam, or clay.

The CB and/or C horizons have hue of 2.5YR to 10YR, value of 4 or 5, and chroma of 4 to 8. Texture is loam, clay loam, sandy clay loam, or clay.

Craigsville Series

The Craigsville series consists of very deep, well drained soils that formed in acid, sandy and gravelly alluvium derived from Pennsylvanian-age sandstone, shale, and siltstone. Craigsville soils are on high-energy flood plains in river valleys. Slopes range from 0 to 3 percent. The mean annual precipitation is 1,207 millimeters (47.5 inches), and the mean annual air temperature is 10.6 degrees C (51 degrees F).

Taxonomic Classification

Loamy-skeletal, mixed, superactive, mesic Fluventic Dystrudepts

Typical Pedon

Craigsville very stony sandy loam; Raleigh County, West Virginia; on a 2 percent slope in a forested area near the mouth of Glade Creek; at an elevation of 372 meters (1,220 feet); lat. 37 degrees 49 minutes 43 seconds N. and long. 81 degrees 00 minutes 46 seconds W.; NAD83; Prince, West Virginia USGS topographic quadrangle. (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 1.4 inches); moderately decomposed plant material; abrupt broken boundary.

A—3 to 13 centimeters (1.4 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 nonflat rounded indurated sandstone cobbles and 35 percent nonflat rounded indurated 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 nonflat rounded indurated sandstone cobbles and 44 percent nonflat rounded indurated 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 nonflat rounded indurated sandstone cobbles and 48 percent nonflat rounded indurated 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; single grain; loose; few fine roots throughout; 15 percent nonflat rounded indurated sandstone cobbles and 60 percent nonflat rounded indurated 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: 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

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. Texture of the fine-earth fraction ranges from sandy loam to silt loam.

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

The BC horizon (if it occurs) has hue of 5YR to 10YR, value of 4 or 5, and chroma of 4 or 6. Texture of the fine-earth fraction is loam, sandy loam, or loamy sand.

The C or 2C horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 3 to 6. Texture of the fine-earth fraction is loamy sand or sandy loam. Thin, nonconforming horizons may have less than 15 percent gravel or cobbles.

Dekalb Series

The Dekalb series consists of moderately deep, well drained soils that formed in residuum weathered from Pennsylvanian-age, acid sandstone (fig. 22). Dekalb soils are on nearly level to steep convex mountain summits, crests, and upper flanks. Slopes range from 3 to 35 percent. The mean annual precipitation is about 1,207 millimeters (47.5 inches), and the mean annual air temperature is about 10.6 degrees C (51 degrees F).

Taxonomic Classification

Loamy-skeletal, siliceous, active, mesic Typic Dystrudepts

Typical Pedon

Dekalb very channery sandy loam; Fayette County, West Virginia; on a 47 percent slope in a forested area about 805 meters (2,641 feet) north of the community of Ames Heights and 115 meters (377 feet) west of Mill Creek; at an elevation of 488 meters (1,601 feet); lat. 38 degrees 05 minutes 30 seconds N. and long. 81 degrees

Figure 22.—A representative profile of the Dekalb series. Dekalb soils are 51 to 102 centimeters (20 to 40 inches) deep to sandstone bedrock. In this photo, bedrock occurs at a depth of approximately 58 centimeters (23 inches). The photo is from Fayette County, West Virginia.

04 minutes 30 seconds W.; NAD83; Fayetteville, West Virginia USGS topographic quadrangle. (When described, the soil was moist throughout.)

Oi—0 to 2 centimeters (0 to 1 inch); slightly decomposed plant material; strongly acid, pH 5.4, 1:1 water; abrupt wavy boundary.

Oe—2 to 5 centimeters (1 to 2 inches); moderately decomposed plant material; very strongly acid, pH 4.8, 1:1 water; abrupt wavy boundary.

A—5 to 12 centimeters (2 to 5 inches); black (7.5YR 2.5/1), broken face, very channery highly organic sandy loam; moderate medium granular structure; very friable; 55 percent sandstone channers; extremely acid, pH 4.2, 1:1 water; abrupt irregular boundary.

Bw1—12 to 21 centimeters (5 to 8 inches); dark yellowish brown (10YR 4/6), broken face, extremely channery sandy loam; weak medium blocky and weak fine subangular blocky structure; very friable; 60 percent sandstone channers; extremely acid, pH 3.8, 1:1 water; clear irregular boundary.

Bw2—21 to 38 centimeters (8 to 15 inches); dark yellowish brown (10YR 4/6), broken face, very channery sandy loam; weak medium and weak fine subangular blocky structure; very friable; 50 percent sandstone channers; extremely acid, pH 3.9, 1:1 water; clear wavy boundary.

Bw3—38 to 55 centimeters (15 to 22 inches); light olive brown (2.5Y 5/6), broken face, very channery sandy loam; weak medium and weak fine subangular blocky structure; very friable; 50 percent sandstone channers; very strongly acid, pH 4.5, 1:1 water; gradual wavy boundary.

BC—55 to 68 centimeters (22 to 27 inches); light olive brown (2.5Y 5/6), broken face, extremely channery loam; weak fine subangular blocky structure; very friable; 60 percent sandstone channers; very strongly acid, pH 4.5, 1:1 water; abrupt smooth boundary.

R—68 centimeters (27 inches); indurated sandstone bedrock; very high excavation difficulty.

Range in Characteristics

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

Rock fragments: 10 to 60 percent in individual horizons of the solum and 50 to 90 percent or more in the C horizon; amount increases as depth increases; flat, subangular or angular sandstone fragments that are 1 to 10 inches across

Soil reaction: Strongly acid to extremely acid throughout the profile

The A horizon has hue of 7.5YR to 10YR, value of 2 or 3, and chroma of 1 or 2. The Ap horizon (occurring in cultivated areas) has hue of 10YR, value of 4, and chroma of 2 to 4. The A horizon is loam, fine sandy loam, or sandy loam. Structure is weak very fine or fine granular.

The E horizon (if it occurs) has hue of 10YR, value of 5 or 6, and chroma of 1 to 4. Its texture and structure are similar to those of the A horizon.

Some pedons have a BA horizon. This horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam, sandy loam, or fine sandy loam.

The B horizon has hue of 7.5YR to 2.5Y and value and chroma of 4 to 8. It is loam, fine sandy loam, or sandy loam. The average clay content typically is between 6 to 15 percent but ranges to 18 percent in the particle-size control section. Structure is weak to moderate, fine or coarse subangular blocky.

The BC horizon (if it occurs) has hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 4 to 8. Texture of the fine-earth fraction is sandy loam, fine sandy loam, or loam.

The C horizon (if it occurs) has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. Texture of the fine-earth fraction is sandy loam or loamy sand. Bedrock is gray to brown sandstone of varying hardness and is commonly fractured without displacement.

The Dekalb soils in Gauley River National Recreation Area are considered a taxadjunct to the Dekalb series because they typically have a semiactive cation-exchange activity class. This is due to the dominance of low-activity clay minerals in the subsoil. This difference, however, does not significantly affect the use and management of the soils.

Fenwick Series

The Fenwick series consists of moderately deep, moderately well drained soils that formed in residuum weathered from Pennsylvanian-age, acid sandstone or interbedded sandstone, siltstone, and shale (fig. 23). Fenwick soils are on broad mountain ridges. Slopes range from 3 to 15 percent. The mean annual precipitation is about 1,207 millimeters (47.5 inches), and the mean annual air temperature is about 10.6 degrees C (51 degrees F).

Figure 23.—A representative profile of the Fenwick series. Fenwick soils are 51 to 102 centimeters (20 to 40 inches) deep to impermeable bedrock. The bedrock "perches" a seasonal high water table which gives the soil a mottled appearance. In this photo, the mottling from the seasonal high water table begins at a depth of about 60 centimeters (24 inches) and highly weathered shale bedrock at a depth of 70 centimeters (28 inches). The photo is from Monongalia County, West Virginia. Scale is in centimeters.

Taxonomic Classification

Fine-loamy, mixed, semiactive, mesic Aquic Hapludults

Typical Pedon

Fenwick silt loam; Nicholas County, West Virginia; on a 7 percent slope in a forested area about 762 meters (2,500 feet) south-southeast of the intersection of County Route 22 and a National Park Service river access road, approximately 2.41

kilometers (1.5 miles) west of Arnett Chapel; at an elevation of 430 meters (1,411 feet); lat. 38 degrees 12 minutes 34 seconds N. and long. 81 degrees 00 minutes 49 seconds W.; NAD83; Ansted, West Virginia USGS topographic quadrangle. (When described, the soil was moist throughout.)

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

A—2 to 13 centimeters (1 to 5 inches); dark grayish brown (10YR 4/2), broken face, silt loam; weak fine and medium granular structure; very friable; many very fine to coarse roots; very strongly acid, pH 4.7 by Hellige-Truog; clear smooth boundary.

BA—13 to 20 centimeters (5 to 8 inches); yellowish brown (10YR 5/4), broken face, loam; weak medium subangular blocky structure; very friable; common very fine to medium roots; very strongly acid, pH 4.7 by Hellige-Truog; clear smooth boundary.

Bt1—20 to 56 centimeters (8 to 22 inches); yellowish brown (10YR 5/6), broken face, loam; moderate medium subangular blocky structure; friable; few very fine to medium roots; 10 percent distinct clay films on all faces of peds; very strongly acid, pH 4.5 by Hellige-Truog; clear wavy boundary.

Bt2—56 to 77 centimeters (22 to 30 inches); yellowish brown (10YR 5/4), broken face, loam; 25 percent clay; moderate medium subangular blocky structure; friable; 25 percent distinct clay films on all faces of peds; 10 percent fine distinct strong brown (7.5YR 5/8) masses of oxidized iron and 25 percent fine and medium distinct light brownish gray (10YR 6/2) iron depletions; very strongly acid, pH 4.5 by Hellige-Truog; clear wavy boundary.

Btg—77 to 93 centimeters (30 to 37 inches); light brownish gray (10YR 6/2), broken face, clay loam; 28 percent clay; moderate medium and coarse subangular blocky structure; firm; 30 percent distinct clay films on all faces of peds; 10 percent fine distinct yellowish brown (10YR 5/8) masses of oxidized iron and 10 percent fine and medium distinct yellowish brown (10YR 5/6) masses of oxidized iron; very strongly acid, pH 4.5 by Hellige-Truog; clear wavy boundary.

BC—93 to 99 centimeters (37 to 39 inches); strong brown (7.5YR 5/6), broken face, loam; 22 percent clay; weak medium subangular blocky structure; firm; 15 percent medium distinct pinkish gray (7.5YR 6/2) iron depletions and 25 percent medium and coarse distinct yellowish red (5YR 4/6) masses of oxidized iron; 10 percent flat moderately cemented siltstone gravel 2 to 20 millimeters in size; extremely acid, pH 4.0 by Hellige-Truog; clear wavy boundary.

Cg—99 to 112 centimeters (39 to 44 inches); light brownish gray (10YR 6/2) (60 percent), broken face, very channery loam; 20 percent clay; massive; firm; medium and coarse distinct yellowish brown (10YR 5/8) (10 percent) and distinct yellowish brown (10YR 5/6) (30 percent) masses of oxidized iron; 35 percent flat moderately cemented siltstone channers; extremely acid, pH 4.0 by Hellige-Truog; abrupt wavy boundary.

R—112 centimeters (44 inches); very strongly cemented sandstone bedrock; high excavation difficulty.

Range in Characteristics

Solum thickness: 50 to 101 centimeters (20 to 40 inches)

Depth to bedrock: 101 centimeters (40 inches)

Rock fragments: 0 to 15 percent, by volume, in the A, AB, BA, and Bt horizons and 5 to 35 percent in the BC and C horizons; commonly channers and flagstones

Soil reaction: Very strongly acid to neutral in the A horizon and very strongly acid or strongly acid in the Bt, BC, and C horizons

The A horizon and AB horizon (if it occurs) have hue of 7.5YR, 10YR, or 2.5Y and value and chroma of 2 to 4. Texture is silt loam or loam. Consistence is friable or very friable.

Some pedons have a BA horizon. This horizon is 0 to 6 inches thick. It has hue of 10YR, value of 3 to 5, and chroma of 3 or 4. Texture is silt loam or loam. Consistence is friable.

The Bt horizon has matrix hue of 7.5YR, 10YR, or 2.5Y, value of 5 or 6, and chroma of 4 to 6. Some pedons have a Btg horizon that contains red, brown, and gray mottles or redoximorphic features. Texture of the fine-earth fraction of the Bt horizon is loam, silt loam, or clay loam. Structure is weak or moderate, fine to coarse subangular blocky. Consistence is friable in the upper part of the horizon and friable to firm in the lower part.

Most pedons have a BC horizon. This horizon has colors and textures similar to those of the Bt horizon. Structure is weak subangular blocky or platy. Consistence is firm or very firm. Part of the BC horizon may have brittle characteristics.

Many pedons have a C or Cg horizon. This horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 7, and chroma of 2 to 6. Texture of the fine-earth fraction is sandy loam, loam, silt loam, or silty clay loam. Consistence is firm or very firm.

Highsplint Series

The Highsplint series consists of very deep, well drained soils that formed in stony loamy colluvium weathered from Pennsylvanian-age sandstone, siltstone, and shale (Kanawha Formation) (fig. 24). Highsplint soils are on mountain slopes. Slopes range from 15 to 80 percent. The mean annual precipitation is about 1,207 millimeters (47.5 inches), and the mean annual air temperature is about 10.6 degrees C (51 degrees F).

Taxonomic Classification

Loamy-skeletal, mixed, active, mesic Typic Dystrudepts

Typical Pedon

Highsplint channery loam; Raleigh County, West Virginia; 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); at an elevation of 725 meters (2,380 feet); lat. 37 degrees 52 minutes 22.40 seconds N. and long. 81 degrees 17 minutes 40.85 seconds W.; NAD 83; Eccles, West Virginia USGS topographic quadrangle. (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, 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, 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, 1:1 water; clear wavy boundary.

Figure 24.—A representative profile of the Highsplint series. Highsplint soils formed in colluvium derived predominantly from materials weathered from the Kanawha Formation. The photo is from Fayette County, West Virginia. Scale is in centimeters.

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, 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, 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, 1:1 water; gradual wavy boundary.

C—140 to 165 centimeters (55 to 65 inches); strong brown (7.5YR 5/6) extremely channery loam; massive; friable; common fine and common medium roots throughout; 80 percent unspecified fragments; strongly acid, pH 5.1, 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: 35 to 90 percent of the soil, by volume; in a few pedons, to a depth of about 24 inches, horizons contain 15 to 35 percent rock fragments; mostly sandstone channers and flagstones

Soil reaction: Slightly acid to extremely acid in the surface layer and extremely acid to strongly acid in the solum and substratum

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Some pedons have a thin A horizon with value of 2 and chroma of 1. Texture of the fine-earth fraction of the A horizon is sandy loam, fine sandy loam, silt loam, or loam. Transitional horizons dominated by A horizon material share these properties. In a few pedons, this horizon meets the depth requirements for a mollic or umbric epipedon but does not meet the dry color criteria.

The AB or BA horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. Texture of the fine-earth fraction is loam, silt loam, or silty clay loam.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 3 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 of the fine-earth fraction is loam, silt loam, clay loam, or silty clay loam. Silt content ranges from 35 to about 65 percent.

The BC horizon has colors and textures similar to those of the Bw horizon but commonly displays weak fragic properties believed to be the result of cementation from lateral water movement. This horizon also may have lithochromic mottles or redoximorphic features in shades of brown, olive, or gray below a depth of 40 inches.

The CB or C horizon (if it occurs) has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. Redoximorphic features in shades of brown, olive, or gray are common below a depth of 40 inches and generally increase in amount as depth increases. Texture of the fine-earth fraction is sandy loam, fine sandy loam, silt loam, silty clay loam, loam, or clay loam.

Laidig Series

The Laidig series consists of very deep, well drained soils that formed in colluvium derived from Pennsylvanian-age, acid sandstone or interbedded sandstone, siltstone, and shale (New River Formation) (fig. 25). Laidig soils are on mountain slopes, on footslopes, and in drainageways. Slopes range from 3 to 35 percent. The mean annual precipitation is about 1,207 millimeters (47.5 inches), and the mean annual air temperature is about 10.6 degrees C (51 degrees F).

Taxonomic Classification

Fine-loamy, siliceous, semiactive, mesic Typic Fragiudults

Typical Pedon

Laidig highly organic silt loam; Fayette County, West Virginia; on an 18 percent slope in a forested area, in an old road cut on the south side of the Miner's Trail at the top of a National Park Service road near Cunard, about 692 meters (2,270 feet) southeast

Figure 25.—A representative profile of the Laidig series. Laidig soils have a dense layer in the subsoil called a fragipan (Btx horizon) which impedes root penetration and the movement of water downward through the soil profile. In this photo, the fragipan begins at a depth of about 122 centimeters (48 inches). The photo is from Fayette County, West Virginia. Scale is in centimeters.

of the town of Cunard; at an elevation of 486 meters (1,594 feet); lat. 38 degrees 00 minutes 02 seconds N. and long. 81 degrees 01 minute 58 seconds W.; NAD83; Fayetteville, West Virginia USGS topographic quadrangle. (When described, the soil was moist throughout.)

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

A—2 to 9 centimeters (1 to 4 inches); very dark grayish brown (10YR 3/2), crushed, highly organic silt loam; weak fine granular structure; very friable; common very fine to coarse roots throughout; 10 percent nonflat subrounded sandstone gravel; extremely acid, pH 4.2 by 1:1 water; clear wavy boundary

A/B—9 to 19 centimeters (4 to 7 inches); 40 percent yellowish brown (10YR 5/6), crushed, and 60 percent dark grayish brown (10YR 4/2), crushed, silt loam; weak medium and weak fine granular structure; very friable; common very fine to coarse roots throughout; 10 percent nonflat subrounded sandstone gravel; extremely acid, pH 4.3 by 1:1 water; gradual wavy boundary.

Bt1—19 to 35 centimeters (7 to 14 inches); yellowish brown (10YR 5/6), broken face, and dark yellowish brown (10YR 4/6), broken face, silt loam; weak medium and weak fine subangular blocky structure; friable; common fine and medium roots throughout; 5 percent patchy faint clay films on vertical faces of peds; 10 percent nonflat subrounded sandstone gravel; very strongly acid, pH 4.5 by 1:1 water; gradual wavy boundary.

Bt2—35 to 80 centimeters (14 to 31 inches); dark yellowish brown (10YR 4/6), broken face, and yellowish brown (10YR 5/6), broken face, silt loam; weak medium subangular blocky structure; friable; common fine and medium roots throughout; 25 percent discontinuous faint clay films on vertical faces of peds; 10 percent nonflat subrounded sandstone gravel; very strongly acid, pH 4.7 by 1:1 water; gradual wavy boundary.

Bt3—80 to 112 centimeters (31 to 44 inches); dark yellowish brown (10YR 4/6), broken face, and yellowish brown (10YR 5/6), broken face, gravelly silt loam; weak medium subangular blocky structure; friable; common fine and medium roots throughout; 15 percent discontinuous faint clay films on vertical faces of peds; 30 percent nonflat subrounded sandstone gravel; very strongly acid, pH 4.6 by 1:1 water; clear wavy boundary.

Bt4—112 to 122 centimeters (44 to 48 inches); yellowish brown (10YR 5/6), broken face, gravelly silt loam; weak medium platy structure; firm; common fine roots throughout; 10 percent patchy faint clay films on vertical faces of peds; 15 percent fine and medium light brownish gray (10YR 6/2) iron depletions on faces of peds and 15 percent fine and medium strong brown (7.5YR 4/6) masses of oxidized iron in matrix surrounding redoximorphic depletions; 30 percent nonflat subrounded sandstone gravel; very strongly acid, pH 4.6 by 1:1 water; gradual wavy boundary.

Btx—122 to 180 centimeters (48 to 71 inches); yellowish brown (10YR 5/6), broken face, very gravelly loam; weak very coarse prismatic structure; very firm; few fine roots on vertical faces of peds; 1 percent patchy faint clay films on vertical faces of peds; 1 percent fine and medium light brownish gray (10YR 6/2) iron depletions on vertical faces of peds and 1 percent fine and medium strong brown (7.5YR 4/6) masses of oxidized iron infused into matrix along faces of peds; 40 percent nonflat subrounded sandstone gravel; very strongly acid, pH 4.8 by 1:1 water.

Range in Characteristics

Solum thickness: 127 to 203 centimeters (50 to 80 inches)
Depth to bedrock: more than 152 centimeters (60 inches)
Depth to the fragipan: 76 to 127 centimeters (30 to 50 inches) (fig. 26)

Figure 26.—Gray zones of iron depletion and reddish zones of oxidized iron concentrations (redoximorphic features) occur along structural faces in the fragipan layer of Laidig soils. These features are indicative of how slowly water passes through this layer.

Content of rock fragments: Average of less than 35 percent in the particle-size control section; 5 to 50 percent in individual subhorizons of the A, E, BE, BA, and Bt horizons, 15 to 70 percent in individual subhorizons of the Btx horizon, and 20 to 70 percent in the C horizon

Soil reaction: Extremely acid to strongly acid throughout the profile in unlimed areas

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 to 4. The Ap horizon (if it occurs) has chroma of 2 to 8. Texture of the fine-earth fraction of the A horizon is loam, sandy loam, fine sandy loam, or silt loam.

The E horizon (if it occurs) has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 1 to 6. Texture of the fine-earth fraction is loam, fine sandy loam, sandy loam, and, less commonly, silt loam.

The BE horizon (if it occurs) has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. Texture of the fine-earth fraction is loam, fine sandy loam, sandy loam, or silt loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. Subhorizons immediately above the Btx horizon may have hue of 5YR. The Bt horizon may have redoximorphic features at a depth of 30 inches or more. Texture of the fine-earth fraction is loam, sandy clay loam, clay loam, fine sandy loam, sandy loam, or silt loam. The horizon has weak or moderate, fine or medium subangular blocky structure.

The Btx horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 8. It has high- and low-chroma redoximorphic features. Texture of the fine-earth fraction is fine sandy loam, sandy loam, loam, sandy clay loam, clay loam, or silt loam. The horizon has weak very coarse prismatic structure parting to platy or subangular blocky.

The C horizon (if it occurs) has hue of 5YR to 10YR, value of 5 or 6, and chroma of 3 to 8. It has high- and low-chroma redoximorphic features. Texture of the fine-earth fraction is fine sandy loam, sandy loam, loam, sandy clay loam, clay loam, or silt loam.

The Laidig soils in Gauley River National Scenic River are considered a taxadjunct to the Laidig series because they typically have a semiactive cation-exchange activity class. This is due to the dominance of low-activity clay minerals in the subsoil. This difference, however, does not significantly affect the use and management of the soils.

Layland Series

The Layland series consists of very deep, well drained soils that formed in colluvium derived from Pennsylvanian-age, acid sandstone and shale (New River Formation) (fig. 27). Layland soils are on mountain slopes and footslopes. Slopes range from 15 to 70 percent. The mean annual precipitation is about 1,207 millimeters (47.5 inches), and the mean annual air temperature is about 10.6 degrees C (51 degrees F).

Taxonomic Classification

Loamy-skeletal, siliceous, semiactive, mesic Typic Dystrudepts

Typical Pedon

Layland cobbly silt loam in an area of Layland-Rock outcrop complex; Nicholas County, West Virginia; on a 49 percent slope in a forested area on the Nicholas County side of the Gauley River, about 1,207 meters (3,960 feet) east of the confluence of Collison Creek and the Gauley River; at an elevation of 424 meters (1,391 feet); lat. 38 degrees 12 minutes 13 seconds N. and long. 80 degrees 54 minutes 49 seconds W.; NAD83; Summersville Dam, West Virginia USGS topographic quadrangle. (When described, the soil was moist throughout.)

A1—0 to 5 centimeters (0 to 2 inches); very dark grayish brown (10YR 3/2), broken face, cobbly silt loam; moderate fine and medium granular structure; very friable; common fine and medium, few coarse, and many very fine roots; 10 percent nonflat subangular sandstone gravel and 20 percent nonflat subangular sandstone cobbles; very strongly acid, pH 4.8 by Hellige-Truog; abrupt wavy boundary.

A2—5 to 20 centimeters (2 to 8 inches); dark brown (10YR 3/3), broken face, very stony silt loam; moderate fine and medium granular structure; very friable; common coarse, few very coarse, and common very fine to medium roots; 15 percent flat subangular sandstone channers and 30 percent nonflat subangular sandstone stones; very strongly acid, pH 4.8 by Hellige-Truog; clear wavy boundary.

BA—20 to 40 centimeters (8 to 16 inches); brown (10YR 4/3), broken face, stony silt loam; weak medium granular structure; very friable; common fine to coarse and few very fine roots; 15 percent nonflat subangular sandstone gravel and 25 percent nonflat subangular sandstone stones; very strongly acid, pH 4.7 by Hellige-Truog; clear wavy boundary.

Bw1—40 to 50 centimeters (16 to 20 inches); dark yellowish brown (10YR 4/6), broken face, very cobbly silt loam; 24 percent clay; moderate medium subangular blocky structure; friable; few very fine and fine and common medium roots; 10 percent flat subangular sandstone channers, 10 percent nonflat subangular sandstone stones, and 20 percent nonflat subangular sandstone cobbles; very strongly acid, pH 4.8 by Hellige-Truog; gradual wavy boundary.

Bw2—50 to 111 centimeters (20 to 44 inches); yellowish brown (10YR 5/4), broken face, very stony loam; 26 percent clay; moderate fine and medium subangular blocky structure; friable; few fine roots; 10 percent flat subangular sandstone

Figure 27.—A representative profile of the Layland series. Disoriented rock fragments in the soil profile are an indication that the soil formed in colluvium (i.e., materials that have moved downslope). Layland soils formed in colluvium derived predominantly from materials weathered from the New River Formation. The photo is from the Gauley River gorge. Scale is in inches.

stones, 15 percent flat subangular sandstone channers, and 20 percent flat subangular sandstone flagstones; very strongly acid, pH 4.9 by Hellige-Truog; clear wavy boundary.

Bw3—111 to 142 centimeters (44 to 56 inches); yellowish brown (10YR 5/4), broken face, very channery clay loam; 28 percent clay; weak medium subangular blocky structure; friable; 5 percent flat subangular sandstone stones, 10 percent flat subangular sandstone flagstones, and 20 percent flat subangular sandstone channers; very strongly acid, pH 4.8 by Hellige-Truog; gradual wavy boundary.

BC—142 to 200 centimeters (56 to 79 inches); yellowish brown (10YR 5/4), broken face, very stony loam; 24 percent clay; weak coarse subangular blocky structure; firm; 2 percent fine distinct light brownish gray (10YR 6/2) and 8 percent fine faint brown (10YR 5/3) iron depletions infused into matrix along faces of peds; 12 percent medium faint dark yellowish brown (10YR 4/6) masses of oxidized iron in matrix surrounding redoximorphic depletions; 5 percent flat subangular sandstone flagstones, 15 percent flat subangular sandstone stones, and 20 percent flat subangular sandstone channers; very strongly acid, pH 4.8 by Hellige-Truog.

Range in Characteristics

Solum thickness: 72 to 200 centimeters (30 to 79 inches)
Depth to bedrock: More than 152 centimeters (60 inches)
Rock fragments: 5 to 60 percent, by volume, in the solum and 30 to 90 percent in the BC and C horizons; dominantly sandstone in the upper part of the profile; fragments of siltstone and shale commonly increase in volume as depth increases
Soil reaction: Very strongly acid or extremely acid

The A horizon has hue of 7.5YR to 2.5Y, value of 2 to 5, and chroma of 1 to 4. Texture of the mineral fine-earth fraction is loam or silt loam.

The BA horizon (or similar transitional horizon) has hue of 7.5YR to 2.5Y, value of 3 to 6 (6 or more dry), and chroma of 3 to 6. Texture of the fine-earth fraction is loam or silt loam.

The E horizon (or transitional eluvial horizon), if it occurs, has hue of 10YR to 2.5Y, value of 4 to 6 (6 or more dry), and chroma of 2 to 6. Texture of the fine-earth fraction is loam or silt loam

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. Texture of the fine-earth fraction is loam, silt loam, or clay loam.

The BC or 2BC horizon has hue of 7.5YR to 2.5Y and value and chroma of 4 to 8. Texture of the fine-earth fraction is loam, silt loam, clay loam, or silty clay loam.

The C or 2C horizon (if it occurs) has hue of 7.5YR to 2.5 and value and chroma of 4 to 8. Texture of the fine-earth fraction is loam, silt loam, clay loam, or silty clay loam.

Lithic Udorthents

Lithic Udorthents consist of shallow, somewhat excessively drained soils. They formed in areas that have been disturbed by excavation, grading, cutting, filling, or a combination of these activities. The parent material is highly variable but generally consists of a mixture of native soil material over sandstone or shale primarily from Pennsylvanian- or Mississippian-age sedimentary rock. Slopes range from 0 to 100 percent. The mean annual precipitation is about 1,207 millimeters (47.5 inches), and the mean annual air temperature is about 10.6 degrees C (51 degrees F).

Taxonomic Classification

Lithic Udorthents

Typical Pedon

Lithic Udorthents; Nicholas County, West Virginia; on a 1 percent slope in an idle area within the spillway area for the Summersville Dam, about 1,127 meters (3,696 feet) southwest of the entrance to a roadside park and 322 meters (1,056 feet) southeast of the entrance to the Battle Run Campground; at an elevation of 513 meters (1,683 feet); lat. 38 degrees 12 minutes 56 seconds N. and long. 80 degrees 54 minutes 19 seconds W.; NAD83; Summersville Dam, West Virginia USGS topographic quadrangle. (When described, the soil was moist throughout.)

A—0 to 10 centimeters (0 to 4 inches); dark brown (10YR 3/3), crushed, very gravelly loam; weak medium and weak fine granular structure; friable; 1 percent nonflat subangular very strongly cemented sandstone stones and 40 percent nonflat angular strongly cemented sandstone gravel; very strongly acid, pH 4.5 by Hellige-Truog; gradual wavy boundary.

C—10 to 22 centimeters (4 to 9 inches); brownish yellow (10YR 6/6), crushed, extremely gravelly sandy loam; massive; friable; 65 percent nonflat angular strongly cemented sandstone gravel; extremely acid, pH 4.4 by Hellige-Truog; abrupt smooth boundary.

R—22 to 23 centimeters (9 inches); indurated sandstone bedrock; very high excavation difficulty.

Range in Characteristics

Solum thickness: Less than 51 centimeters (20 inches)

Depth to bedrock: Less than 51 centimeters (20 inches)

Content of rock fragments: Variable, commonly more than 35 percent throughout the profile

Soil reaction: Variable, depending on the nature of the parent lithology

Nallen Series

The Nallen series consists of moderately deep, well drained soils that formed in residuum weathered from Pennsylvanian-age sandstone (fig. 28). Nallen soils are on mountain ridges. Slopes range from 3 to 25 percent. The mean annual precipitation is about 1,207 millimeters (47.5 inches), and the mean annual air temperature is about 10.6 degrees C (51 degrees F).

Taxonomic Classification

Coarse-loamy, siliceous, semiactive, mesic Typic Hapludults

Typical Pedon

Nallen loam; Fayette County, West Virginia; on a 9 percent slope in a forested area on a ridge near the edge of the Meadow River gorge, about 610 meters (2,000 feet) southeast of the U.S. Route 19 bridge over the Meadow River; at an elevation of 558 meters (1,831 feet); lat. 38 degrees 08 minutes 45 seconds N. and long. 80 degrees 55 minutes 31 seconds W.; NAD83; Summersville Dam, West Virginia USGS topographic quadrangle. (When described, the soil was moist throughout.)

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

A—2 to 15 centimeters (1 to 6 inches); very dark grayish brown (10YR 3/2), broken face, loam; 8 percent clay; moderate medium granular structure; very friable; 5 percent nonflat subangular moderately cemented sandstone gravel and 5 percent nonflat subangular very strongly cemented sandstone gravel; very strongly acid, pH 4.5 by Hellige-Truog; abrupt smooth boundary.

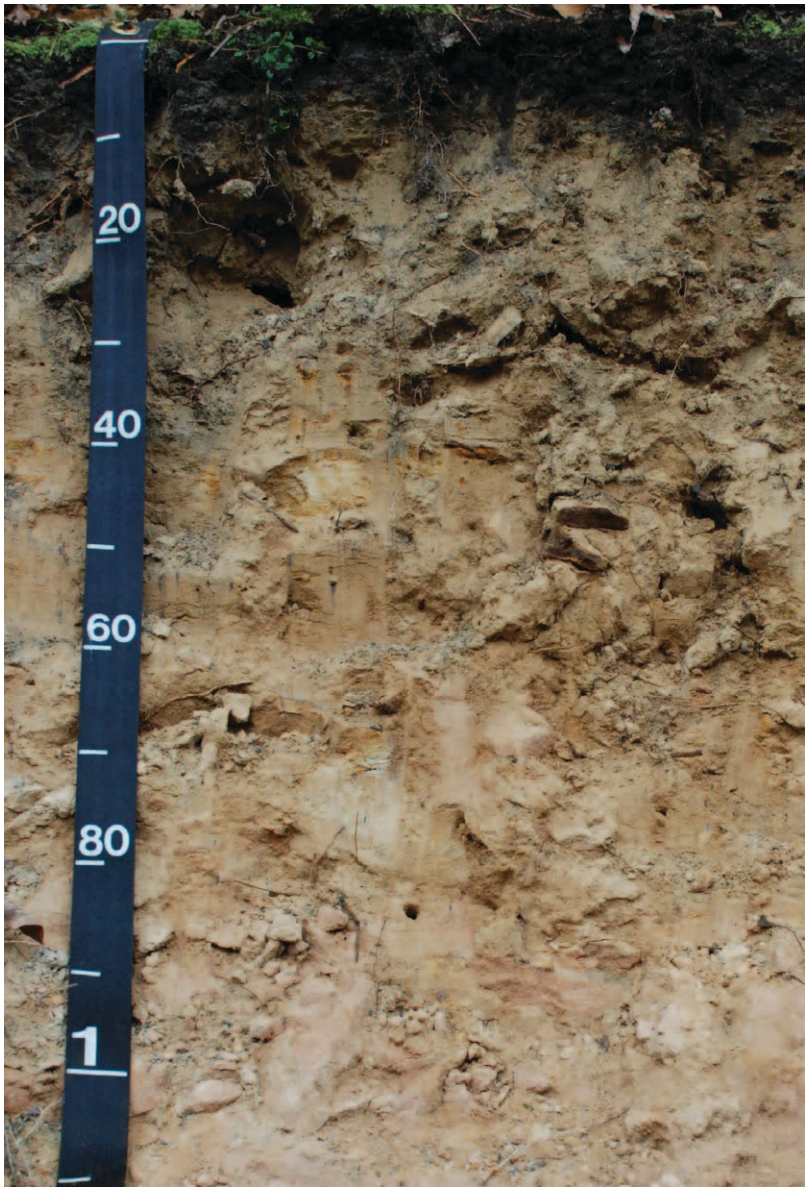

Figure 28.—A representative profile of the Nallen series. Nallen soils are 51 to 102 centimeters (20 to 40 inches) deep to sandstone bedrock. In this photo, highly weathered sandstone bedrock occurs at a depth of approximately 90 centimeters (35 inches). The photo is from the New River Gorge National River park. Scale is in centimeters.

B/A—15 to 23 centimeters (6 to 9 inches); 40 percent dark brown (10YR 3/3) and 60 percent yellowish brown (10YR 5/4), broken face, gravelly loam; 10 percent clay; weak medium subangular blocky structure; friable; 10 percent nonflat subangular moderately cemented sandstone gravel and 10 percent nonflat subangular very strongly cemented sandstone gravel; very strongly acid, pH 4.5 by Hellige-Truog; clear wavy boundary.

Bt—23 to 53 centimeters (9 to 21 inches); yellowish brown (10YR 5/6), broken face, gravelly loam; 16 percent clay; moderate medium subangular blocky structure; friable; 10 percent patchy faint clay films on surfaces along pores; 10 percent nonflat subangular very strongly cemented sandstone gravel and 10 percent

nonflat subangular moderately cemented sandstone gravel; very strongly acid, pH 4.5 by Hellige-Truog; clear wavy boundary.

BC—53 to 67 centimeters (21 to 26 inches); yellowish brown (10YR 5/6), broken face, gravelly loam; 14 percent clay; weak coarse subangular blocky structure; friable; 10 percent nonflat subangular very strongly cemented sandstone gravel and 15 percent nonflat subangular moderately cemented sandstone gravel; extremely acid, pH 4.4 by Hellige-Truog; abrupt wavy boundary.

R—67 to 77 centimeters (26 to 30 inches); indurated sandstone bedrock; very high excavation difficulty.

Range in Characteristics

Solum thickness: 23 to 102 centimeters (9 to 40 inches)
Depth to bedrock: 51 to 102 centimeters (20 to 40 inches)
Content of rock fragments: 0 to 15 percent in the upper part of the solum and 5 to 50 percent in the BC and C horizons
Soil reaction: Very strongly acid to extremely acid throughout the profile, except in areas that have been limed or affected by burning

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 to 4. Texture of the fine-earth fraction is silt loam, loam, fine sandy loam, or sandy loam.

The BA horizon (or similar transitional horizon) has hue of 7.5YR to 2.5Y, value of 3 to 6 (6 or more dry), and chroma of 3 to 6. Texture of the fine-earth fraction is silt loam, loam, fine sandy loam, or sandy loam.

The E horizon (or transitional eluvial horizon), if it occurs, has hue of 10YR to 2.5Y, value of 4 to 6 (6 or more dry), and chroma of 2 to 6. Texture of the fine-earth fraction is silt loam, loam, fine sandy loam, or sandy loam

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. Texture of the fine-earth fraction is loam, fine sandy loam, or sandy loam.

The BC or CB horizon has hue of 7.5YR to 2.5Y and value and chroma of 4 to 8. Texture of the fine-earth fraction is loam, fine sandy loam, or sandy loam.

The C horizon (if it occurs) has hue of 7.5YR to 2.5Y and value and chroma of 4 to 8. Texture of the fine-earth fraction is loam, fine sandy loam, sandy loam, or loamy sand. Lithochromic features in shades of yellow and reddish brown may occur.

Pope Series

The Pope series consists of very deep, well drained soils that formed in acid alluvium derived mainly from Pennsylvanian-age, acid sandstone, siltstone, and shale (fig. 29). Pope soils are on flood plains in river valleys. Slopes range from 0 to 3 percent. The mean annual precipitation is about 1,207 millimeters (47.5 inches), and the mean annual air temperature is about 10.6 degrees C (51 degrees F).

Taxonomic Classification

Coarse-loamy, mixed, active, mesic Fluventic Dystrudepts

Typical Pedon

Pope sandy loam; Nicholas County, West Virginia; on a 3 percent slope in a forested area approximately 198 meters (650 feet) west of the boat launch at the Masons Branch river take out on the Gauley River; at an elevation of 317 meters (1,040 feet); lat. 38 degrees 13 minutes 23 seconds N. and long. 80 degrees 59 minutes 32 seconds W.; NAD83; Summersville Dam, West Virginia USGS topographic quadrangle. (When described, the soil was moist throughout.)

Oi—0 to 5 centimeters (0 to 2 inches); slightly decomposed plant material; abrupt broken boundary.

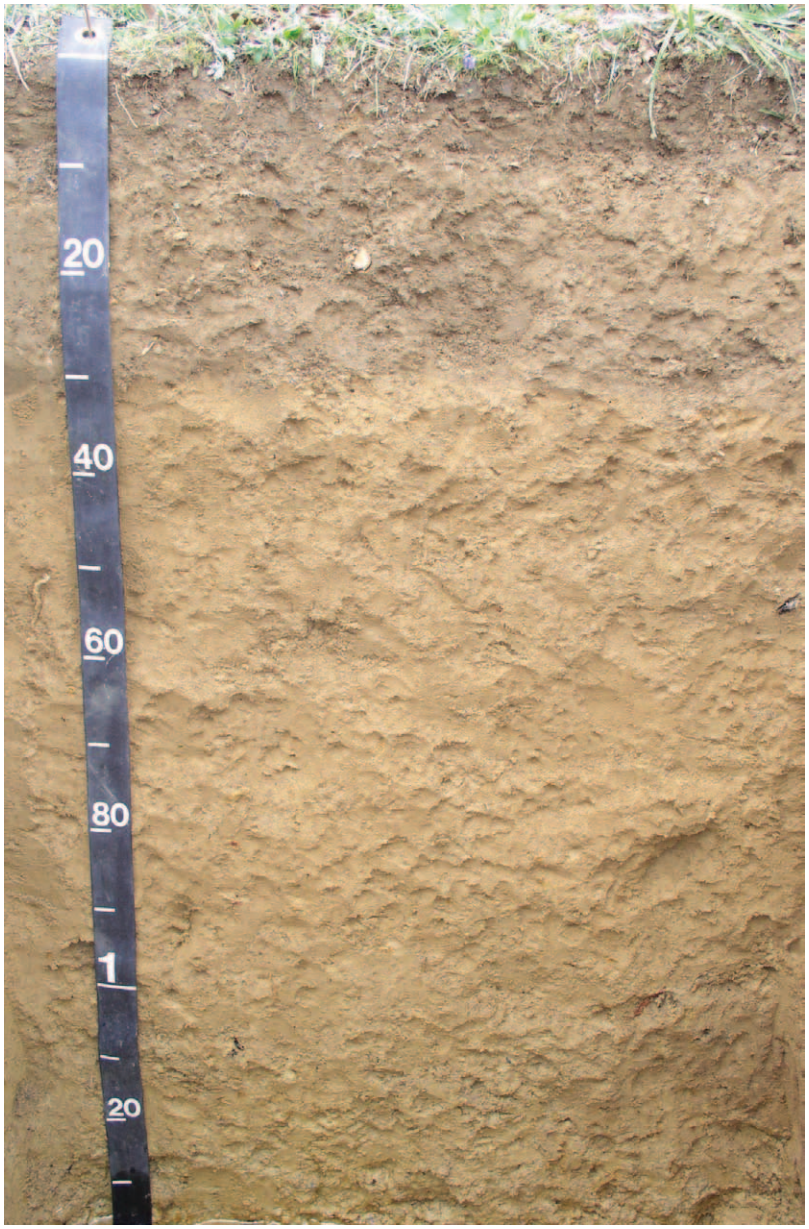

Figure 29.—A representative profile of the Pope series, located in a cultivated field. This young alluvial soil does not have distinctive genetic horizons in the subsoil. The bright yellowish brown colors indicate a well drained soil. The photo is from Lincoln County, West Virginia. Scale is in centimeters.

Oe—5 to 8 centimeters (2 to 3 inches); moderately decomposed plant material; abrupt broken boundary.

A—8 to 18 centimeters (3 to 7 inches); dark brown (10YR 3/3), broken face, sandy loam; weak medium granular structure; 5 percent well rounded indurated sandstone gravel; very strongly acid, pH 4.6 by Hellige-Truog; abrupt wavy boundary.

Bw1—18 to 56 centimeters (7 to 22 inches); yellowish brown (10YR 5/6), broken face, sandy loam; weak medium subangular blocky structure; 1 percent subrounded very weakly cemented charcoal fragments 2 to 5 millimeters in size, 2 percent well rounded indurated sandstone cobbles, and 8 percent well rounded indurated

sandstone gravel; very strongly acid, pH 4.6 by Hellige-Truog; clear wavy boundary.

Bw2—56 to 81 centimeters (22 to 32 inches); strong brown (7.5YR 5/6), broken face, gravelly sandy loam; weak coarse subangular blocky structure; 5 percent well rounded indurated sandstone cobbles and 10 percent well rounded indurated sandstone gravel; very strongly acid, pH 4.5 by Hellige-Truog; gradual wavy boundary.

C—81 to 200 centimeters (32 to 79 inches); yellowish brown (10YR 5/6), broken face, extremely cobbly loamy sand; single grain; 10 percent rounded indurated sandstone stones, 25 percent well rounded indurated sandstone cobbles, and 30 percent well rounded indurated sandstone gravel; very strongly acid, pH 4.5 by Hellige-Truog.

Range in Characteristics

Solum thickness: 72 to 200 centimeters (30 to 60 inches)
Depth to bedrock: More than 152 centimeters (60 inches)
Rock fragments: 0 to 30 percent, by volume, in the solum and 0 to 75 percent in the substratum; gravel, channers, and cobbles
Soil reaction: Very strongly acid or extremely acid

The Ap or A horizon has hue of 10YR and value and chroma of 3 to 6. If value is 3, dry color is 6 or more. Texture of the fine-earth fraction is fine sandy loam, sandy loam, loam, or silt loam.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. In some pedons, it has iron depletions with chroma of 2 or less below a depth of 40 inches. Texture of the fine-earth fraction is sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam.

The C or 2C horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. In some pedons, it has iron depletions with chroma of 2 or less. Texture of the fine-earth fraction is loamy sand, loamy fine sand, fine sandy loam, sandy loam, loam, or sandy clay loam, or the horizon has stratified layers of these textures. Some pedons have stratified sand layers below a depth of 40 inches.

Sharondale Series

The Sharondale series consists of very deep, well drained soils that formed in loamy colluvium derived from a mixture of Pennsylvanian-age sandstone, siltstone, and shale and thin beds of limestone (Kanawha Formation). Sharondale soils are in north- or east-facing mountain coves. Slopes range from 35 to 80 percent. The mean annual precipitation is about 1,207 millimeters (47.5 inches), and the mean annual air temperature is about 10.6 degrees C (51 degrees F).

Taxonomic Classification

Loamy-skeletal, mixed, active, mesic Typic Hapludolls

Typical Pedon

Sharondale silt loam; Fayette County, West Virginia; on a north-facing, 51 percent slope in a forested area of a mountain cove, about 1,883 meters (6,178 feet) south-southwest of the confluence of Peters Creek and the Gauley River and 2,044 meters (6,706 feet) northwest of Mt. Eary Church; at an elevation of 495 meters (1,624 feet); lat. 38 degrees 12 minutes 29 seconds N. and long. 81 degrees 02 minutes 59 seconds W.; NAD83; Ansted, West Virginia USGS topographic quadrangle. (When described, the soil was moist throughout.)

Oi—0 to 4 centimeters (0 to 2 inches); slightly decomposed plant material; abrupt wavy boundary.

A1—4 to 21 centimeters (2 to 8 inches); dark brown (10YR 3/3), crushed and dry, silt loam, very dark brown (10YR 2/2), crushed and moist; 23 percent clay; strong fine granular structure; very friable; common fine and very fine and few medium roots throughout; 4 percent flat subangular moderately cemented shale channers and 6 percent nonflat subrounded strongly cemented sandstone gravel; neutral, pH 6.8 by Hellige-Truog; abrupt wavy boundary.

A2—21 to 38 centimeters (8 to 15 inches); brown (10YR 5/3), crushed and dry, and dark brown (10YR 3/3), crushed and moist, gravelly silt loam; 21 percent clay; moderate fine and medium granular structure; very friable; common fine and very fine and few medium roots throughout; 6 percent flat subangular moderately cemented shale channers and 9 percent nonflat subrounded strongly cemented sandstone gravel; neutral, pH 6.7 by Hellige-Truog; clear wavy boundary.

AB—38 to 65 centimeters (15 to 26 inches); dark yellowish brown (10YR 3/4), broken face, gravelly silt loam; 23 percent clay; weak medium subangular blocky structure parting to moderate medium granular; very friable; few very fine to very coarse roots throughout; 10 percent flat subangular moderately cemented shale channers and 15 percent nonflat subrounded strongly cemented sandstone gravel; slightly acid, pH 6.5 by Hellige-Truog; gradual wavy boundary.

Bw1—65 to 91 centimeters (26 to 36 inches); brown (10YR 4/3), broken face, very gravelly silt loam; 24 percent clay; weak medium subangular blocky structure; friable; few very fine to very coarse roots throughout; 20 percent flat subangular moderately cemented shale channers and 25 percent nonflat subangular strongly cemented sandstone gravel; slightly acid, pH 6.5 by Hellige-Truog; clear wavy boundary.

Bw2—91 to 130 centimeters (36 to 51 inches); strong brown (10YR 4/6) very flaggy silt loam; 24 percent clay; moderate medium subangular blocky and moderate medium prismatic structure; friable; common fine and medium roots throughout; 20 percent flat subangular moderately cemented shale channers and 30 percent flat subangular strongly cemented sandstone flagstones; moderately acid, pH 5.8 by Hellige-Truog; gradual wavy boundary.

BC—130 to 190 centimeters (51 to 75 inches); strong brown (7.5YR 4/6) extremely channery silt loam; 26 percent clay; weak fine and weak medium subangular blocky structure; friable; common fine roots throughout; 35 percent flat subangular moderately cemented shale channers and 25 percent flat subangular strongly cemented sandstone channers; moderately acid, pH 5.8 by Hellige-Truog; abrupt smooth boundary.

2Cr—190 to 200 centimeters (75 to 79 inches); weathered shale bedrock; moderate excavation difficulty.

Range in Characteristics

Solum thickness: 102 to 203 centimeters (40 to 80 inches)

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

Rock fragments: 10 to 85 percent in individual horizons; average of 35 percent or more in the particle-size control section; flat fragments are mostly 2 millimeters to 38 centimeters (15 inches) in length

Soil reaction: Strongly acid to neutral throughout the profile

The A horizon has hue of 10YR or 2.5Y, value of 2 or 3 (3 to 5 dry), and chroma of 1 to 3 (3 to 5 dry). Texture of the fine-earth fraction is silt loam, loam, fine sandy loam, or sandy loam.

The B horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 3 to 6. Texture of the fine-earth fraction is silt loam, loam, fine sandy loam, or sandy loam. In

some pedons, this horizon displays lithochromic mottles in shades of brown, yellow, red, or gray. In some pedons, it has very few or few thin discontinuous silt coatings or clay films on faces of peds and on rock surfaces below a depth of about 30 inches.

The C horizon (if it occurs) has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. Texture of the fine-earth fraction is silt loam, loam, silty clay loam, clay loam, fine sandy loam, or sandy loam. In some pedons, this horizon has lithochromic mottles and discontinuous silt coatings or clay films similar to those of the B horizon. Bedrock is hard sandstone or siltstone and, less commonly, soft shale.

Typic Haplorthods

Typic Haplorthods consist of very deep, well drained soils that formed in acid alluvium derived from Pennsylvanian-age sandstone, siltstone, and shale. These soils are on low terraces of flood plains in river valleys. Slopes range from 0 to 8 percent. The mean annual precipitation is about 1,207 millimeters (47.5 inches), and the mean annual air temperature is about 10.6 degrees C (51 degrees F).

Taxonomic Classification

Loamy-skeletal, mixed, active, mesic Typic Haplorthods

Typical Pedon

Typic Haplorthods highly organic sandy loam; Fayette County, West Virginia; on a 5 percent slope on an forested island in the Meadow River about 3.7 kilometers (2.3 miles) downstream from the U.S. Route 19 bridge; at an elevation of 415 meters (1,360 feet); lat. 38 degrees 10 minutes 21 seconds N. and long. 80 degrees 56 minutes 49 seconds W.; NAD83; Summersville Dam, West Virginia USGS topographic quadrangle. (When described, the soil was moist throughout.)

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

Oe—2 to 4 centimeters (1 to 2 inches); moderately decomposed plant material; many very fine to medium roots throughout; abrupt wavy boundary.

A—4 to 13 centimeters (2 to 5 inches); black (7.5YR 2/1), rubbed, highly organic sandy loam; moderate fine granular structure; very friable; many very fine to medium roots; extremely acid, pH 4.3 by Hellige-Truog; abrupt smooth boundary.

E—13 to 33 centimeters (5 to 13 inches); light gray (10YR 7/2), broken face, loamy sand; single grain; very friable; common very fine to medium roots throughout; extremely acid, pH 4.1 by Hellige-Truog; abrupt smooth boundary.

Bhs—33 to 43 centimeters (13 to 17 inches); black (5YR 2/1), broken face, sandy loam; weak medium subangular blocky structure; friable; few very fine and fine roots throughout; extremely acid, pH 4.3 by Hellige-Truog; abrupt wavy boundary.

Bs—43 to 92 centimeters (17 to 36 inches); strong brown (7.5YR 5/8), broken face, extremely stony sandy loam; weak medium subangular blocky structure; very friable; few very fine and fine roots; 15 percent nonflat rounded indurated sandstone gravel, 25 percent nonflat rounded indurated sandstone cobbles, and 30 percent nonflat subrounded indurated sandstone stones; extremely acid, pH 4.3 by Hellige-Truog; gradual wavy boundary.

C—92 to 165 centimeters (36 to 65 inches); dark yellowish brown (10YR 4/6), broken face, extremely stony loamy sand; single grain; very friable; 15 percent nonflat rounded indurated sandstone gravel, 30 percent nonflat rounded indurated sandstone cobbles, and 35 percent nonflat rounded indurated sandstone stones; extremely acid, pH 4.4 by Hellige-Truog.

Range in Characteristics

Depth to bedrock: More than 165 centimeters (60 inches)
Rock fragments: 10 to 60 percent in individual horizons of the solum and 50 to 90 percent or more in the C horizon; amount increases as depth increases; rounded fragments of dominantly sandstone; mixture of gravel, cobbles, stones, and boulders
Soil reaction: Very strongly acid or extremely acid throughout the profile

Udorthents

Udorthents mainly consist of well drained, deep or very deep soils. These soils formed in a mixture of native soil and geologic materials that have been drastically disturbed by excavation, grading, cutting, filling, or a combination of these activities. The parent material is highly variable but generally consists of a mixture of native soils and excavated bedrock from local sources. Slopes range from 0 to 55 percent. The mean annual precipitation is about 1,207 millimeters (47.5 inches), and the mean annual air temperature is about 10.6 degrees C (51 degrees F).

Taxonomic Classification

Udorthents

Typical Pedon

Udorthents in an area of Udorthents-Urban land complex, highways; Summers County, West Virginia; on a 53 percent slope above Route 20 and adjacent to the I-64 overpass, about 229 meters (750 feet) southeast of Sandstone High School; the site is located within the lower clover leaf formed by the highway off ramp; at an elevation of 410 meters (1,345 feet); lat. 37 degrees 46 minutes 50 seconds N. and long. 80 degrees 53 minutes 39 seconds W.; NAD83; Meadow Creek, West Virginia USGS topographic quadrangle. (When described, the soil was moist throughout.)

A—0 to 4 centimeters (0 to 2 inches); brown (7.5YR 4/3), broken face, very channery silt loam; 23 percent clay; weak very coarse subangular blocky structure parting to moderate fine subangular blocky; friable; common fine and medium and many very fine roots throughout; common fine tubular pores; 1 percent flat subangular moderately cemented sandstone stones, 5 percent flat subangular weakly cemented sandstone channers, and 40 percent nonflat subangular very weakly cemented siltstone gravel; strongly acid, pH 5.5 by Hellige-Truog; clear wavy boundary.

AC—4 to 27 centimeters (2 to 11 inches); brown (7.5YR 4/4), broken face, very channery silt loam; 25 percent clay; weak coarse subangular blocky structure parting to weak fine subangular blocky; friable; common very fine and fine roots throughout and common medium roots around fragments; common fine tubular and common medium irregular pores; 5 percent nonflat subangular very weakly cemented siltstone gravel, 15 percent nonflat subrounded weakly cemented sandstone gravel, and 20 percent flat subangular weakly cemented siltstone channers; very strongly acid, pH 5.0 by Hellige-Truog; gradual wavy boundary.

C—27 to 165 centimeters (11 to 65 inches); reddish brown (5YR 4/4), broken face, extremely gravelly silt loam; 18 percent clay; massive; friable; common very fine and fine roots throughout and common medium and coarse roots around fragments; common fine tubular and many very coarse irregular pores; 10 percent flat subangular weakly cemented siltstone stones, 10 percent nonflat subangular very weakly cemented siltstone gravel, 20 percent flat subangular weakly cemented siltstone channers, and 40 percent nonflat subrounded weakly cemented sandstone gravel; very strongly acid, pH 5.0 by Hellige-Truog.

Range in Characteristics

Thickness of solum (A and AC horizons): Variable; commonly less than 38 centimeters (15 inches)
Depth to bedrock: Variable; commonly more than 102 centimeters (40 inches)
Rock fragment content: Variable; commonly more than 35 percent throughout the profile
Soil reaction: Variable, depending on the nature of the geologic parent material

Formation of the Soils

This section discusses the factors of soil formation and relates them to the soils in Gauley River National Recreation Area.

Factors of Soil Formation

Soil covers the surface of the earth as a three-dimensional body with varying depths 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 physical and chemical processes that result from the interaction of five soil-forming factors. These 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. The term pedogenesis is 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. This concept developed into a more quantitative principle in which the formation of soil and its properties are the result of interrelated factors. The soil-forming factors are parent material, climate, plant and animal organisms, topography, and time (Jenny, 1941). 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 factors within a survey area can help us to better understand the physical and chemical characteristics of soils.

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 cases, 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. There are four general types of parent material in Gauley River National Recreation Area: alluvium, colluvium, residuum, and human-transported materials (HTM).

Alluvium consists of the detrital materials deposited by streams and includes various combinations of sand, silt, clay, and rock fragments. Colluvium consists of soil

materials and rock fragments that accumulate at the base of slopes and in concave coves by gravitational action. Residuum consists of soil materials accumulated by the disintegration of consolidated bedrock in place. HTM is unsorted, unconsolidated earthy materials deposited by directed human activity and includes the earthy materials used to construct road beds, railroad beds, dam spillways, etc. These four types of parent materials have formed the 17 major soil types which have been correlated and classified within the boundaries of the park. Fourteen soil types were correlated and classified to the soil series level, and three soil types were classified at the higher levels of Soil Taxonomy.

The properties of soils are greatly influenced by the properties of their parent bedrocks. Two geologic formations have weathered to provide the local alluvium, residuum, and colluvium in the park. The parent bedrocks are members of the Pennsylvania-age Kanawha and New River Formations of the Pottsville Group (fig. 30). The strata of the Kanawha Formation are about 50 percent sandstone, but this formation also contains significant amounts of shale, siltstone, and coal and a few thin beds of limestone. The New River Formation is dominated by massive beds of acid sandstone, but it also contains gray and dark gray siltstone, shale, and coal (West Virginia Geological Survey, 1919).

Sampling and analysis of the soils on these geologic formations has determined that there are differences in soil chemistry and mineralogy which affect soil fertility. On the young, very steep upland landforms in the park (backslopes), the soils that formed in materials weathered from the New River Formation are very acidic and have low natural fertility. The clay minerals of these soils have been intensely weathered, which hinders the soil's ability to retain plant nutrients. The sand and silt fraction of many of these soils is dominantly quartz (siliceous mineralogy), which is highly resistant to weathering and inert and adds nothing to the soil's nutrient reserves. In comparison, on these same landforms, the soils that formed from materials weathered from the Kanawha Formation are slightly more fertile. They are less acidic, have an array of clay minerals that are better able to retain plant nutrients, and contain more weatherable minerals in the sand and silt fractions of the fine-earth. These differences are not as pronounced on older, less sloping landforms (summits and shoulder slopes). In these areas, the soils have undergone intense weathering which has mitigated the effects of the geologic parent materials on their chemical properties and clay mineralogy.

Time refers to a measured period in which soil-forming processes have been at work. Generally, the longer the processes have been at work, the older the soil and the more well developed the soil profile. In turn, a well developed soil profile is often a reflection of an old and stable landscape. Mature soils exhibit well developed structure, strong colors, and distinct genetic horizons (fig. 31). In the park, these soil profile features are mainly the result of the addition of silicate clay minerals and oxides of iron and aluminum to the subsoil by translocation, mainly downward, through the soil profile. Young soils lack distinct genetic horizons, strong color, and/or structure because these features have not had time to form (fig. 32). This is often a reflection of a dynamic landscape.

Soils That Formed in Alluvium

Because the Gauley and Meadow Rivers and their tributaries (fig. 33) are swift and drop in elevation so rapidly, their floodwaters have not deposited great amounts of alluvium in the park. Much of the sediment load in these rivers is carried downstream and out of the park. Alluvial soils on the active flood plains of the park's rivers and tributaries account for only 1 percent of the park's acreage. An interesting area of alluvium known as Koontz Bend occupies an old alluvial terrace, high above the active flood plain of the Gauley River.

Figure 30.—An unnamed stream plunges over a cliff formed by the massive Lower Nuttall sandstone, a member of the New River Formation.

Alluvial soils on active flood plains are generally considered young. Because of the dynamic nature of the flood plain, these soils have not been stable long enough for distinct genetic horizons to form (fig. 34). The soils often do not exhibit any distinct changes in color or development of structure below the soil surface. In some areas, however, there are abrupt changes in texture or stratification, a result of different depositional events. Alluvial soils may also exhibit dark horizons in the subsoil where

Figure 31.—Profile of a taxadjunct of the Laidig series (fine-loamy, siliceous, semiactive, mesic Typic Fragiudults). This photo illustrates the strong colors and well developed structure of a mature soil. Scale is centimeters.

old surface horizons, which have been darkened by organic matter, are buried by younger alluvial deposits.

The alluvium on the flood plain of the Meadow and Gauley Rivers is mainly of remote origin. It has been carried into the park by floodwaters from distant areas of the watershed. It has been washed from acidic upland soils which formed from geologic parent materials similar to those found in the park. These soils include members

Figure 32.—Profile of a Layland soil (loamy-skeletal, siliceous, semiactive, mesic Typic Dystrudepts). In contrast to Laidig soils, Layland soils are young and do not exhibit strong colors or well developed structure in the subsoil. Scale is in inches.

of the Craigsville and Pope series. Craigsville and Pope soils are acid and contain large volumes of sand and rock fragments. They commonly occur along high-energy streams.

In addition, a small area of Typic Haplorthods was found during fieldwork on an elevated island in the Meadow River (fig. 35). Because these soils are very limited in extent and do not fit the concept of any known soil series, they are named at a higher level of Soil Taxonomy. They formed in sandy materials under a heavy

Figure 33.—The steep gradient and swift currents of Peters Creek, a tributary of the Gauley River.

canopy of eastern hemlock (*Tsuga canadensis*) and rhododendron (*Rhododendron maximum*). The duff from these plants acidifies the soil and facilitates the leaching and translocation of iron, aluminum, and organic compounds downward through the soil. The result is a concentration of these compounds in a reddish brown to black "spodic" horizon. This process, called podzolization, is also facilitated by the sandy texture of the alluvial parent material. In this region of the Appalachians, these types of soils (Spodosols) commonly occur on summits at high elevations, under a canopy of red spruce (*Picea rubens*). They rarely occur at this elevation (that of the island), especially on a flood plain.

The alluvial terrace at Koontz Bend is an ancient landform. The alluvium that is the parent material for the soils on this terrace was deposited on the flood plain of the Gauley River eons ago. The active flood plain of the river is presently about 61 meters (200 feet) lower in elevation than the terrace. The geologic strata under the site are dominated by the massive Lower Nuttall sandstone, a hard bedrock that is resistant to weathering. It took a very long time for the Gauley River to cut through these strata to its present elevation. The oldest soils at this site are members of the Cottonbend series. A profile of a Cottonbend soil exhibits evidence of the soil's great age (fig. 36). A deep red color (hue of 2.5YR) developed in the subsoil from the accumulation of iron oxides, and there is an abundant accumulation of translocated clay minerals (argillic horizon) very deep in the soil profile (230 centimeters). These clay minerals have formed visible "skins" on the faces of structural units, in pores, and on rock fragments. These features, along with the presence of highly weathered sandstone paragravel in the substratum, indicate that this soil has undergone intense weathering for a very long period of time.

Figure 34.—Profile of the Craigsville series (loamy-skeletal, mixed, superactive, mesic Fluventic Dystrudepts). Craigsville soils, which occur on active flood plains, have not been stable long enough to form distinct genetic horizons. Scale is in centimeters.

Members of the Allegheny series can also be observed at Koontz Bend. Allegheny soils occur at an elevation slightly lower than that of Cottonbend soils and, although very old, are not as old as Cottonbend soils. Allegheny soils exhibit well developed structure and an argillic horizon but have not been in place long enough to have developed the deep red colors occurring in Cottonbend soils.

Soils That Formed in Colluvium

The steep slopes in the survey area, along with abundant rainfall, contribute to an abundance of colluvium, the most extensive parent material in the park. Colluvial soils occupy about 57 percent of the land area in the park.

When gravity pulls colluvium downslope quickly, as in a landslide, it tends to accumulate at the base of slopes (footslopes or toeslopes). When colluvium moves

Figure 35.—The upper profile of Typic Haplorthods on an elevated island in the Meadow River. The highly organic black surface horizon (A horizon) is underlain by a light gray horizon (E horizon) that has been leached by organic acids and a black spodic horizon (Bhs horizon). The spodic horizon formed from the concentration of iron, aluminum, and organic compounds that were translocated downward through the soil profile.

slowly, it tends to accumulate higher on the slope (on concave surfaces, such as coves) by a process commonly called soil creep (or solifluction). Both this process and landslides are facilitated when soils are saturated with water. Below the cliffs formed by the Lower Nuttall sandstone, much of the colluvium is mantled by stones and boulders that have toppled from the cliffs (fig. 37). Some of the boulders are huge in dimension, more than 12 meters (40 feet) along their longest axis.

Like alluvium, the accumulation of colluvium is a dynamic process. Therefore, colluvial landforms, and the soils occupying them, tend to be relatively young. This is especially true of the colluvial soils on the very steep walls (backslopes) of the gorges of the Gauley and Meadow Rivers. These colluvial soils have not been stable long enough for the development of strong structure, the accumulation of translocated clay minerals, or the development of distinctive genetic horizons in the subsoil. Examples of young colluvial soils in the park are Highsplint, Layland, and Sharondale.

Layland soils are very strongly acid and formed in colluvium derived mainly from the New River Formation. Both Highsplint and Sharondale soils formed in colluvium derived from the Kanawha Formation. Highsplint soils are strongly acid, while Sharondale soils are moderately acid. Sharondale soils occur exclusively in very steep, north-facing mountain coves.

Colluvial landforms on gently sloping to strongly sloping footslopes tend to be older and more stable. The soils that formed on these landforms include Buchanan and Laidig. Both Buchanan and Laidig soils have an argillic horizon. They also contain a genetic horizon deep in the subsoil called a fragipan. The fragipan is a dense and

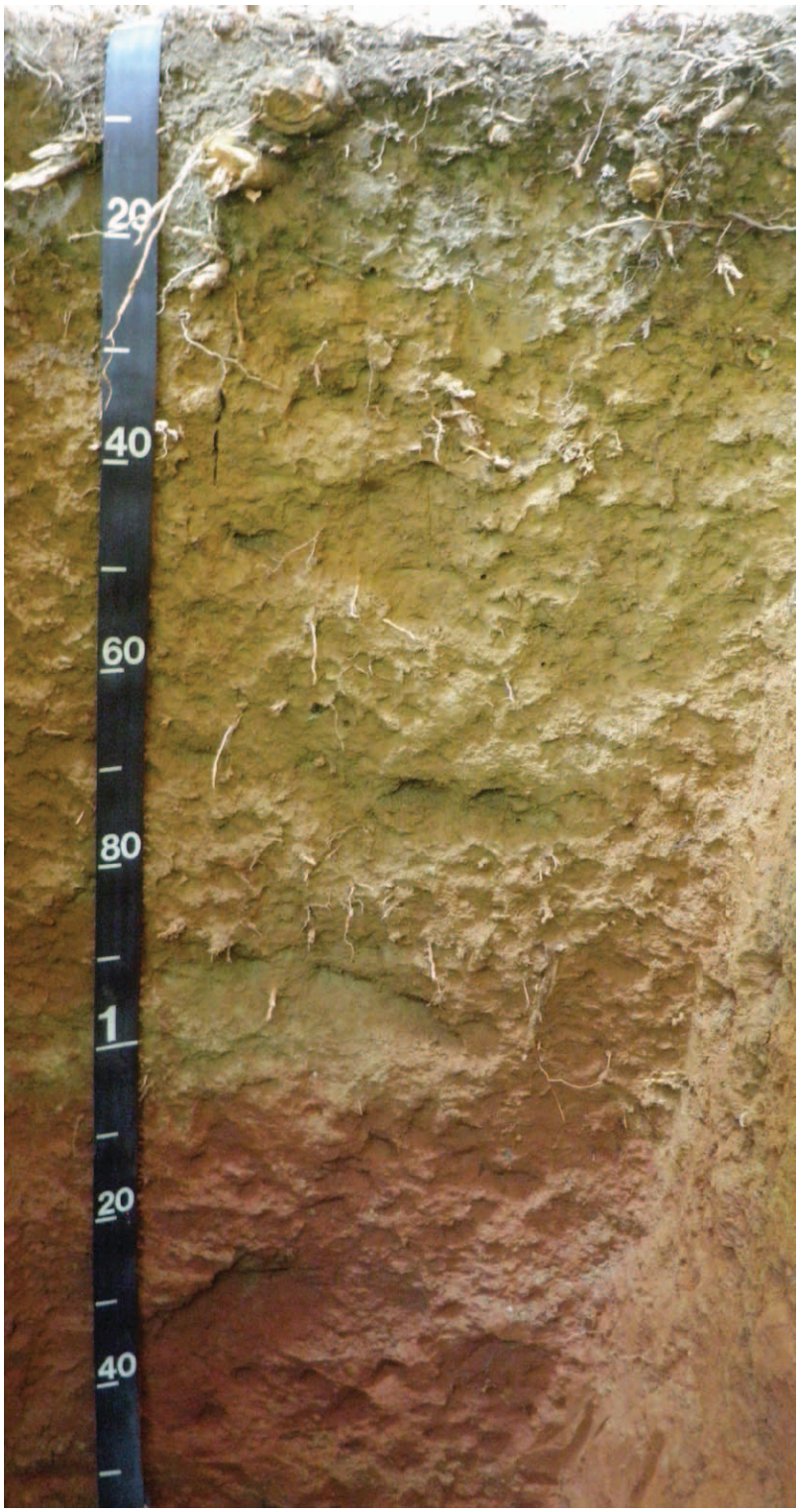

Figure 36.—Profile of a Cottonbend soil (fine-loamy, siliceous, semiactive, mesic Typic Paleudults) showing the deep red color (hue of 2.5YR) in the subsoil, evidence that this soil has undergone intense weathering for a very long period of time. Scale is in centimeters.

Figure 37.— A huge boulder which has toppled from the cliffs formed by the Lower Nuttall sandstone. Soils occurring under the mantle of boulders and stones are members of the Layland and Laidig series.

brittle horizon that impedes the growth of plant roots and the flow of water downward through the soil profile (fig. 38). In Buchanan soils, the fragipan is closer to the surface than in Laidig soils.

Soils That Formed in Residuum

Residuum is the second most abundant parent material in the park. Soils that formed in residuum occupy about 30 percent of the survey area.

Residual soils mainly occur on old and stable landforms, such as gently sloping to moderately steep summits and shoulder slopes. Most of these soils are considered mature. They have undergone pedogenesis long enough to develop structure and strong color. Most of them also have an argillic horizon. Members of the Dekalb and Berks series are exceptions. These soils occur on steep slopes or formed in materials that are resistant to weathering. These factors combine to slow the pedogenic process and prevent the soils from developing the characteristics of a mature soil.

In Gauley River National Recreation Area, with one exception, the differences in the residuum derived from members of the New River Formation and members of the Kanawha Formation are not enough to affect the classification of the soils or their use and management. The exception is Berks soils, which occur exclusively on the convex mountain slopes underlain by the Kanawha Formation. The other residual soils in the park (Clifftop, Dekalb, Fenwick, and Nallen) formed in bedrock members of either geologic formation. Berks soils are strongly acid and have medium natural fertility. All of the other residual soils in the park are very strongly acid and have low natural fertility.

The fine-earth textures of residual soils are mostly inherited from the parent bedrock. For example, Clifftop and Berks soils formed in residuum derived mainly from

shale or siltstone. As a result, these soils have fine-earth textures that are dominated by silt-sized particles and have a moderate amount of clay and very little sand. In contrast, Dekalb and Nallen soils formed in residuum derived mainly from sandstone (fig. 39). These soils have inherited fine-earth textures that are dominated by sand-sized particles and have lesser amounts of silt and very little clay.

Good examples of soils that formed in residuum can be found on a summit in a bend of the Gauley River, opposite the mouth of Ramsey Branch.

Anthropogenic Soils That Formed in Human-Transported Materials (HTM)

Anthropogenic soils occupy about 3 percent of the survey area. These soils are on landscapes that have been drastically disturbed by humans with the aid of heavy machinery, including road beds, railroad beds, the spillway of the Summersville Dam, and areas that have been graded for development. They are the youngest soils in the park. The parent materials of these soils have not been in place long enough for pedogenic processes to form any of the characteristic properties of a mature soil. These soils are classified and named as Udorthents and Lithic Udorthents.

Udorthents are soils that formed in HTM. The properties of these soils are so variable that they cannot be classified as a soil series. In layman's terms, these soils are "cut and fill" materials. Some Udorthents have been graded to meet site needs and tend to be deep or very deep in areas that have been filled and raised above the original ground level. Lithic Udorthents formed in the substratum of native soils or in weathered bedrock exposed by excavation. These soils are shallow and droughty.

Figure 38.—A road cut through an area of Laidig soils (fine-loamy, siliceous, semiactive, mesic Typic Fragiudults). The dense fragipan in the subsoil forms a bulge in the road bank. During wet periods, water seeps out of the road bank at the top of the slowly permeable fragipan.

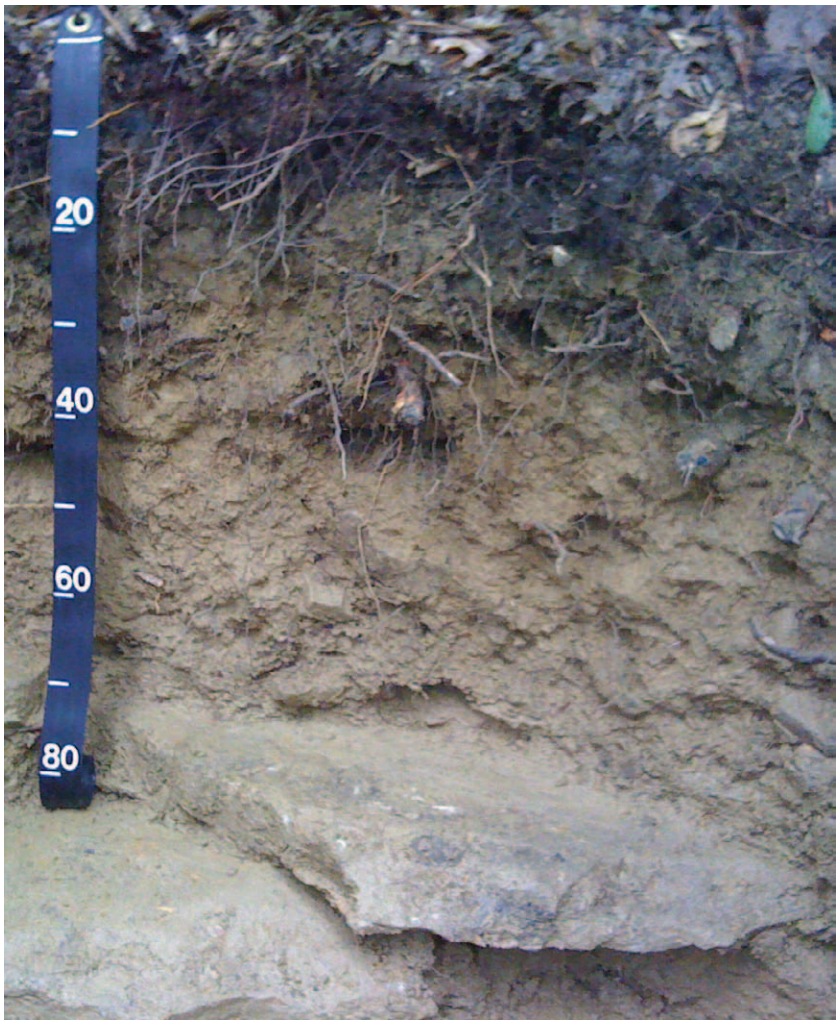

Figure 39.—Profile of a Dekalb soil (loamy-skeletal, siliceous, semiactive, mesic Typic Dystrudepts). Dekalb soils formed in residuum derived from sandstone bedrock. The bedrock in the photo begins at a depth of about 70 centimeters (28 inches). Scale is in centimeters.

Examples of Lithic Udorthents can be seen in the area excavated ("cut") to construct the emergency spillway for the Summersville Dam.

Climate

Temperature and moisture influence soil formation and are the two most commonly measured features of climate. Weathering is most active when soils are moist and warm since these conditions are conducive to rapid chemical reactions. Cooler temperatures result in slower chemical reactions. While average temperatures and amounts of precipitation are important, the extremes of weather in any given locale also play a major role in soil formation.

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. Differences in temperature and the amount of moisture cause different patterns of weathering and leaching in the

soil. Seasonal and daily changes in temperature affect moisture availability, biological activity, rates of chemical reactions, and kinds of vegetation.

Present-day climate variations are the result of topography and relief. In most areas of the United States, temperature generally decreases as elevation increases and precipitation generally increases as elevation increases. As the amount of precipitation increases, the extent of leaching and the amount of vegetation generally increase to a point where they then decrease because of decreasing temperatures. Colder temperatures result in less leaching because of decreased microbial growth, decreased vegetation, 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, the cycling of bases is pronounced in areas of warm climate and large amounts of vegetation.

The climate of Gauley River National Recreation Area is a humid continental type characterized by marked seasonal temperature changes and relatively uniform precipitation throughout the year (Vanderhorst et al., 2010). Climate data recorded at Summersville Lake (at an elevation of 536 meters or 1,760 feet) show a mean annual air temperature of 10.6 degrees C (51.0 degrees F), a mean annual precipitation of 1,207 millimeters (47.52 inches), and an average of 163 frost-free days per year.

This climate profile is a somewhat intense weathering regime with regard to soil formation. Because the soils in the survey area are not dry or frozen for long periods, soil formation processes are active throughout the year. All the correlated soils in the park have a mesic (temperate) soil temperature regime and a udic (usually moist) soil moisture regime.

Differences in climate can result in differences in soils. This is evidenced by Sharondale soils, which occur in coves on mountain backslopes with north aspect (fig. 40). The coves are cooler and stay moist longer than other positions on the landscape. These conditions slow the oxidation of organic matter and allow it to accumulate in the surface layer of the soil. The result is a soil with a thick, dark, highly organic surface horizon (mollic epipedon) which holds nutrients, increases the soil's array of micro and macro fauna, increases the water-holding capacity, and creates an ideal environment for the growth of plants. Sharondale soils are very productive woodland soils and produce some of the finest and most diverse stands of hardwood trees, wildflowers, and herbs in the central Appalachians.

Plant and Animal Organisms

Plants, animals, micro-organisms, and humans affect the formation of soils. Flora, such as fungi and bacteria, can help to decompose organic matter and add nutrients to the soil. Animals and micro-organisms mix soils and form burrows and pores. Earthworms are one example of animals that have a major affect in soil formation. A single earthworm can produce almost 10 pounds of castings a year. 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 decompose easily, 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, which are thicker and stronger than most roots, can open pathways through dense and, in some cases, otherwise impermeable layers. Micro-organisms affect chemical exchanges between roots and soil material, such as processing nitrogen into more readily available forms for plant uptake. Humans also can mix the soil extensively, such as with farming, rail line construction, and dam construction. Soil profiles in some of the flatter ridgetop areas of the park show

Figure 40.—Profile of a Sharondale soil in a north-facing mountain cove. The dark surface horizon, which is about 51 centimeters (20 inches) thick, results from the accumulation or organic matter. Sharondale soils are some of the most productive woodland soils in the central Appalachians. Scale is in inches.

evidence of past farming. These soils show mixing in the top layers from plowing and cultivation. Some of these areas are now covered by forest but were cleared and farmed as recently as 60 years ago.

The native vegetation depends on climate, topography, and biological factors as well as many soil factors, such as soil density, depth to bedrock, chemistry, temperature, and moisture. Leaves from plants fall to the surface and decompose on the soil. Organisms help to more rapidly 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.

With the exception of the anthropogenic soils and Typic Haplorthods, the soils in the park formed a under mixed mesophytic (hardwood) forest that represents one of the most biologically diverse temperate regions of the world (Loucks et al., 2001).

Most of the forest soils are topped by thin, dark organic layers formed from the breakdown of forest litter, including leaves and woody debris. Because of the recycling effect of the deciduous forest, the base cations (nutrients) are concentrated in the upper part of the soil profiles (epipedons). This effect is very pronounced in Sharondale soils, which have accumulated enough base cations (a base saturation of 50 percent or more to a depth of 180 centimeters) to classify as members of the Mollisol soil order. Most Mollisols form under grassland vegetation in calcareous parent materials. It is very unusual to have a Mollisol form under hardwood trees in parent materials that are mostly acid. In Sharondale soils, the recycling effect is magnified by the high amounts of organic matter which efficiently adsorb the base cations.

Topography

Topography refers to the differences in shape and elevation of landscapes. The overall landscape in the park is the result of erosional processes (fig. 41). These

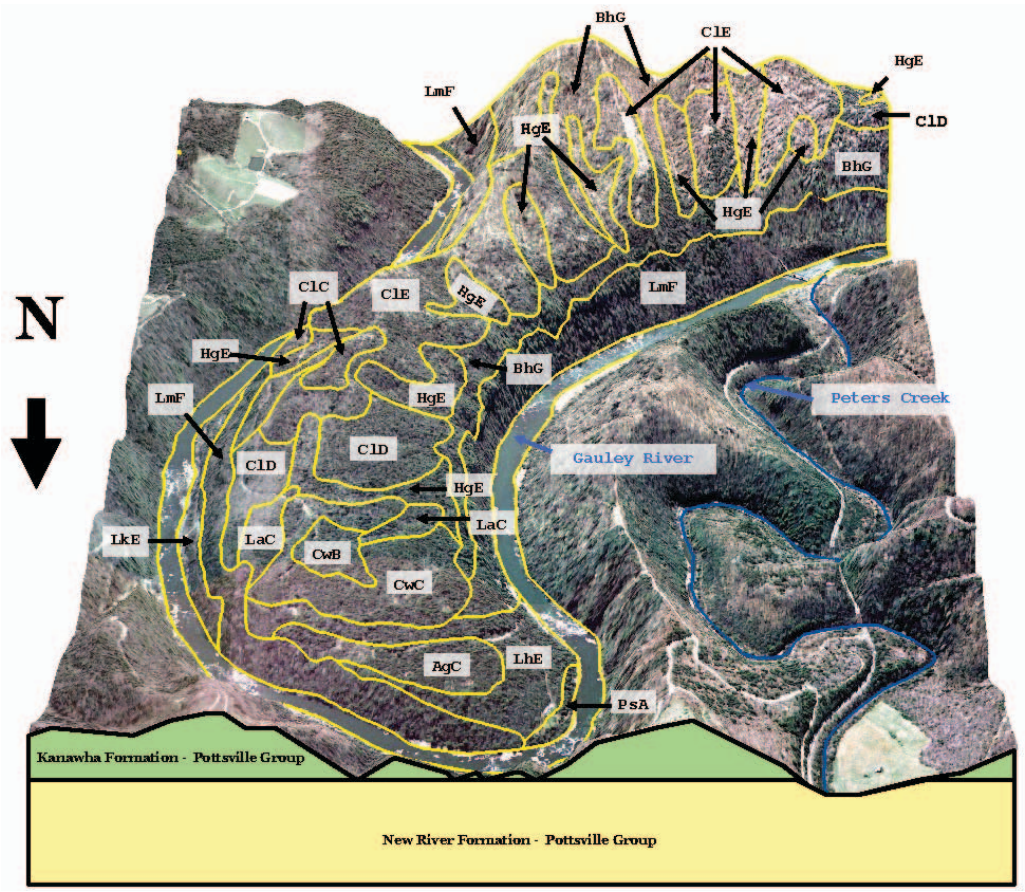

Figure 41.— A view of Gauley River National Recreation Area looking south across the ancient alluvial terrace at Koontz Bend.

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 formed on this landscape.

Slope and aspect of the overall landscape can affect the moisture content and temperature of the soil. Steep slopes facing the sun are warmer. The effects of aspect on soils in this survey area were not great enough to delineate at the scale of mapping.

On most landscapes, landforms that shed water the fastest tend to have the shallowest soils because the soils erode and lose their topsoil as they form. Thus, soils on convex portions of steep backslopes (nose slopes) are thinner than soils on less sloping concave surfaces (coves) that concentrate water and also receive soil materials from areas upslope. Examples of soils on steep, convex slopes include Clifftop and Berks soils, which are less than 1 meter deep to bedrock. In contrast, soils on linear to concave surfaces, such as Highsplint and Layland soils, are more than 2 meters (sometimes much more) deep to bedrock. Soils on steep slopes also show less development than soils on gentle slopes since they shed water faster and less water moves through the soil profile to facilitate pedogenesis. Soil-forming factors continue to affect soils even on more stable landforms. Materials are deposited on the surface, 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.

The oldest soils in the park, Cottonbend soils, occur on the highest portion of the terrace (in map units CwB and CwC). Allegheny soils are on a lower terrace that is younger in age (in map unit AgC). The active flood plain of the river is occupied by young soils, such as Pope and Craigsville soils (in map unit PsA). The moderately deep Clifftop soils formed in residuum and occur on convex summits that are relatively old and stable (in map units ClC, ClD, and ClE). Berks soils are younger and occur on very steep convex slopes on mountainsides (in convex parts of map unit BhG). Soils that formed in colluvium are the most extensive type of soils in the park. Layland and Laidig soils formed in colluvium derived from materials dominantly weathered from the New River Formation (in map units LaC, LhE, LkE, and LmF). Colluvium derived from the Kanawha Formation is the parent material of Highsplint and Sharondale soils (in map unit HgE and in linear and concave areas of map unit BhG).

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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

K_{sat}. 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.
Major land resource area (MLRA). A geographic area that generally has similar soils, vegetation, water, climate, elevation, relief, and land use characteristics.
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 Summersville Lake, West Virginia)

Month	Temperature (degrees F)						Precipitation (inches)				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temp. higher than--	2 years in 10 will have-- Minimum temp. lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snow-fall
January--	39.3	20.1	29.7	67	-11	37	3.63	2.04	5.13	8	16.1
February-	43.0	22.1	32.5	72	-5	54	3.05	1.96	4.10	8	10.2
March----	52.2	29.4	40.8	79	5	154	3.90	2.61	4.92	9	6.0
April----	62.7	37.9	50.3	86	19	331	3.85	2.51	5.09	9	1.5
May------	70.9	47.0	58.9	87	29	587	4.77	3.15	6.39	10	0.0
June-----	77.6	55.4	66.5	90	39	795	4.44	2.39	6.20	9	0.0
July-----	81.2	59.9	70.6	91	46	948	5.53	3.98	7.14	8	0.0
August---	80.0	58.7	69.3	91	45	909	4.71	3.05	6.19	7	0.0
September	74.3	52.6	63.4	89	36	700	3.57	2.01	5.09	7	0.0
October--	64.1	40.7	52.4	81	23	393	3.31	1.83	4.63	7	0.2
November	53.5	32.6	43.0	77	13	178	3.27	1.93	4.38	7	2.0
December-	43.5	24.6	34.1	69	-1	65	3.49	2.20	4.48	8	7.1
Yearly:											
Average	61.9	40.1	51.0	---	---	---	----	----	----	---	---
Extreme	94	-20	---	92	-13	---	----	----	----	---	---
Total--	---	---	---	---	---	5,152	47.52	41.42	53.01	97	43.1

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

Table 2.—Freeze Dates in Spring and Fall

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

Probability	Temperature (degrees F)		
	24 degrees or lower	28 degrees or lower	32 degrees or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 17	May 3	May 14
2 years in 10 later than--	Apr. 12	Apr. 28	May 10
5 years in 10 later than--	Apr. 3	Apr. 18	May 2
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 17	Oct. 8	Sept. 29
2 years in 10 earlier than--	Oct. 24	Oct. 14	Oct. 3
5 years in 10 earlier than--	Nov. 7	Oct. 26	Oct. 13

Table 3.—Growing Season

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

Probability	Daily minimum temperature (degrees F) during growing season		
	Higher than 24 degrees	Higher than 28 degrees	Higher than 32 degrees
	Days	Days	Days
9 years in 10	191	165	147
8 years in 10	200	173	153
5 years in 10	217	190	163
2 years in 10	235	207	173
1 year in 10	244	216	178

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

Map symbol	Map unit name	Acres	Hectares	Percent
AgC	Allegheny loam, 8 to 15 percent slopes	12	5	0.1
BhG	Berks-Highsplint-Sharondale complex, 35 to 80 percent slopes, very stony	1,961	794	17.4
BuC	Buchanan loam, 8 to 15 percent slopes	19	8	0.2
ClB	Clifftop channery silt loam, 3 to 8 percent slopes	45	18	0.4
ClC	Clifftop channery silt loam, 8 to 15 percent slopes	262	106	2.3
ClD	Clifftop channery silt loam, 15 to 25 percent slopes	266	108	2.4
ClE	Clifftop channery silt loam, 25 to 35 percent slopes	523	212	4.6
CmC	Clifftop channery silt loam, 3 to 15 percent slopes, very stony	29	12	0.3
CwB	Cottonbend loam, 3 to 8 percent slopes	6	2	*
CwC	Cottonbend loam, 8 to 15 percent slopes	28	11	0.2
DkC	Dekalb very channery loam, 3 to 15 percent slopes, extremely stony	43	17	0.4
DrE	Dekalb-Rock outcrop complex, 15 to 35 percent slopes, extremely stony	149	60	1.3
FeB	Fenwick silt loam, 3 to 8 percent slopes	13	5	0.1
FeC	Fenwick silt loam, 8 to 15 percent slopes	29	12	0.3
HgE	Highsplint channery loam, 15 to 35 percent slopes, very stony	402	163	3.6
LaC	Laidig channery loam, 3 to 15 percent slopes, rubbly	233	94	2.1
LbC	Laidig channery loam, 3 to 15 percent slopes, very rubbly	41	17	0.4
LcE	Laidig-Clifftop complex, 15 to 35 percent slopes, very stony	663	269	5.9
LdF	Layland-Clifftop complex, 35 to 70 percent slopes, very stony	611	247	5.4
LhE	Layland-Laidig complex, 15 to 35 percent slopes, rubbly	312	126	2.8
LkE	Layland-Laidig complex, 15 to 35 percent slopes, very rubbly	613	248	5.4
LmF	Layland-Rock outcrop complex, 35 to 70 percent slopes, very rubbly	3,350	1,357	29.8
LuC	Lithic Udorthents, leveled land, 0 to 15 percent slopes	192	78	1.7
LxG	Lithic Udorthents-Rock outcrop complex, cut land, 5 to 100 percent slopes	1	0	*
NaB	Nallen loam, 3 to 8 percent slopes	3	1	*
NaC	Nallen loam, 8 to 15 percent slopes	104	42	0.9
NaD	Nallen loam, 15 to 25 percent slopes	134	54	1.2
PsA	Pope sandy loam, 0 to 3 percent slopes, rarely flooded	34	14	0.3
PvA	Pope-Craigsville complex, 0 to 3 percent slopes, occasionally flooded	83	34	0.7
Rw	Riverwash, frequently flooded	8	3	*
ThB	Typic Haplorthods, 0 to 8 percent slopes, rubbly, rarely flooded	2	1	*
UgC	Udorthents, graded, 0 to 15 percent slopes	30	12	0.3
UgF	Udorthents, graded, 15 to 55 percent slopes	45	18	0.4
Ur	Udorthents, railroad grade	275	111	2.4
Uu	Udorthents-Urban land complex, highways	9	4	*
W	Water	478	194	4.2
Wr	Water-Rubble land complex	248	100	2.2
	Total	11,256	4,559	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
AgC:						
Allegheny	3e	115.00	3.50	5.50	75.00	45.00
BhG:						
Berks	7s	---	---	---	---	---
Highsplint	7s					
Sharondale	7s					
BuC:						
Buchanan	3e	90.00	3.00	4.50	60.00	35.00
ClB:						
Clifftop	2e	90.00	3.00	4.50	65.00	40.00
ClC:						
Clifftop	3e	85.00	3.00	4.50	60.00	35.00
ClD:						
Clifftop	4e	75.00	2.50	4.00	55.00	30.00
ClE:						
Clifftop	6e	---	---	3.00	---	---
CmC:						
Clifftop	6s	---	---	3.50	---	---
CwB:						
Cottonbend	2e	130.00	4.00	5.50	80.00	64.00
CwC:						
Cottonbend	3e	114.00	3.50	4.70	75.00	56.00
DkC:						
Dekalb	7s	---	---	---	---	---
DrE:						
Dekalb	7s	---	---	---	---	---
Rock outcrop	8s					
FeB:						
Fenwick	2e	100.00	3.00	4.50	65.00	40.00
FeC:						
Fenwick	3e	90.00	3.00	4.50	65.00	35.00
HgE:						
Highsplint	6s	---	---	3.00	---	---
LaC:						
Laidig	7s	---	---	---	---	---
LbC:						
Laidig	7s	---	---	---	---	---

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
LcE:		---	---	3.00	---	---
Laidig	6s					
Clifftop	6s					
LdF:		---	---	---	---	---
Layland	7s					
Clifftop	7s					
LhE:		---	---	---	---	---
Layland	7s					
Laidig	7s					
LkE:		---	---	---	---	---
Layland	7s					
Laidig	7s					
LmF:		---	---	---	---	---
Layland	7s					
Rock outcrop	8s					
LuC:		---	---	---	---	---
Lithic Udorthents, leveled land	8s					
LxG:		---	---	---	---	---
Lithic Udorthents, cut land	8s					
Rock outcrop	8s					
NaB:		85.00	2.50	4.00	60.00	30.00
Nallen	2e					
NaC:		75.00	2.50	4.00	55.00	30.00
Nallen	3e					
NaD:		65.00	2.00	3.50	50.00	25.00
Nallen	4e					
PsA:		100.00	3.00	4.50	70.00	40.00
Pope, rarely flooded	1					
PvA:		89.00	2.40	4.00	64.00	46.00
Pope, occasionally flooded	2w					
Craigsville, occasionally flooded	2w					
Rw:		---	---	---	---	---
Riverwash, frequently flooded	8w					
ThB:		---	---	---	---	---
Typic Haplorthods, rarely flooded	7s					

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
UgC:		---	---	---	---	---
Udorthents, graded------	7e					
UgF:		---	---	---	---	---
Udorthents, graded------	8e					
Ur:		---	---	---	---	---
Udorthents, railroad grade----------	8e					
Uu:		---	---	---	---	---
Udorthents, highways----	7e					
Urban land, highways----	8s					
W.						
Water						
Wr:						
Water.						
Rubble land, frequently flooded----------	8s					

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
ClB	Clifftop channery silt loam, 3 to 8 percent slopes	All areas are prime farmland
CwB	Cottonbend loam, 3 to 8 percent slopes	All areas are prime farmland
FeB	Fenwick silt loam, 3 to 8 percent slopes	All areas are prime farmland
NaB	Nallen loam, 3 to 8 percent slopes	All areas are prime farmland
PsA	Pope sandy loam, 0 to 3 percent slopes, rarely flooded	All areas are prime farmland
PvA	Pope-Craigsville complex, 0 to 3 percent slopes, occasionally flooded	All areas are prime farmland
AgC	Allegheny loam, 8 to 15 percent slopes	Farmland of statewide importance
BuC	Buchanan loam, 8 to 15 percent slopes	Farmland of statewide importance
ClC	Clifftop channery silt loam, 8 to 15 percent slopes	Farmland of statewide importance
ClD	Clifftop channery silt loam, 15 to 25 percent slopes	Farmland of statewide importance
CwC	Cottonbend loam, 8 to 15 percent slopes	Farmland of statewide importance
FeC	Fenwick silt loam, 8 to 15 percent slopes	Farmland of statewide importance
NaC	Nallen loam, 8 to 15 percent slopes	Farmland of statewide importance
NaD	Nallen loam, 15 to 25 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 bottom 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
AgC:								
Allegheny loam, 8 to 15 percent slopes	Knowlton, occasionally ponded	2	Yes	depressions on high stream terraces	2B3	Yes	No	No
LaC:								
Laidig channery loam, 3 to 15 percent slopes, rubbly	Atkins, occasionally flooded	5	Yes	flood plains in mountain valleys	2B3	Yes	No	No
PsA:								
Pope sandy loam, 0 to 3 percent slopes, rarely flooded	Atkins, occasionally flooded	5	Yes	nearly level flood plains	2B3	Yes	No	No
PvA:								
Pope-Craigsville complex, 0 to 3 percent slopes, occasionally flooded	Atkins, occasionally flooded	5	Yes	nearly level flood plains	2B3	Yes	No	No
Ur:								
Udorthents, railroad grade	Endoaquepts, frequently ponded	1	Yes	closed depressions located behind the rail beds on mountain slopes	3, 2B3	Yes	No	Yes

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

(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				
AgC:								
Allegheny	80	8-15	302-328	1052-1346	Mountains	High stream terrace in river valley	Fine-loamy alluvium	Acid Loams (AL3)
BhG:								
Berks	35	35-80	211-558	1052-1346	Mountains	Convex mountain slope	Residuum weathered from interbedded sedimentary rock	Not Suited (NS)
Highsplint	30	35-80	211-558	1052-1346	Mountains	Mountain slope	Very stony colluvium derived from interbedded sedimentary rock	Not Suited (NS)
Sharondale	20	35-80	211-558	1052-1346	Mountains	North-facing mountain slope	Very stony colluvium derived from interbedded sedimentary rock	Not Suited (NS)
BuC:								
Buchanan	80	8-15	238-489	1052-1346	Mountains	Drainageway, footslope, and mountain slope	Loamy colluvium derived from sandstone and siltstone	Acid Loams (AL2)
ClB:								
Clifftop	80	3-8	382-591	1052-1346	Mountains	Ridge	Acid fine-loamy residuum weathered from shale and siltstone	Acid Loams (AL3)
ClC:								
Clifftop	80	8-15	356-591	1052-1346	Mountains	Ridge	Acid fine-loamy residuum weathered from shale and siltstone	Acid Loams (AL3)
ClD:								
Clifftop	75	15-25	319-551	1052-1346	Mountains	Ridge	Acid fine-loamy residuum weathered from shale and siltstone	Acid Loams (AL3)

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				
ClE:								
Clifftop----------	70	25-35	221-571	1052-1346	Mountains	Convex mountain slope	Acid fine-loamy residuum weathered from shale and siltstone	Acid Hills (AH3)
CmC:								
Clifftop----------	75	3-15	321-455	1052-1346	Mountains	Ridge	Acid fine-loamy residuum weathered from shale and siltstone	Very Rocky, Acid Soils (RA3)
CwB:								
Cottonbend---------	90	3-8	342-349	1052-1346	Mountains	High stream terrace in river valley	Alluvium derived from sedimentary rock	Acid Loams (AL3)
CwC:								
Cottonbend---------	90	8-15	325-359	1052-1346	Mountains	High stream terrace in river valley	Alluvium derived from sedimentary rock	Acid Loams (AL3)
DkC:								
Dekalb----------	80	3-15	327-603	1052-1346	Mountains	Ridge	Acid loamy residuum weathered from sandstone	Very Rocky, Acid Soils (RA3)
DrE:								
Dekalb----------	55	15-35	331-610	1052-1346	Mountains	Mountain slope	Acid loamy residuum weathered from sandstone	Not suited (NS)
Rock outcrop-------	15	None assigned	331-610	1052-1346	Mountains	Sandstone cliff	Sandstone	Not Suited (NS)
FeB:								
Fenwick----------	85	3-8	411-530	1052-1346	Mountains	Broad ridge	Residuum weathered from sandstone and shale	Acid Loams (AL3)
FeC:								
Fenwick----------	85	8-15	403-586	1052-1346	Mountains	Broad ridge	Residuum weathered from sandstone and shale	Acid Loams (AL3)

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	320-352	1052-1346	Mountains	Mountain slope	Very stony colluvium derived from interbedded sedimentary rock	Very Rocky, Acid Soils (RA3)
LaC:								
Laidig----------	70	3-15	327-578	1052-1346	Mountains	Drainageway, footslope, and mountain slope	Rubbly colluvium derived from interbedded sedimentary rock	Very Rocky, Acid Soils (RA3)
LbC:								
Laidig----------	75	3-15	252-468	1052-1346	Mountains	Drainageway, footslope, and mountain slope	Very rubbly colluvium derived from interbedded sedimentary rock	Not Suited (NS)
LcE:								
Laidig----------	45	15-35	212-613	1052-1346	Mountains	Drainageway, footslope, and mountain slope	Very stony colluvium derived from interbedded sedimentary rock	Very Rocky, Acid Soils (RA3)
Clifftop----------	25	15-35	212-613	1052-1346	Mountains	Convex mountain slope	Acid fine-loamy residuum weathered from shale and siltstone	Very Rocky, Acid Soils (RA3)
LdF:								
Layland----------	60	35-70	257-586	1052-1346	Mountains	Mountain slope	Very stony colluvium derived from sandstone and siltstone	Very Rocky, Acid Soils (RA3)
Clifftop----------	20	35-70	257-586	1052-1346	Mountains	Convex mountain slope	Acid fine-loamy residuum weathered from shale and siltstone	Very Rocky, Acid Soils (RA3)
LhE:								
Layland----------	60	15-35	229-589	1052-1346	Mountains	Mountain slope	Rubbly, acid colluvium derived from interbedded sedimentary rock	Very Rocky, Acid Soils (RA3)

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				
LhE:								
Laidig----------	25	15-35	229-589	1052-1346	Mountains	Mountain slope	Rubbly colluvium derived from interbedded sedimentary rock	Very Rocky, Acid Soils (RA3)
LkE:								
Layland----------	55	15-35	214-556	1052-1346	Mountains	Areas below rock outcrop on mountain slope	Very rubbly colluvium derived from sandstone and siltstone	Not Suited (NS)
Laidig----------	30	15-35	214-556	1052-1346	Mountains	Drainageway, footslope, and mountain slope	Very rubbly colluvium derived from interbedded sedimentary rock	Not Suited (NS)
LmF:								
Layland----------	60	35-70	212-600	1052-1346	Mountains	Areas below rock outcrop on mountain slope	Very rubbly colluvium derived from sandstone and siltstone	Not Suited (NS)
Rock outcrop-------	10	None assigned	212-600	1052-1346	Mountains	Sandstone escarpment	Sandstone	Not Suited (NS)
LuC:								
Lithic Udorthents, leveled land------	85	0-15	301-377	1052-1346	Mountains	Drastically disturbed areas on mountain slope	Cut and fill materials derived from native soils and interbedded sedimentary rock	Not Suited (NS)
LxG:								
Lithic Udorthents, cut land----------	50	5-100	301-377	1052-1346	Mountains	Drastically disturbed areas on mountain slope	Cut and fill materials derived from native soils and interbedded sedimentary rock	Not Suited (NS)
Rock outcrop-------	40	None assigned	301-377	1052-1346	Mountains	Drastically disturbed areas on mountain slope	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				
NaB:								
Nallen	80	3-8	523-528	1052-1346	Mountains	Ridge	Acid coarse-loamy residuum weathered from sandstone	Acid Loams (AL3)
NaC:								
Nallen	75	8-15	326-584	1052-1346	Mountains	Ridge	Acid coarse-loamy residuum weathered from sandstone	Acid Loams (AL3)
NaD:								
Nallen	75	15-25	297-569	1052-1346	Mountains	Ridge	Acid coarse-loamy residuum weathered from sandstone	Acid Loams (AL3)
PsA:								
Pope, rarely flooded	85	0-3	213-374	1052-1346	Mountains	Flood plain in river valley	Coarse-loamy alluvium derived from sandstone and shale	Acid Loams (AL3)
PvA:								
Pope, occasionally flooded	50	0-3	211-515	1052-1346	Mountains	Flood plain in river valley	Coarse-loamy alluvium derived from sandstone and shale	Acid Loams (AL3)
Craigsville, occasionally flooded	30	0-3	211-515	1052-1346	Mountains	Flood plain in river valley	Loamy-skeletal alluvium derived from sandstone and shale	Acid Loams (AL3)
Rw:								
Riverwash, frequently flooded	95	0-3	211-511	1052-1346	Mountains	Sand and cobble bars along the river on high-energy flood plain in river valley	Sandy and gravelly alluvium derived 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				
ThB:								
Typic Haplorthods, rarely flooded----	80	0-8	412-418	1052-1346	Mountains	Island in river valley	Acid, stony alluvium derived from sandstone	Not Suited (NS)
UgC:								
Udorthents, graded-	85	0-15	303-580	1052-1346	Mountains	None assigned	Cut and fill materials derived from native soils and interbedded sedimentary rock	Not Suited (NS)
UgF:								
Udorthents, graded-	85	15-55	302-560	1052-1346	Mountains	None assigned	Cut and fill materials derived from native soils and interbedded sedimentary rock	Not Suited (NS)
Ur:								
Udorthents, railroad grade----	93	0-70	215-518	1052-1346	Mountains	Railroad beds	Cut and fill materials derived from native soils and interbedded sedimentary rock	Not Suited (NS)
Uu:								
Udorthents, highways----------	70	0-7	533-571	1052-1346	Mountains	Road beds	Cut and fill materials derived from native soils and interbedded sedimentary rock	Not Suited (NS)
Urban land, highways----------	25	0-7	533-571	1052-1346	Mountains	None assigned	None assigned	Not Suited (NS)
W:								
Water----------	90	None assigned	211-511	1052-1346	Mountains	Rivers and ponds	None assigned	None assigned
Wr:								
Water----------	75	None assigned	339-488	1052-1346	Mountains	Rivers and ponds	None assigned	None assigned

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				
Wr:								
Rubble land, frequently flooded	25	None assigned	339-488	1052-1346	Mountains	Boulder and stone rock topple deposits along the river	Rock topple deposits derived from sandstone	Not Suited (NS)

Table 9.—Forest Productivity

(Characteristic trees are pulled from the National Soil Information System (NASIS) component forest productivity table. The site index base age indicates the age used for the site curves. The volume of wood fiber is the yield likely to be produced by the most important tree species at the age of culmination of the mean annual increment (CMAI). The volume is the amount of fiber produced in a fully stocked, even-aged, unmanaged stand. Only the soils suitable for forestland are listed)

Map unit symbol and soil name	Potential productivity: Characteristic trees	Site index base age	Site index in feet	Volume of wood fiber (CMAI)
		yrs		cu ft/ac/yr
AgC:				
Allegheny	black oak	50	78	60
	eastern white pine	50	90	166
	northern red oak	50	80	62
	yellow-poplar	50	90	90
BhG:				
Berks	black oak	50	70	52
	chestnut oak	50	70	52
	eastern white pine	50	82	148
	northern red oak	50	70	52
Highsplint	yellow-poplar	50	108	121
	northern red oak	50	86	68
Sharondale	yellow-poplar	50	116	133
	cucumbertree	50	101	109
	northern red oak	50	92	74
BuC:				
Buchanan	northern red oak	50	80	62
	yellow-poplar	50	90	90
ClB:				
Clifftop	northern red oak	50	75	57
	yellow-poplar	50	86	82
	white oak	50	67	49
ClC:				
Clifftop	northern red oak	50	75	57
	yellow-poplar	50	86	82
	white oak	50	67	49
ClD:				
Clifftop	northern red oak	50	75	57
	white oak	50	67	49
	yellow-poplar	50	86	82
ClE:				
Clifftop	yellow-poplar	50	86	82
	northern red oak	50	75	57
	white oak	50	67	49
CmC:				
Clifftop	northern red oak	50	75	57
	yellow-poplar	50	86	82
	white oak	50	67	49
CwB:				
Cottonbend	northern red oak	50	78	60
	tuliptree	50	88	86

Table 9.—Forest Productivity—Continued

Map unit symbol and soil name	Potential productivity: Characteristic trees	Site index base age	Site index in feet	Volume of wood fiber (CMAI)
		yrs		cu ft/ac/yr
CwC:				
Cottonbend	northern red oak	50	78	60
	tuliptree	50	88	86
DkC:				
Dekalb	scarlet oak	50	69	51
	northern red oak	50	65	47
	chestnut oak	50	60	43
DrE:				
Dekalb	scarlet oak	50	69	51
	northern red oak	50	65	47
	chestnut oak	50	60	43
FeB:				
Fenwick	black cherry	50	85	52
	northern red oak	50	75	57
	white ash	50	85	111
	yellow-poplar	50	90	90
FeC:				
Fenwick	black cherry	50	85	52
	northern red oak	50	75	57
	white ash	50	85	111
	yellow-poplar	50	90	90
HgE:				
Highsplint	yellow-poplar	50	108	121
	northern red oak	50	86	68
LaC:				
Laidig	yellow-poplar	50	90	90
	northern red oak	50	80	62
	white oak	50	80	62
LbC:				
Laidig	yellow-poplar	50	90	90
	northern red oak	50	80	62
	white oak	50	80	62
LcE:				
Laidig	northern red oak	50	80	62
	white oak	50	80	62
	yellow-poplar	50	90	90
Clifftop	yellow-poplar	50	86	82
	northern red oak	50	75	57
	white oak	50	67	49
LdF:				
Layland	yellow-poplar	50	100	107
	northern red oak	50	82	64
Clifftop	yellow-poplar	50	86	82
	northern red oak	50	75	57
	white oak	50	67	49

Table 9.—Forest Productivity—Continued

Map unit symbol and soil name	Potential productivity: Characteristic trees	Site index base age	Site index in feet	Volume of wood fiber (CMAI)
		yrs		cu ft/ac/yr
LhE:				
Layland	yellow-poplar	50	100	107
	northern red oak	50	82	64
Laidig	yellow-poplar	50	90	90
	northern red oak	50	80	62
	white oak	50	80	62
LkE:				
Layland	yellow-poplar	50	100	107
	northern red oak	50	82	64
Laidig	yellow-poplar	50	90	90
	northern red oak	50	80	62
	white oak	50	80	62
LmF:				
Layland	yellow-poplar	50	100	107
	northern red oak	50	82	64
NaB:				
Nallen	chestnut oak	50	67	49
	northern red oak	50	70	52
	scarlet oak	50	56	39
NaC:				
Nallen	chestnut oak	50	67	49
	northern red oak	50	70	52
	scarlet oak	50	56	39
NaD:				
Nallen	chestnut oak	50	67	49
	northern red oak	50	70	52
	scarlet oak	50	56	39
PsA:				
Pope, rarely flooded	yellow-poplar	50	96	100
	northern red oak	50	80	62
	white oak	50	80	62
PvA:				
Pope, occasionally flooded	yellow-poplar	50	96	100
	northern red oak	50	80	62
	white oak	50	80	62
Craigsville, occasionally flooded	eastern white pine	50	90	166
	northern red oak	50	75	57
	Virginia pine	50	80	114
	yellow-poplar	50	90	100
ThB:				
Typic Haplorthods, rarely flooded	northern red oak	50	65	47

Table 10.—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 chestnut	Castanea dentata	CADE12
American ginseng	Panax quinquefolius	PAQU
American holly	Ilex opaca	ILOP
American hornbeam	Carpinus caroliniana	CACA18
American sycamore	Platanus occidentalis	PLOC
American witchhazel	Hamamelis virginiana	HAVI4
autumn olive	laeagnus umbellata	ELUM
basswood	Tilia	TILIA
bitternut hickory	Carya cordiformis	CACO15
black cherry	Prunus serotina	PRSE2
black cohosh	Cimicifuga racemosa	CIRA
black locust	Robinia pseudoacacia	ROPS
black oak	Quercus velutina	QUVE
black walnut	Juglans nigra	JUNI
blackberry	Rubus	RUBUS
blackgum	yssa sylvatica	NYSY
blue cohosh	Caulophyllum thalictroides	CATH2
Blue Ridge blueberry	Vaccinium pallidum	VAPA4
blueberry	Vaccinium	VACCI
boxelder	Acer negundo	ACNE2
checkerberry wintergreen	Gaultheria procumbens	GAPR2
chestnut oak	Quercus prinus	QUPR2
Christmas fern	Polystichum acrostichoides	POAC4
common elderberry	Sambucus nigra ssp. canadensis	SANIC4
cucumbertree	Magnolia acuminata	MAAC
eastern cottonwood	Populus deltoides	PODE3
eastern hemlock	Tsuga canadensis	TSCA
eastern poison ivy	Toxicodendron radicans	TORA2
eastern redbud	Cercis canadensis	CECA4
eastern teaberry	Gaultheria procumbens	GAPR2
eastern white pine	Pinus strobus	PIST
flowering dogwood	Cornus florida	COFL2
grass		2GP
grass, perennial		2GP
green ash	Fraxinus pennsylvanica	FRPE
greenbrier	Smilax rotundifolia	SMRO
groundcedar	Lycopodium complanatum	LYCO3
hazel alder	Alnus serrulata	ALSE2
hickory	Carya	CARYA
huckleberry	Gaylussacia	GAYLU
Indianpipe	Monotropa	MONOT
lespedeza	Lespedeza	LESPE
Lichen, crustose		2LC
maidenfern	Adiantum pedatum	ADPE
mapleleaf viburnum	Viburnum acerifolium	VIAC
mayapple	Podophyllum peltatum	POPE
mockernut hickory	Carya alba	CAAL27
mountain laurel	Kalmia latifolia	KALA
mountain magnolia	Magnolia fraseri	MAFR
mountain maple	Acer spicatum	ACSP2
multiflora rose	Rosa multiflora	ROMU
navel lichen	Umbilicaria mammulata	UMMA60
New York fern	Thelypteris noveboracensis	THNO
northern red oak	Quercus rubra	QURU
perennial grasses	unknown scientific name	UNKNOWN
pignut hickory	Carya glabra	CAGL8
pin oak	Quercus palustris	QUPA2
pitch pine	Pinus rigida	PIRI

Table 10.—Index of Common and Scientific Plant Names and Plant Symbols Sorted by Common Name—Continued

Local common name	Scientific name	Plant symbol
rattlesnake plantain	Goodyera	GOODY
red maple	Acer rubrum	ACRU
rhododendron	Rhododendron	RHODO
river birch	Betula nigra	BENI
riverbank grape	Vitis riparia	VIRI
sassafras	Sassafras albidum	SAAL5
scarlet oak	Quercus coccinea	QUCO2
shagbark hickory	Carya ovata	CAOV2
shellbark hickory	Carya laciniosa	CALA21
shortleaf pine	Pinus echinata	PIEC2
sourwood	Oxydendrum arboreum	OXAR
springbeauty	Claytonia	CLAYT
striped maple	Acer pensylvanicum	ACPE
sugar maple	Acer saccharum	ACSA3
sweet birch	Betula lenta	BELE
tall fescue	Lolium arundinaceum	LOAR10
tree of heaven	Ailanthus altissima	AIAL
trillium	Trillium	TRILL
tuliptree	Liriodendron tulipifera	LITU
umbrella magnolia	Magnolia tripetala	MATR
vetch	Vicia	VICIA
Virginia creeper	Parthenocissus quinquefolia	PAQU2
Virginia pine	Pinus virginiana	PIVI2
white ash	Fraxinus americana	FRAM2
white baneberry	Actaea pachypoda	ACPA
white oak	Quercus alba	QUAL
white snakeroot	Ageratina altissima	AGAL5
wild leek	Allium tricoccum	ALTR3
yellow buckeye	Aesculus flava	AEFL
yellow-poplar	Liriodendron tulipifera	LITU

Table 11.—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		2GP
grass, perennial		2GP
Lichen, crustose		2LC
boxelder	Acer negundo	ACNE2
white baneberry	Actaea pachypoda	ACPA
striped maple	Acer pensylvanicum	ACPE
red maple	Acer rubrum	ACRU
sugar maple	Acer saccharum	ACSA3
mountain maple	Acer spicatum	ACSP2
maidenfern	Adiantum pedatum	ADPE
yellow buckeye	Aesculus flava	AEFL
white snakeroot	Ageratina altissima	AGAL5
tree of heaven	Ailanthus altissima	AIAL
hazel alder	Alnus serrulata	ALSE2
wild leek	Allium tricoccum	ALTR3
sweet birch	Betula lenta	BELE
river birch	Betula nigra	BENI
mockernut hickory	Carya alba	CAAL27
American hornbeam	Carpinus caroliniana	CACA18
bitternut hickory	Carya cordiformis	CACO15
American chestnut	Castanea dentata	CADE12
pignut hickory	Carya glabra	CAGL8
shellbark hickory	Carya laciniosa	CALA21
shagbark hickory	Carya ovata	CAOV2
hickory	Carya	CARYA
blue cohosh	Caulophyllum thalictroides	CATH2
eastern redbud	Cercis canadensis	CECA4
black cohosh	Cimicifuga racemosa	CIRA
springbeauty	Claytonia	CLAYT
flowering dogwood	Cornus florida	COFL2
autumn olive	Elaeagnus umbellata	ELUM
American beech	Fagus grandifolia	FAGR
white ash	Fraxinus americana	FRAM2
green ash	Fraxinus pennsylvanica	FRPE
checkerberry wintergreen	Gaultheria procumbens	GAPR2
eastern teaberry	Gaultheria procumbens	GAPR2
huckleberry	Gaylussacia	GAYLU
rattlesnake plantain	Goodyera	GOODY
American witchhazel	Hamamelis virginiana	HAVI4
American holly	Ilex opaca	ILOP
black walnut	Juglans nigra	JUNI
mountain laurel	Kalmia latifolia	KALA
lespedeza	Lespedeza	LESPE
tuliptree	Liriodendron tulipifera	LITU
yellow-poplar	Liriodendron tulipifera	LITU
tall fescue	Lolium arundinaceum	LOAR10
groundcedar	Lycopodium complanatum	LYCO3
cucumbertree	Magnolia acuminata	MAAC
mountain magnolia	Magnolia fraseri	MAFR
umbrella magnolia	Magnolia tripetala	MATR
Indianpipe	Monotropa	MONOT
blackgum	Nyssa sylvatica	NYSY
sourwood	Oxydendrum arboreum	OXAR
American ginseng	Panax quinquefolius	PAQU
Virginia creeper	Parthenocissus quinquefolia	PAQU2
shortleaf pine	Pinus echinata	PIEC2
pitch pine	Pinus rigida	PIRI
eastern white pine	Pinus strobus	PIST
Virginia pine	Pinus virginiana	PIVI2
American sycamore	Platanus occidentalis	PLOC

Table 11.—Index of Common and Scientific Plant Names and Plant Symbols Sorted by Plant Symbol—Continued

Local common name	Scientific name	Plant symbol
Christmas fern	Polystichum acrostichoides	POAC4
eastern cottonwood	Populus deltoides	PODE3
mayapple	Podophyllum peltatum	POPE
black cherry	Prunus serotina	PRSE2
white oak	Quercus alba	QUAL
scarlet oak	Quercus coccinea	QUCO2
pin oak	Quercus palustris	QUPA2
chestnut oak	Quercus prinus	QUPR2
northern red oak	Quercus rubra	QURU
black oak	Quercus velutina	QUVE
rhododendron	Rhododendron	RHODO
multiflora rose	Rosa multiflora	ROMU
black locust	Robinia pseudoacacia	ROPS
blackberry	Rubus	RUBUS
sassafras	Sassafras albidum	SAAL5
common elderberry	Sambucus nigra ssp. canadensis	SANIC4
greenbrier	Smilax rotundifolia	SMRO
New York fern	Thelypteris noveboracensis	THNO
American basswood	Tilia americana	TIAM
basswood	Tilia	TILIA
eastern poison ivy	Toxicodendron radicans	TORA2
trillium	Trillium	TRILL
eastern hemlock	Tsuga canadensis	TSCA
navel lichen	Umbilicaria mammulata	UMMA60
perennial grasses	unknown scientific name	UNKNOWN
blueberry	Vaccinium	VACCI
Blue Ridge blueberry	Vaccinium pallidum	VAPA4
mapleleaf viburnum	Viburnum acerifolium	VIAC
vetch	Vicia	VICIA
riverbank grape	Vitis riparia	VIRI

Table 12.—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
AgC:							
Allegheny	80	Well suited		Moderately suited		Severe	
				Slope	0.50	Low strength	1.00
BhG:							
Berks	35	Moderately suited		Unsuited		Slight	
		Slope	0.50	Slope	1.00	Strength	0.10
				Rock fragments	0.50		
Highsplint	30	Moderately suited		Unsuited		Slight	
		Slope	0.50	Slope	1.00	Strength	0.10
				Rock fragments	0.50		
Sharondale	20	Moderately suited		Unsuited		Slight	
		Slope	0.50	Slope	1.00	Strength	0.10
				Rock fragments	0.50		
BuC:							
Buchanan	80	Well suited		Moderately suited		Severe	
				Slope	0.50	Low strength	1.00
				Rock fragments	0.50		
ClB:							
Clifftop	80	Well suited		Moderately suited		Severe	
				Slope	0.50	Low strength	1.00
ClC:							
Clifftop	80	Well suited		Moderately suited		Severe	
				Slope	0.50	Low strength	1.00
ClD:							
Clifftop	75	Well suited		Poorly suited		Severe	
				Slope	0.75	Low strength	1.00
ClE:							
Clifftop	70	Well suited		Unsuited		Severe	
				Slope	1.00	Low strength	1.00
CmC:							
Clifftop	75	Well suited		Moderately suited		Severe	
				Rock fragments	0.50	Low strength	1.00
				Slope	0.50		
CwB:							
Cottonbend	90	Well suited		Moderately suited		Severe	
				Slope	0.50	Low strength	1.00
CwC:							
Cottonbend	90	Well suited		Moderately suited		Severe	
				Slope	0.50	Low strength	1.00
DkC:							
Dekalb	80	Moderately suited		Poorly suited		Moderate	
		Rock fragments	0.50	Rock fragments	0.75	Low strength	0.50
				Slope	0.50		

Table 12.—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
DrE:							
Dekalb	55	Moderately suited		Poorly suited		Moderate	
		Rock fragments	0.50	Slope	0.75	Low strength	0.50
				Rock fragments	0.75		
Rock outcrop	15	Not rated		Not rated		Not rated	
FeB:							
Fenwick	85	Well suited		Moderately suited		Severe	
				Slope	0.50	Low strength	1.00
FeC:							
Fenwick	85	Well suited		Moderately suited		Severe	
				Slope	0.50	Low strength	1.00
HgE:							
Highsplint	70	Well suited		Poorly suited		Slight	
				Slope	0.75	Strength	0.10
				Rock fragments	0.50		
LaC:							
Laidig	70	Poorly suited		Unsuited		Moderate	
		Rock fragments	0.75	Rock fragments	1.00	Low strength	0.50
				Slope	0.50		
LbC:							
Laidig	75	Unsuited		Unsuited		Moderate	
		Rock fragments	1.00	Rock fragments	1.00	Low strength	0.50
				Slope	0.50		
LcE:							
Laidig	45	Well suited		Poorly suited		Moderate	
				Slope	0.75	Low strength	0.50
				Rock fragments	0.50		
Clifftop	25	Well suited		Poorly suited		Severe	
				Slope	0.75	Low strength	1.00
				Rock fragments	0.50		
LdF:							
Layland	60	Moderately suited		Unsuited		Moderate	
		Slope	0.50	Slope	1.00	Low strength	0.50
				Rock fragments	0.50		
Clifftop	20	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
				Rock fragments	0.50		
LhE:							
Layland	60	Poorly suited		Unsuited		Moderate	
		Rock fragments	0.75	Rock fragments	1.00	Low strength	0.50
				Slope	0.75		
Laidig	25	Poorly suited		Unsuited		Moderate	
		Rock fragments	0.75	Rock fragments	1.00	Low strength	0.50
				Slope	0.75		

Table 12.—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
LkE:							
Layland	55	Unsuited		Unsuited		Moderate	
		Rock fragments	1.00	Rock fragments	1.00	Low strength	0.50
				Slope	0.75		
Laidig	30	Unsuited		Unsuited		Moderate	
		Rock fragments	1.00	Rock fragments	1.00	Low strength	0.50
				Slope	0.75		
LmF:							
Layland	60	Unsuited		Unsuited		Moderate	
		Rock fragments	1.00	Slope	1.00	Low strength	0.50
		Slope	0.50	Rock fragments	1.00		
Rock outcrop	10	Not rated		Not rated		Not rated	
LuC:							
Lithic Udorthents, leveled land	85	Not rated		Not rated		Not rated	
LxG:							
Lithic Udorthents, cut land	50	Not rated		Not rated		Not rated	
Rock outcrop	40	Not rated		Not rated		Not rated	
NaB:							
Nallen	80	Well suited		Moderately suited		Severe	
				Slope	0.50	Low strength	1.00
NaC:							
Nallen	75	Well suited		Moderately suited		Severe	
				Slope	0.50	Low strength	1.00
NaD:							
Nallen	75	Well suited		Poorly suited		Severe	
				Slope	0.75	Low strength	1.00
PsA:							
Pope, rarely flooded	85	Well suited		Well suited		Moderate	
						Low strength	0.50
PvA:							
Pope, occasionally flooded	50	Well suited		Well suited		Moderate	
						Low strength	0.50
Craigsville, occasionally flooded	30	Well suited		Moderately suited		Moderate	
				Rock fragments	0.50	Low strength	0.50
Rw:							
Riverwash, frequently flooded	95	Not rated		Not rated		Not rated	
ThB:							
Typic Haplorthods, rarely flooded	80	Poorly suited		Unsuited		Moderate	
		Rock fragments	0.75	Rock fragments	1.00	Low strength	0.50

Table 12.—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
UgC:							
Udorthents, graded--	85	Not rated		Not rated		Not rated	
UgF:							
Udorthents, graded--	85	Not rated		Not rated		Not rated	
Ur:							
Udorthents, railroad grade-----	93	Not rated		Not rated		Not rated	
Uu:							
Udorthents, highways	70	Not rated		Not rated		Not rated	
Urban land, highways	25	Not rated		Not rated		Not rated	
W:							
Water----------	100	Not rated		Not rated		Not rated	
Wr:							
Water----------	75	Not rated		Not rated		Not rated	
Rubble land, frequently flooded-	25	Not rated		Not rated		Not rated	

Table 12.—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
AgC:							
Allegheny	80	Moderate		Severe		Moderately suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
						Landslides	0.07
BhG:							
Berks	35	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
Highsplint	30	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
Sharondale	20	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
BuC:							
Buchanan	80	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
						Wetness	0.50
						Landslides	0.21
ClB:							
Clifftop	80	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Landslides	0.01
ClC:							
Clifftop	80	Moderate		Severe		Moderately suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
						Landslides	0.07
ClD:							
Clifftop	75	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.15
ClE:							
Clifftop	70	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Landslides	0.60
						Low strength	0.50
CmC:							
Clifftop	75	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
						Landslides	0.04

Table 12.—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
CwB:							
Cottonbend	90	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
CwC:							
Cottonbend	90	Moderate		Severe		Moderately suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
						Landslides	0.07
DkC:							
Dekalb	80	Slight		Slight		Moderately suited	
						Slope	0.50
						Rock fragments	0.50
						Landslides	0.04
DrE:							
Dekalb	55	Moderate		Moderate		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.50	Slope	1.00
						Landslides	0.60
						Rock fragments	0.50
Rock outcrop	15	Not rated		Not rated		Not rated	
FeB:							
Fenwick	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
						Wetness	0.50
						Landslides	0.01
FeC:							
Fenwick	85	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
						Wetness	0.50
						Landslides	0.21
HgE:							
Highsplint	70	Moderate		Moderate		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.50	Slope	1.00
						Landslides	1.00
LaC:							
Laidig	70	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Rock fragments	1.00
						Slope	0.50
						Low strength	0.50
						Landslides	0.12
LbC:							
Laidig	75	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Rock fragments	1.00
						Slope	0.50
						Low strength	0.50
						Landslides	0.21

Table 12.—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
LcE:							
Laidig	45	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Low strength	0.50
Clifftop	25	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	0.60
						Low strength	0.50
LdF:							
Layland	60	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
Clifftop	20	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Low strength	0.50
LhE:							
Layland	60	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Rock fragments	1.00
						Landslides	1.00
Laidig	25	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Rock fragments	1.00
						Landslides	1.00
						Low strength	0.50
LkE:							
Layland	55	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Rock fragments	1.00
						Landslides	0.60
Laidig	30	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Rock fragments	1.00
						Landslides	1.00
						Low strength	0.50
LmF:							
Layland	60	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Rock fragments	1.00
						Landslides	1.00
Rock outcrop	10	Not rated		Not rated		Not rated	
LuC:							
Lithic Udorthents, leveled land	85	Not rated		Not rated		Not rated	

Table 12.—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
LxG:							
Lithic Udorthents, cut land	50	Not rated		Not rated		Not rated	
Rock outcrop	40	Not rated		Not rated		Not rated	
NaB:							
Nallen	80	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
						Landslides	0.01
NaC:							
Nallen	75	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
						Landslides	0.07
NaD:							
Nallen	75	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.15
PsA:							
Pope, rarely flooded	85	Slight		Slight		Well suited	
PvA:							
Pope, occasionally flooded	50	Slight		Slight		Poorly suited	
						Flooding	1.00
Craigsville, occasionally flooded	30	Slight		Slight		Poorly suited	
						Flooding	1.00
Rw:							
Riverwash, frequently flooded	95	Not rated		Not rated		Not rated	
ThB:							
Typic Haplorthods, rarely flooded	80	Slight		Slight		Poorly suited	
						Rock fragments	1.00
UgC:							
Udorthents, graded	85	Not rated		Not rated		Not rated	
UgF:							
Udorthents, graded	85	Not rated		Not rated		Not rated	
Ur:							
Udorthents, railroad grade	93	Not rated		Not rated		Not rated	
Uu:							
Udorthents, highways	70	Not rated		Not rated		Not rated	
Urban land, highways	25	Not rated		Not rated		Not rated	

Table 12.—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
W:							
Water	100	Not rated		Not rated		Not rated	
Wr:							
Water	75	Not rated		Not rated		Not rated	
Rubble land, frequently flooded	25	Not rated		Not rated		Not rated	

Table 12.—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
AgC:					
Allegheny	80	Well suited		Well suited	
BhG:					
Berks	35	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
Highsplint	30	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
Sharondale	20	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
BuC:					
Buchanan	80	Well suited		Well suited	
ClB:					
Clifftop	80	Well suited		Well suited	
ClC:					
Clifftop	80	Well suited		Well suited	
ClD:					
Clifftop	75	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
ClE:					
Clifftop	70	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
CmC:					
Clifftop	75	Well suited		Well suited	
CwB:					
Cottonbend	90	Well suited		Well suited	
CwC:					
Cottonbend	90	Well suited		Well suited	
DkC:					
Dekalb	80	Poorly suited		Poorly suited	
		Restrictive layer	0.50	Rock fragments	0.50
		Rock fragments	0.50		
DrE:					
Dekalb	55	Poorly suited		Poorly suited	
		Restrictive layer	0.50	Slope	0.50
		Slope	0.50	Rock fragments	0.50
		Rock fragments	0.50		
Rock outcrop	15	Not rated		Not rated	
FeB:					
Fenwick	85	Well suited		Well suited	

Table 12.—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
FeC:					
Fenwick	85	Well suited		Well suited	
HgE:					
Highsplint	70	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
LaC:					
Laidig	70	Unsuited		Unsuited	
		Rock fragments	1.00	Rock fragments	1.00
LbC:					
Laidig	75	Unsuited		Unsuited	
		Rock fragments	1.00	Rock fragments	1.00
LcE:					
Laidig	45	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
Clifftop	25	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
LdF:					
Layland	60	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
Clifftop	20	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
LhE:					
Layland	60	Unsuited		Unsuited	
		Rock fragments	1.00	Rock fragments	1.00
		Slope	0.50	Slope	0.50
Laidig	25	Unsuited		Unsuited	
		Rock fragments	1.00	Rock fragments	1.00
		Slope	0.50	Slope	0.50
LkE:					
Layland	55	Unsuited		Unsuited	
		Rock fragments	1.00	Rock fragments	1.00
		Slope	0.50	Slope	0.50
Laidig	30	Unsuited		Unsuited	
		Rock fragments	1.00	Rock fragments	1.00
		Slope	0.50	Slope	0.50
LmF:					
Layland	60	Unsuited		Unsuited	
		Rock fragments	1.00	Rock fragments	1.00
		Slope	1.00	Slope	1.00
Rock outcrop	10	Not rated		Not rated	
LuC:					
Lithic Udorthents, leveled land	85	Not rated		Not rated	
LxG:					
Lithic Udorthents, cut land	50	Not rated		Not rated	
Rock outcrop	40	Not rated		Not rated	

Table 12.—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
NaB:					
Nallen	80	Poorly suited		Well suited	
		Restrictive layer	0.50		
NaC:					
Nallen	75	Poorly suited		Well suited	
		Restrictive layer	0.50		
NaD:					
Nallen	75	Poorly suited		Poorly suited	
		Restrictive layer	0.50	Slope	0.50
		Slope	0.50		
PsA:					
Pope, rarely flooded	85	Well suited		Well suited	
PvA:					
Pope, occasionally flooded	50	Well suited		Well suited	
Craigsville, occasionally flooded	30	Well suited		Well suited	
Rw:					
Riverwash, frequently flooded	95	Not rated		Not rated	
ThB:					
Typic Haplorthods, rarely flooded	80	Unsuited		Unsuited	
		Rock fragments	1.00	Rock fragments	1.00
UgC:					
Udorthents, graded	85	Not rated		Not rated	
UgF:					
Udorthents, graded	85	Not rated		Not rated	
Ur:					
Udorthents, railroad grade	93	Not rated		Not rated	
Uu:					
Udorthents, highways	70	Not rated		Not rated	
Urban land, highways	25	Not rated		Not rated	
W:					
Water	100	Not rated		Not rated	
Wr:					
Water	75	Not rated		Not rated	
Rubble land, frequently flooded	25	Not rated		Not rated	

Table 12.—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
AgC:					
Allegheny	80	Low Texture/rock fragments	0.10	Moderate Soil reaction	0.50
BhG:					
Berks	35	Low		Moderate Available water	0.50
Highsplint	30	Low		Moderate Available water	0.50
Sharondale	20	Low Texture/rock fragments	0.10	Low	
BuC:					
Buchanan	80	Low Texture/rock fragments	0.10	Moderate Soil reaction	0.50
ClB:					
Clifftop	80	Moderate Texture/surface depth/rock fragments	0.50	Low	
ClC:					
Clifftop	80	Moderate Texture/surface depth/rock fragments	0.50	Low	
ClD:					
Clifftop	75	Moderate Texture/surface depth/rock fragments	0.50	Moderate Available water	0.50
ClE:					
Clifftop	70	Moderate Texture/slope/surface depth/rock fragments	0.50	Moderate Available water	0.50
CmC:					
Clifftop	75	Moderate Texture/surface depth/rock fragments	0.50	Low	

Table 12.—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
CwB:					
Cottonbend	90	Moderate		Low	
		Texture/surface depth/rock fragments	0.50		
CwC:					
Cottonbend	90	Moderate		Low	
		Texture/surface depth/rock fragments	0.50		
DkC:					
Dekalb	80	Moderate		Moderate	
		Texture/surface depth/rock fragments	0.50	Soil reaction	0.50
DrE:					
Dekalb	55	Moderate		Moderate	
		Texture/surface depth/rock fragments	0.50	Soil reaction	0.50
				Available water	0.50
Rock outcrop	15	Not rated		Not rated	
FeB:					
Fenwick	85	Moderate		High	
		Texture/surface depth/rock fragments	0.50	Wetness	1.00
				Soil reaction	0.50
FeC:					
Fenwick	85	Moderate		High	
		Texture/surface depth/rock fragments	0.50	Wetness	1.00
				Soil reaction	0.50
HgE:					
Highsplint	70	Low		Moderate	
		Texture/rock fragments	0.10	Available water	0.50
LaC:					
Laidig	70	Moderate		Moderate	
		Texture/surface depth/rock fragments	0.50	Soil reaction	0.50
LbC:					
Laidig	75	Moderate		Moderate	
		Texture/surface depth/rock fragments	0.50	Soil reaction	0.50
LcE:					
Laidig	45	Moderate		Moderate	
		Texture/surface depth/rock fragments	0.50	Soil reaction	0.50
				Available water	0.50

Table 12.—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
LcE:					
Clifftop	25	Moderate Texture/surface depth/rock fragments	0.50	Moderate Available water	0.50
LdF:					
Layland	60	Moderate Texture/slope/surface depth/rock fragments	0.50	Moderate Available water Soil reaction	0.50 0.50
Clifftop	20	Moderate Texture/slope/surface depth/rock fragments	0.50	Moderate Available water	0.50
LhE:					
Layland	60	Moderate Texture/surface depth/rock fragments	0.50	Moderate Soil reaction Available water	0.50 0.50
Laidig	25	Moderate Texture/surface depth/rock fragments	0.50	Moderate Soil reaction Available water	0.50 0.50
LkE:					
Layland	55	Moderate Texture/surface depth/rock fragments	0.50	Moderate Soil reaction Available water	0.50 0.50
Laidig	30	Moderate Texture/surface depth/rock fragments	0.50	Moderate Soil reaction Available water	0.50 0.50
LmF:					
Layland	60	Moderate Texture/slope/surface depth/rock fragments	0.50	Moderate Available water Soil reaction	0.50 0.50
Rock outcrop	10	Not rated		Not rated	
LuC:					
Lithic Udorthents, leveled land	85	Not rated		Not rated	
LxG:					
Lithic Udorthents, cut land	50	Not rated		Not rated	
Rock outcrop	40	Not rated		Not rated	
NaB:					
Nallen	80	Moderate Texture/surface depth/rock fragments	0.50	Moderate Soil reaction	0.50

Table 12.—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
NaC:					
Nallen	75	Moderate		Moderate	
		Texture/surface depth/rock fragments	0.50	Soil reaction	0.50
NaD:					
Nallen	75	Moderate		Moderate	
		Texture/surface depth/rock fragments	0.50	Soil reaction	0.50
				Available water	0.50
PsA:					
Pope, rarely flooded	85	Low		High	
		Texture/rock fragments	0.10	Wetness	1.00
				Soil reaction	0.50
PvA:					
Pope, occasionally flooded	50	Low		High	
		Texture/rock fragments	0.10	Wetness	1.00
				Soil reaction	0.50
Craigsville, occasionally flooded	30	Moderate		High	
		Texture/rock fragments	0.50	Wetness	1.00
				Soil reaction	0.50
Rw:					
Riverwash, frequently flooded	95	Not rated		Not rated	
ThB:					
Typic Haplorthods, rarely flooded	80	Moderate		High	
		Texture/surface depth/rock fragments	0.50	Wetness	1.00
				Soil reaction	0.50
UgC:					
Udorthents, graded	85	Not rated		Not rated	
UgF:					
Udorthents, graded	85	Not rated		Not rated	
Ur:					
Udorthents, railroad grade	93	Not rated		Not rated	
Uu:					
Udorthents, highways	70	Not rated		Not rated	
Urban land, highways	25	Not rated		Not rated	
W:					
Water	100	Not rated		Not rated	
Wr:					
Water	75	Not rated		Not rated	
Rubble land, frequently flooded	25	Not rated		Not rated	

Table 13.—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	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
AgC:					
Allegheny	80	Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63
BhG:					
Berks	35	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Large stones content	0.47	Large stones content	0.47
Highsplint	30	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Large stones content	0.47	Large stones content	0.47
Sharondale	20	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Large stones content	0.47	Large stones content	0.47
BuC:					
Buchanan	80	Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63
		Depth to saturated zone	0.39	Depth to saturated zone	0.19
ClB:					
Clifftop	80	Not limited		Not limited	
ClC:					
Clifftop	80	Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63
ClD:					
Clifftop	75	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
ClE:					
Clifftop	70	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
CmC:					
Clifftop	75	Somewhat limited		Somewhat limited	
		Large stones content	0.47	Large stones content	0.47
		Slope	0.04	Slope	0.04
CwB:					
Cottonbend	90	Not limited		Not limited	
CwC:					
Cottonbend	90	Somewhat limited	0.63	Somewhat limited	0.63
		Slope		Slope	

Table 13.—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	Value	Picnic areas: Rating class and limiting features	Value
DkC:					
Dekalb	80	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	0.04	Slope	0.04
DrE:					
Dekalb	55	Very limited		Very limited	
		Too steep	1.00	Large stones content	1.00
		Large stones content	1.00	Too steep	1.00
Rock outcrop	15	Not rated		Not rated	
FeB:					
Fenwick	85	Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.95	Depth to saturated zone	0.68
		Slow water movement	0.26	Slow water movement	0.26
FeC:					
Fenwick	85	Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.95	Depth to saturated zone	0.68
		Slope	0.63	Slope	0.63
		Slow water movement	0.26	Slow water movement	0.26
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
LaC:					
Laidig	70	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	0.04	Slope	0.04
LbC:					
Laidig	75	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	0.63	Slope	0.63
LcE:					
Laidig	45	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Large stones content	0.47	Large stones content	0.47
Clifftop	25	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Large stones content	0.47	Large stones content	0.47

Table 13.—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	Value	Picnic areas: Rating class and limiting features	Value
LdF:					
Layland	60	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Large stones content	0.47	Large stones content	0.47
Clifftop	20	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Large stones content	0.47	Large stones content	0.47
LhE:					
Layland	60	Very limited		Very limited	
		Too steep	1.00	Large stones content	1.00
		Large stones content	1.00	Too steep	1.00
Laidig	25	Very limited		Very limited	
		Too steep	1.00	Large stones content	1.00
		Large stones content	1.00	Too steep	1.00
LkE:					
Layland	55	Very limited		Very limited	
		Too steep	1.00	Large stones content	1.00
		Large stones content	1.00	Too steep	1.00
Laidig	30	Very limited		Very limited	
		Too steep	1.00	Large stones content	1.00
		Large stones content	1.00	Too steep	1.00
LmF:					
Layland	60	Very limited		Very limited	
		Too steep	1.00	Large stones content	1.00
		Large stones content	1.00	Too steep	1.00
Rock outcrop	10	Not rated		Not rated	
LuC:					
Lithic Udorthents, leveled land	85	Not rated		Not rated	
LxG:					
Lithic Udorthents, cut land	50	Not rated		Not rated	
Rock outcrop	40	Not rated		Not rated	
NaB:					
Nallen	80	Not limited		Not limited	
NaC:					
Nallen	75	Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63
NaD:					
Nallen	75	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00

Table 13.—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
PsA:					
Pope, rarely flooded	85	Very limited		Not limited	
		Flooding	1.00		
PvA:					
Pope, occasionally flooded	50	Very limited		Not limited	
		Flooding	1.00		
Craigsville, occasionally flooded	30	Very limited		Not limited	
		Flooding	1.00		
Rw:					
Riverwash, frequently flooded	95	Not rated		Not rated	
ThB:					
Typic Haplorthods, rarely flooded	80	Very limited		Very limited	
		Flooding	1.00	Large stones content	1.00
		Large stones content	1.00		
UgC:					
Udorthents, graded	85	Not rated		Not rated	
UgF:					
Udorthents, graded	85	Not rated		Not rated	
Ur:					
Udorthents, railroad grade	93	Not rated		Not rated	
Uu:					
Udorthents, highways	70	Not rated		Not rated	
Urban land, highways	25	Not rated		Not rated	
W:					
Water	100	Not rated		Not rated	
Wr:					
Water	75	Not rated		Not rated	
Rubble land, frequently flooded	25	Not rated		Not rated	

Table 13.—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
AgC:					
Allegheny	80	Very limited Water erosion	1.00	Very limited Water erosion	1.00
BhG:					
Berks	35	Very limited Slope Large stones content	1.00 0.47	Very limited Slope Large stones content	1.00 0.47
Highsplint	30	Very limited Slope Large stones content	1.00 0.47	Very limited Slope Large stones content	1.00 0.47
Sharondale	20	Very limited Slope Large stones content	1.00 0.47	Very limited Slope Large stones content	1.00 0.47
BuC:					
Buchanan	80	Not limited		Not limited	
ClB:					
Clifftop	80	Not limited		Not limited	
ClC:					
Clifftop	80	Not limited		Not limited	
ClD:					
Clifftop	75	Somewhat limited Slope	0.50	Not limited	
ClE:					
Clifftop	70	Very limited Slope	1.00	Somewhat limited Slope	0.22
CmC:					
Clifftop	75	Somewhat limited Large stones content	0.47	Somewhat limited Large stones content	0.47
CwB:					
Cottonbend	90	Not limited		Not limited	
CwC:					
Cottonbend	90	Very limited Water erosion	1.00	Very limited Water erosion	1.00
DkC:					
Dekalb	80	Very limited Large stones content	1.00	Very limited Large stones content	1.00

Table 13.—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
DrE:					
Dekalb	55	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	1.00		
Rock outcrop	15	Not rated		Not rated	
FeB:					
Fenwick	85	Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.32	Depth to saturated zone	0.32
FeC:					
Fenwick	85	Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00
		Depth to saturated zone	0.32	Depth to saturated zone	0.32
HgE:					
Highsplint	70	Very limited		Somewhat limited	
		Slope	1.00	Large stones content	0.47
		Large stones content	0.47		
LaC:					
Laidig	70	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
LbC:					
Laidig	75	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
LcE:					
Laidig	45	Very limited		Somewhat limited	
		Slope	1.00	Large stones content	0.47
		Large stones content	0.47		
Clifftop	25	Very limited		Somewhat limited	
		Slope	1.00	Large stones content	0.47
		Large stones content	0.47		
LdF:					
Layland	60	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.47	Large stones content	0.47
Clifftop	20	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.47	Large stones content	0.47

Table 13.—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
LhE:					
Layland	60	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	1.00		
Laidig	25	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	1.00		
LkE:					
Layland	55	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	1.00		
Laidig	30	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	1.00		
LmF:					
Layland	60	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	1.00	Slope	1.00
Rock outcrop	10	Not rated		Not rated	
LuC:					
Lithic Udorthents, leveled land	85	Not rated		Not rated	
LxG:					
Lithic Udorthents, cut land	50	Not rated		Not rated	
Rock outcrop	40	Not rated		Not rated	
NaB:					
Nallen	80	Not limited		Not limited	
NaC:					
Nallen	75	Not limited		Not limited	
NaD:					
Nallen	75	Somewhat limited		Not limited	
		Slope	0.50		
PsA:					
Pope, rarely flooded	85	Not limited		Not limited	
PvA:					
Pope, occasionally flooded	50	Not limited		Not limited	
Craigsville, occasionally flooded	30	Not limited		Not limited	

Table 13.—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
Rw:					
Riverwash, frequently flooded	95	Not rated		Not rated	
ThB:					
Typic Haplorthods, rarely flooded	80	Very limited Large stones content	1.00	Very limited Large stones content	1.00
UgC:					
Udorthents, graded	85	Not rated		Not rated	
UgF:					
Udorthents, graded	85	Not rated		Not rated	
Ur:					
Udorthents, railroad grade	93	Not rated		Not rated	
Uu:					
Udorthents, highways	70	Not rated		Not rated	
Urban land, highways	25	Not rated		Not rated	
W:					
Water	100	Not rated		Not rated	
Wr:					
Water	75	Not rated		Not rated	
Rubble land, frequently flooded	25	Not rated		Not rated	

Table 14.—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
AgC:							
Allegheny	80	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
BhG:							
Berks	35	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
				Depth to hard bedrock	1.00		
Highsplint	30	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
Sharondale	20	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
BuC:							
Buchanan	80	Somewhat limited		Very limited		Very limited	
		Slope	0.63	Depth to saturated zone	1.00	Slope	1.00
		Depth to thin cemented pan	0.50	Slope	0.63	Depth to saturated zone	0.39
		Depth to saturated zone	0.39				
ClB:							
Clifftop	80	Not limited		Somewhat limited		Somewhat limited	
				Depth to soft bedrock	0.10	Slope	0.28
ClC:							
Clifftop	80	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
				Depth to soft bedrock	0.10		
ClD:							
Clifftop	75	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
				Depth to soft bedrock	0.10		
ClE:							
Clifftop	70	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
				Depth to soft bedrock	0.10		
CmC:							
Clifftop	75	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.04	Depth to soft bedrock	0.10	Slope	1.00
				Slope	0.04		

Table 14.—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
CwB:							
Cottonbend	90	Not limited		Not limited		Somewhat limited	
						Slope	0.12
CwC:							
Cottonbend	90	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
DkC:							
Dekalb	80	Somewhat limited		Very limited		Very limited	
		Depth to hard bedrock	0.32	Depth to hard bedrock	1.00	Slope	1.00
						Depth to hard bedrock	0.32
		Large stones	0.14	Large stones	0.14		0.14
		Slope	0.04	Slope	0.04	Large stones	
DrE:							
Dekalb	55	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Depth to hard bedrock	0.32	Depth to hard bedrock	1.00	Depth to hard bedrock	0.32
		Large stones	0.14	Large stones	0.14	Large stones	0.14
Rock outcrop	15	Not rated		Not rated		Not rated	
FeB:							
Fenwick	85	Somewhat limited		Very limited		Somewhat limited	
		Depth to saturated zone	0.95	Depth to saturated zone	1.00	Depth to saturated zone	0.95
				Depth to hard bedrock	1.00	Slope	0.50
FeC:							
Fenwick	85	Somewhat limited		Very limited		Very limited	
		Depth to saturated zone	0.95	Depth to saturated zone	1.00	Slope	1.00
		Slope	0.63	Depth to hard bedrock	1.00	Depth to saturated zone	0.95
				Slope	0.63		
HgE:							
Highsplint	70	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
LaC:							
Laidig	70	Somewhat limited		Very limited		Very limited	
		Depth to thin cemented pan	0.50	Depth to saturated zone	1.00	Slope	1.00
		Slope	0.04	Slope	0.04		
LbC:							
Laidig	75	Somewhat limited		Very limited		Very limited	
		Slope	0.63	Depth to saturated zone	1.00	Slope	1.00
		Depth to thin cemented pan	0.50	Slope	0.63		
LcE:							
Laidig	45	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Depth to thin cemented pan	0.50	Depth to saturated zone	1.00		

Table 14.—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
LcE:							
Clifftop	25	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
				Depth to soft bedrock	0.10		
LdF:							
Layland	60	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
Clifftop	20	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
				Depth to soft bedrock	0.10		
LhE:							
Layland	60	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
Laidig	25	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Depth to thin cemented pan	0.50	Depth to saturated zone	1.00		
LkE:							
Layland	55	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
Laidig	30	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Depth to thin cemented pan	0.50	Depth to saturated zone	1.00		
LmF:							
Layland	60	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
Rock outcrop	10	Not rated		Not rated		Not rated	
LuC:							
Lithic Udorthents, leveled land	85	Not rated		Not rated		Not rated	
LxG:							
Lithic Udorthents, cut land	50	Not rated		Not rated		Not rated	
Rock outcrop	40	Not rated		Not rated		Not rated	
NaB:							
Nallen	80	Somewhat limited		Very limited		Somewhat limited	
		Depth to hard bedrock	0.15	Depth to hard bedrock	1.00	Slope	0.50
						Depth to hard bedrock	0.15
NaC:							
Nallen	75	Somewhat limited		Very limited		Very limited	
		Slope	0.63	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.15	Slope	0.63	Depth to hard bedrock	0.15

Table 14.—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
NaD:							
Nallen	75	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
PsA:							
Pope, rarely flooded	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
PvA:							
Pope, occasionally flooded	50	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
Craigsville, occasionally flooded	30	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.35		
Rw:							
Riverwash, frequently flooded	95	Not rated		Not rated		Not rated	
ThB:							
Typic Haplorthods, rarely flooded	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Large stones	0.73	Large stones	0.73	Large stones	0.73
UgC:							
Udorthents, graded	85	Not rated		Not rated		Not rated	
UgF:							
Udorthents, graded	85	Not rated		Not rated		Not rated	
Ur:							
Udorthents, railroad grade	93	Not rated		Not rated		Not rated	
Uu:							
Udorthents, highways	70	Not rated		Not rated		Not rated	
Urban land, highways	25	Not rated		Not rated		Not rated	
W:							
Water	100	Not rated		Not rated		Not rated	
Wr:							
Water	75	Not rated		Not rated		Not rated	
Rubble land, frequently flooded	25	Not rated		Not rated		Not rated	

Table 15.—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
AgC:							
Allegheny	80	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Unstable excavation walls	0.10		
BhG:							
Berks	35	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	0.51
				Unstable excavation walls	0.10	Large stones	0.20
Highsplint	30	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
Sharondale	20	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
BuC:							
Buchanan	80	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.63	Depth to saturated zone	1.00	Slope	0.63
		Frost action	0.50	Slope	0.63	Depth to saturated zone	0.19
		Depth to saturated zone	0.19	Unstable excavation walls	0.10		
ClB:							
Clifftop	80	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.10	Depth to bedrock	0.10
				Unstable excavation walls	0.10		
ClC:							
Clifftop	80	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Depth to soft bedrock	0.10	Depth to bedrock	0.10
				Unstable excavation walls	0.10		
ClD:							
Clifftop	75	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	0.10	Depth to bedrock	0.10
				Unstable excavation walls	0.10		

Table 15.—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
ClE:							
Clifftop	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	0.10	Depth to bedrock	0.10
				Unstable excavation walls	0.10		
CmC:							
Clifftop	75	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.10	Large stones	0.20
		Slope	0.04	Unstable excavation walls	0.10	Depth to bedrock	0.10
				Slope	0.04	Slope	0.04
CwB:							
Cottonbend	90	Somewhat limited		Somewhat limited		Not limited	
		Low strength	0.78	Unstable excavation walls	0.10		
		Frost action	0.50				
CwC:							
Cottonbend	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Low strength	0.78	Slope	0.63	Slope	0.63
		Slope	0.63	Unstable excavation walls	0.10		
		Frost action	0.50				
DkC:							
Dekalb	80	Somewhat limited		Very limited		Very limited	
		Frost action	0.50	Depth to hard bedrock	1.00	Large stones	1.00
		Depth to hard bedrock	0.32	Large stones	0.14	Droughty	0.32
		Large stones	0.14	Unstable excavation walls	0.10	Depth to bedrock	0.32
		Slope	0.04	Slope	0.04	Slope	0.04
DrE:							
Dekalb	55	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	Large stones	1.00
		Depth to hard bedrock	0.32	Large stones	0.14	Depth to bedrock	0.32
		Large stones	0.14	Unstable excavation walls	0.10	Droughty	0.32
Rock outcrop	15	Not rated		Not rated		Not rated	
FeB:							
Fenwick	85	Somewhat limited		Very limited		Somewhat limited	
		Low strength	0.78	Depth to hard bedrock	1.00	Depth to saturated zone	0.68
		Depth to saturated zone	0.68	Depth to saturated zone	1.00		
		Frost action	0.50	Unstable excavation walls	0.10		

Table 15.—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
FeC:							
Fenwick	85	Somewhat limited		Very limited		Somewhat limited	
		Low strength	0.78	Depth to hard bedrock	1.00	Depth to saturated zone	0.68
		Depth to saturated zone	0.68	Depth to saturated zone	1.00	Slope	0.63
		Slope	0.63	Slope	0.63		
		Frost action	0.50	Unstable excavation walls	0.10		
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
LaC:							
Laidig	70	Somewhat limited		Very limited		Very limited	
		Frost action	0.50	Depth to saturated zone	1.00	Large stones	1.00
		Slope	0.04	Unstable excavation walls	1.00	Slope	0.04
				Slope	0.04		
LbC:							
Laidig	75	Somewhat limited		Very limited		Very limited	
		Slope	0.63	Depth to saturated zone	1.00	Large stones	1.00
		Frost action	0.50	Unstable excavation walls	1.00	Slope	0.63
				Slope	0.63		
LcE:							
Laidig	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 saturated zone	1.00	Large stones	0.20
				Unstable excavation walls	1.00		
Clifftop	25	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	0.10	Large stones	0.20
				Unstable excavation walls	0.10	Depth to bedrock	0.10
LdF:							
Layland	60	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	1.00	Large stones	0.20
Clifftop	20	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	0.10	Large stones	0.20
				Unstable excavation walls	0.10	Depth to bedrock	0.10

Table 15.—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
LhE:							
Layland	60	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	1.00	Large stones	1.00
Laidig	25	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Frost action	0.50	Depth to saturated zone	1.00	Large stones	1.00
				Unstable excavation walls	1.00		
LkE:							
Layland	55	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	1.00	Large stones	1.00
Laidig	30	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Frost action	0.50	Depth to saturated zone	1.00	Large stones	1.00
				Unstable excavation walls	1.00		
LmF:							
Layland	60	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	1.00	Large stones	1.00
Rock outcrop	10	Not rated		Not rated		Not rated	
LuC:							
Lithic Udorthents, leveled land	85	Not rated		Not rated		Not rated	
LxG:							
Lithic Udorthents, cut land	50	Not rated		Not rated		Not rated	
Rock outcrop	40	Not rated		Not rated		Not rated	
NaB:							
Nallen	80	Somewhat limited		Very limited		Somewhat limited	
		Frost action	0.50	Depth to hard bedrock	1.00	Depth to bedrock	0.16
		Depth to hard bedrock	0.15	Unstable excavation walls	0.10		
NaC:							
Nallen	75	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.63	Depth to hard bedrock	1.00	Slope	0.63
		Frost action	0.50	Slope	0.63	Depth to bedrock	0.16
		Depth to hard bedrock	0.15	Unstable excavation walls	0.10		

Table 15.—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
NaD:							
Nallen	75	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	Depth to bedrock	0.16
		Depth to hard bedrock	0.15	Unstable excavation walls	0.10		
PsA:							
Pope, rarely flooded	85	Somewhat limited		Very limited		Not limited	
		Frost action	0.50	Unstable excavation walls	1.00		
		Flooding	0.40				
PvA:							
Pope, occasionally flooded	50	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Unstable excavation walls	1.00	Flooding	0.60
		Frost action	0.50	Flooding	0.60		
Craigsville, occasionally flooded	30	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Unstable excavation walls	1.00	Flooding	0.60
		Frost action	0.50	Flooding	0.60	Droughty	0.28
				Depth to saturated zone	0.35		
Rw:							
Riverwash, frequently flooded	95	Not rated		Not rated		Not rated	
ThB:							
Typic Haplorthods, rarely flooded	80	Somewhat limited		Very limited		Very limited	
		Large stones	0.73	Unstable excavation walls	1.00	Large stones	1.00
		Flooding	0.40	Large stones	0.73	Droughty	0.45
UgC:							
Udorthents, graded	85	Not rated		Not rated		Not rated	
UgF:							
Udorthents, graded	85	Not rated		Not rated		Not rated	
Ur:							
Udorthents, railroad grade	93	Not rated		Not rated		Not rated	
Uu:							
Udorthents, highways	70	Not rated		Not rated		Not rated	
Urban land, highways	25	Not rated		Not rated		Not rated	
W:							
Water	100	Not rated		Not rated		Not rated	
Wr:							
Water	75	Not rated		Not rated		Not rated	
Rubble land, frequently flooded	25	Not rated		Not rated		Not rated	

Table 16.—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
AgC:					
Allegheny	80	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Slope	0.63	Seepage	0.52
BhG:					
Berks	35	Very limited		Very limited	
		Shallow 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
Highsplint	30	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Sharondale	20	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	1.00		
BuC:					
Buchanan	80	Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00
		Slow water movement	1.00	Depth to saturated zone	0.75
		Slope	0.63	Seepage	0.50
ClB:					
Clifftop	80	Very limited		Very limited	
		Shallow depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slow water movement	0.50	Slope	0.82
				Seepage	0.50
ClC:					
Clifftop	80	Very limited		Very limited	
		Shallow depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.63	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
ClD:					
Clifftop	75	Very limited		Very limited	
		Shallow depth to bedrock	1.00	Depth to soft bedrock	1.00
		Too steep	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50

Table 16.—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
ClE:					
Clifftop	70	Very limited		Very limited	
		Shallow 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
CmC:					
Clifftop	75	Very limited		Very limited	
		Shallow depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slow water movement	0.50	Slope	1.00
		Slope	0.04	Seepage	0.50
CwB:					
Cottonbend	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Slope	0.68
				Seepage	0.50
CwC:					
Cottonbend	90	Somewhat limited		Very limited	
		Slope	0.63	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
DkC:					
Dekalb	80	Very limited		Very limited	
		Shallow depth to bedrock	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Filtering capacity	1.00	Slope	1.00
		Large stones	0.14	Large stones	0.18
		Slope	0.04		
DrE:					
Dekalb	55	Very limited		Very limited	
		Shallow 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
		Filtering capacity	1.00	Large stones	0.18
		Large stones	0.14		
Rock outcrop	15	Not rated		Not rated	
FeB:					
Fenwick	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to hard bedrock	1.00
		Slow water movement	1.00	Depth to saturated zone	1.00
		Shallow depth to bedrock	1.00	Slope	0.92
				Seepage	0.50

Table 16.—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
FeC:					
Fenwick	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to hard bedrock	1.00
		Slow water movement	1.00	Slope	1.00
		Shallow depth to bedrock	1.00	Depth to saturated zone	1.00
		Slope	0.63	Seepage	0.50
HgE:					
Highsplint	70	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
LaC:					
Laidig	70	Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00
		Slow water movement	1.00	Organic matter content	1.00
		Slope	0.04	Seepage	0.52
				Depth to saturated zone	0.10
LbC:					
Laidig	75	Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00
		Slow water movement	1.00	Seepage	0.42
		Slope	0.63	Depth to saturated zone	0.10
LcE:					
Laidig	45	Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00
		Slow water movement	1.00	Seepage	0.52
		Too steep	1.00	Depth to saturated zone	0.10
Clifftop	25	Very limited		Very limited	
		Shallow depth to bedrock	1.00	Depth to soft bedrock	1.00
		Too steep	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
LdF:					
Layland	60	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Slow water movement	0.98	Seepage	0.54
Clifftop	20	Very limited		Very limited	
		Shallow depth to bedrock	1.00	Depth to soft bedrock	1.00
		Too steep	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50

Table 16.—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
LhE:					
Layland	60	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Slow water movement	0.98	Organic matter content	1.00
				Seepage	0.54
Laidig	25	Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00
				Seepage	0.52
		Slow water movement	1.00	Depth to saturated zone	0.10
		Too steep	1.00		
LkE:					
Layland	55	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Slow water movement	0.98	Organic matter content	1.00
				Seepage	0.54
Laidig	30	Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00
				Organic matter content	1.00
		Slow water movement	1.00	Seepage	0.52
		Too steep	1.00	Depth to saturated zone	0.10
LmF:					
Layland	60	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Slow water movement	0.98	Organic matter content	1.00
				Seepage	0.54
Rock outcrop	10	Not rated		Not rated	
LuC:					
Lithic Udorthents, leveled land	85	Not rated		Not rated	
LxG:					
Lithic Udorthents, cut land	50	Not rated		Not rated	
Rock outcrop	40	Not rated		Not rated	
NaB:					
Nallen	80	Very limited		Very limited	
		Shallow depth to bedrock	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.92
NaC:					
Nallen	75	Very limited		Very limited	
		Shallow depth to bedrock	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
		Slope	0.63		

Table 16.—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
NaD:					
Nallen	75	Very limited		Very limited	
		Shallow 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
PsA:					
Pope, rarely flooded	85	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Flooding	0.40	Flooding	0.40
PvA:					
Pope, occasionally flooded	50	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Craigsville, occasionally flooded	30	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Filtering capacity	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	0.17
		Depth to saturated zone	0.84		
Rw:					
Riverwash, frequently flooded	95	Not rated		Not rated	
ThB:					
Typic Haplorthods, rarely flooded	80	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Flooding	0.40
		Large stones	0.73	Slope	0.32
		Flooding	0.40	Large stones	0.05
UgC:					
Udorthents, graded	85	Not rated		Not rated	
UgF:					
Udorthents, graded	85	Not rated		Not rated	
Ur:					
Udorthents, railroad grade	93	Not rated		Not rated	
Uu:					
Udorthents, highways	70	Not rated		Not rated	
Urban land, highways	25	Not rated		Not rated	

Table 16.—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
W:					
Water	100	Not rated		Not rated	
Wr:					
Water	75	Not rated		Not rated	
Rubble land, frequently flooded	25	Not rated		Not rated	

Table 17.—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: Rating class and limiting features	Gravel source: Value	Sand source: Rating class and limiting features	Sand source: Value
AgC:					
Allegheny	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
BhG:					
Berks	35	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.08	Thickest layer	0.00
Highsplint	30	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Sharondale	20	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
BuC:					
Buchanan	80	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
ClB:					
Clifftop	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
ClC:					
Clifftop	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
ClD:					
Clifftop	75	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
ClE:					
Clifftop	70	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
CmC:					
Clifftop	75	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
CwB:					
Cottonbend	90	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00

Table 17.—Source of Gravel and Sand—Continued

Map unit symbol and soil name	Pct. of map unit	Gravel source: Rating class and limiting features	Value	Sand source: Rating class and limiting features	Value
CwC:					
Cottonbend	90	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
DkC:					
Dekalb	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
DrE:					
Dekalb	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Rock outcrop	15	Not rated		Not rated	
FeB:					
Fenwick	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
FeC:					
Fenwick	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
HgE:					
Highsplint	70	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
LaC:					
Laidig	70	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
LbC:					
Laidig	75	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
LcE:					
Laidig	45	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Clifftop	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
LdF:					
Layland	60	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Clifftop	20	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00

Table 17.—Source of Gravel and Sand—Continued

Map unit symbol and soil name	Pct. of map unit	Gravel source: Rating class and limiting features	Value	Sand source: Rating class and limiting features	Value
LhE:					
Layland	60	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Laidig	25	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
LkE:					
Layland	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Laidig	30	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
LmF:					
Layland	60	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Rock outcrop	10	Not rated		Not rated	
LuC:					
Lithic Udorthents, leveled land	85	Not rated		Not rated	
LxG:					
Lithic Udorthents, cut land	50	Not rated		Not rated	
Rock outcrop	40	Not rated		Not rated	
NaB:					
Nallen	80	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.03
NaC:					
Nallen	75	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.03
NaD:					
Nallen	75	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.03
PsA:					
Pope, rarely flooded	85	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.09
PvA:					
Pope, occasionally flooded	50	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.09

Table 17.—Source of Gravel and Sand—Continued

Map unit symbol and soil name	Pct. of map unit	Gravel source: Rating class and limiting features	Gravel source: Value	Sand source: Rating class and limiting features	Sand source: Value
PvA:					
Craigsville, occasionally flooded	30	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.12
		Thickest layer	0.00	Thickest layer	0.16
Rw:					
Riverwash, frequently flooded	95	Not rated		Not rated	
ThB:					
Typic Haplorthods, rarely flooded	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
UgC:					
Udorthents, graded	85	Not rated		Not rated	
UgF:					
Udorthents, graded	85	Not rated		Not rated	
Ur:					
Udorthents, railroad grade	93	Not rated		Not rated	
Uu:					
Udorthents, highways	70	Not rated		Not rated	
Urban land, highways	25	Not rated		Not rated	
W:					
Water	90	Not rated		Not rated	
Wr:					
Water	75	Not rated		Not rated	
Rubble land, frequently flooded	25	Not rated		Not rated	

Table 18.—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 0.00 to 0.99. 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
AgC:							
Allegheny	80	Fair		Good		Fair	
		Organic matter content low	0.12			Slope	0.37
						Too clayey	0.48
		Too acid	0.50			Too acid	0.59
		Water erosion	0.99				
BhG:							
Berks	35	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
				Cobble content	0.99	Too acid	0.76
Highsplint	30	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
Sharondale	20	Fair		Poor		Poor	
		Too acid	0.84	Slope	0.00	Slope	0.00
						Rock fragments	0.00
						Hard to reclaim (rock fragments)	0.00
BuC:							
Buchanan	80	Fair		Fair		Poor	
		Too acid	0.03	Wetness depth	0.53	Rock fragments	0.00
		Organic matter content low	0.12			Slope	0.37
						Wetness depth	0.53
ClB:							
Clifftop	80	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Rock fragments	0.00
		Organic matter content low	0.82			Too acid	0.68
						Too clayey	0.69
		Water erosion	0.99				
ClC:							
Clifftop	80	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Rock fragments	0.00
		Organic matter content low	0.82			Slope	0.37
						Too acid	0.68
		Water erosion	0.99				
ClD:							
Clifftop	75	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Organic matter content low	0.82	Slope	0.50	Rock fragments	0.00
						Too acid	0.68
		Water erosion	0.99				

Table 18.—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
ClE:							
Clifftop----------	70	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Organic matter content low	0.82	Slope	0.00	Rock fragments	0.32
		Water erosion	0.99			Too acid	0.68
CmC:							
Clifftop----------	75	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Rock fragments	0.00
		Organic matter content low	0.82			Too acid	0.68
		Droughty	0.86			Too clayey	0.69
CwB:							
Cottonbend----------	90	Fair		Good		Fair	
		Organic matter content low	0.12			Too acid	0.50
		Too acid	0.50				
		Water erosion	0.90				
CwC:							
Cottonbend----------	90	Fair		Good		Fair	
		Too acid	0.08			Slope	0.37
		Organic matter content low	0.12			Too acid	0.50
		Water erosion	0.99				
DkC:							
Dekalb----------	80	Fair		Poor		Poor	
		Droughty	0.01	Depth to bedrock	0.00	Rock fragments	0.00
		Too acid	0.50	Cobble content	0.29	Too acid	0.24
		Depth to bedrock	0.68			Depth to bedrock	0.68
DrE:							
Dekalb----------	55	Fair		Poor		Poor	
		Droughty	0.01	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.00	Rock fragments	0.00
		Depth to bedrock	0.68	Cobble content	0.29	Too acid	0.24
Rock outcrop--------	15	Not rated		Not rated		Not rated	
FeB:							
Fenwick----------	85	Fair		Poor		Fair	
		Too acid	0.50	Depth to bedrock	0.00	Wetness depth	0.18
		Droughty	0.81	Wetness depth	0.18	Too acid	0.59
		Water erosion	0.90	Low strength	0.22	Rock fragments	0.92
FeC:							
Fenwick----------	85	Fair		Poor		Fair	
		Too acid	0.50	Depth to bedrock	0.00	Wetness depth	0.18
		Droughty	0.81	Wetness depth	0.18	Slope	0.37
		Water erosion	0.90	Low strength	0.22	Too acid	0.59
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

Table 18.—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
LaC:							
Laidig	70	Poor		Fair		Fair	
		Too acid	0.00	Wetness depth	0.94	Rock fragments	0.18
		Organic matter content low	0.56			Too acid	0.59
						Wetness depth	0.94
LbC:							
Laidig	75	Poor		Fair		Fair	
		Too acid	0.00	Wetness depth	0.94	Rock fragments	0.18
		Organic matter content low	0.56			Too acid	0.59
						Wetness depth	0.94
LcE:							
Laidig	45	Poor		Poor		Poor	
		Too acid	0.00	Slope	0.00	Slope	0.00
		Organic matter content low	0.56	Wetness depth	0.94	Too acid	0.59
						Wetness depth	0.94
Clifftop	25	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Organic matter content low	0.82	Slope	0.00	Rock fragments	0.32
						Too acid	0.68
		Water erosion	0.99				
LdF:							
Layland	60	Fair		Poor		Poor	
		Too acid	0.03	Slope	0.00	Slope	0.00
		Organic matter content low	0.82			Hard to reclaim (rock fragments)	0.00
		Stone content	0.98			Too acid	0.59
Clifftop	20	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Organic matter content low	0.82	Slope	0.00	Rock fragments	0.32
						Too acid	0.68
		Water erosion	0.99				
LhE:							
Layland	60	Fair		Poor		Poor	
		Too acid	0.03	Slope	0.00	Slope	0.00
		Organic matter content low	0.82			Hard to reclaim (rock fragments)	0.00
		Stone content	0.88			Too acid	0.59
Laidig	25	Poor		Poor		Poor	
		Too acid	0.00	Slope	0.00	Slope	0.00
		Organic matter content low	0.56	Wetness depth	0.94	Too acid	0.59
						Wetness depth	0.94
LkE:							
Layland	55	Fair		Poor		Poor	
		Too acid	0.03	Slope	0.00	Slope	0.00
		Stone content	0.79			Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.82			Too acid	0.59
Laidig	30	Poor		Poor		Poor	
		Too acid	0.00	Slope	0.00	Slope	0.00
		Organic matter content low	0.56	Wetness depth	0.94	Too acid	0.59
						Wetness depth	0.94

Table 18.—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
LmF:							
Layland	60	Fair		Poor		Poor	
		Too acid	0.03	Slope	0.00	Slope	0.00
		Stone content	0.79			Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.82			Too acid	0.59
Rock outcrop	10	Not rated		Not rated		Not rated	
LuC:							
Lithic Udorthents, leveled land	85	Not rated		Not rated		Not rated	
LxG:							
Lithic Udorthents, cut land	50	Not rated		Not rated		Not rated	
Rock outcrop	40	Not rated		Not rated		Not rated	
NaB:							
Nallen	80	Fair		Poor		Fair	
		Organic matter content low	0.10	Depth to bedrock	0.00	Too acid	0.50
		Droughty	0.26			Depth to bedrock	0.84
		Too acid	0.50			Rock fragments	0.96
NaC:							
Nallen	75	Fair		Poor		Fair	
		Organic matter content low	0.10	Depth to bedrock	0.00	Slope	0.37
		Droughty	0.26			Too acid	0.50
		Too acid	0.50			Depth to bedrock	0.84
NaD:							
Nallen	75	Fair		Poor		Poor	
		Organic matter content low	0.10	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.26	Slope	0.50	Too acid	0.50
		Too acid	0.50			Depth to bedrock	0.84
PsA:							
Pope, rarely flooded	85	Fair		Good		Poor	
		Too acid	0.50			Hard to reclaim (rock fragments)	0.00
						Too acid	0.59
						Rock fragments	0.92
PvA:							
Pope, occasionally flooded	50	Fair		Good		Poor	
		Too acid	0.50			Hard to reclaim (rock fragments)	0.00
						Too acid	0.59
						Rock fragments	0.92
Craigsville, occasionally flooded	30	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

Table 18.—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
Rw:							
Riverwash, frequently flooded	95	Not rated		Not rated		Not rated	
ThB:							
Typic Haplorthods, rarely flooded	80	Poor		Poor		Poor	
		Stone content	0.00	Stones	0.00	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.12			Rock fragments	0.00
		Too acid	0.50			Too acid	0.32
UgC:							
Udorthents, graded	85	Not rated		Not rated		Not rated	
UgF:							
Udorthents, graded	85	Not rated		Not rated		Not rated	
Ur:							
Udorthents, railroad grade	93	Not rated		Not rated		Not rated	
Uu:							
Udorthents, highways	70	Not rated		Not rated		Not rated	
Urban land, highways	25	Not rated		Not rated		Not rated	
W:							
Water	100	Not rated		Not rated		Not rated	
Wr:							
Water	75	Not rated		Not rated		Not rated	
Rubble land, frequently flooded	25	Not rated		Not rated		Not rated	

Table 19.—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
AgC:							
Allegheny	80	Very limited		Very limited		Very limited	
		Slope	1.00	Piping	1.00	Depth to water	1.00
		Seepage	0.12				
BhG:							
Berks	35	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.54	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.54				
Highsplint	30	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.70				
Sharondale	20	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
BuC:							
Buchanan	80	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to saturated zone	1.00	Depth to water	1.00
		Seepage	0.70	Piping	1.00		
ClB:							
Clifftop	80	Somewhat limited		Very limited		Very limited	
		Seepage	0.70	Piping	1.00	Depth to water	1.00
		Slope	0.50	Thin layer	0.70		
		Depth to bedrock	0.04				
ClC:							
Clifftop	80	Very limited		Very limited		Very limited	
		Slope	1.00	Piping	1.00	Depth to water	1.00
		Seepage	0.70	Thin layer	0.70		
		Depth to bedrock	0.04				
ClD:							
Clifftop	75	Very limited		Very limited		Very limited	
		Slope	1.00	Piping	1.00	Depth to water	1.00
		Seepage	0.70	Thin layer	0.70		
		Depth to bedrock	0.04				
ClE:							
Clifftop	70	Very limited		Very limited		Very limited	
		Slope	1.00	Piping	1.00	Depth to water	1.00
		Seepage	0.70	Thin layer	0.70		
		Depth to bedrock	0.04				
CmC:							
Clifftop	75	Very limited		Very limited		Very limited	
		Slope	1.00	Piping	1.00	Depth to water	1.00
		Seepage	0.70	Thin layer	0.70		
		Depth to bedrock	0.04				

Table 19.—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
CwB:							
Cottonbend	90	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.88	Depth to water	1.00
		Slope	0.32				
CwC:							
Cottonbend	90	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Piping	0.88	Depth to water	1.00
		Seepage	0.70				
DkC:							
Dekalb	80	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.82	Depth to water	1.00
		Slope	1.00	Large stones	0.14		
		Depth to bedrock	0.82				
DrE:							
Dekalb	55	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.82	Depth to water	1.00
		Slope	1.00	Large stones	0.14		
		Depth to bedrock	0.82				
Rock outcrop	15	Not rated		Not rated		Not rated	
FeB:							
Fenwick	85	Somewhat limited		Very limited		Very limited	
		Seepage	0.70	Depth to saturated zone	1.00	Depth to hard bedrock	1.00
		Slope	0.68	Piping	0.77	Unstable excavation walls	0.50
		Depth to bedrock	0.52	Thin layer	0.52	Slow refill	0.30
FeC:							
Fenwick	85	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to saturated zone	1.00	Depth to hard bedrock	1.00
		Seepage	0.70	Piping	0.77	Unstable excavation walls	0.50
		Depth to bedrock	0.52	Thin layer	0.52	Slow refill	0.30
HgE:							
Highsplint	70	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.70				
LaC:							
Laidig	70	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Depth to saturated zone	0.78	Depth to water	1.00
		Seepage	0.72				
LbC:							
Laidig	75	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Depth to saturated zone	0.78	Depth to water	1.00
		Seepage	0.72				
LcE:							
Laidig	45	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Depth to saturated zone	0.78	Depth to water	1.00
		Seepage	0.72				

Table 19.—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
LcE:							
Clifftop	25	Very limited		Very limited		Very limited	
		Slope	1.00	Piping	1.00	Depth to water	1.00
		Seepage	0.70	Thin layer	0.70		
		Depth to bedrock	0.04				
LdF:							
Layland	60	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.73				
Clifftop	20	Very limited		Very limited		Very limited	
		Slope	1.00	Piping	1.00	Depth to water	1.00
		Seepage	0.70	Thin layer	0.70		
		Depth to bedrock	0.04				
LhE:							
Layland	60	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.73				
Laidig	25	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Depth to saturated zone	0.78	Depth to water	1.00
		Seepage	0.72				
LkE:							
Layland	55	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.73				
Laidig	30	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Depth to saturated zone	0.78	Depth to water	1.00
		Seepage	0.72				
LmF:							
Layland	60	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.73				
Rock outcrop	10	Not rated		Not rated		Not rated	
LuC:							
Lithic Udorthents, leveled land	85	Very limited		Not rated		Not rated	
		Depth to bedrock	1.00				
		Slope	0.32				
LxG:							
Lithic Udorthents, cut land	50	Very limited		Not rated		Not rated	
		Depth to bedrock	1.00				
		Slope	1.00				
Rock outcrop	40	Not rated		Not rated		Not rated	
NaB:							
Nallen	80	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.74	Depth to water	1.00
		Depth to bedrock	0.74				
		Slope	0.68				

Table 19.—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
NaC:							
Nallen	75	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				
NaD:							
Nallen	75	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				
PsA:							
Pope, rarely flooded	85	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.62	Depth to water	1.00
PvA:							
Pope, occasionally flooded	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.62	Depth to water	1.00
Craigsville, occasionally flooded	30	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Unstable excavation walls	1.00
						Depth to saturated zone	0.96
Rw:							
Riverwash, frequently flooded	95	Not rated		Not rated		Not rated	
ThB:							
Typic Haplorthods, rarely flooded	80	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Depth to water	1.00
		Slope	0.08	Large stones	0.73		
UgC:							
Udorthents, graded	85	Not rated		Not rated		Not rated	
UgF:							
Udorthents, graded	85	Not rated		Not rated		Not rated	
Ur:							
Udorthents, railroad grade	93	Not rated		Not rated		Not rated	
Uu:							
Udorthents, highways	70	Not rated		Not rated		Not rated	
Urban land, highways	25	Not rated		Not rated		Not rated	
W:							
Water	100	Not rated		Not rated		Not rated	
Wr:							
Water	75	Not rated		Not rated		Not rated	
Rubble land, frequently flooded	25	Not rated		Not rated		Not rated	

Table 20.—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: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
AgC:												
Allegheny-------	0-1	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	1-4	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	4-26	Loam	CL-ML, CL, ML	A-4	0	0	90-100	80-100	65-100	45-85	0-35	NP-10
	26-42	Loam	CL-ML, CL, ML	A-4	0	0	90-100	80-100	65-100	45-85	0-35	NP-10
	42-165	Clay loam, sandy clay loam, loam	CL, SC, ML, SM	A-6, A-2-4, A-4	0	0	90-100	80-100	65-95	35-80	0-35	NP-15
BhG:												
Berks----------	0-2	Slightly decomposed plant material	PT	A-8	1-25	0	---	---	---	---	---	---
	2-19	Channery loam, channery silt loam	SM, GM	A-4, A-2	0-6	6-36	25-93	22-93	19-93	16-85	36-55	8-15
	19-28	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
	28-76	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
	76-98	Extremely channery loam, extremely channery silt loam	GC-GM, GC	A-2	0-30	8-71	9-81	6-80	6-80	5-77	27-37	11-18
	98-108	Bedrock	---	---	---	---	---	---	---	---	---	---
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

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
BhG:												
Sharondale------	0-5	Slightly decomposed plant material	PT	A-8	1-25	0	---	---	---	---	---	---
	5-38	Channery loam, loam, flaggy sandy loam, very channery clay loam	GC, GM, ML	A-2-6, A-2-4, A-6	0	0	39-86	22-81	18-78	13-63	32-67	9-23
	38-51	Channery loam, loam, flaggy sandy loam, very channery clay loam	GM, GC, ML	A-6, A-2-4, A-2-6	0	0	43-85	26-83	22-79	16-61	26-49	8-20
	51-160	Very channery loam, extremely flaggy silt loam, very flaggy sandy loam	GM, GC, SC	A-2-4, A-2-6	0	6-53	21-82	9-80	7-77	5-59	21-46	5-19
	160-218	Very channery loam, extremely flaggy silt loam, very flaggy sandy loam	GM, GC, SC	A-2-6, A-2-4	0	7-51	24-80	11-76	9-73	7-60	23-44	7-20
	218-228	Bedrock	---	---	---	---	---	---	---	---	---	---
BuC:												
Buchanan--------	0-3	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	3-20	Loam, fine sandy loam	ML, CL-ML, CL	A-4	0	0-5	90-100	85-100	75-90	65-85	0-37	NP-13
	20-53	Channery loam, silt loam, gravelly sandy clay loam	GM, ML, SM, CL	A-2, A-4	0	0-20	50-100	45-90	40-90	20-80	20-35	2-15
	53-152	Channery loam, silt loam, gravelly sandy clay loam	GC, SC, CL, GM	A-4, A-2	0	0-20	50-100	45-90	40-90	20-80	20-35	2-15
	152-165	Gravelly loam, loam, channery clay loam, very channery sandy loam	GC, SC, CL, GM	A-6, A-4, A-2	0	0-20	50-100	30-80	30-75	20-60	20-35	2-15

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
ClB:												
Clifftop--------	0-3	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	3-8	Channery silt loam	CL, GM, ML, GC	A-4, A-2	0	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	8-20	Silt loam, channery silt loam, channery loam	CL, ML	A-4, A-6	0	0-5	80-95	75-90	70-85	65-80	27-43	9-12
	20-74	Channery silty clay loam, channery silt loam, channery loam, silty clay loam	SC, CL-ML, GC-GM, CL	A-4, A-7, A-5	0	0-30	50-95	45-90	35-85	30-80	20-45	4-15
	74-91	Very channery silty clay loam, very channery silt loam, channery loam, channery silty clay	GC, GC-GM	A-1, A-2, A-4, A-6	0-15	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	91-101	Bedrock	---	---	---	---	---	---	---	---	---	---
ClC:												
Clifftop--------	0-3	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	3-8	Channery silt loam	CL, GM, ML, GC	A-4, A-2	0	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	8-20	Silt loam, channery silt loam, channery loam	ML, CL	A-6, A-4	0	0-5	80-95	75-90	70-85	65-80	27-43	9-12
	20-74	Channery silty clay loam, channery silt loam, channery loam, silty clay loam	CL, SC, CL-ML, GC-GM	A-7, A-5, A-4	0	0-30	50-95	45-90	35-85	30-80	20-45	4-15
	74-91	Very channery silty clay loam, very channery silt loam, channery loam, channery silty clay	GC-GM, GC	A-1, A-6, A-2, A-4	0-15	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	91-101	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
ClD:												
Clifftop--------	0-3	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	3-8	Channery silt loam	GC, GM, ML, CL	A-2, A-4	0	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	8-20	Silt loam, channery silt loam, channery loam	CL, ML	A-6, A-4	0	0-5	80-95	75-90	70-85	65-80	27-43	9-12
	20-74	Channery silty clay loam, channery silt loam, channery loam, silty clay loam	CL, SC, CL-ML, GC-GM	A-5, A-4, A-7	0	0-30	50-95	45-90	35-85	30-80	20-45	4-15
	74-91	Very channery silty clay loam, very channery silt loam, channery loam, channery silty clay	GC-GM, GC	A-2, A-4, A-1, A-6	0-15	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	91-101	Bedrock	---	---	---	---	---	---	---	---	---	---
ClE:												
Clifftop--------	0-3	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	3-8	Channery silt loam	GC, CL, GM, ML	A-2, A-4	0	0-57	64-100	27-100	21-97	17-80	25-36	5-10
	8-20	Silt loam, channery silt loam, channery loam	ML, CL	A-6, A-4	0	0-5	81-94	63-94	55-90	45-75	27-43	9-12
	20-74	Channery silty clay loam, channery silt loam, channery loam, silty clay loam	SC, CL, CL-ML, GC-GM	A-5, A-4, A-7	0	0-24	69-96	39-96	34-96	30-89	20-45	4-15
	74-91	Very channery silty clay loam, very channery silt loam, channery loam, channery silty clay	GC-GM, GC	A-1, A-2, A-4, A-6	0	0-23	48-71	24-71	20-71	18-70	20-40	4-15
	91-99	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
CmC:												
Clifftop--------	0-3	Slightly decomposed plant material	PT	A-8	1-25	0	---	---	---	---	---	---
	3-8	Channery silt loam	CL, GM, ML, GC	A-4, A-2	0	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	8-20	Silt loam, channery silt loam, channery loam	CL, ML	A-4, A-6	0	0-5	80-95	75-90	70-85	65-80	27-43	9-12
	20-74	Channery silty clay loam, channery silt loam, channery loam, silty clay loam	SC, CL-ML, GC-GM, CL	A-4, A-7, A-5	0	0-30	50-95	45-90	35-85	30-80	20-45	4-15
	74-91	Very channery silty clay loam, very channery silt loam, channery loam, channery silty clay	GC, GC-GM	A-1, A-2, A-4, A-6	0-15	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	91-101	Bedrock	---	---	---	---	---	---	---	---	---	---
CwB:												
Cottonbend------	0-1	Slightly decomposed plant material	---	---	0	0	---	---	---	---	---	---
	1-8	Loam	CL, CL-ML, SM	A-4	0	0-7	79-100	78-100	68-100	47-78	20-43	4-17
	8-20	Gravelly loam, loam, fine sandy loam	CL-ML	A-1, A-2, A-4	0	0-12	56-100	55-100	47-100	33-80	20-43	4-18
	20-61	Gravelly loam, loam, clay loam, silty clay loam, sandy clay loam	CL	A-4, A-2, A-6	0	0-12	56-100	55-100	48-100	35-85	24-46	9-24
	61-102	Loam, clay loam, silty clay loam, sandy clay loam, gravelly loam	CL	A-4, A-2, A-6	0	0-12	56-100	55-100	47-100	34-80	27-44	12-25
	102-128	Clay loam, loam, sandy clay loam, silty clay loam, gravelly loam, very cobbly clay loam	CL	A-4, A-1, A-6	0	0-40	45-100	42-100	37-100	27-80	27-44	12-25
	128-200	Very cobbly clay loam, clay loam, loam, sandy clay loam, clay, gravelly loam	CL	A-4, A-1, A-6, A-7	0-17	0-52	45-100	43-100	36-100	25-93	24-57	9-36

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
CwC:												
Cottonbend------	0-1	Slightly decomposed plant material	---	---	0	0	---	---	---	---	---	---
	1-8	Loam	CL, CL-ML, SM	A-4	0	0-7	79-100	78-100	68-100	47-78	20-43	4-17
	8-20	Gravelly loam, loam, fine sandy loam	CL-ML	A-1, A-2, A-4	0	0-12	56-100	55-100	47-100	33-80	20-43	4-18
	20-61	Gravelly loam, loam, clay loam, silty clay loam, sandy clay loam	CL	A-4, A-2, A-6	0	0-12	56-100	55-100	48-100	35-85	24-46	9-24
	61-102	Loam, clay loam, silty clay loam, sandy clay loam, gravelly loam	CL	A-4, A-2, A-6	0	0-12	56-100	55-100	47-100	34-80	27-44	12-25
	102-128	Clay loam, loam, sandy clay loam, silty clay loam, gravelly loam, very cobbly clay loam	CL	A-4, A-1, A-6	0	0-40	45-100	42-100	37-100	27-80	27-44	12-25
	128-200	Very cobbly clay loam, clay loam, loam, sandy clay loam, clay, gravelly loam	CL	A-4, A-1, A-6, A-7	0-17	0-52	45-100	43-100	36-100	25-93	24-57	9-36
DkC:												
Dekalb----------	0-1	Slightly decomposed plant material	PT	A-8	25-43	0	---	---	---	---	---	---
	1-3	Moderately decomposed plant material	PT	A-8	24-42	0	---	---	---	---	---	---
	3-8	Highly organic very channery sandy loam, channery highly organic loam, very channery sandy loam	GM, ML, SM	A-2-5, A-2-4, A-5	0	12-36	65-95	30-91	24-80	14-52	33-69	1-8
	8-20	Very channery sandy loam, channery loam	SM, ML, GM	A-2-4, A-2-5, A-5	0	11-33	64-92	30-92	24-83	14-56	21-43	2-11
	20-65	Very channery loam, channery loam, very channery sandy loam	GC, GM, SM, ML	A-4, A-2-4	0-8	4-40	64-91	32-91	24-84	16-60	18-35	2-13
	65-80	Very channery sandy loam, very flaggy loamy sand, extremely channery loam	SC, SM, GC, GM	A-2-4, A-4	4-20	19-63	57-88	9-88	7-80	5-55	17-32	2-12
	80-90	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
DrE:												
Dekalb----------	0-1	Slightly decomposed plant material	PT	A-8	25-43	0	---	---	---	---	---	---
	1-3	Moderately decomposed plant material	PT	A-8	24-42	0	---	---	---	---	---	---
	3-8	Highly organic very channery sandy loam, channery highly organic loam, very channery sandy loam	SM, GM, ML	A-2-5, A-2-4, A-5	0	12-36	65-95	30-91	24-80	14-52	33-69	1-8
	8-20	Very channery sandy loam, channery loam	SM, ML, GM	A-2-4, A-2-5, A-5	0	11-33	64-92	30-92	24-83	14-56	21-43	2-11
	20-65	Very channery loam, channery loam, very channery sandy loam	GC, GM, SM, ML	A-4, A-2-4	0-8	4-40	64-91	32-91	24-84	16-60	18-35	2-13
	65-80	Very channery sandy loam, very flaggy loamy sand, extremely channery loam	SM, GM, SC, GC	A-2-4, A-4	4-20	19-63	57-88	9-88	7-80	5-55	17-32	2-12
	80-90	Bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
FeB:												
Fenwick---------	0-3	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	3-8	Silt loam	MH, ML, CL-ML, SM	A-7-5, A-4	0	0-13	85-100	64-100	54-100	45-88	29-80	6-17
	8-23	Silt loam, loam	CL-ML, ML, SM	A-4	0	0-13	85-100	65-100	54-100	45-86	20-35	2-10
	23-66	Loam, silt loam, clay loam	CL, CL-ML, ML, SC	A-4, A-6	0	0-10	88-100	68-100	58-100	45-81	30-46	13-24
	66-86	Loam, silt loam, clay loam	CL, SC, CL-ML, ML	A-6, A-4, A-2-4	0	0-13	74-100	45-100	38-100	28-80	28-46	12-24
	86-99	Loam, silt loam, channery loam, channery sandy loam	CL, SC, CL-ML, ML	A-4, A-6, A-2-4	0	0-12	75-100	47-100	39-98	27-72	25-35	4-12
	99-109	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
FeC:												
Fenwick---------	0-3	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	3-8	Silt loam	MH, ML, CL-ML, SM	A-7-5, A-4	0	0-13	85-100	64-100	54-100	45-88	29-80	6-17
	8-23	Silt loam, loam	CL-ML, ML, SM	A-4	0	0-13	85-100	65-100	54-100	45-86	20-35	2-10
	23-66	Loam, silt loam, clay loam	CL, CL-ML, ML, SC	A-4, A-6	0	0-10	88-100	68-100	58-100	45-81	30-46	13-24
	66-86	Loam, silt loam, clay loam	CL, SC, CL-ML, ML	A-6, A-4, A-2-4	0	0-13	74-100	45-100	38-100	28-80	28-46	12-24
	86-99	Loam, silt loam, channery loam, channery sandy loam	CL, SC, CL-ML, ML	A-4, A-6, A-2-4	0	0-12	75-100	47-100	39-98	27-72	25-35	4-12
	99-109	Bedrock	---	---	---	---	---	---	---	---	---	---
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

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
LaC:												
Laidig----------	0-2	Stony slightly decomposed plant material	PT	A-8	45-85	11-31	---	---	---	---	---	---
	2-9	Very gravelly loam, silt loam, gravelly highly organic loam	SM, GM, ML	A-2-5, A-4, A-5	0	0-14	39-89	30-87	23-83	16-62	0-69	NP-13
	9-19	Very gravelly loam, silt loam, gravelly loam	CL, GM, SM, CL-ML	A-6, A-4, A-2-6	0	0-12	47-91	39-89	33-88	24-69	26-44	7-17
	19-80	Very gravelly loam, silt loam, gravelly loam	CL, CL-ML, SC	A-6, A-4, A-2-6	0	0-13	56-97	44-95	36-92	27-73	23-38	7-18
	80-122	Very gravelly clay loam, silt loam, gravelly loam, gravelly silt loam	CL, CL-ML, SC	A-6, A-4, A-2-6	0	0-10	50-92	42-91	35-91	26-74	25-44	9-24
	122-200	Gravelly loam, loam, very gravelly sandy loam, very gravelly clay loam	SC, CL, CL-ML	A-6, A-4, A-2-6	0-13	0-31	44-93	32-90	26-90	18-69	22-40	6-21
LbC:												
Laidig----------	0-2	Extremely bouldery slightly decomposed plant material	PT	A-8	85-99	0	---	---	---	---	---	---
	2-9	Silt loam, gravelly highly organic loam, very gravelly loam	SM, GM, ML	A-2-5, A-4, A-5	0	0-14	39-89	30-87	23-83	16-62	0-69	NP-13
	9-19	Silt loam, gravelly loam, very gravelly loam	CL, GM, SM, CL-ML	A-6, A-4, A-2-6	0	0-12	47-91	39-89	33-88	24-69	26-44	7-17
	19-80	Silt loam, gravelly loam, very gravelly loam	CL, CL-ML, SC	A-6, A-4, A-2-6	0	0-13	56-97	44-95	36-92	27-73	23-38	7-18
	80-122	Gravelly silt loam, very gravelly clay loam, silt loam, gravelly loam	CL, CL-ML, SC	A-6, A-4, A-2-6	0	0-10	50-92	42-91	35-91	26-74	25-44	9-24
	122-200	Loam, gravelly loam, very gravelly sandy loam, very gravelly clay loam	SC, CL, CL-ML	A-6, A-4, A-2-6	0-13	0-31	44-93	32-90	26-90	18-69	22-40	6-21

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
LcE:												
Laidig----------	0-2	Slightly decomposed plant material	PT	A-8	1-25	0	---	---	---	---	---	---
	2-9	Very gravelly loam, silt loam, gravelly highly organic loam	SM, GM, ML	A-2-5, A-4, A-5	0	0-14	39-89	30-87	23-83	16-62	0-69	NP-13
	9-19	Very gravelly loam, silt loam, gravelly loam	CL, GM, SM, CL-ML	A-6, A-4, A-2-6	0	0-12	47-91	39-89	33-88	24-69	26-44	7-17
	19-80	Very gravelly loam, silt loam, gravelly loam	CL, CL-ML, SC	A-6, A-4, A-2-6	0	0-13	56-97	44-95	36-92	27-73	23-38	7-18
	80-122	Very gravelly clay loam, gravelly silt loam, gravelly loam	CL, CL-ML, SC	A-6, A-4, A-2-6	0	0-10	50-92	42-91	35-91	26-74	25-44	9-24
	122-200	Gravelly loam, very gravelly clay loam, very gravelly sandy loam	SC, CL, CL-ML	A-6, A-4, A-2-6	0-13	0-31	44-93	32-90	26-90	18-69	22-40	6-21
Clifftop--------	0-3	Slightly decomposed plant material	PT	A-8	1-20	0-5	---	---	---	---	---	---
	3-8	Channery silt loam	ML, CL, GC, GM	A-4, A-2	0	0-57	64-100	27-100	21-97	17-80	25-36	5-10
	8-20	Silt loam, channery silt loam, channery loam	ML, CL	A-6, A-4	0	0-4	81-94	63-94	55-90	45-75	27-43	9-12
	20-74	Channery silty clay loam, channery silt loam, channery loam, silty clay loam	GC-GM, SC, CL, CL-ML	A-5, A-4, A-7	0	0-24	69-96	39-96	34-96	30-89	20-45	4-15
	74-91	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	20-71	18-70	20-40	4-15
	91-101	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
LdF:												
Layland---------	0-3	Slightly decomposed plant material	PT	A-8	1-25	0	---	---	---	---	---	---
	3-5	Moderately decomposed plant material	PT	A-8	1-24	0	---	---	---	---	---	---
	5-15	Gravelly loam, very gravelly loam, silt loam	SM, GM, ML	A-2-5, A-7-5	0	0-38	20-90	17-90	15-90	11-69	42-78	10-12
	15-23	Gravelly loam, very gravelly loam, silt loam	SC, GC, ML	A-6, A-2-6	0	0-37	22-92	20-91	18-91	13-72	31-40	11-14
	23-117	Gravelly loam, very gravelly loam, silt loam	SC, GC	A-6, A-2-6	0-35	0-45	25-93	23-93	20-93	15-72	28-39	12-18
	117-145	Very gravelly loam, gravelly silt loam, extremely flaggy clay loam, extremely channery silty clay loam	SC, GC	A-6, A-2-6	4-60	23-93	11-79	8-78	7-78	5-65	27-38	11-20
	145-200	Very gravelly loam, gravelly silt loam, extremely flaggy clay loam, extremely channery silty clay loam	SC, GC	A-6, A-2-6	4-60	23-93	11-79	8-78	7-78	5-65	27-38	11-20
Clifftop--------	0-3	Slightly decomposed plant material	PT	A-8	1-25	0	---	---	---	---	---	---
	3-8	Channery silt loam	ML, CL, GC, GM	A-4, A-2	0	0-57	64-100	27-100	21-97	17-80	25-36	5-10
	8-20	Silt loam, channery silt loam, channery loam	ML, CL	A-6, A-4	0	0-5	81-94	63-94	55-90	45-75	27-43	9-12
	20-74	Channery silty clay loam, channery silt loam, channery loam, silty clay loam	GC-GM, SC, CL, CL-ML	A-5, A-4, A-7	0	0-24	69-96	39-96	34-96	30-89	20-45	4-15
	74-91	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	20-71	18-70	20-40	4-15
	91-101	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
LhE:												
Layland---------	0-3	Stony slightly decomposed plant material	PT	A-8	45-85	0	---	---	---	---	---	---
	3-5	Stony moderately decomposed plant material	PT	A-8	44-84	0	---	---	---	---	---	---
	5-15	Gravelly loam, very gravelly loam, silt loam	SM, GM, ML	A-2-5, A-7-5	0	0-38	20-90	17-90	15-90	11-69	42-78	10-12
	15-23	Gravelly loam, very gravelly loam, silt loam	SC, GC, ML	A-6, A-2-6	0	0-37	22-92	20-91	18-91	13-72	31-40	11-14
	23-117	Gravelly loam, very gravelly loam, silt loam	SC, GC	A-6, A-2-6	0-35	0-45	25-93	23-93	20-93	15-72	28-39	12-18
	117-145	Very gravelly loam, gravelly silt loam, extremely flaggy clay loam, extremely channery silty clay loam	SC, GC	A-6, A-2-6	4-60	23-93	11-79	8-78	7-78	5-65	27-38	11-20
	145-200	Very gravelly loam, gravelly silt loam, extremely flaggy clay loam, extremely channery silty clay loam	SC, GC	A-6, A-2-6	4-60	23-93	11-79	8-78	7-78	5-65	27-38	11-20

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
LhE:												
Laidig----------	0-2	Stony slightly decomposed plant material	PT	A-8	45-85	0	---	---	---	---	---	---
	2-9	Very gravelly loam, silt loam, gravelly highly organic loam	SM, GM, ML	A-2-5, A-4, A-5	0	0-14	39-89	30-87	23-83	16-62	0-69	NP-13
	9-19	Very gravelly loam, silt loam, gravelly loam	CL, GM, SM, CL-ML	A-6, A-4, A-2-6	0	0-12	47-91	39-89	33-88	24-69	26-44	7-17
	19-80	Very gravelly loam, silt loam, gravelly loam	CL, CL-ML, SC	A-6, A-4, A-2-6	0	0-13	56-97	44-95	36-92	27-73	23-38	7-18
	80-122	Very gravelly clay loam, gravelly silt loam, gravelly loam	CL, CL-ML, SC	A-6, A-4, A-2-6	0	0-10	50-92	42-91	35-91	26-74	25-44	9-24
	122-200	Gravelly loam, very gravelly clay loam, very gravelly sandy loam	SC, CL, CL-ML	A-6, A-4, A-2-6	0-13	0-31	44-93	32-90	26-90	18-69	22-40	6-21

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
LkE:												
Layland---------	0-3	Extremely bouldery slightly decomposed plant material	PT	A-8	85-99	0	---	---	---	---	---	---
	3-5	Extremely bouldery moderately decomposed plant material	PT	A-8	84-99	0	---	---	---	---	---	---
	5-15	Gravelly loam, very gravelly loam, silt loam	SM, GM, ML	A-2-5, A-7-5	0	0-38	20-90	17-90	15-90	11-69	42-78	10-12
	15-23	Gravelly loam, very gravelly loam, silt loam	SC, GC, ML	A-2-6, A-6	0	0-37	22-92	20-91	18-91	13-72	31-40	11-14
	23-117	Gravelly loam, very gravelly loam, silt loam	SC, GC	A-6, A-2-6	0-35	0-45	25-93	23-93	20-93	15-72	28-39	12-18
	117-145	Very gravelly loam, gravelly silt loam, extremely flaggy clay loam, extremely channery silty clay loam	SC, GC	A-6, A-2-6	4-60	23-93	11-79	8-78	7-78	5-65	27-38	11-20
	145-200	Very gravelly loam, gravelly silt loam, extremely flaggy clay loam, extremely channery silty clay loam	SC, GC	A-2-6, A-6	4-60	23-93	11-79	8-78	7-78	5-65	27-38	11-20
Laidig----------	0-2	Extremely bouldery slightly decomposed plant material	PT	A-8	85-99	0	---	---	---	---	---	---
	2-9	Gravelly highly organic loam, very gravelly loam, silt loam	SM, GM, ML	A-2-5, A-4, A-5	0	0-14	39-89	30-87	23-83	16-62	0-69	NP-13
	9-19	Gravelly loam, very gravelly loam, silt loam	CL, GM, SM, CL-ML	A-6, A-4, A-2-6	0	0-12	47-91	39-89	33-88	24-69	26-44	7-17
	19-80	Gravelly loam, very gravelly loam, silt loam	CL, CL-ML, SC	A-6, A-4, A-2-6	0	0-13	56-97	44-95	36-92	27-73	23-38	7-18
	80-122	Gravelly loam, very gravelly clay loam, gravelly silt loam	CL, CL-ML, SC	A-6, A-4, A-2-6	0	0-10	50-92	42-91	35-91	26-74	25-44	9-24
	122-200	Very gravelly sandy loam, gravelly loam, very gravelly clay loam	SC, CL, CL-ML	A-6, A-4, A-2-6	0-13	0-31	44-93	32-90	26-90	18-69	22-40	6-21

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
LmF:												
Layland---------	0-3	Extremely bouldery slightly decomposed plant material	PT	A-8	85-99	0	---	---	---	---	---	---
	3-5	Extremely bouldery moderately decomposed plant material	PT	A-8	84-99	0	---	---	---	---	---	---
	5-15	Gravelly loam, very gravelly loam, silt loam	SM, GM, ML	A-2-5, A-7-5	0	0-38	20-90	17-90	15-90	11-69	42-78	10-12
	15-23	Gravelly loam, very gravelly loam, silt loam	SC, GC, ML	A-6, A-2-6	0	0-37	22-92	20-91	18-91	13-72	31-40	11-14
	23-117	Gravelly loam, very gravelly loam, silt loam	SC, GC	A-6, A-2-6	0-35	0-45	25-93	23-93	20-93	15-72	28-39	12-18
	117-145	Very gravelly loam, gravelly silt loam, extremely flaggy clay loam, extremely channery silty clay loam	SC, GC	A-6, A-2-6	4-60	23-93	11-79	8-78	7-78	5-65	27-38	11-20
	145-200	Very gravelly loam, gravelly silt loam, extremely flaggy clay loam, extremely channery silty clay loam	SC, GC	A-6, A-2-6	4-60	23-93	11-79	8-78	7-78	5-65	27-38	11-20
Rock outcrop.												
LuC:												
Lithic Udorthents, leveled land---	0-10	Gravelly sandy loam, very gravelly clay loam, very gravelly loam, extremely channery silt loam	---	---	---	---	---	---	---	---	---	---
	10-22	Gravelly sandy loam, very gravelly clay loam, extremely channery silt loam, extremely channery loam	---	---	---	---	---	---	---	---	---	---
	22-32	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
LxG:												
Lithic Udorthents, cut land	0-10	Gravelly sandy loam, very gravelly clay loam, very gravelly loam, extremely channery silt loam	---	---	---	---	---	---	---	---	---	---
	10-22	Gravelly sandy loam, very gravelly clay loam, extremely channery silt loam, extremely channery loam	---	---	---	---	---	---	---	---	---	---
	22-32	Bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
NaB:												
Nallen	0-3	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	3-4	Moderately decomposed plant material	PT	A-8	0	0-7	---	---	---	---	---	---
	4-13	Loam	ML, SM, CL-ML	A-5, A-4	0	0-7	88-100	71-100	62-100	36-71	29-54	5-11
	13-23	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
	23-48	Channery sandy loam, loam, fine sandy loam	CL, SC, SC-SM	A-4, A-6	0	0-12	86-100	72-100	61-100	36-70	21-34	5-14
	48-86	Channery sandy loam, loam, very channery fine sandy loam	GC, GC-GM, CL	A-4, A-2-4, A-1-b	0	2-38	70-97	41-96	32-96	15-53	16-28	2-12
	86-96	Bedrock	---	---	---	---	---	---	---	---	---	---
NaC:												
Nallen	0-3	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	3-4	Moderately decomposed plant material	PT	A-8	0	0-7	---	---	---	---	---	---
	4-13	Loam	ML, SM, CL-ML	A-5, A-4	0	0-7	88-100	71-100	62-100	36-71	29-54	5-11
	13-23	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
	23-48	Channery sandy loam, loam, fine sandy loam	CL, SC, SC-SM	A-4, A-6	0	0-12	86-100	72-100	61-100	36-70	21-34	5-14
	48-86	Channery sandy loam, loam, very channery fine sandy loam	GC, GC-GM, CL	A-4, A-2-4, A-1-b	0	2-38	70-97	41-96	32-96	15-53	16-28	2-12
	86-96	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
NaD:												
Nallen----------	0-3	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	3-4	Moderately decomposed plant material	PT	A-8	0	0-7	---	---	---	---	---	---
	4-13	Loam	ML, SM, CL-ML	A-4, A-5	0	0-7	88-100	71-100	62-100	36-71	29-54	5-11
	13-23	Channery sandy loam, loam, fine sandy loam	ML, CL, SC, SM	A-4, A-5	0	0-13	85-100	70-100	60-100	38-73	22-44	4-14
	23-48	Channery sandy loam, loam, fine sandy loam	SC, SC-SM, CL	A-4, A-6	0	0-12	86-100	72-100	61-100	36-70	21-34	5-14
	48-86	Channery sandy loam, loam, very channery fine sandy loam	GC, GC-GM, CL	A-4, A-2-4, A-1-b	0	2-38	70-97	41-96	32-96	15-53	16-28	2-12
	86-96	Bedrock	---	---	---	---	---	---	---	---	---	---
PsA:												
Pope, rarely flooded--------	0-3	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	3-5	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	5-18	Sandy loam	SC-SM, SM, CL-ML, ML	A-4, A-2	0	0	87-100	63-100	43-88	20-52	15-20	NP-5
	18-81	Fine sandy loam, sandy loam, loam	SM, CL-ML, ML, SC-SM	A-4, A-2	0	0	95-100	77-100	50-92	22-56	15-30	NP-7
	81-200	Very gravelly sandy loam, loamy sand	SM, SC-SM, GM	A-4, A-2, A-1	0	0-12	61-100	14-100	10-87	4-49	15-30	NP-7
PvA:												
Pope, occasionally flooded--------	0-3	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	3-5	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	5-18	Sandy loam	SC-SM, SM, CL-ML, ML	A-4, A-2	0	0	87-100	63-100	43-88	20-52	15-20	NP-5
	18-81	Fine sandy loam, sandy loam, loam	SM, CL-ML, ML, SC-SM	A-4, A-2	0	0	95-100	77-100	50-92	22-56	15-30	NP-7
	81-200	Very gravelly sandy loam, loamy sand	SM, SC-SM, GM	A-4, A-2, A-1	0	0-12	61-100	14-100	10-87	4-49	15-30	NP-7

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
PvA: Craigsville, occasionally flooded--------	0-5	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	5-8	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	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
Rw. Riverwash, frequently flooded												
ThB: Typic Haplorthods, rarely flooded-	0-2	Stony slightly decomposed plant material	PT	A-8	45-85	0	---	---	---	---	---	---
	2-4	Stony moderately decomposed plant material	PT	A-8	24-42	24-58	---	---	---	---	---	---
	4-13	Highly organic sandy loam	SC-SM, SM, CL-ML, ML	A-4, A-2	0	0	87-100	63-100	45-88	21-52	15-20	NP-5
	13-33	Loamy sand, gravelly sandy loam, very cobbly sand	SC, GC, SM, SP	A-3, A-2, A-1	0-20	0-21	61-100	9-100	7-85	2-32	0-25	NP-7
	33-43	Gravelly loamy sand, sandy loam, very cobbly sandy loam	SP, SM	A-3, A-2, A-1	0-27	0-28	74-100	39-100	26-78	8-32	0-59	NP-7
	43-92	Very bouldery loamy sand, cobbly sandy loam, extremely stony sandy loam	SM, SP-SM, GP, GW	A-3, A-2, A-1	7-98	7-32	63-91	13-91	10-78	2-18	0-35	NP-6
	92-165	Very bouldery sand, very cobbly sand, extremely stony loamy sand	SM, SP-SM, GP, GW	A-3, A-2, A-1-b	27-94	6-31	61-88	7-88	6-78	2-29	0-23	NP-6

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >250 mm	Fragments: 75-250 mm	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	Cm				Pct	Pct					Pct	
UgC:												
Udorthents, graded---------	0-4	Gravelly sandy loam, very gravelly clay loam, very channery silt loam, extremely channery loam	---	---	---	---	---	---	---	---	---	---
	4-27	Gravelly sandy loam, very gravelly clay loam, very channery silt loam, extremely channery loam	---	---	---	---	---	---	---	---	---	---
	27-165	Gravelly sandy loam, very gravelly clay loam, extremely channery silt loam, extremely channery loam	---	---	---	---	---	---	---	---	---	---
UgF:												
Udorthents, graded---------	0-4	Gravelly sandy loam, very gravelly clay loam, very channery silt loam, extremely channery loam	---	---	---	---	---	---	---	---	---	---
	4-27	Gravelly sandy loam, very gravelly clay loam, very channery silt loam, extremely channery loam	---	---	---	---	---	---	---	---	---	---
	27-165	Gravelly sandy loam, very gravelly clay loam, extremely channery silt loam, extremely channery loam	---	---	---	---	---	---	---	---	---	---
Ur.												
Udorthents, railroad grade												

Table 20.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
Uu:												
Udorthents, highways-------	0-4	Gravelly sandy loam, very gravelly clay loam, very channery silt loam, extremely channery loam	---	---	---	---	---	---	---	---	---	---
	4-27	Gravelly sandy loam, very gravelly clay loam, very channery silt loam, extremely channery loam	---	---	---	---	---	---	---	---	---	---
	27-165	Gravelly sandy loam, very gravelly clay loam, extremely channery silt loam, extremely channery loam	---	---	---	---	---	---	---	---	0-35	NP-18
Urban land, highways.												
W. Water												
Wr. Water-Rubble land												

Table 21.—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. Soil properties are measured or inferred from direct observations in the field or laboratory)

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
AgC:									
Allegheny-------	0-1	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	1-4	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	4-26	30-50	30-50	15-27	1.20-1.40	4.2-14.1	0.08-0.22	0.0-2.9	1.0-4.0
	26-42	30-50	30-50	15-27	1.20-1.40	4.2-14.1	0.08-0.22	0.0-2.9	0.5-2.0
	42-165	30-55	20-45	18-38	1.20-1.50	1.4-14.1	0.13-0.18	0.0-2.9	0.0-0.5
BhG:									
Berks----------	0-2	0-0		0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	2-19	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
	19-28	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
	28-76	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
	76-98	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
	98-108	---	---	---	---	0.0-141.0	---	---	---
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
Sharondale------	0-5	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	5-38	24-56	24-49	15-34	0.77-1.19	14.1-42.3	0.06-0.17	2.0-4.1	2.8-12
	38-51	25-55	32-50	14-30	1.17-1.34	14.1-42.3	0.06-0.17	0.8-1.3	1.0-5.3
	51-160	17-60	29-55	9-28	1.19-1.53	14.1-42.3	0.05-0.14	0.4-1.8	0.5-4.3
	160-218	15-52	37-56	12-29	1.22-1.66	14.1-42.3	0.05-0.12	0.5-1.8	0.3-3.0
	218-228	---	---	---	---	0.4-14.1	---	---	---
BuC:									
Buchanan--------	0-3	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	3-20	43-85	0-50	0-20	1.20-1.40	4.0-14.0	0.14-0.20	0.0-2.9	1.0-3.0
	20-53	0-80	0-88	0-35	1.30-1.60	4.0-14.0	0.10-0.16	0.0-2.9	0.0-0.5
	53-152	0-80	0-88	0-35	1.30-1.60	0.4-1.4	0.10-0.16	0.0-2.9	0.0-0.5
	152-165	20-85	0-53	0-40	1.40-1.70	1.4-4.2	0.06-0.10	0.0-2.9	0.0-0.5

Table 21.—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
ClB:									
Clifftop--------	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	0.80-1.27	4.0-42.0	0.13-0.18	1.4-3.3	3.5-27
	8-20	10-42	35-65	14-23	1.11-1.56	4.0-42.0	0.11-0.18	0.4-3.0	0.4-4.3
	20-74	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
	74-91	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
	91-101	---	---	---	---	0.4-14.1	---	---	---
ClC:									
Clifftop--------	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	0.80-1.27	4.0-42.0	0.13-0.18	1.4-3.3	3.5-27
	8-20	10-42	35-65	14-23	1.11-1.56	4.0-42.0	0.11-0.18	0.4-3.0	0.4-4.3
	20-74	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
	74-91	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
	91-101	---	---	---	---	0.4-14.1	---	---	---
ClD:									
Clifftop--------	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	0.80-1.27	4.0-42.0	0.13-0.18	1.4-3.3	3.5-27
	8-20	10-42	35-65	14-23	1.11-1.56	4.0-42.0	0.11-0.18	0.4-3.0	0.4-4.3
	20-74	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
	74-91	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
	91-101	---	---	---	---	0.4-14.1	---	---	---
ClE:									
Clifftop--------	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	0.80-1.27	4.0-42.0	0.13-0.18	1.4-3.3	3.5-27
	8-20	10-42	35-65	14-23	1.11-1.56	4.0-42.0	0.11-0.18	0.4-3.0	0.4-4.3
	20-74	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
	74-91	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
	91-99	---	---	---	---	0.4-14.1	---	---	---
CmC:									
Clifftop--------	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	0.80-1.27	4.0-42.0	0.13-0.18	1.4-3.3	3.5-27
	8-20	10-42	35-65	14-23	1.11-1.56	4.0-42.0	0.11-0.18	0.4-3.0	0.4-4.3
	20-74	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
	74-91	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
	91-101	---	---	---	---	0.4-14.1	---	---	---

Table 21.—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
CwB:									
Cottonbend------	0-1	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	1-8	25-50	30-50	8-25	1.35-1.50	4.0-14.0	0.14-0.21	0.0-2.9	0.5-4.0
	8-20	25-65	15-50	8-27	1.40-1.55	4.0-14.0	0.09-0.19	0.0-2.9	0.5-3.0
	20-61	10-65	15-60	15-35	1.40-1.55	4.0-14.0	0.07-0.19	0.0-2.9	0.0-1.5
	61-102	10-65	15-60	18-35	1.40-1.55	4.0-14.0	0.07-0.19	0.0-2.9	0.0-0.5
	102-128	10-65	15-60	18-35	1.40-1.55	4.0-14.0	0.05-0.19	0.0-2.9	0.0-0.5
	128-200	10-65	15-50	15-50	1.40-1.60	4.0-14.0	0.05-0.19	0.0-2.9	0.0-0.5
CwC:									
Cottonbend------	0-1	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	1-8	25-50	30-50	8-25	1.35-1.50	4.0-14.0	0.14-0.21	0.0-2.9	0.5-4.0
	8-20	25-65	15-50	8-27	1.40-1.55	4.0-14.0	0.09-0.19	0.0-2.9	0.5-3.0
	20-61	10-65	15-60	15-35	1.40-1.55	4.0-14.0	0.07-0.19	0.0-2.9	0.0-1.5
	61-102	10-65	15-60	18-35	1.40-1.55	4.0-14.0	0.07-0.19	0.0-2.9	0.0-0.5
	102-128	10-65	15-60	18-35	1.40-1.55	4.0-14.0	0.05-0.19	0.0-2.9	0.0-0.5
	128-200	10-65	15-50	15-50	1.40-1.60	4.0-14.0	0.05-0.19	0.0-2.9	0.0-0.5
DkC:									
Dekalb----------	0-1	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	1-3	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	3-8	35-70	22-45	3-14	0.80-1.20	42.0-141.0	0.15-0.45	2.0-2.2	8.0-20
	8-20	35-70	24-46	5-18	1.10-1.20	42.0-141.0	0.08-0.12	0.5-1.4	2.0-7.0
	20-65	35-70	24-46	5-20	1.20-1.50	42.0-141.0	0.06-0.12	0.4-1.8	1.0-2.5
	65-80	35-90	16-44	5-18	1.20-1.50	42.0-141.0	0.05-0.10	0.4-1.3	0.3-2.0
	80-90	---	---	---	---	1.4-141.1	---	---	---
DrE:									
Dekalb----------	0-1	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	1-3	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	3-8	35-70	22-45	3-14	0.80-1.20	42.0-141.0	0.15-0.45	2.0-2.2	8.0-20
	8-20	35-70	24-46	5-18	1.10-1.20	42.0-141.0	0.08-0.12	0.5-1.4	2.0-7.0
	20-65	35-70	24-46	5-20	1.20-1.50	42.0-141.0	0.06-0.12	0.4-1.8	1.0-2.5
	65-80	35-90	16-44	5-18	1.20-1.50	42.0-141.0	0.05-0.10	0.4-1.3	0.3-2.0
	80-90	---	---	---	---	1.4-141.1	---	---	---

Table 21.—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
FeB:									
Fenwick---------	0-3	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	3-8	14-50	35-60	10-27	0.80-1.27	4.0-42.0	0.13-0.18	1.4-3.3	3.5-21
	8-23	14-50	35-60	10-27	1.01-1.21	4.0-42.0	0.12-0.16	0.4-3.0	3.0-6.0
	23-66	10-52	28-60	20-35	1.25-1.60	4.0-14.0	0.10-0.16	1.2-2.9	0.2-1.5
	66-86	10-52	28-60	18-35	1.25-1.60	1.4-4.0	0.10-0.16	1.2-2.9	0.2-1.5
	86-99	10-60	28-60	15-30	1.40-1.70	1.4-4.0	0.08-0.14	1.0-2.9	0.1-0.3
	99-109	---	---	---	---	0.0-4.2	---	---	---
FeC:									
Fenwick---------	0-3	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	3-8	14-50	35-60	10-27	0.80-1.27	4.0-42.0	0.13-0.18	1.4-3.3	3.5-21
	8-23	14-50	35-60	10-27	1.01-1.21	4.0-42.0	0.12-0.16	0.4-3.0	3.0-6.0
	23-66	10-52	28-60	20-35	1.25-1.60	4.0-14.0	0.10-0.16	1.2-2.9	0.2-1.5
	66-86	10-52	28-60	18-35	1.25-1.60	1.4-4.0	0.10-0.16	1.2-2.9	0.2-1.5
	86-99	10-60	28-60	15-30	1.40-1.70	1.4-4.0	0.08-0.14	1.0-2.9	0.1-0.3
	99-109	---	---	---	---	0.0-4.2	---	---	---
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
LaC:									
Laidig----------	0-2	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	2-9	23-50	34-59	1-21	0.80-1.20	14.0-42.0	0.15-0.45	0.2-1.0	4.4-18
	9-19	24-51	34-57	12-26	1.10-1.35	14.0-42.0	0.12-0.22	0.2-1.5	2.0-4.4
	19-80	20-51	36-56	12-27	1.35-1.60	4.2-14.0	0.09-0.17	0.2-2.0	0.3-0.8
	80-122	24-52	31-52	15-35	1.35-1.65	4.2-14.0	0.09-0.17	0.6-1.7	0.2-0.7
	122-200	24-63	25-50	11-31	1.55-1.80	0.4-1.4	0.03-0.12	0.3-1.4	0.2-0.3
LbC:									
Laidig----------	0-2	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	2-9	23-50	34-59	1-21	0.80-1.20	14.0-42.0	0.15-0.45	0.2-1.0	4.4-18
	9-19	24-51	34-57	12-26	1.10-1.35	14.0-42.0	0.12-0.22	0.2-1.5	2.0-4.4
	19-80	20-51	36-56	12-27	1.35-1.60	4.2-14.0	0.09-0.17	0.2-2.0	0.3-0.8
	80-122	24-52	31-52	15-35	1.35-1.65	4.2-14.0	0.09-0.17	0.6-1.7	0.2-0.7
	122-200	24-63	25-50	11-31	1.55-1.80	0.4-1.4	0.03-0.12	0.3-1.4	0.2-0.3

Table 21.—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
LcE:									
Laidig----------	0-2	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	2-9	23-50	34-59	1-21	0.80-1.20	14.0-42.0	0.15-0.45	0.2-1.0	4.4-18
	9-19	24-51	34-57	12-26	1.10-1.35	14.0-42.0	0.12-0.22	0.2-1.5	2.0-4.4
	19-80	20-51	36-56	12-27	1.35-1.60	4.2-14.0	0.09-0.17	0.2-2.0	0.3-0.8
	80-122	24-52	31-52	15-35	1.35-1.65	4.2-14.0	0.09-0.17	0.6-1.7	0.2-0.7
	122-200	24-63	25-50	11-31	1.55-1.80	0.4-1.4	0.03-0.12	0.3-1.4	0.2-0.3
Clifftop--------	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	0.80-1.27	4.0-42.0	0.13-0.18	1.4-3.3	3.5-27
	8-20	10-42	35-65	14-23	1.11-1.56	4.0-42.0	0.11-0.18	0.4-3.0	0.4-4.3
	20-74	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
	74-91	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
	91-101	---	---	---	---	0.4-14.1	---	---	---
LdF:									
Layland---------	0-3	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	3-5	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	5-15	28-43	36-54	16-20	1.04-1.07	14.1-42.3	0.08-0.18	1.9-2.7	7.0-22
	15-23	26-44	35-55	17-21	1.19-1.33	4.2-14.1	0.08-0.18	1.4-2.1	2.0-4.5
	23-117	23-45	34-53	18-26	1.43-1.66	4.2-14.1	0.08-0.18	0.4-2.1	0.2-1.6
	117-145	10-43	39-61	17-29	1.31-1.68	4.2-14.1	0.06-0.13	0.5-1.3	0.2-0.6
	145-200	10-43	39-61	17-29	1.31-1.68	4.2-14.1	0.06-0.13	0.5-1.3	0.1-0.5
Clifftop--------	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	0.80-1.27	4.0-42.0	0.13-0.18	1.4-3.3	3.5-27
	8-20	10-42	35-65	14-23	1.11-1.56	4.0-42.0	0.11-0.18	0.4-3.0	0.4-4.3
	20-74	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
	74-91	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
	91-101	---	---	---	---	0.4-14.1	---	---	---
LhE:									
Layland---------	0-3	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	3-5	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	5-15	28-43	36-54	16-20	1.04-1.07	14.1-42.3	0.08-0.18	1.9-2.7	7.0-22
	15-23	26-44	35-55	17-21	1.19-1.33	4.2-14.1	0.08-0.18	1.4-2.1	2.0-4.5
	23-117	23-45	34-53	18-26	1.43-1.66	4.2-14.1	0.08-0.18	0.4-2.1	0.2-1.6
	117-145	10-43	39-61	17-29	1.31-1.68	4.2-14.1	0.06-0.13	0.5-1.3	0.2-0.6
	145-200	10-43	39-61	17-29	1.31-1.68	4.2-14.1	0.06-0.13	0.5-1.3	0.1-0.5

Table 21.—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
LhE:									
Laidig----------	0-2	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	2-9	23-50	34-59	1-21	0.80-1.20	14.0-42.0	0.15-0.45	0.2-1.0	4.4-18
	9-19	24-51	34-57	12-26	1.10-1.35	14.0-42.0	0.12-0.22	0.2-1.5	2.0-4.4
	19-80	20-51	36-56	12-27	1.35-1.60	4.2-14.0	0.09-0.17	0.2-2.0	0.3-0.8
	80-122	24-52	31-52	15-35	1.35-1.65	4.2-14.0	0.09-0.17	0.6-1.7	0.2-0.7
	122-200	24-63	25-50	11-31	1.55-1.80	0.4-1.4	0.03-0.12	0.3-1.4	0.2-0.3
LkE:									
Layland---------	0-3	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	3-5	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	5-15	28-43	36-54	16-20	1.04-1.07	14.1-42.3	0.08-0.18	1.9-2.7	7.0-22
	15-23	26-44	35-55	17-21	1.19-1.33	4.2-14.1	0.08-0.18	1.4-2.1	2.0-4.5
	23-117	23-45	34-53	18-26	1.43-1.66	4.2-14.1	0.08-0.18	0.4-2.1	0.2-1.6
	117-145	10-43	39-61	17-29	1.31-1.68	4.2-14.1	0.06-0.13	0.5-1.3	0.2-0.6
	145-200	10-43	39-61	17-29	1.31-1.68	4.2-14.1	0.06-0.13	0.5-1.3	0.1-0.5
Laidig----------	0-2	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	2-9	23-50	34-59	1-21	0.80-1.20	14.0-42.0	0.15-0.45	0.2-1.0	4.4-18
	9-19	24-51	34-57	12-26	1.10-1.35	14.0-42.0	0.12-0.22	0.2-1.5	2.0-4.4
	19-80	20-51	36-56	12-27	1.35-1.60	4.2-14.0	0.09-0.17	0.2-2.0	0.3-0.8
	80-122	24-52	31-52	15-35	1.35-1.65	4.2-14.0	0.09-0.17	0.6-1.7	0.2-0.7
	122-200	24-63	25-50	11-31	1.55-1.80	0.4-1.4	0.03-0.12	0.3-1.4	0.2-0.3
LmF:									
Layland---------	0-3	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	3-5	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	5-15	28-43	36-54	16-20	1.04-1.07	14.1-42.3	0.08-0.18	1.9-2.7	7.0-22
	15-23	26-44	35-55	17-21	1.19-1.33	4.2-14.1	0.08-0.18	1.4-2.1	2.0-4.5
	23-117	23-45	34-53	18-26	1.43-1.66	4.2-14.1	0.08-0.18	0.4-2.1	0.2-1.6
	117-145	10-43	39-61	17-29	1.31-1.68	4.2-14.1	0.06-0.13	0.5-1.3	0.2-0.6
	145-200	10-43	39-61	17-29	1.31-1.68	4.2-14.1	0.06-0.13	0.5-1.3	0.1-0.5
LuC:									
Lithic Udorthents, leveled land---	0-10	20-70	10-79	0-35	---	---	0.04-0.10	---	0.0-0.5
	10-22	0-70	10-79	0-35	---	---	0.04-0.10	---	0.0-0.1
	22-32	---	---	---	---	0.0-10.0	---	---	---

Table 21.—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
LxG:									
Lithic Udorthents, cut land	0-10	20-70	10-79	0-35	---	---	0.04-0.10	---	0.0-0.5
	10-22	0-70	10-79	0-35	---	---	0.04-0.10	---	0.0-0.1
	22-32	---	---	---	---	0.0-10.0	---	---	---
NaB:									
Nallen	0-3	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	3-4	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	4-13	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
	13-23	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
	23-48	29-65	24-49	9-21	1.26-1.56	14.0-42.0	0.09-0.17	0.4-2.4	0.5-1.2
	48-86	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
	86-96	---	---	---	---	0.4-14.1	---	---	---
NaC:									
Nallen	0-3	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	3-4	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	4-13	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
	13-23	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
	23-48	29-65	24-49	9-21	1.26-1.56	14.0-42.0	0.09-0.17	0.4-2.4	0.5-1.2
	48-86	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
	86-96	---	---	---	---	0.4-14.1	---	---	---
NaD:									
Nallen	0-3	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	3-4	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	4-13	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
	13-23	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
	23-48	29-65	24-49	9-21	1.26-1.56	14.0-42.0	0.09-0.17	0.4-2.4	0.5-1.2
	48-86	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
	86-96	---	---	---	---	0.4-14.1	---	---	---

Table 21.—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
PsA:									
Pope, rarely flooded--------	0-3	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	3-5	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	5-18	43-85	0-50	0-20	1.20-1.40	14.0-42.0	0.10-0.16	0.0-2.9	1.0-4.0
	18-81	23-85	0-50	0-27	1.30-1.60	4.0-42.0	0.10-0.18	0.0-2.9	0.3-2.0
	81-200	43-90	0-50	0-20	1.30-1.60	4.0-42.0	0.10-0.18	0.0-2.9	0.3-1.6
PvA:									
Pope, occasionally flooded--------	0-3	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	3-5	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	5-18	43-85	0-50	0-20	1.20-1.40	14.0-42.0	0.10-0.16	0.0-2.9	1.0-4.0
	18-81	23-85	0-50	0-27	1.30-1.60	4.0-42.0	0.10-0.18	0.0-2.9	0.3-2.0
	81-200	43-90	0-50	0-20	1.30-1.60	4.0-42.0	0.10-0.18	0.0-2.9	0.3-1.6
Craigsville, occasionally 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
ThB:									
Typic Haplorthods, rarely flooded-	0-2	14-48	0	0-0	0.05-0.20	42.0-141.0	0.00-0.03	---	52-86
	2-4	16-52	0	0-0	0.10-0.20	42.0-141.0	0.03-0.08	---	48-84
	4-13	43-70	5-40	2-20	1.20-1.40	14.0-42.0	0.10-0.16	0.0-2.9	10-34
	13-33	60-90	2-15	2-12	1.40-1.60	42.3-141.1	0.06-0.10	0.0-2.9	0.0-0.5
	33-43	60-85	2-30	2-12	1.40-1.60	4.2-14.1	0.06-0.10	0.0-2.9	4.0-16
	43-92	60-85	2-40	2-10	1.40-1.60	42.3-141.1	0.04-0.10	0.0-2.9	1.0-6.0
	92-165	75-95	2-15	2-10	1.40-1.60	42.3-141.1	0.04-0.10	0.0-2.9	0.0-0.5
UgC:									
Udorthents, graded---------	0-4	---	---	0-35	---	---	---	---	0.0-0.5
	4-27	---	---	0-35	---	---	---	---	0.0-0.5
	27-165	---	---	0-35	---	---	---	---	0.0-0.1

Table 21.—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
UgF:									
Udorthents, graded---------	0-4	---	---	0-35	---	---	---	---	0.0-0.5
	4-27	---	---	0-35	---	---	---	---	0.0-0.5
	27-165	---	---	0-35	1.20-1.65	---	---	---	0.0-0.1
Uu:									
Udorthents, highways-------	0-4	0-70	10-79	0-35	---	---	---	---	0.0-0.5
	4-27	0-70	10-79	0-35	---	---	---	---	0.0-0.5
	27-165	0-70	10-79	0-35	---	---	---	---	0.0-0.1

Table 22.—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 (centimeters)	Erosion factors Kw	Kf	T	Wind erodibility group	Wind erodibility index
AgC:						
Allegheny	0-1	---	---	5	6	48
	1-4	---	---			
	4-26	.37	.37			
	26-42	.37	.37			
	42-165	.32	.32			
BhG:						
Berks	0-2	---	---	2	7	38
	2-19	.10	.28			
	19-28	.17	.37			
	28-76	.17	.43			
	76-98	.10	.49			
	98-108	---	---			
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			
Sharondale	0-5	---	---	5	7	38
	5-38	.10	.20			
	38-51	.15	.28			
	51-160	.10	.32			
	160-218	.10	.37			
	218-228	---	---			
BuC:						
Buchanan	0-3	---	---	3	3	86
	3-20	.32	.32			
	20-53	.20	.43			
	53-152	.20	.43			
	152-165	.15	.32			
ClB:						
Clifftop	0-3	---	---	3	6	48
	3-8	.20	.32			
	8-20	.37	.37			
	20-74	.24	.37			
	74-91	.10	.37			
	91-101	---	---			
ClC:						
Clifftop	0-3	---	---	3	6	48
	3-8	.20	.32			
	8-20	.37	.37			
	20-74	.24	.37			
	74-91	.10	.37			
	91-101	---	---			
ClD:						
Clifftop	0-3	---	---	3	6	48
	3-8	.20	.32			
	8-20	.37	.37			
	20-74	.24	.37			
	74-91	.10	.37			
	91-101	---	---			

Table 22.—Erosion Properties—Continued

Map unit symbol and soil name	Depth (centimeters)	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
ClE:						
Clifftop	0-3	---	---	3	6	48
	3-8	.20	.32			
	8-20	.37	.37			
	20-74	.24	.37			
	74-91	.10	.37			
	91-99	---	---			
CmC:						
Clifftop	0-3	---	---	3	6	48
	3-8	.20	.32			
	8-20	.37	.37			
	20-74	.24	.37			
	74-91	.10	.37			
	91-101	---	---			
CwB:						
Cottonbend	0-1	---	---	5	5	56
	1-8	.43	.43			
	8-20	.43	.43			
	20-61	.43	.43			
	61-102	.37	.37			
	102-128	.37	.37			
	128-200	.37	.37			
CwC:						
Cottonbend	0-1	---	---	5	5	56
	1-8	.43	.43			
	8-20	.43	.43			
	20-61	.43	.43			
	61-102	.37	.37			
	102-128	.37	.37			
	128-200	.37	.37			
DkC:						
Dekalb	0-1	---	---	2	6	48
	1-3	---	---			
	3-8	.05	.20			
	8-20	.10	.24			
	20-65	.10	.32			
	65-80	.10	.37			
	80-90	---	---			
DrE:						
Dekalb	0-1	---	---	2	6	48
	1-3	---	---			
	3-8	.05	.20			
	8-20	.10	.24			
	20-65	.10	.32			
	65-80	.10	.37			
	80-90	---	---			
Rock outcrop.						
FeB:						
Fenwick	0-3	---	---	2	5	56
	3-8	.37	.37			
	8-23	.32	.32			
	23-66	.37	.37			
	66-86	.43	.43			
	86-99	.43	.43			
	99-109	---	---			

Table 22.—Erosion Properties—Continued

Map unit symbol and soil name	Depth (centimeters)	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
FeC:						
Fenwick	0-3	---	---	2	5	56
	3-8	.37	.37			
	8-23	.32	.32			
	23-66	.37	.37			
	66-86	.43	.43			
	86-99	.43	.43			
	99-109	---	---			
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			
LaC:						
Laidig	0-2	---	---	4	6	48
	2-9	.15	.28			
	9-19	.20	.28			
	19-80	.24	.37			
	80-122	.24	.43			
	122-200	.20	.43			
LbC:						
Laidig	0-2	---	---	4	6	48
	2-9	.15	.28			
	9-19	.20	.28			
	19-80	.24	.37			
	80-122	.24	.43			
	122-200	.20	.43			
LcE:						
Laidig	0-2	---	---	4	6	48
	2-9	.15	.28			
	9-19	.20	.28			
	19-80	.24	.37			
	80-122	.24	.43			
	122-200	.20	.43			
Clifftop	0-3	---	---	3	6	48
	3-8	.20	.32			
	8-20	.37	.37			
	20-74	.24	.37			
	74-91	.10	.37			
	91-101	---	---			
LdF:						
Layland	0-3	---	---	4	6	48
	3-5	---	---			
	5-15	.15	.28			
	15-23	.20	.37			
	23-117	.15	.37			
	117-145	.10	.43			
	145-200	.10	.43			
Clifftop	0-3	---	---	3	6	48
	3-8	.20	.32			
	8-20	.37	.37			
	20-74	.24	.37			
	74-91	.10	.37			
	91-101	---	---			

Table 22.—Erosion Properties—Continued

Map unit symbol and soil name	Depth (centimeters)	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
LhE:						
Layland	0-3	---	---	4	6	48
	3-5	---	---			
	5-15	.15	.28			
	15-23	.20	.37			
	23-117	.15	.37			
	117-145	.10	.43			
	145-200	.10	.43			
Laidig	0-2	---	---	4	6	48
	2-9	.15	.28			
	9-19	.20	.28			
	19-80	.24	.37			
	80-122	.24	.43			
	122-200	.20	.43			
LkE:						
Layland	0-3	---	---	4	6	48
	3-5	---	---			
	5-15	.15	.28			
	15-23	.20	.37			
	23-117	.15	.37			
	117-145	.10	.43			
	145-200	.10	.43			
Laidig	0-2	---	---	4	6	48
	2-9	.15	.28			
	9-19	.20	.28			
	19-80	.24	.37			
	80-122	.24	.43			
	122-200	.20	.43			
LmF:						
Layland	0-3	---	---	4	6	48
	3-5	---	---			
	5-15	.15	.28			
	15-23	.20	.37			
	23-117	.15	.37			
	117-145	.10	.43			
	145-200	.10	.43			
Rock outcrop.						
LuC:						
Lithic Udorthents, leveled land	0-10	---	---	1	---	---
	10-22	---	---			
	22-32	---	---			
LxG:						
Lithic Udorthents, cut land	0-10	---	---	1	---	---
	10-22	---	---			
	22-32	---	---			
Rock outcrop.						
NaB:						
Nallen	0-3	---	---	2	5	56
	3-4	---	---			
	4-13	.24	.24			
	13-23	.32	.32			
	23-48	.37	.37			
	48-86	.24	.32			
	86-96	---	---			

Table 22.—Erosion Properties—Continued

Map unit symbol and soil name	Depth (centimeters)	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
NaC:						
Nallen	0-3	---	---	2	5	56
	3-4	---	---			
	4-13	.24	.24			
	13-23	.32	.32			
	23-48	.37	.37			
	48-86	.24	.32			
	86-96	---	---			
NaD:						
Nallen	0-3	---	---	2	5	56
	3-4	---	---			
	4-13	.24	.24			
	13-23	.32	.32			
	23-48	.37	.37			
	48-86	.24	.32			
	86-96	---	---			
PsA:						
Pope, rarely flooded	0-3	---	---	4	3	86
	3-5	---	---			
	5-18	.17	.17			
	18-81	.24	.24			
	81-200	.05	.15			
PvA:						
Pope, occasionally flooded	0-3	---	---	4	3	86
	3-5	---	---			
	5-18	.17	.17			
	18-81	.24	.24			
	81-200	.05	.15			
Craigsville, occasionally flooded	0-5	---	---	3	6	48
	5-8	---	---			
	8-21	.05	.17			
	21-60	.05	.24			
	60-200	.02	.05			
Rw.						
Riverwash, frequently flooded						
ThB:						
Typic Haplorthods, rarely flooded	0-2	---	---	2	3	86
	2-4	---	---			
	4-13	.17	.17			
	13-33	.15	.15			
	33-43	.24	.24			
	43-92	.05	.20			
	92-165	.02	.05			
UgC:						
Udorthents, graded	0-4	---	---	3	---	---
	4-27	---	---			
	27-165	---	---			
UgF:						
Udorthents, graded	0-4	---	---	3	---	---
	4-27	---	---			
	27-165	---	---			

Table 22.—Erosion Properties—Continued

Map unit symbol and soil name	Depth (centimeters)	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
Ur.						
Udorthents, railroad grade						
Uu:						
Udorthents, highways	0-4	---	---	3	---	---
	4-27	---	---			
	27-165	---	---			
Urban land, highways.						
W.						
Water						
Wr.						
Water-Rubble land						

Table 23.—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/m^2	kg/m^2
AgC:		
Allegheny (80%)	10	0
BhG:		
Berks (35%)	11	0
Highsplint (30%)	11	0
Sharondale (20%)	29	0
BuC:		
Buchanan (80%)	6	0
ClB:		
Clifftop (80%)	8	0
ClC:		
Clifftop (80%)	8	0
ClD:		
Clifftop (75%)	8	0
ClE:		
Clifftop (70%)	9	0
CmC:		
Clifftop (75%)	8	0
CwB:		
Cottonbend (90%)	8	0
CwC:		
Cottonbend (90%)	8	0
DkC:		
Dekalb (80%)	10	0
DrE:		
Dekalb (55%)	9	0
Rock outcrop (15%)	0	0

Table 23.—Total Soil Carbon—Continued

Map unit symbol, component name, and component percent	SOC	SIC
	kg/m^2	kg/m^2
FeB:		
Fenwick (85%)	13	0
FeC:		
Fenwick (85%)	13	0
HgE:		
Highsplint (70%)	10	0
LaC:		
Laidig (70%)	11	0
LbC:		
Laidig (75%)	10	0
LcE:		
Laidig (45%)	11	0
Clifftop (25%)	9	0
LdF:		
Layland (60%)	12	0
Clifftop (20%)	8	0
LhE:		
Layland (60%)	13	0
Laidig (25%)	10	0
LkE:		
Layland (55%)	10	0
Laidig (30%)	9	0
LmF:		
Layland (60%)	10	0
Rock outcrop (10%)	0	0
LuC:		
Lithic Udorthents, leveled land (85%)	0	0
LxG:		
Lithic Udorthents, cut land (50%)	0	0
Rock outcrop (40%)	0	0
NaB:		
Nallen (80%)	10	0
NaC:		
Nallen (75%)	10	0
NaD:		
Nallen (75%)	10	0
PsA:		
Pope, rarely flooded (85%)	19	0

Table 23.—Total Soil Carbon—Continued

Map unit symbol, component name, and component percent	SOC	SIC
	kg/m^2	kg/m^2
PvA:		
Pope, occasionally flooded (50%)	19	0
Craigsville, occasionally flooded (30%)	18	0
Rw:		
Riverwash, frequently flooded (95%)	0	0
ThB:		
Typic Haplorthods, rarely flooded (80%)	27	0
UgC:		
Udorthents, graded (85%)	0	0
UgF:		
Udorthents, graded (85%)	0	0
Ur:		
Udorthents, railroad grade (93%)	0	0
Uu:		
Udorthents, highways (70%)	0	0
Urban land, highways (25%)	0	0
W:		
Water (100%)	0	0
Wr:		
Water (75%)	0	0
Rubble land, frequently flooded (25%)	0	0

Table 24.—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
AgC:				
Allegheny	0-1	---	5.0-60.0	3.8-5.2
	1-4	---	10.0-75.0	3.5-5.0
	4-26	10.0-20.0	3.8-8.4	3.6-5.5
	26-42	10.0-20.0	3.8-8.4	3.6-5.5
	42-165	10.0-15.0	3.6-7.4	3.6-5.5
BhG:				
Berks	0-2	40.0-125.0	5.0-60.0	5.1-6.3
	2-19	13.8-24.6	6.0-14.1	4.2-6.1
	19-28	6.2-12.9	2.8-6.1	4.4-5.3
	28-76	5.5-12.8	1.8-6.8	4.4-5.2
	76-98	6.0-16.0	3.4-12.3	4.6-5.4
	98-108	---	---	---
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
Sharondale	0-5	40.0-125.0	5.0-60.0	5.3-6.3
	5-38	7.0-37.0	---	5.1-7.3
	38-51	6.4-20.0	---	5.1-7.3
	51-160	6.0-15.6	---	5.1-7.3
	160-218	6.2-14.6	---	5.1-7.3
	218-228	---	---	---
BuC:				
Buchanan	0-3	60.0-125.0	10.0-75.0	3.5-5.0
	3-20	4.8-13.5	3.6-10.1	3.6-5.5
	20-53	4.5-8.6	3.4-6.5	3.6-5.5
	53-152	4.5-8.6	3.4-6.5	3.6-5.5
	152-165	4.5-9.9	3.4-7.4	3.6-5.5
ClB:				
Clifftop	0-3	---	5.0-60.0	4.1-5.5
	3-8	8.0-53.0	5.0-19.0	3.5-5.5
	8-20	5.0-22.0	3.0-7.0	3.9-5.0
	20-74	5.0-15.0	3.0-11.0	4.2-5.2
	74-91	6.0-17.0	4.0-11.0	4.4-5.0
	91-101	---	---	---
ClC:				
Clifftop	0-3	---	5.0-60.0	4.1-5.5
	3-8	8.0-53.0	5.0-19.0	3.5-5.5
	8-20	5.0-22.0	3.0-7.0	3.9-5.0
	20-74	5.0-15.0	3.0-11.0	4.2-5.2
	74-91	6.0-17.0	4.0-11.0	4.4-5.0
	91-101	---	---	---
ClD:				
Clifftop	0-3	---	5.0-60.0	4.1-5.5
	3-8	8.0-53.0	5.0-19.0	3.5-5.5
	8-20	5.0-22.0	3.0-7.0	3.9-5.0
	20-74	5.0-15.0	3.0-11.0	4.2-5.2
	74-91	6.0-17.0	4.0-11.0	4.4-5.0
	91-101	---	---	---

Table 24.—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
ClE:				
Clifftop	0-3	---	5.0-60.0	4.1-5.5
	3-8	8.0-53.0	5.0-19.0	3.5-5.5
	8-20	5.0-22.0	3.0-7.0	3.9-5.0
	20-74	5.0-15.0	3.0-11.0	4.2-5.2
	74-91	6.0-17.0	4.0-11.0	4.4-5.0
	91-99	---	---	---
CmC:				
Clifftop	0-3	---	5.0-60.0	4.1-5.5
	3-8	8.0-53.0	5.0-19.0	3.5-5.5
	8-20	5.0-22.0	3.0-7.0	3.9-5.0
	20-74	5.0-15.0	3.0-11.0	4.2-5.2
	74-91	6.0-17.0	4.0-11.0	4.4-5.0
	91-101	---	---	---
CwB:				
Cottonbend	0-1	---	5.0-60.0	3.8-5.2
	1-8	2.9-9.3	---	4.5-6.0
	8-20	2.9-9.9	---	4.5-6.0
	20-61	---	2.7-8.4	3.5-5.5
	61-102	---	3.5-8.4	3.5-5.5
	102-128	---	3.5-8.4	3.5-5.5
	128-200	---	2.9-12.3	3.5-5.5
CwC:				
Cottonbend	0-1	---	5.0-60.0	3.8-5.2
	1-8	2.9-9.3	---	4.5-6.0
	8-20	2.9-9.9	---	4.5-6.0
	20-61	---	2.7-8.4	3.5-5.5
	61-102	---	3.5-8.4	3.5-5.5
	102-128	---	3.5-8.4	3.5-5.5
	128-200	---	2.9-12.3	3.5-5.5
DkC:				
Dekalb	0-1	---	5.0-60.0	3.8-5.0
	1-3	---	10.0-75.0	3.5-4.5
	3-8	11.0-68.0	7.8-13.5	3.5-5.5
	8-20	6.8-12.8	4.5-6.0	3.6-5.4
	20-65	3.4-7.4	1.6-7.2	3.6-5.4
	65-80	3.4-7.3	1.8-6.0	3.6-5.4
	80-90	---	---	---
DrE:				
Dekalb	0-1	---	5.0-60.0	3.8-5.0
	1-3	---	10.0-75.0	3.5-4.5
	3-8	11.0-68.0	7.8-13.5	3.5-5.5
	8-20	6.8-12.8	4.5-6.0	3.6-5.4
	20-65	3.4-7.4	1.6-7.2	3.6-5.4
	65-80	3.4-7.3	1.8-6.0	3.6-5.4
	80-90	---	---	---
FeB:				
Fenwick	0-3	---	10.0-75.0	3.9-5.3
	3-8	---	1.5-4.7	3.5-5.0
	8-23	---	1.6-4.8	4.0-5.0
	23-66	---	3.6-7.3	4.0-5.0
	66-86	---	3.2-7.3	4.0-5.0
	86-99	---	2.9-6.5	4.0-5.0
	99-109	---	---	---

Table 24.—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
FeC:				
Fenwick	0-3	---	10.0-75.0	3.9-5.3
	3-8	---	1.5-4.7	3.5-5.0
	8-23	---	1.6-4.8	4.0-5.0
	23-66	---	3.6-7.3	4.0-5.0
	66-86	---	3.2-7.3	4.0-5.0
	86-99	---	2.9-6.5	4.0-5.0
	99-109	---	---	---
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
LaC:				
Laidig	0-2	---	5.0-60.0	3.8-5.2
	2-9	9.9-62.9	4.5-16.8	3.9-4.3
	9-19	6.1-21.3	3.3-8.2	3.9-4.6
	19-80	4.4-9.2	2.4-4.9	4.4-4.8
	80-122	4.7-10.2	2.9-5.4	4.6-4.9
	122-200	3.8-9.9	2.3-4.3	4.4-5.1
LbC:				
Laidig	0-2	---	5.0-60.0	3.8-5.2
	2-9	9.9-62.9	4.5-16.8	3.9-4.3
	9-19	6.1-21.3	3.3-8.2	3.9-4.6
	19-80	4.4-9.2	2.4-4.9	4.4-4.8
	80-122	4.7-10.2	2.9-5.4	4.6-4.9
	122-200	3.8-9.9	2.3-4.3	4.4-5.1
LcE:				
Laidig	0-2	---	5.0-60.0	3.8-5.2
	2-9	9.9-62.9	4.5-16.8	3.9-4.3
	9-19	6.1-21.3	3.3-8.2	3.9-4.6
	19-80	4.4-9.2	2.4-4.9	4.4-4.8
	80-122	4.7-10.2	2.9-5.4	4.6-4.9
	122-200	3.8-9.9	2.3-4.3	4.4-5.1
Clifftop	0-3	---	5.0-60.0	4.1-5.5
	3-8	8.0-53.0	5.0-19.0	3.5-5.5
	8-20	5.0-22.0	3.0-7.0	3.9-5.0
	20-74	5.0-15.0	3.0-11.0	4.2-5.2
	74-91	6.0-17.0	4.0-11.0	4.4-5.0
	91-101	---	---	---
LdF:				
Layland	0-3	---	5.0-60.0	3.8-5.2
	3-5	---	10.0-75.0	3.5-5.0
	5-15	0.0-29.4	5.4-16.3	3.5-5.0
	15-23	6.9-9.3	4.3-6.4	3.5-5.0
	23-117	4.3-7.4	3.3-5.6	3.5-5.0
	117-145	6.5-7.8	4.9-9.5	3.5-5.0
	145-200	6.5-7.8	4.9-9.5	3.5-5.0

Table 24.—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
LdF:				
Clifftop	0-3	---	5.0-60.0	4.1-5.5
	3-8	8.0-53.0	5.0-19.0	3.5-5.5
	8-20	5.0-22.0	3.0-7.0	3.9-5.0
	20-74	5.0-15.0	3.0-11.0	4.2-5.2
	74-91	6.0-17.0	4.0-11.0	4.4-5.0
	91-101	---	---	---
LhE:				
Layland	0-3	---	5.0-60.0	3.8-5.2
	3-5	---	10.0-75.0	3.5-5.0
	5-15	0.0-29.4	5.4-16.3	3.5-5.0
	15-23	6.9-9.3	4.3-6.4	3.5-5.0
	23-117	4.3-7.4	3.3-5.6	3.5-5.0
	117-145	6.5-7.8	4.9-9.5	3.5-5.0
	145-200	6.5-7.8	4.9-9.5	3.5-5.0
Laidig	0-2	---	5.0-60.0	3.8-5.2
	2-9	9.9-62.9	4.5-16.8	3.9-4.3
	9-19	6.1-21.3	3.3-8.2	3.9-4.6
	19-80	4.4-9.2	2.4-4.9	4.4-4.8
	80-122	4.7-10.2	2.9-5.4	4.6-4.9
	122-200	3.8-9.9	2.3-4.3	4.4-5.1
LkE:				
Layland	0-3	---	5.0-60.0	3.8-5.2
	3-5	---	10.0-75.0	3.5-5.0
	5-15	0.0-29.4	5.4-16.3	3.5-5.0
	15-23	6.9-9.3	4.3-6.4	3.5-5.0
	23-117	4.3-7.4	3.3-5.6	3.5-5.0
	117-145	6.5-7.8	4.9-9.5	3.5-5.0
	145-200	6.5-7.8	4.9-9.5	3.5-5.0
Laidig	0-2	---	5.0-60.0	3.8-5.2
	2-9	9.9-62.9	4.5-16.8	3.9-4.3
	9-19	6.1-21.3	3.3-8.2	3.9-4.6
	19-80	4.4-9.2	2.4-4.9	4.4-4.8
	80-122	4.7-10.2	2.9-5.4	4.6-4.9
	122-200	3.8-9.9	2.3-4.3	4.4-5.1
LmF:				
Layland	0-3	---	5.0-60.0	3.8-5.2
	3-5	---	10.0-75.0	3.5-5.0
	5-15	0.0-29.4	5.4-16.3	3.5-5.0
	15-23	6.9-9.3	4.3-6.4	3.5-5.0
	23-117	4.3-7.4	3.3-5.6	3.5-5.0
	117-145	6.5-7.8	4.9-9.5	3.5-5.0
	145-200	6.5-7.8	4.9-9.5	3.5-5.0
LuC:				
Lithic Udorthents, leveled land	0-10	---	---	3.6-7.5
	10-22	---	---	3.6-7.5
	22-32	---	---	---
LxG:				
Lithic Udorthents, cut land	0-10	---	---	3.6-7.5
	10-22	---	---	3.6-7.5
	22-32	---	---	---

Table 24.—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
NaB:				
Nallen	0-3	---	5.0-60.0	3.8-5.0
	3-4	---	10.0-75.0	3.5-4.8
	4-13	6.0-17.0	3.5-11.0	3.5-5.0
	13-23	3.0-7.0	3.0-6.0	3.5-5.0
	23-48	3.0-6.0	2.3-4.7	3.5-5.0
	48-86	4.0-5.0	3.0-4.5	3.5-5.0
	86-96	---	---	---
NaC:				
Nallen	0-3	---	5.0-60.0	3.8-5.0
	3-4	---	10.0-75.0	3.5-4.8
	4-13	6.0-17.0	3.5-11.0	3.5-5.0
	13-23	3.0-7.0	3.0-6.0	3.5-5.0
	23-48	3.0-6.0	2.3-4.7	3.5-5.0
	48-86	4.0-5.0	3.0-4.5	3.5-5.0
	86-96	---	---	---
NaD:				
Nallen	0-3	---	5.0-60.0	3.8-5.0
	3-4	---	10.0-75.0	3.5-4.8
	4-13	6.0-17.0	3.5-11.0	3.5-5.0
	13-23	3.0-7.0	3.0-6.0	3.5-5.0
	23-48	3.0-6.0	2.3-4.7	3.5-5.0
	48-86	4.0-5.0	3.0-4.5	3.5-5.0
	86-96	---	---	---
PsA:				
Pope, rarely flooded	0-3	---	5.0-60.0	3.8-5.2
	3-5	---	10.0-75.0	3.5-5.0
	5-18	4.0-14.2	3.0-10.7	3.6-5.5
	18-81	2.4-10.8	1.8-8.1	3.6-5.5
	81-200	2.4-10.6	1.8-8.0	3.6-5.5
PvA:				
Pope, occasionally flooded	0-3	---	5.0-60.0	3.8-5.2
	3-5	---	10.0-75.0	3.5-5.0
	5-18	4.0-14.2	3.0-10.7	3.6-5.5
	18-81	2.4-10.8	1.8-8.1	3.6-5.5
	81-200	2.4-10.6	1.8-8.0	3.6-5.5
Craigsville, occasionally 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
ThB:				
Typic Haplorthods, rarely flooded	0-2	---	5.0-60.0	3.8-5.2
	2-4	---	10.0-75.0	3.5-5.0
	4-13	---	4.8-31.1	3.5-4.5
	13-33	---	0.1-4.5	3.5-4.5
	33-43	---	0.3-2.8	3.5-4.5
	43-92	---	0.3-2.7	3.5-5.0
	92-165	---	0.5-4.3	3.5-5.0

Table 24.—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
UgC:				
Udorthents, graded---	0-4	---	---	3.6-7.5
	4-27	---	---	3.6-7.5
	27-165	---	---	3.6-7.5
UgF:				
Udorthents, graded---	0-4	---	---	3.6-7.5
	4-27	---	---	3.6-7.5
	27-165	---	---	3.6-7.5
Uu:				
Udorthents, highways-	0-4	---	---	3.6-7.5
	4-27	---	---	3.6-7.5
	27-165	---	0.0-3.5	3.6-7.5

Table 25.—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				
AgC:									
Allegheny	B								
		---	---	---	---	---	---	---	---
BhG:									
Berks	B								
		---	---	---	---	---	---	---	---
Highsplint	B								
		---	---	---	---	---	---	---	---
Sharondale	A								
		---	---	---	---	---	---	---	---
BuC:									
Buchanan	C								
		January	61	84	---	---	None	---	None
		February	61	84	---	---	None	---	None
		March	61	84	---	---	None	---	None
		April	61	84	---	---	None	---	None
		May	61	84	---	---	None	---	None
		November	61	84	---	---	None	---	None
		December	61	84	---	---	None	---	None
ClB:									
Clifftop	C								
		---	---	---	---	---	---	---	---
ClC:									
Clifftop	C								
		---	---	---	---	---	---	---	---
ClD:									
Clifftop	C								
		---	---	---	---	---	---	---	---
ClE:									
Clifftop	C								
		---	---	---	---	---	---	---	---

Table 25.—Water Features—Continued

Map unit symbol and soil name	Hydro-logic 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				
CmC:									
Clifftop	C								
		---	---	---	---	---	---	---	---
CwB:									
Cottonbend	B								
		---	---	---	---	---	---	---	---
CwC:									
Cottonbend	B								
		---	---	---	---	---	---	---	---
DkC:									
Dekalb	A								
		---	---	---	---	---	---	---	---
DrE:									
Dekalb	A								
		---	---	---	---	---	---	---	---
Rock outcrop.									
FeB:									
Fenwick	C								
		January	48	99	---	---	None	---	None
		February	48	99	---	---	None	---	None
		March	48	99	---	---	None	---	None
		April	48	99	---	---	None	---	None
		November	48	99	---	---	None	---	None
		December	48	99	---	---	None	---	None
FeC:									
Fenwick	C								
		January	48	99	---	---	None	---	None
		February	48	99	---	---	None	---	None
		March	48	99	---	---	None	---	None
		April	48	99	---	---	None	---	None
		November	48	99	---	---	None	---	None
		December	48	99	---	---	None	---	None
HgE:									
Highsplint	B								
		---	---	---	---	---	---	---	---

Table 25.—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				
LaC:									
Laidig	C								
		January	80	122	---	---	None	---	None
		February	80	122	---	---	None	---	None
		March	80	122	---	---	None	---	None
LbC:									
Laidig	B								
		January	80	122	---	---	None	---	None
		February	80	122	---	---	None	---	None
		March	80	122	---	---	None	---	None
LcE:									
Laidig	C								
		January	80	122	---	---	None	---	None
		February	80	122	---	---	None	---	None
		March	80	122	---	---	None	---	None
Clifftop	C								
		---	---	---	---	---	---	---	---
LdF:									
Layland	B								
		---	---	---	---	---	---	---	---
Clifftop	C								
		---	---	---	---	---	---	---	---
LhE:									
Layland	B								
		---	---	---	---	---	---	---	---
Laidig	C								
		January	80	122	---	---	None	---	None
		February	80	122	---	---	None	---	None
		March	80	122	---	---	None	---	None
LkE:									
Layland	A								
		---	---	---	---	---	---	---	---
Laidig	B								
		January	80	122	---	---	None	---	None
		February	80	122	---	---	None	---	None
		March	80	122	---	---	None	---	None

Table 25.—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				
LmF:									
Layland	A								
		---	---	---	---	---	---	---	---
Rock outcrop.									
LuC:									
Lithic Udorthents, leveled land	D								
		---	---	---	---	---	---	---	---
LxG:									
Lithic Udorthents, cut land	D								
		---	---	---	---	---	---	---	---
Rock outcrop.									
NaB:									
Nallen	B								
		---	---	---	---	---	---	---	---
NaC:									
Nallen	B								
		---	---	---	---	---	---	---	---
NaD:									
Nallen	B								
		---	---	---	---	---	---	---	---
PsA:									
Pope, 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
PvA:									
Pope, occasionally flooded	A								
		January	---	---	---	---	None	Very brief	Occasional
		February	---	---	---	---	None	Very brief	Occasional
		March	---	---	---	---	None	Very brief	Occasional
		April	---	---	---	---	None	Very brief	Occasional
		May	---	---	---	---	None	Very brief	Occasional
		November	---	---	---	---	None	Very brief	Occasional
		December	---	---	---	---	None	Very brief	Occasional

Table 25.—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				
PvA:									
Craigsville, occasionally flooded--------	A								
		January	137	>200	---	---	None	Very brief	Occasional
		February	137	>200	---	---	None	Very brief	Occasional
		March	137	>200	---	---	None	Very brief	Occasional
		April	137	>200	---	---	None	Very brief	Occasional
		May	137	>200	---	---	None	Very brief	Occasional
		November	137	>200	---	---	None	Very brief	Occasional
		December	137	>200	---	---	None	Very brief	Occasional
Rw:									
Riverwash, frequently flooded----------	---								
		January	---	---	---	---	None	Long	Frequent
		February	---	---	---	---	None	Long	Frequent
		March	---	---	---	---	None	Long	Frequent
		April	---	---	---	---	None	Long	Frequent
		May	---	---	---	---	None	Long	Frequent
		November	---	---	---	---	None	Long	Frequent
		December	---	---	---	---	None	Long	Frequent
ThB:									
Typic Haplorthods, rarely flooded--------	B								
		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
UgC.									
Udorthents, graded									
UgF.									
Udorthents, graded									
Ur.									
Udorthents, railroad grade									
Uu.									
Udorthents-Urban land, highways									
W.									
Water									

Table 25.—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				
Wr:									
Water.									
Rubble land, frequently flooded----------	---								
		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

Table 26.—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	Thickness	Hardness		Uncoated steel	Concrete
		Cm	Cm				
AgC:							
Allegheny	No restriction	---	---	---	Moderate	Moderate	High
Cotaco	No restriction	---	---	---	Moderate	High	High
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Knowlton, occasionally ponded	No restriction	---	---	---	High	High	High
BhG:							
Berks	Lithic bedrock	51-102	---	Strongly cemented	Moderate	Moderate	High
Highsplint	No restriction	---	---	---	Moderate	Moderate	High
Sharondale	Paralithic bedrock	152-251	---	Moderately cemented	Moderate	Low	Moderate
Matewan	Lithic bedrock	51-102	---	Strongly cemented	Moderate	Moderate	High
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Rock outcrop	Lithic bedrock	0-0	---	Indurated	---	---	---
BuC:							
Buchanan	Fragipan	53-53	---	Noncemented	Moderate	High	High
Laidig	Fragipan	76-127	41-132	Noncemented	Moderate	High	High
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Morehead	No restriction	---	---	---	High	High	Moderate
ClB:							
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Nallen	Lithic bedrock	51-102	---	Indurated	Moderate	Moderate	High
Dekalb	Lithic bedrock	51-102	---	Indurated	Moderate	High	High

Table 26.—Soil Features—Continued

Map unit symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		Cm	Cm				
ClB:							
Cookport	Fragipan Lithic bedrock	41-76 102-183	---	Noncemented Strongly cemented	Moderate	High	High
Fenwick	Lithic bedrock	51-109	---	Strongly cemented	Moderate	High	High
ClC:							
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Nallen	Lithic bedrock	51-102	---	Indurated	Moderate	Moderate	High
Dekalb	Lithic bedrock	51-102	---	Indurated	Moderate	High	High
Fenwick	Lithic bedrock	51-109	---	Strongly cemented	Moderate	High	High
Cookport	Fragipan Lithic bedrock	41-76 102-183	---	Noncemented Strongly cemented	Moderate	High	High
ClD:							
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Nallen	Lithic bedrock	51-102	---	Indurated	Moderate	Moderate	High
Dekalb	Lithic bedrock	51-102	---	Indurated	Moderate	High	High
Laidig	Fragipan	76-127	41-132	Noncemented	Moderate	High	High
Layland	No restriction	---	---	---	Moderate	High	High
ClE:							
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Nallen	Lithic bedrock	51-102	---	Indurated	Moderate	Moderate	High
Dekalb	Lithic bedrock	51-102	---	Indurated	Moderate	High	High
Layland	No restriction	---	---	---	Moderate	High	High
CmC:							
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Dekalb	Lithic bedrock	51-102	---	Indurated	Moderate	High	High

Table 26.—Soil Features—Continued

Map unit symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		Cm	Cm				
CmC:							
Cookport	Fragipan	41-76	---	Noncemented	Moderate	High	High
	Lithic bedrock	102-183		Strongly cemented			
Fenwick	Lithic bedrock	51-109	---	Strongly cemented	Moderate	High	High
Nallen	Lithic bedrock	51-102	---	Indurated	Moderate	Moderate	High
CwB:							
Cottonbend	No restriction	---	---	---	Moderate	High	High
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Cotaco	No restriction	---	---	---	Moderate	High	High
CwC:							
Cottonbend	No restriction	---	---	---	Moderate	High	High
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Cotaco	No restriction	---	---	---	Moderate	High	High
DkC:							
Dekalb	Lithic bedrock	51-102	---	Indurated	Moderate	High	High
Fenwick	Lithic bedrock	51-109	---	Strongly cemented	Moderate	High	High
Nallen	Lithic bedrock	51-102	---	Indurated	Moderate	Moderate	High
DrE:							
Dekalb	Lithic bedrock	51-102	---	Indurated	Moderate	High	High
Rock outcrop	Lithic bedrock	0-0	---	Indurated	---	---	---
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Nallen	Lithic bedrock	51-102	---	Indurated	Moderate	Moderate	High
Layland	No restriction	---	---	---	Moderate	High	High
Totz	Lithic bedrock	25-51	---	Indurated	Low	Low	High

Table 26.—Soil Features—Continued

Map unit symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		Cm	Cm				
FeB:							
Fenwick	Lithic bedrock	51-109	---	Strongly cemented	Moderate	High	High
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Dekalb	Lithic bedrock	51-102	---	Indurated	Moderate	High	High
Laidig	Fragipan	76-127	41-132	Noncemented	Moderate	High	High
FeC:							
Fenwick	Lithic bedrock	51-109	---	Strongly cemented	Moderate	High	High
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Dekalb	Lithic bedrock	51-102	---	Indurated	Moderate	High	High
Laidig	Fragipan	76-127	41-132	Noncemented	Moderate	High	High
HgE:							
Highsplint	No restriction	---	---	---	Moderate	Moderate	High
Laidig	Fragipan	76-127	41-132	Noncemented	Moderate	High	High
Pineville	No restriction	---	---	---	Moderate	Moderate	High
Berks	Lithic bedrock	51-102	---	Strongly cemented	Moderate	Moderate	High
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Cotaco	No restriction	---	---	---	Moderate	High	High
LaC:							
Laidig	Fragipan	76-127	41-132	Noncemented	Moderate	High	High
Layland	No restriction	---	---	---	Moderate	High	High
Atkins, occasionally flooded	No restriction	---	---	---	High	High	Moderate
Philo, occasionally flooded	No restriction	---	---	---	Moderate	High	Moderate
Pope, occasionally flooded	No restriction	---	---	---	Moderate	Moderate	High
Rock outcrop	Lithic bedrock	0-0	---	Indurated	---	---	---

Table 26.—Soil Features—Continued

Map unit symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		Cm	Cm				
LbC:							
Laidig	Fragipan	76-127	41-132	Noncemented	Moderate	High	High
Layland	No restriction	---	---	---	Moderate	High	High
Philo, occassionally flooded	No restriction	---	---	---	Moderate	High	Moderate
Pope, occasionally flooded	No restriction	---	---	---	Moderate	Moderate	High
Rock outcrop	Lithic bedrock	0-0	---	Indurated	---	---	---
LcE:							
Laidig	Fragipan	76-127	41-132	Noncemented	Moderate	High	High
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Layland	No restriction	---	---	---	Moderate	High	High
Nallen	Lithic bedrock	51-102	---	Indurated	Moderate	Moderate	High
Buchanan	Fragipan	53-53	---	Noncemented	Moderate	High	High
LdF:							
Layland	No restriction	---	---	---	Moderate	High	High
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Nallen	Lithic bedrock	51-102	---	Indurated	Moderate	Moderate	High
Dekalb	Lithic bedrock	51-102	---	Indurated	Moderate	High	High
Laidig	Fragipan	76-127	41-132	Noncemented	Moderate	High	High
LhE:							
Layland	No restriction	---	---	---	Moderate	High	High
Laidig	Fragipan	76-127	41-132	Noncemented	Moderate	High	High
Dekalb	Lithic bedrock	51-102	---	Indurated	Moderate	High	High
Philo, occasionally flooded	No restriction	---	---	---	Moderate	High	Moderate
Rock outcrop	Lithic bedrock	0-0	---	Indurated	---	---	---

Table 26.—Soil Features—Continued

Map unit symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		Cm	Cm				
LkE:							
Layland	No restriction	---	---	---	Moderate	High	High
Laidig	Fragipan	76-127	41-132	Noncemented	Moderate	High	High
Buchanan	Fragipan	53-53	---	Noncemented	Moderate	High	High
Craigsville, occasionally flooded	No restriction	---	---	---	Moderate	Moderate	High
Pope, occasionally flooded	No restriction	---	---	---	Moderate	Moderate	High
Riverwash, frequently flooded	No restriction	---	---	---	---	---	---
Rock outcrop	Lithic bedrock	0-0	---	Indurated	---	---	---
LmF:							
Layland	No restriction	---	---	---	Moderate	High	High
Rock outcrop	Lithic bedrock	0-0	---	Indurated	---	---	---
Laidig	Fragipan	76-127	41-132	Noncemented	Moderate	High	High
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Dekalb	Lithic bedrock	51-102	---	Indurated	Moderate	High	High
Guyandotte	No restriction	---	---	---	Moderate	Moderate	Moderate
Rubble land	No restriction	---	---	---	---	---	---
Totz	Lithic bedrock	25-51	---	Indurated	Low	Low	High
LuC:							
Lithic Udorthents, leveled land	Lithic bedrock	10-50	---	Indurated	---	---	---
Udorthents, graded	No restriction	---	---	---	---	---	---
Rock outcrop	Lithic bedrock	0-0	---	Indurated	---	---	---
LxG:							
Lithic Udorthents, cut land	Lithic bedrock	10-50	---	Indurated	---	---	---
Rock outcrop	Lithic bedrock	0-0	---	Indurated	---	---	---
Udorthents, graded	No restriction	---	---	---	---	---	---

Table 26.—Soil Features—Continued

Map unit symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		Cm	Cm				
NaB:							
Nallen	Lithic bedrock	51-102	---	Indurated	Moderate	Moderate	High
Dekalb	Lithic bedrock	51-102	---	Indurated	Moderate	High	High
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Fenwick	Lithic bedrock	51-109	---	Strongly cemented	Moderate	High	High
NaC:							
Nallen	Lithic bedrock	51-102	---	Indurated	Moderate	Moderate	High
Dekalb	Lithic bedrock	51-102	---	Indurated	Moderate	High	High
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Cookport	Fragipan Lithic bedrock	41-76 102-183	---	Noncemented Strongly cemented	Moderate	High	High
Fenwick	Lithic bedrock	51-109	---	Strongly cemented	Moderate	High	High
NaD:							
Nallen	Lithic bedrock	51-102	---	Indurated	Moderate	Moderate	High
Clymer	Lithic bedrock	122-132	---	Strongly cemented	Moderate	Moderate	High
Clifftop	Paralithic bedrock	51-102	---	Moderately cemented	Moderate	Moderate	High
Dekalb	Lithic bedrock	51-102	---	Indurated	Moderate	High	High
Fenwick	Lithic bedrock	51-109	---	Strongly cemented	Moderate	High	High
PsA:							
Pope, rarely flooded	No restriction	---	---	---	Moderate	Moderate	High
Atkins, occasionally flooded	No restriction	---	---	---	High	High	Moderate
Philo, rarely flooded	No restriction	---	---	---	Moderate	High	Moderate
Riverwash, frequently flooded	No restriction	---	---	---	---	---	---

Table 26.—Soil Features—Continued

Map unit symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		Cm	Cm				
PvA:							
Pope, occasionally flooded	No restriction	---	---	---	Moderate	Moderate	High
Craigsville, occasionally flooded	No restriction	---	---	---	Moderate	Moderate	High
Philo, occasionally flooded	No restriction	---	---	---	Moderate	High	Moderate
Riverwash, frequently flooded	No restriction	---	---	---	---	---	---
Atkins, occasionally flooded	No restriction	---	---	---	High	High	Moderate
Rw:							
Riverwash, frequently flooded	No restriction	---	---	---	---	---	---
Rubble land, frequently flooded	No restriction	---	---	---	---	---	---
ThB:							
Typic Haplorthods, rarely flooded	No restriction	---	---	---	Low	High	High
Craigsville, occasionally flooded	No restriction	---	---	---	Low	Moderate	High
Pope, occasionally flooded	No restriction	---	---	---	Low	Moderate	High
Riverwash, frequently flooded	No restriction	---	---	---	---	---	---
UgC:							
Udorthents, graded	No restriction	---	---	---	---	---	---
Lithic Udorthents, leveled land	Lithic bedrock	10-50	---	Indurated	---	---	---
Rock outcrop	Lithic bedrock	0-0	---	Indurated	---	---	---
Urban land	No restriction	---	---	---	---	---	---
UgF:							
Udorthents, graded	No restriction	---	---	---	---	---	---
Lithic Udorthents, cut land	Lithic bedrock	10-50	---	Indurated	---	---	---
Rock outcrop	Lithic bedrock	0-0	---	Indurated	---	---	---
Ur:							
Udorthents, railroad grade	No restriction	---	---	---	---	---	---
Rock outcrop	Lithic bedrock	0-0	---	Indurated	---	---	---

Table 26.—Soil Features—Continued

Map unit symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		Cm	Cm				
Ur:							
Urban land	No restriction	---	---	---	---	---	---
Endoaquepts, frequently ponded	No restriction	---	---	---	High	High	High
Uu:							
Udorthents, highways	No restriction	---	---	---	---	---	---
Urban land, highways	No restriction	---	---	---	---	---	---
Rock outcrop	Lithic bedrock	0-0	---	Indurated	---	---	---
W:							
Water	No restriction	---	---	---	---	---	---
Wr:							
Water	No restriction	---	---	---	---	---	---
Rubble land, frequently flooded	No restriction	---	---	---	---	---	---

Table 27.—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
Allegheny	Fine-loamy, mixed, semiactive, mesic Typic Hapludults
Berks	Loamy-skeletal, mixed, active, mesic Typic Dystrudepts
Buchanan	Fine-loamy, mixed, semiactive, mesic Aquic Fragiudults
Clifftop	Fine-loamy, mixed, semiactive, mesic Typic Hapludults
Cottonbend	Fine-loamy, siliceous, semiactive, mesic Typic Paleudults
Craigsville	Loamy-skeletal, mixed, superactive, mesic Fluventic Dystrudepts
*Dekalb	Loamy-skeletal, siliceous, semiactive, mesic Typic Dystrudepts
Fenwick	Fine-loamy, mixed, semiactive, mesic Aquic Hapludults
Highsplint	Loamy-skeletal, mixed, active, mesic Typic Dystrudepts
*Laidig	Fine-loamy, siliceous, semiactive, mesic Typic Fragiudults
Layland	Loamy-skeletal, siliceous, semiactive, mesic Typic Dystrudepts
Lithic Udorthents	Lithic Udorthents
Nallen	Coarse-loamy, siliceous, semiactive, mesic Typic Hapludults
Pope	Coarse-loamy, mixed, active, mesic Fluventic Dystrudepts
Sharondale	Loamy-skeletal, mixed, active, mesic Typic Hapludolls
Typic Haplorthods	Loamy-skeletal, siliceous, active, mesic Typic Haplorthods
Udorthents	Udorthents

Table 28.—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

ENTISOLS
   Orthents
      Udorthents

            Udorthents--------------------Udorthents
         Lithic Udorthents
            Lithic Udorthents-------------Lithic Udorthents
   Psamments
      Quartzipsamments
         Lithic Quartzipsamments
            Totz--------------------------Mesic, coated Lithic Quartzipsamments

INCEPTISOLS
   Aquepts
      Endoaquepts
            Endoaquepts-------------------Endoaquepts
         Fluvaquentic Endoaquepts
            Atkins------------------------Fine-loamy, mixed, active, acid, mesic Fluvaquentic
                                           Endoaquepts
   Udepts
      Dystrudepts
         Fluvaquentic Dystrudepts
            Philo-------------------------Coarse-loamy, mixed, active, mesic Fluvaquentic Dystrudepts
         Fluventic Dystrudepts
            Pope--------------------------Coarse-loamy, mixed, active, mesic Fluventic Dystrudepts
            Craigsville-------------------Loamy-skeletal, mixed, superactive, mesic Fluventic
                                           Dystrudepts
         Typic Dystrudepts
            Berks-------------------------Loamy-skeletal, mixed, active, mesic Typic Dystrudepts
            Highsplint--------------------Loamy-skeletal, mixed, active, mesic Typic Dystrudepts
            Matewan-----------------------Loamy-skeletal, mixed, active, mesic Typic Dystrudepts
           *Dekalb------------------------Loamy-skeletal, siliceous, semiactive, mesic Typic Dystrudepts
            Layland-----------------------Loamy-skeletal, siliceous, semiactive, mesic Typic Dystrudepts
      Humudepts
         Typic Humudepts
            Guyandotte--------------------Loamy-skeletal, mixed, active, mesic Typic Humudepts

MOLLISOLS
   Udolls
      Hapludolls
         Typic Hapludolls
            Sharondale--------------------Loamy-skeletal, mixed, active, mesic Typic Hapludolls

SPODOSOLS
   Orthods
      Haplorthods
         Typic Haplorthods
            Typic Haplorthods-------------Loamy-skeletal, siliceous, active, mesic Typic Haplorthods
```

Table 28.—Soil Classification Key—Continued

```
ORDER
   Suborder
      Great Group
         Subgroup
            Series or Higher Category

ULTISOLS
   Aquults
      Endoaquults
         Typic Endoaquults
           *Knowlton----------------------Fine-loamy, mixed, semiactive, mesic Typic Endoaquults
   Udults
      Fragiudults
         Typic Fragiudults
           *Laidig------------------------Fine-loamy, siliceous, semiactive, mesic Typic Fragiudults
         Aquic Fragiudults
            Buchanan----------------------Fine-loamy, mixed, semiactive, mesic Aquic Fragiudults
           *Cookport----------------------Fine-loamy, mixed, semiactive, mesic Aquic Fragiudults
      Hapludults
         Typic Hapludults
            Nallen------------------------Coarse-loamy, siliceous, semiactive, mesic Typic Hapludults
           *Clymer------------------------Fine-loamy, mixed, active, mesic Typic Hapludults
            Pineville---------------------Fine-loamy, mixed, active, mesic Typic Hapludults
            Allegheny---------------------Fine-loamy, mixed, semiactive, mesic Typic Hapludults
            Clifftop----------------------Fine-loamy, mixed, semiactive, mesic Typic Hapludults
         Aquic Hapludults
            Cotaco------------------------Fine-loamy, mixed, semiactive, mesic Aquic Hapludults
            Fenwick-----------------------Fine-loamy, mixed, semiactive, mesic Aquic Hapludults
            Morehead----------------------Fine-silty, mixed, semiactive, mesic Aquic Hapludults
      Paleudults
         Typic Paleudults
            Cottonbend--------------------Fine-loamy, siliceous, semiactive, mesic Typic Paleudults
```

Appendices

Appendix 1.—West Virginia Grassland Suitability Groups

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Appendix 2.—Vegetation Classification and Mapping of Gauley River National Recreation Area, West Virginia

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