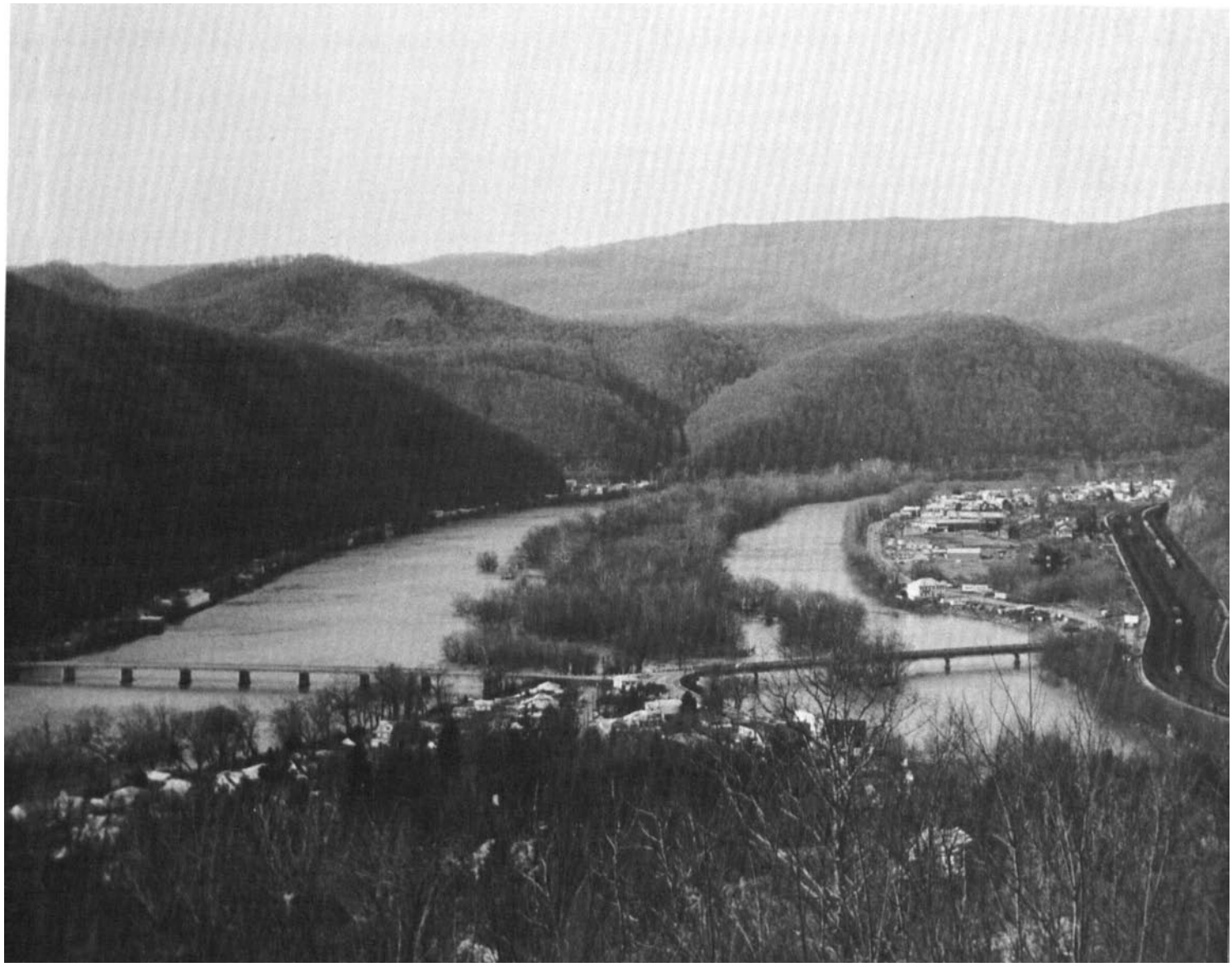
United States
Department of
Agriculture

Soil
Conservation
Service

In Cooperation with
West Virginia University
Agricultural and Forestry
Experiment Station

Soil Survey of Mercer and Summers Counties West Virginia



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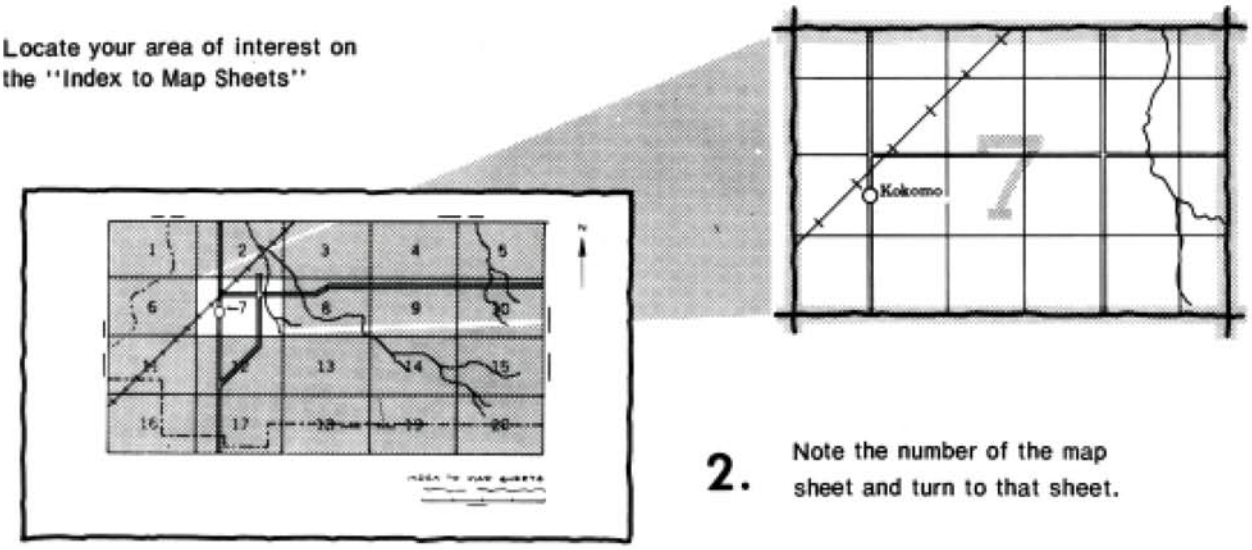

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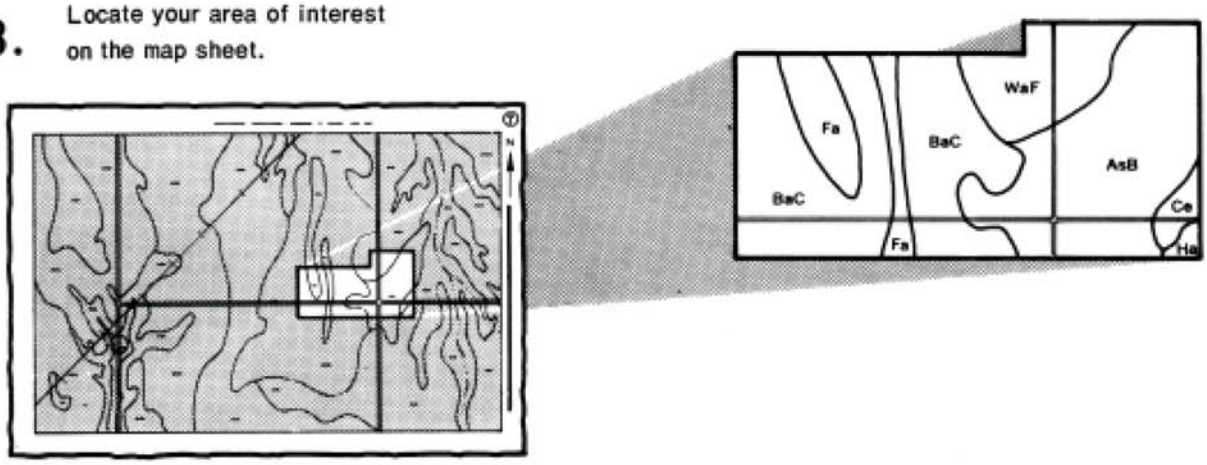

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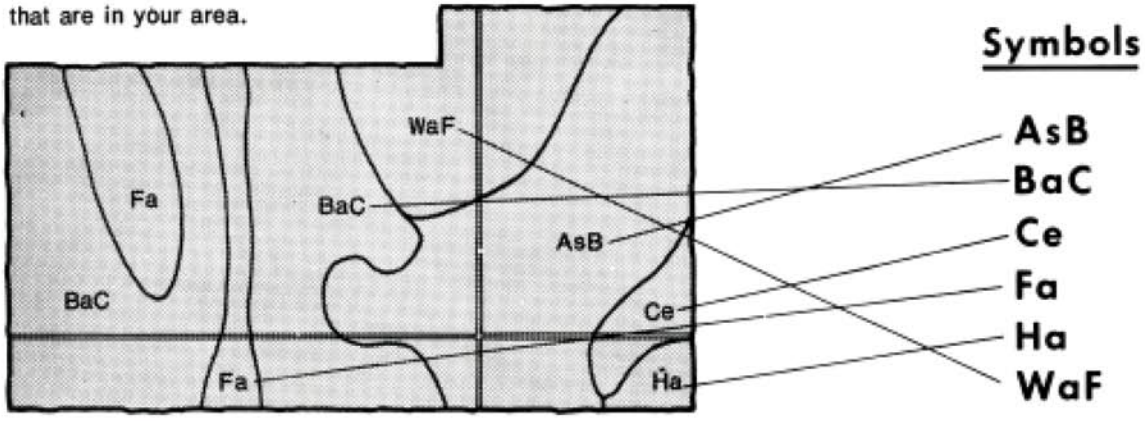

THIS SOIL SURVEY

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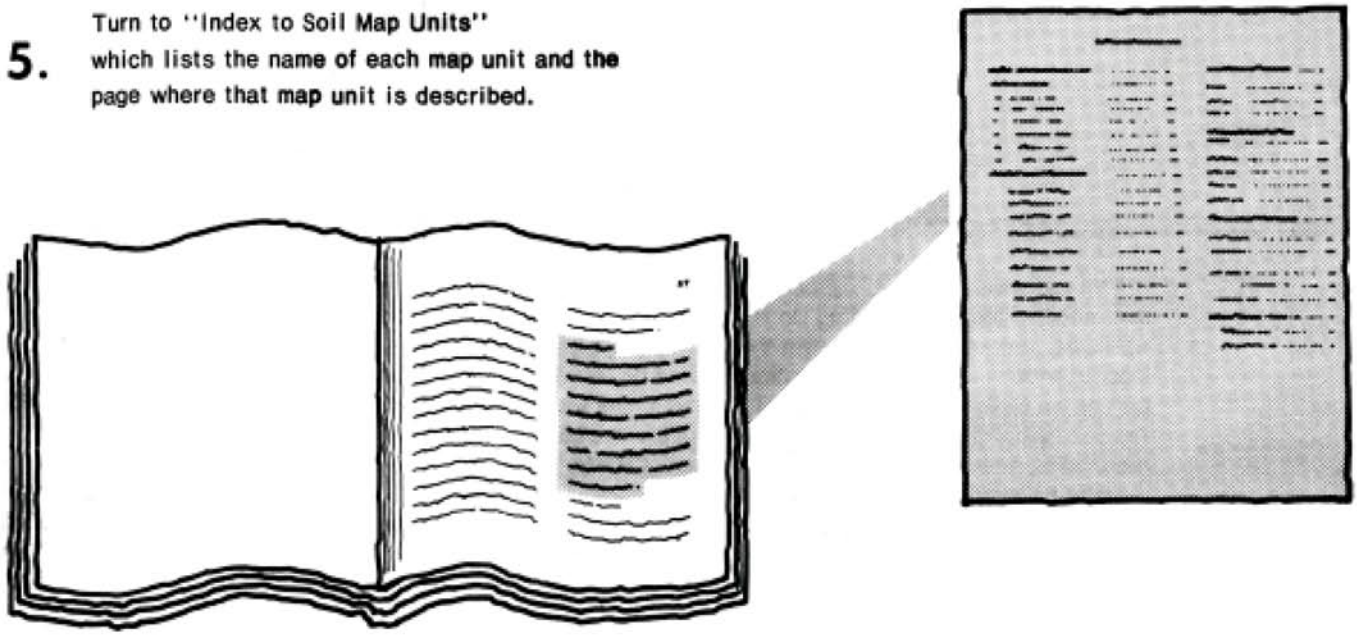
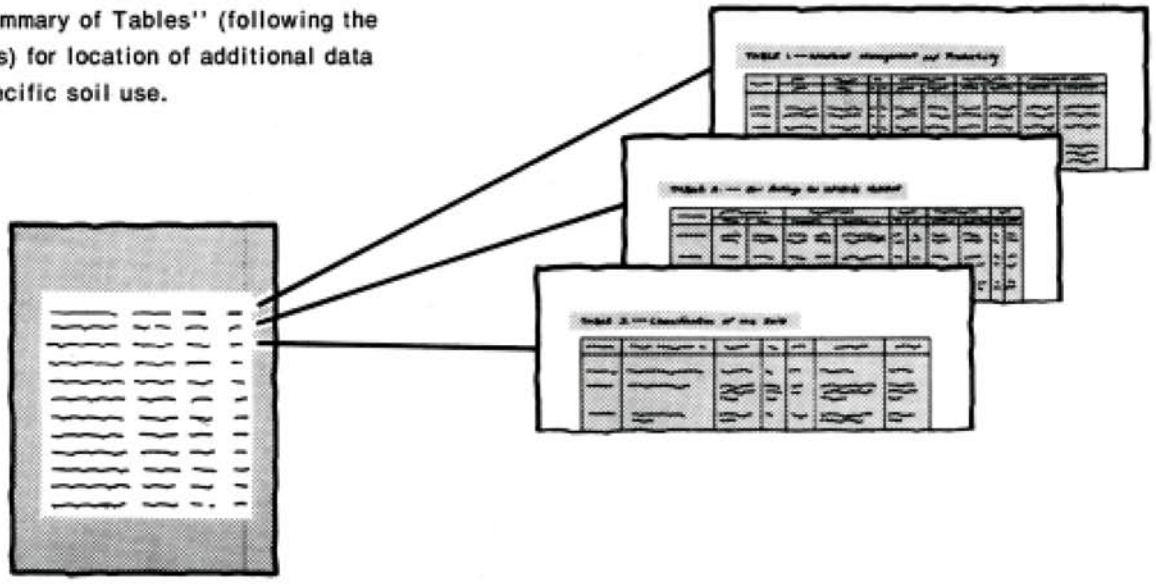


6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



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

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

Major fieldwork for this soil survey was performed in the period 1971-79. Soil names and descriptions were approved in 1979. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1979. This survey was made cooperatively by the Soil Conservation Service and the West Virginia University Agricultural and Forestry Experiment Station. It is part of the technical assistance furnished to the Southern Soil Conservation District.

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

Cover: Udifluvents and Psamments and Kanawha soils are dominant at the confluence of the New River and Greenbrier River.

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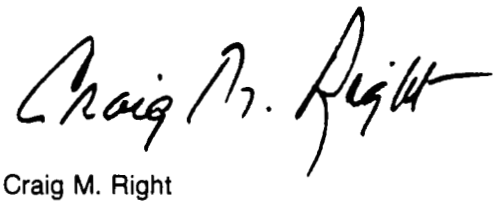
foreword

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

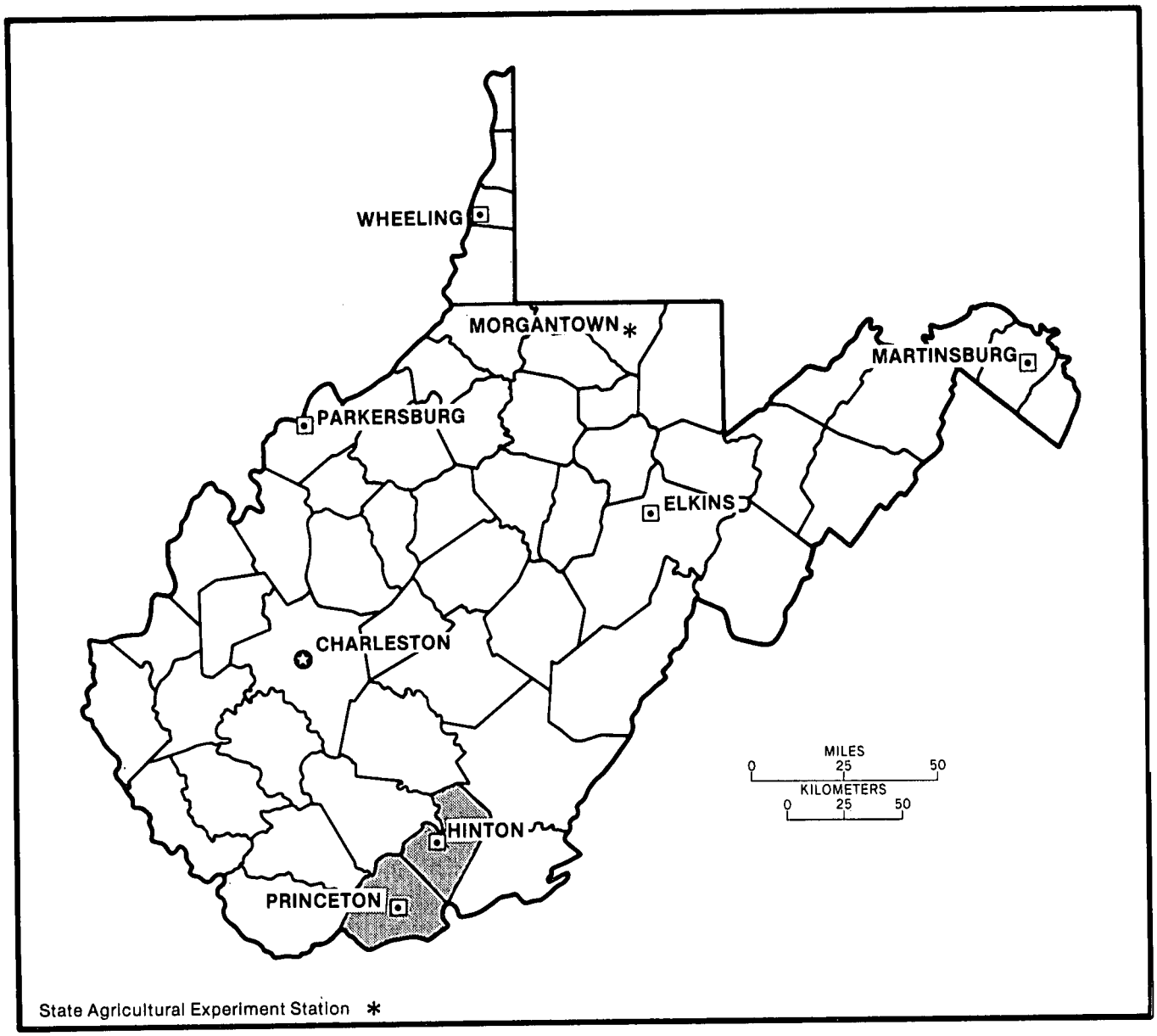
This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use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

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

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



Craig M. Right
State Conservationist
Soil Conservation Service



Location of Mercer and Summers Counties in West Virginia.

soil survey of
Mercer and Summers Counties
West Virginia

By Kelley N. Sponaugle, David E. McKinney, Linton Wright, Jr.,
Charles E. Nelson, Roy E. Pyle, and Claude L. Marra,
Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
in cooperation with
the West Virginia University Agricultural and Forestry Experiment Station

MERCER AND SUMMERS COUNTIES are in the southwestern part of West Virginia. The survey area is 781 square miles, or 499,840 acres. The major rivers in the area are the New, the Greenbrier, and the Bluestone.

Mercer County was formed from parts of Giles and Tazewell Counties, Virginia, in 1837. Bluefield, the largest city in Mercer County, is in the southwestern corner along the Virginia border. Princeton, the second largest city and the county seat, is in the south-central part of the county. The population of Mercer County in 1970 was 63,206.

Summers County was formed from parts of Monroe, Mercer, Greenbrier, and Fayette Counties in 1871. Hinton, the largest city and the county seat, is at the confluence of the Greenbrier River and the New River. The population of Summers County in 1970 was 13,213.

A network of State and Federal highways, two railroads, and an airport serve the transportation needs of the survey area. The mining and processing of coal and coal-related industries and railroads are the major sources of employment.

general nature of the survey area

This section provides information about farming in the survey area and describes the relief and drainage, the geology, and the climate.

farming

According to the 1974 Census of Agriculture (*8*), Mercer County had 328 farms and a total farm area of 54,421 acres, and Summers County had 297 farms and a total farm area of 45,360 acres.

The number of farms in the survey area decreased by 84 in Mercer County and 23 in Summers County between 1969 and 1974. During that period the average-size farm increased from 154 to 166 acres in Mercer County and decreased from 190 to 153 acres in Summers County.

Most of the farms in the area are used for raising beef cattle or sheep. There are a few dairy farms.

relief and drainage

Mercer and Summers Counties are in two major land resource areas (*7*). The northwestern quarter of Mercer County and the northwestern edge of Summers County are part of the Eastern Allegheny Plateau and Mountains. The rest of the survey area is part of the Southern Appalachian Ridges and Valleys. Elevation in the survey area ranges from 1,270 feet above sea level along the New River near Meadow Creek to 3,945 feet above sea level at Keeney Knob.

The two-county area is characterized by mountain ranges oriented in a northeast-southwest direction and by steep mountainsides, intramountain plateaus, very steep river gorges, and moderately wide and narrow valleys.

The topography of the western quarter of Mercer County consists of narrow ridgetops, steep and very steep mountainsides, and very narrow valleys. The topography of the southern part of Mercer County consists of parallel, mostly rounded ridges; steep side slopes; and narrow valleys. The rest of the survey is intramountain plateaus dissected by steep and very

steep river gorges. Most ridges are rounded and have steep and very steep sides. Steep and very steep mountains extend above the plateaus. The valleys are narrow along the major streams.

Most of Mercer County is drained by the New, East, and Bluestone Rivers and by Brush Creek and Brush Fork. Summers County is drained mainly by the New, Greenbrier, Meadow, and Bluestone Rivers and Meadow Creek and Lick Creek. All drainage from the survey area flows through the New River and into the Kanawha River, a tributary of the Ohio River.

geology

Gordon Bayles, geologist, Soil Conservation Service, assisted with the preparation of this section.

The landforms of Mercer and Summers Counties are the result of many forces acting throughout geologic history. The area is an eroded plateau through which the New, Greenbrier, and Bluestone rivers and their tributaries have cut deep V-shaped valleys. Most of the nearly level or gently sloping land is on hilltops on the old plateau.

surface rock

All the surface rocks of the survey area are of sedimentary origin but are in three distinctly different areas:

(1) Western Mercer and Summers Counties. West of the Bluestone River and along the McDowell-Mercer and Summers-Raleigh county lines, the New River and Pocahontas formations form an outcrop belt which becomes narrower to the northeast. These rocks generally dip slightly to the northwest and are predominantly sandstone, some shale and siltstone, and numerous coal seams, some of which are mined.

(2) Central Mercer and Summers Counties. Most of the surface area of the two counties is underlain by gently to strongly folded rocks of the Mauch Chunk Group made up of, in descending order of extent, the Bluestone, Princeton, Hinton, and Bluefield formations. These formations are red, green, and gray shale and sandstone with a few thin limestone beds. The deeper Greenbrier limestone is exposed in some small areas along the Greenbrier River.

(3) Southeast Mercer County-East River Mountain. The St. Clair Fault roughly parallels the East River and the West Virginia-Virginia line and is considered a classic overturned fold and thrust fault. The St. Clair Fault has caused older Ordovician rocks to be over younger Devonian black shales. Several formations crop along the fault. From northwest to southeast, there are the Greenbrier limestone, McGrady formation, and Pocono sandstone of the Mississippi System; the Chemung, Braillier, and Marcellus of the Devonian west of the fault; the Beekmantown Group, middle calcareous units, and Martinsburg formation of the Ordovician system; and the Clinton, Juniata, and Tuscarora sandstones of the Silurian System east of the fault.

geologic materials

Pennsylvania System:

The Pottesville group comprises the New River and Pocahontas formations in the survey area and is dominantly sandstone and some shale and siltstone. The Beckley, Fire Creek, and Pocahontas coal seams are in these formations. The topography is mountainous. It consists of Lily soils on sandstone ridgetops; Gilpin soils on siltstone and shale ridgetops; Clymer soils on mixed sandstone, siltstone, and shale ridgetops; and the Clymer-Gilpin complex on mountain side slopes.

Mississippian System:

The Mauch Chunk group includes the Bluestone, Princeton, Hinton, and Bluefield formations. The Bluestone, Hinton, and Bluefield formations are red, green, and gray shale and sandstone; the Princeton formation is sandstone. The Hinton and Bluestone formations have thin limestone lenses. Dekalb and Lily soils are the major soils on plateaus in the Princeton formation. Berks, Calvin high base substratum, and Gilpin soils are the major soils in the Bluestone, Hinton, and Bluefield formations. Ernest and Shouns soils are on foot slopes throughout the area.

The Greenbrier group consists of limestone and calcareous shale and siltstone exposed along the Boissevain Fault in southwestern Mercer County, along the northwestern side of the St. Clair Fault in southeastern Mercer County, and along the Greenbrier River in Summers County (fig. 1). Culleoka and Westmoreland soils are dominant on these formations.

Devonian, Silurian, and Ordovician Systems:

The St. Clair Fault and East River Mountain consist of Dekalb and Lehew soils on the sandstone of the Silurian System at the top of the mountain, Murrill soils along the lower slopes where sandstone colluvium has covered limestone, Caneyville and Frederick soils on the limestone of the Ordovician System, and Berks and Weikert soils on the shales of the Devonian System.

climate

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

Winters are cold and snowy at high elevations in Mercer and Summers Counties. In valleys it is also frequently cold, but intermittent thaws preclude a long-lasting snow cover. Summers are fairly warm on mountain slopes and very warm with occasional very hot days in the valleys. Rainfall is evenly distributed during the year, but it is appreciably heavier on the windward, west-facing slopes than in the valleys. Normal annual precipitation is adequate for all crops, although summer

temperature and growing season length, particularly at higher elevations, may be inadequate.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Bluestone Lake and Flat Top, West Virginia, in the period 1951 to 1977. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperatures at Bluestone Lake and Flat Top are 34 and 30 degrees F, respectively. The average daily minimum temperature is 24 degrees at Bluestone Lake and 21 degrees at Flat Top. The lowest temperature, -21 degrees, occurred at Flat Top on January 24, 1963. In summer the average temperature is 72 degrees at Bluestone Lake and 66 degrees at Flat Top. The average daily maximum temperature is 79 degrees. The highest recorded temperature, at Bluestone Lake on July 29, 1952, is 100 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Figure 1.—Pinnacle Rock marks the Boissevain Fault and consists of the sandstone that underlies the Dekalb soils along Black Oak Mountain.

The total annual precipitation is 35 inches at Bluestone Lake and 44 inches at Flat Top. Of this, 60 percent, usually falls in April through September, which includes the growing season for most crops. The heaviest 1-day rainfall during the period of record was 3.94 inches at Bluestone Lake on August 20, 1969. Thunderstorms occur on about 45 days each year, and most occur in summer.

Average seasonal snowfall is 21 inches at Bluestone Lake and 55 inches at Flat Top. The greatest snow depth at any one time during the period of record was 34 inches at Flat Top. On the average there are 15 to 27 days with at least 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 60 percent of the time possible in summer and 30 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 11 miles per hour, in winter.

Heavy rains, which occur at any time of the year, and severe thunderstorms in summer sometimes cause flash flooding, particularly in narrow valleys.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

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

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

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for

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

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

general soil map units

The general soil map at the back of this publication shows broad areas, called soil associations, that have a distinctive pattern of soils, relief, and drainage. Each association on the general soil map is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in other associations 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 association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

soil descriptions

1. Lehew-Dekalb association

Moderately deep, strongly sloping to very steep, well drained, very stony, acid soils; on uplands

This association is in Mercer County along the top of East River Mountain. The association makes up less than 1 percent of the survey area and is about 60 percent Lehew soils, 25 percent Dekalb soils, and 15 percent soils of minor extent.

The Lehew soils have a surface layer that is very dark grayish brown, channery, and moderately coarse textured. The subsoil is reddish brown, very channery, and moderately coarse textured.

The Dekalb soils have a surface layer that is very dark grayish brown, channery, and moderately coarse textured. The subsoil is brownish yellow and strong brown, very channery, and moderately coarse textured.

The minor soils in the association are Clymer soils on uplands and Jefferson and Murrill soils on foot slopes. Areas of exposed bedrock are common throughout the association.

Most of the association is wooded. Access to the association is limited; one highway, U.S. 52, is in the area. Slope and the depth to bedrock are the major soil limitations for farming or community development. The area is better suited to wildlife habitat, woodland, recreation, and esthetic uses.

2. Murrill-Frederick-Caneyville association

Deep and moderately deep, strongly sloping to very steep, well drained, acid and lime-influenced soils that are very stony, very rocky, and nonstony; on uplands and at the heads of drainageways

This association consists of soils in the area of the St. Clair Fault along East River Mountain in Mercer County. The association makes up about 5 percent of the survey area and is about 28 percent Murrill soils, 20 percent Frederick soils, 17 percent Caneyville soils, and 35 percent soils of minor extent.

The Murrill soils are deep. They have a surface layer that is dark grayish brown and medium textured. The subsoil is strong brown and yellowish red and moderately fine textured.

The Frederick soils are deep. They have a surface layer that is dark brown and medium textured. The subsoil is strong brown and yellowish red and moderately fine textured and fine textured.

The Caneyville soils are moderately deep. They have a surface layer that is brown and medium textured. The subsoil is strong brown and yellowish red and moderately fine textured and fine textured.

The minor soils in the association are the Berks, Gilpin, Westmoreland, and Weikert soils on uplands.

Most of the association is wooded. Many small grassland farms are in the area.

Slope and depth to bedrock are the major limitations of the association for farming and community development. The soils have very good potential for trees.

3. Clymer-Gilpin-Udorthents association

Deep and moderately deep, strongly sloping to very steep, well drained, acid soils; on uplands

This association consists of soils in the Cumberland Mountains of western Mercer County (fig. 2). The association makes up about 8 percent of the survey area and is 31 percent Clymer soils, 25 percent Gilpin soils, 12 percent Udorthents, and 32 percent soils of minor extent.

The Clymer soils are deep. They have a surface layer that is very dark gray and medium textured. The subsoil is yellowish brown and strong brown and medium textured and moderately fine textured.

The Gilpin soils are moderately deep. They have a surface layer that is dark brown and medium textured.

Figure 2.—A typical landscape in the Clymer-Gilpin-Udorthents association.

The subsoil is yellowish brown and strong brown and medium textured and moderately fine textured.

Udorthents are yellowish brown, medium textured or moderately fine textured, and channery or very channery.

The minor soils in this association are Berks, Dekalb, and Lily soils on uplands; Jefferson and Ernest soils on foot slopes; and Atkins and Lobdell soils on flood plains.

Most of this association is wooded, but some large areas have been surface mined for coal.

Slope and the depth to bedrock are the major limitations of the association for farming or community development. This association has good potential for trees.

4. Gilpin-Lily-Tilsit association

Moderately deep and deep, gently sloping to very steep, well drained and moderately well drained, acid soils; on uplands

This association consists of soils on the plateau in the Nimitz-Jumping Branch areas of Summers County, and soils on the plateau between Pipestem in Summers County and Athens in Mercer County. The association makes up about 3 percent of the survey area and is about 25 percent Gilpin soils, 20 percent Lily soils, 20 percent Tilsit soils, and 35 percent soils of minor extent.

The Gilpin soils are moderately deep and well drained. They have a surface layer that is dark brown and medium textured. The subsoil is yellowish brown and strong brown and medium textured and moderately fine textured.

The Lily soils are moderately deep and well drained. They have a surface layer that is brown and medium textured. The subsoil is strong brown and yellowish red and moderately fine textured.

The Tilsit soils are deep and moderately well drained. They have a surface layer that is dark grayish brown and medium textured. The subsoil is yellowish brown and medium textured and moderately fine textured. The lower part is mottled and very firm and brittle.

The minor soils in the association are the Berks, Coolville, Dekalb, and Latham soils on uplands; the Ernest soils on foot slopes; and the Atkins soils on flood plains.

Most of the association is used for woodland or grassland farms, and the area has good potential for farming and trees.

The depth to bedrock, the slope, and a seasonal high water table are the major limitations of the soils for community development.

5. Calvin high base substratum-Berks-Gilpin association

Moderately deep, strongly sloping to very steep, well drained, lime-influenced and acid soils; on uplands

This association makes up about 78 percent of the survey area and is about 25 percent Calvin high base substratum soils, 21 percent Berks soils, 14 percent Gilpin soils, and 40 percent soils of minor extent (fig. 3).

The Calvin high base substratum soils have a surface layer that is dark reddish brown and reddish brown and medium textured. The subsoil is reddish brown and medium textured.

The Berks soils have a surface layer that is very dark grayish brown and medium textured. The subsoil is yellowish brown, medium textured, and shaly, very shaly, channery, or very channery.

The Gilpin soils have a surface layer that is dark brown and medium textured. The subsoil is yellowish brown and strong brown and medium textured and moderately fine textured.

The minor soils in this association are the Coolville, Dekalb, Latham, Lily, and Tilsit soils on uplands; the Ernest, Jefferson, and Shouns soils on foot slopes; and the Orrville soils on flood plains.

This association is mostly wooded; however, many farms are located throughout the area. The association has fair potential for farming, but slope limits crops mainly to grasses. Slope and the depth to bedrock are the major limitations for community development. The area has good potential for trees.

6. Lily-Gilpin-Ernest association

Moderately deep and deep, gently sloping to very steep, well drained and moderately well drained, acid soils; on uplands and foot slopes

This association consists of soils on the Appalachian Plateau along the border of Mercer County and Raleigh County and Summers County and Raleigh County (fig. 4). The association makes up about 3 percent of the survey

Figure 3.—A typical landscape in the Calvin high base substratum-Berks-Gilpin association.

area and is about 40 percent Lily soils, 25 percent Gilpin soils, 15 percent Ernest soils, and 20 percent soils of minor extent.

The Lily soils are moderately deep and well drained. They have a surface layer that is brown and medium textured. The subsoil is strong brown and yellowish red and moderately fine textured.

The Gilpin soils are moderately deep and well drained. They have a surface layer that is dark brown and medium textured. The subsoil is yellowish brown and strong brown and medium textured and moderately fine textured.

The Ernest soils are deep and moderately well drained. They have a surface layer that is dark yellowish brown and medium textured. The subsoil is yellowish brown and strong brown and medium textured and moderately fine textured. The lower part is mottled and very firm and brittle.

The minor soils in this association are the Clymer, Berks, Dekalb, and Tilsit soils on uplands; the Buchanan and Jefferson soils on foot slopes; and the Atkins soils on flood plains.

This association is mostly woodland, but the area has several small grassland farms and has good potential for farming. Slope, the depth to bedrock, and a seasonal high water table are the major limitations of the area for community development. The area has good potential for trees.

7. Monongahela-Kanawha-Chagrin association

Deep, nearly level to strongly sloping, moderately well drained and well drained, acid and lime-influenced soils; on stream terraces and high and low flood plains

This association consists of soils along the Greenbrier River, New River, and Bluestone River (fig. 5). The association makes up about 2 percent of the survey area and is about 40 percent Monongahela soils, 20 percent Kanawha soils, 15 percent Chagrin soils, and 25 percent soils of minor extent.

The Monongahela soils are moderately well drained. They have a surface layer that is dark brown and medium textured. The subsoil is yellowish brown and

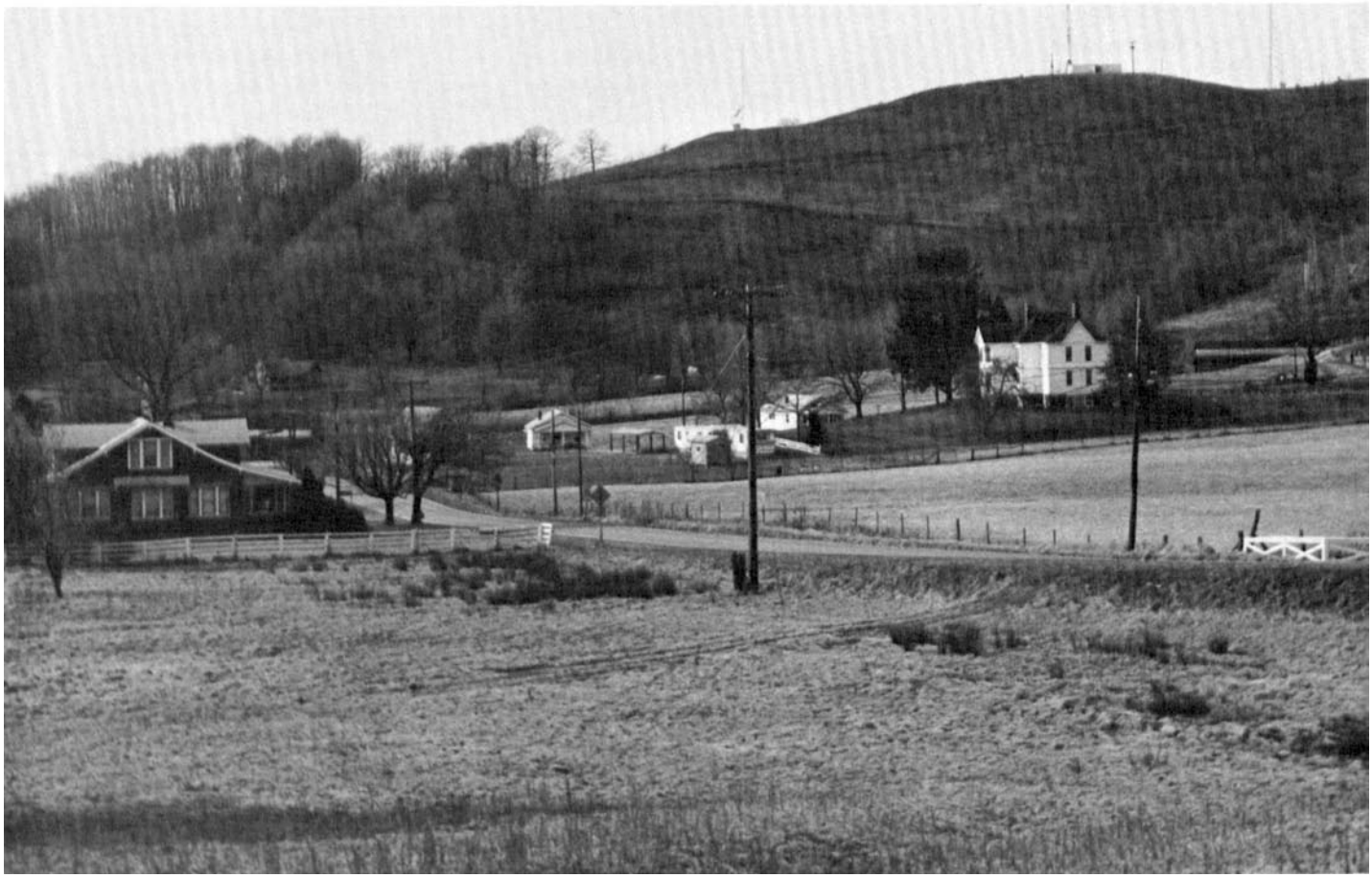


Figure 4.—A typical landscape in the Lily-Gilpin-Ernest association.

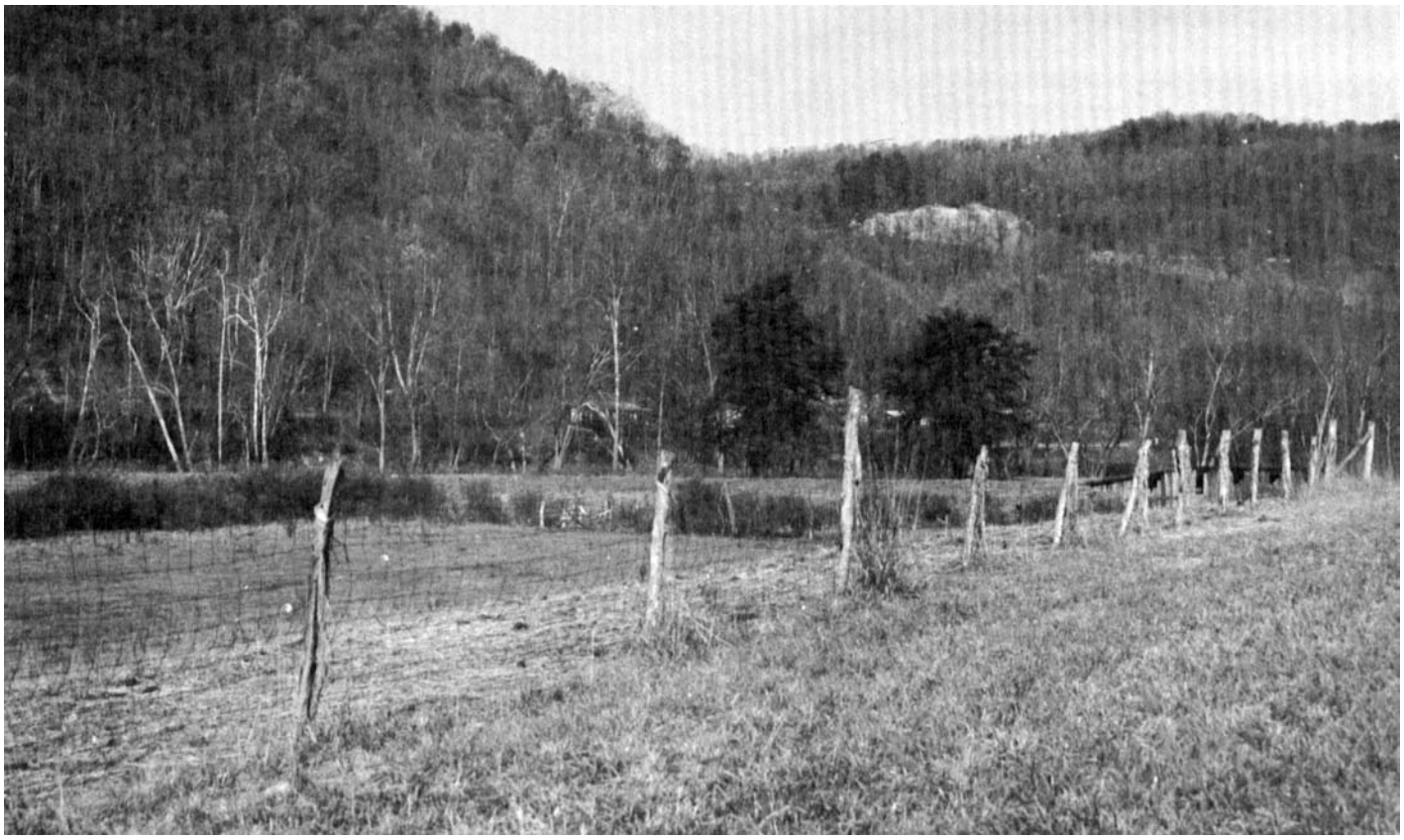


Figure 5.—A typical landscape in the Monongahela-Kanawha-Chagrin association.

medium textured and moderately fine textured and is mottled and very firm and brittle in the lower part.

The Kanawha soils are well drained. They have a surface layer that is dark brown and moderately coarse textured. The subsoil is brown and reddish brown and moderately coarse textured and medium textured.

The Chagrin soils are well drained. They have a surface layer that is dark grayish brown and medium textured. The subsoil is dark brown and medium textured.

The minor soils in this association are the Tygart Variant soils on stream terraces and the Lobdell and Orrville soils and Udifluvents on flood plains.

About two-thirds of this association consists of farms and rural homesites. Most of the remaining area is along the New River within the flood pool of the Bluestone Reservoir. The association has good potential for farming. A seasonal high water table and a hazard of flooding are the major limitations for community development. The association has very good to good potential for trees and excellent potential for the development of recreation areas and wildlife habitat.

detailed soil map units

Dr. John Sencindiver, assistant professor of soil science, West Virginia University Agricultural and Forestry Experiment Station, assisted with the preparation of this section and the section "Soil series and their morphology."

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

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

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

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, *Gilpin silt loam, 15 to 25 percent slopes,* is one of several phases in the Gilpin series.

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

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. *Clymer-Gilpin complex, 30 to 70 percent slopes,* is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. *Coolville and Latham silt loams, 3 to 15 percent slopes,* is an undifferentiated group in this survey area.

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

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

soil descriptions

At—Atkins silt loam. This soil is nearly level and poorly drained. It is on flood plains along streams of the Allegheny Plateau. The soil is subject to common flooding. The areas are long and narrow and range from about 5 to 30 acres.

Typically, the surface layer is dark gray silt loam about 9 inches thick. The subsoil is gray and light gray silt loam about 32 inches thick. The substratum is mixed light gray and strong brown silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of moderately well drained Ernest soils. Also included are a few areas of soils that are moderately well drained, soils that have a clayey subsoil, soils that are less than 60 inches deep to bedrock, and soils that are gently sloping. Included soils make up about 20 percent of this unit.

The available water capacity of this Atkins soil is high. Permeability is slow in the subsoil. Runoff is slow, and natural fertility is moderate. A seasonal high water table at or near the surface restricts the root zone of many types of plants. Where unlimed, the soil is strongly acid or very strongly acid. The depth to bedrock is greater than 60 inches.

This soil is suited to cultivated crops but is better suited to water-tolerant hay or pasture plants. Artificial

drainage is needed for cultivated crops or for hay or pasture, and providing drainage is a major farming management concern. If this soil is cultivated, using minimum tillage and a crop sequence that includes hay, delaying tillage until the soil is reasonably dry, and returning crop residue to the soil help to maintain fertility and tilth. Flooding is a hazard for crops in some areas of this soil. The use of proper stocking rates, the use of rotational grazing, and deferment of grazing until the soil is firm are major pasture management needs.

This soil has very high potential for trees that tolerate wetness, but only a small acreage is wooded. The use of equipment is restricted during wet seasons because the soil is soft.

The hazard of flooding, the high water table, and the slow to moderate permeability limit the soil for most types of community development.

The capability subclass is IIIw.

BwF—Berks-Weikert shaly silt loams, 35 to 70 percent slopes. These soils are very steep and well drained. They are on narrow ridges and hillsides that are dissected by many drainageways. The areas range from about 10 to 40 acres. The unit is about 60 percent Berks shaly silt loam, 30 percent Weikert shaly silt loam, and 10 percent other soils. The Berks and Weikert soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Berks soils is very dark grayish brown and yellowish brown shaly silt loam 4 inches thick. The subsoil is yellowish brown and is 20 inches thick. The upper 13 inches of the subsoil is shaly silt loam, and the lower 7 inches is very shaly silt loam. The substratum is strong brown very channery silt loam. Bedrock is at a depth of 28 inches.

Typically, the surface layer of the Weikert soils is very dark grayish brown and dark yellowish brown shaly silt loam 6 inches thick. The subsoil is yellowish brown very shaly silt loam 6 inches thick. The substratum is yellowish brown very shaly silt loam that extends to bedrock at a depth of about 15 inches.

Included with these soils in mapping are a few areas of well drained Gilpin soils and moderately well drained Ernest soils. Also included are a few small areas of moderately steep soils, severely eroded soils, and very stony soils.

Available water capacity is very low or low in the Berks soil, and very low in the Weikert soil. Permeability is moderate or moderately rapid in the Berks soil and moderately rapid in the Weikert soil. Runoff is very rapid on both soils, and natural fertility is low. Where unlimed, both soils are strongly acid or very strongly acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches in the Berks soil and 10 to 20 inches in the Weikert soil.

Slope makes these soils unsuitable for cultivated crops or hay and difficult to manage for pasture. Pastures require intensive management to maintain the plant cover and control erosion.

Most areas of these soils are wooded. The soils have low to moderate potential for trees. Erosion on logging roads and skid trails is the main management concern, and placing the roads and trails on the contour helps to control erosion. Slope limits the use of equipment.

Slope and the depth to bedrock are the main limitations of these soils for most types of community development.

The capability subclass is VIIe.

CaC—Calvin silt loam, high base substratum, 3 to 15 percent slopes. This soil is gently sloping to strongly sloping and is well drained. The areas are mostly on ridgetops and on benches dissected by drainageways. The areas range from about 5 to 25 acres.

Typically, the surface layer is reddish brown silt loam about 8 inches thick. The subsoil is reddish brown and is 14 inches thick. The upper 8 inches of the subsoil is light silty clay loam, and the lower 6 inches is shaly silty clay loam. The substratum is reddish brown very shaly silty clay loam that extends to bedrock at a depth of about 31 inches.

Included with this soil in mapping are a few small areas of well drained Berks, Gilpin, and Lily soils. Also included are a few small areas of slightly acid soils, moderately steep soils, and severely eroded soils. Included soils make up about 20 percent of this unit.

The available water capacity of this Calvin soil is moderate. Permeability is moderate throughout. Runoff is medium or rapid, and natural fertility is low or medium. Where unlimed, the soil is strongly acid or very strongly acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

This soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. The use of proper stocking rates and the use of rotational grazing are major pasture management needs.

This soil has high potential for trees, but only a small acreage is wooded. Erosion control on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour of the slope will help to control this erosion.

Slope and the depth to bedrock limit this soil for most types of community development.

The capability subclass is IIIe.

CaD—Calvin silt loam, high base substratum, 15 to 25 percent slopes. This soil is moderately steep and well drained. The areas are mostly on ridgetops and benches, and the benches are dissected by drainageways. The areas range from about 10 to 25 acres.

Typically, the surface layer is reddish brown silt loam about 6 inches thick. The subsoil is reddish brown and is 16 inches thick. The upper 9 inches of the subsoil is light silty clay loam, and the lower 7 inches is shaly silty clay loam. The substratum is reddish brown very shaly silty clay loam that extends to bedrock, which is at a depth of about 31 inches.

Included with this soil in mapping are a few small areas of well drained Gilpin and Berks soils. Also included are a few small areas of slightly acid soils, strongly sloping soils, steep soils, and severely eroded soils. Included soils make up about 25 percent of the unit.

The available water capacity and permeability of this Calvin soil are moderate. Runoff is rapid, and natural fertility is low or medium. Where unlimed, the soil is strongly acid or very strongly acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

This soil has limited suitability for cultivated crops and is better suited to hay or pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. Slope limits the use of farm machinery. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. The use of proper stocking rates and the use of rotational grazing are major pasture management needs.

This soil has moderately high or high potential for trees, but only a small acreage is wooded. Erosion control on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour will help to control erosion. Slope limits the use of equipment.

Slope and the depth to bedrock limit this soil for most types of community development.

The capability subclass is IVe.

CbC—Calvin, high base substratum-Berks shaly silt loams, 3 to 15 percent slopes. These soils are gently sloping to strongly sloping and are well drained. Most areas are on ridgetops and benches, some of which are dissected by small drainageways. The areas range from about 10 to 40 acres. They are about 50 percent Calvin shaly silt loam, high base substratum; 35 percent Berks shaly silt loam; and 15 percent other soils. The Calvin and Berks soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Calvin soils is reddish brown shaly silt loam about 5 inches thick. The subsoil is reddish brown and is 17 inches thick. The upper 8 inches of the subsoil is shaly silt loam, and the lower 9 inches is very channery silt loam. The substratum is reddish brown very channery silt loam that extends to bedrock at a depth of about 33 inches.

Typically, the surface layer of the Berks soils is dark brown shaly silt loam about 5 inches thick. The subsoil is yellowish brown and is 21 inches thick. The upper 10 inches of the subsoil is shaly silt loam, and the lower 11 inches is very shaly silt loam. The substratum is strong brown very channery silt loam that extends to bedrock at a depth of about 34 inches.

Included with these soils in mapping are a few small areas of well drained Gilpin and Shouns soils and moderately well drained Coolville and Latham soils. Also included are a few small areas of moderately steep soils and severely eroded soils.

The available water capacity and permeability of these Calvin soils are moderate. Runoff is rapid, and natural fertility is moderate. These Calvin soils are medium acid or strongly acid in unlimed areas. Bedrock at a depth of 20 to 40 inches restricts the root zone of some types of plants.

The available water capacity of these Berks soils is very low or low, and permeability is moderate or moderately rapid. Runoff is rapid, and natural fertility is low. These Berks soils are strongly acid or very strongly acid in unlimed areas. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

These soils are suited to cultivated crops and to hay and pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. The use of proper stocking rates and the use of rotational grazing are major pasture management needs.

These soils have moderately high or high potential for trees. Erosion control on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour will help to control this erosion.

Slope and the depth to bedrock limit these soils for most types of community development.

The capability subclass is IIIe.

CbC3—Calvin, high base substratum-Berks shaly silt loams, 8 to 15 percent slopes, severely eroded. These soils are strongly sloping and well drained. They are mostly on ridgetops and benches that commonly are dissected by small drainageways. The areas range from about 10 to 30 acres. They are about 50 percent Calvin shaly silt loam, high base substratum; 30 percent Berks shaly silt loam; and 20 percent other soils. The Calvin and Berks soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Calvin soils is reddish brown silt loam about 4 inches thick. The subsoil is reddish brown and is 16 inches thick. The upper 7 inches of the subsoil is shaly silt loam, and the lower 9 inches is very channery silt loam. The substratum is reddish brown very channery silt loam that extends to bedrock at a depth of about 31 inches.

Typically, the surface layer of the Berks soils is yellowish brown shaly silt loam about 4 inches thick. The subsoil is yellowish brown and is 20 inches thick. The upper 9 inches of the subsoil is shaly silt loam, and the lower 11 inches is very channery silt loam. The substratum is strong brown very channery silt loam that extends to bedrock at a depth of about 32 inches.

Included with these soils in mapping are a few small areas of well drained Gilpin, Weikert, and Shouns soils and moderately well drained Coolville and Latham soils. Also included are a few small areas of moderately steep soils and shallow soils.

The available water capacity and permeability of these Calvin soils are moderate. Runoff is rapid, and natural fertility is moderate. These Calvin soils are medium acid or strongly acid in unlimed areas. Bedrock at a depth of 20 to 40 inches restricts the root zone of some types of plants.

The available water capacity of these Berks soils is very low or low, and permeability is moderate or moderately rapid. Runoff is rapid, and natural fertility is low. These Berks soils are strongly acid or very strongly acid in unlimed areas. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

These soils have limited suitability for cultivated crops and are better suited to hay or pasture. The hazard of erosion is very severe on unprotected areas and is a major management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and to maintain fertility and tilth in cultivated areas. The use of proper stocking rates and the use of rotational grazing are major pasture management needs. Seeding a permanent cover on bare areas will help to control erosion.

These soils have moderately high or high potential for trees. Erosion control on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour will help to control this erosion.

Slope and the depth to bedrock limit these soils for most types of community development.

The capability subclass is IVe.

CbD—Calvin, high base substratum-Berks shaly silt loams, 15 to 30 percent slopes. These soils are moderately steep and well drained. They are mostly on ridgetops and benches dissected by many small drainageways. The areas range from about 10 to 100 acres. They are about 50 percent Calvin shaly silt loam, high base substratum; 35 percent Berks shaly silt loam; and 15 percent other soils. The Calvin and Berks soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Calvin soils is reddish brown shaly silt loam about 5 inches thick. The subsoil is reddish brown and is 17 inches thick. The upper 8 inches of the subsoil is shaly silt loam, and the lower 9 inches is very channery silt loam. The substratum is reddish brown very channery silt loam that extends to bedrock at a depth of about 34 inches.

Typically, the surface layer of the Berks soil is dark brown shaly silt loam about 5 inches thick. The subsoil is yellowish brown and is 21 inches thick. The upper 10 inches of the subsoil is shaly silt loam, and the lower 11 inches is very shaly silt loam. The substratum is strong brown very channery silt loam that extends to bedrock at a depth of about 34 inches.

Included with these soils in mapping are a few small areas of well drained Gilpin, Lily, and Shouns soils and moderately well drained Coolville and Latham soils. Also included are a few small areas of deep soils, strongly sloping soils, steep soils, severely eroded soils, and stony soils.

The available water capacity and permeability of these Calvin soils are moderate. Runoff is rapid, and natural fertility is moderate. These Calvin soils are medium acid or strongly acid in unlimed areas. Bedrock at a depth of 20 to 40 inches restricts the root zone of some types of plants.

The available water capacity of these Berks soils is very low or low, and permeability is moderate or moderately rapid. Runoff is rapid, and natural fertility is low. These Berks soils are strongly acid or very strongly acid in unlimed areas. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

These soils have limited suitability for cultivated crops and are better suited to hay or pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. The use of proper stocking rates and the use of rotational grazing are the major pasture management needs.

These soils have moderate to high potential for trees. Erosion control on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour will help to control this erosion. Slope limits the use of equipment on these soils.

Slope and the depth to bedrock limit these soils for most types of community development.

The capability subclass is IVe.

CbD3—Calvin, high base substratum-Berks shaly silt loams, 15 to 35 percent slopes, severely eroded. These soils are moderately steep and steep and are well drained. They are mostly on ridgetops and benches dissected by many small drainageways. The areas range from about 10 to 50 acres. They are about 55 percent Calvin shaly silt loam, high base substratum; 25 percent Berks shaly silt loam; and 20 percent other soils. The Calvin and Berks soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Calvin soils is reddish brown shaly silt loam about 4 inches thick. The subsoil is reddish brown and is 16 inches thick. The upper 7 inches of the subsoil is shaly silt loam, and the lower 9 inches is very channery silt loam. The substratum is reddish brown very channery silt loam that extends to bedrock at a depth of about 32 inches.

Typically, the surface layer of the Berks soils is yellowish brown shaly silt loam about 4 inches thick. The subsoil is yellowish brown and is 20 inches thick. The upper 9 inches of the subsoil is shaly silt loam, and the lower 11 inches is very shaly silt loam. The substratum is strong brown very channery silt loam that extends to bedrock at a depth of about 32 inches.

Included with these soils in mapping are a few small areas of well drained Gilpin, Lily, and Shouns soils and moderately well drained Coolville and Latham soils. Also included are a few small areas of strongly sloping soils, shallow soils, and stony soils.

The available water capacity and permeability of these Calvin soils are moderate. Runoff is rapid, and natural fertility is moderate. These Calvin soils are medium acid or strongly acid in unlimed areas. Bedrock at a depth of 20 to 40 inches restricts the root zone of some types of plants.

The available water capacity of these Berks soils is very low or low, and permeability is moderate or moderately rapid. Runoff is rapid, and natural fertility is low. These Berks soils are strongly acid or very strongly acid in unlimed areas. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

A very severe hazard of erosion makes these soils unsuitable for cultivated crops or hay. The soils are suited to pasture. Seeding a permanent cover on bare areas will help to control erosion. The use of proper stocking rates and the use of rotational grazing are major pasture management needs.

These soils have moderate to high potential for trees. Erosion control on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour will help to control this erosion. Slope limits the use of equipment on these soils.

Slope and the depth to bedrock limit these soils for most types of community development.

The capability subclass is VIe.

CbF—Calvin, high base substratum-Berks shaly silt loams, 30 to 70 percent slopes. These soils are very steep and well drained. They are on narrow ridges and hillsides dissected by many small drainageways. The areas range from about 15 to 250 acres. They are about 60 percent Calvin shaly silt loam, high base substratum; 25 percent Berks shaly silt loam; and 15 percent other soils. The Calvin and Berks soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Calvin soils is dark reddish brown and reddish brown shaly silt loam about 5 inches thick. The subsoil is reddish brown and is 18 inches thick. The upper 9 inches of the subsoil is shaly silt loam, and the lower 9 inches is very channery silt loam. The substratum is reddish brown very channery silt loam that extends to bedrock at a depth of about 35 inches.

Typically, the surface layer of the Berks soils is very dark grayish brown and yellowish brown shaly silt loam 7 inches thick. The subsoil is yellowish brown and is 21 inches thick. The upper 13 inches of the subsoil is shaly silt loam, and the lower 8 inches is very shaly silt loam. The substratum is strong brown very channery silt loam that extends to bedrock at a depth of about 35 inches.

Included with these soils in mapping are a few small areas of well drained Gilpin, Dekalb, Jefferson, and Shouns soils. Also included are a few small areas of deep soils, moderately steep soils, severely eroded soils, and stony soils.

The available water capacity and permeability of these Calvin soils are moderate. Runoff is very rapid, and natural fertility is moderate. These Calvin soils are medium acid or strongly acid in unlimed areas. Bedrock at a depth of 20 to 40 inches restricts the root zone of some types of plants.

The available water capacity of these Berks soils is very low or low, and permeability is moderate or moderately rapid. Runoff is very rapid, and natural fertility is low. These Berks soils are strongly acid or very strongly acid in unlimed areas. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

Slope makes these soils unsuitable for cultivated crops or hay and difficult to manage for pasture. Most areas are wooded, and the soils have moderate to high potential for trees. Erosion control on logging roads and skid trails is the major management concern. Placing the roads and trails on the contour helps to control this erosion. Slope limits the use of equipment on these soils.

Slope and the depth to bedrock limit these soils for most types of community development.

The capability subclass is VIIe.

CbF3—Calvin, high base substratum-Berks shaly silt loams, 35 to 70 percent slopes, severely eroded. These soils are very steep and well drained. They are on narrow ridges and hillsides dissected by many small drainageways. The areas range from about 10 to 30 acres. They are about 60 percent Calvin shaly silt loam, high base substratum; 20 percent Berks shaly silt loam; and 20 percent other soils. The Calvin and Berks soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Calvin soils is reddish brown shaly silt loam about 2 inches thick. The subsoil is reddish brown and is 19 inches thick. The upper 10 inches of the subsoil is shaly silt loam, and the lower 9 inches is very channery silt loam. The

substratum is reddish brown very channery silt loam that extends to bedrock at a depth of about 31 inches.

Typically, the surface layer of the Berks soils is yellowish brown shaly silt loam about 2 inches thick. The subsoil is yellowish brown and is 21 inches thick. The upper 11 inches of the subsoil is shaly silt loam, and the lower 10 inches is very shaly silt loam. The substratum is strong brown very channery silt loam that extends to bedrock at a depth of about 30 inches.

Included with these soils in mapping are a few small areas of well drained Gilpin, Dekalb, Jefferson, and Shouns soils. Also included are a few small areas of moderately steep soils, shallow soils, and stony soils.

The available water capacity and permeability of these Calvin soils are moderate. Runoff is very rapid, and natural fertility is moderate. These Calvin soils are medium acid or strongly acid in unlimed areas. Bedrock at a depth of 20 to 40 inches restricts the root zone of some types of plants.

The available water capacity of these Berks soils is very low or low, and permeability is moderate or moderately rapid. Runoff is very rapid, and natural fertility is low. These Berks soils are strongly acid or very strongly acid in unlimed areas. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

Slope makes these soils unsuitable for cultivated crops or hay and difficult to manage for pasture. The soils have moderate to high potential for trees, and most areas are wooded. Erosion control on logging roads and skid trails is the major management concern. Placing the roads and trails on the contour helps to control this erosion. Slope limits the use of equipment on these soils.

Slope and the depth to bedrock limit these soils for most types of community development.

The capability subclass is VIIe.

CkD—Calvin, high base substratum-Berks stony silt loams, 15 to 30 percent slopes. These soils are moderately steep and well drained. They are mostly on ridgetops and benches dissected by many small drainageways. Stones cover about 1 to 3 percent of the surface. The areas range from 15 to 50 acres. They are about 50 percent Calvin stony silt loam, high base substratum; 35 percent Berks stony silt loam; and 15 percent other soils. The Calvin and Berks soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Calvin soils is dark reddish brown and reddish brown shaly silt loam 7 inches thick. The subsoil is reddish brown and is 17 inches thick. The upper 8 inches of the subsoil is very shaly silt loam, and the lower 9 inches is very channery silt loam. The substratum is reddish brown very channery silt loam that extends to bedrock at a depth of about 34 inches.

Typically, the surface layer of the Berks soils is very dark grayish brown and yellowish brown shaly silt loam 8 inches thick. The subsoil is yellowish brown and is 21 inches thick. The upper 10 inches of the subsoil is shaly silt loam, and the lower 11 inches is very shaly silt loam. The substratum is strong brown very channery silt loam that extends to bedrock at a depth of about 34 inches.

Included with these soils in mapping are a few small areas of well drained Gilpin, Dekalb, Jefferson, and Shouns soils. Also included are a few small areas of deep soils, strongly sloping soils, steep soils, soils that do not have stones on the surface, and exposed bedrock.

The available water capacity and permeability of these Calvin soils are moderate. Runoff is rapid, and natural fertility is moderate. These Calvin soils are medium acid or strongly acid in unlimed areas. Bedrock at a depth of 20 to 40 inches restricts the root zone of some types of plants.

The available water capacity of these Berks soils is very low or low, and permeability is moderate or moderately rapid. Runoff is rapid, and natural fertility is low. These Berks soils are strongly acid or very strongly acid in unlimed areas. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

Slope and the stones on the surface restrict the use of farm machinery and make the soils unsuitable for cultivated crops or hay. The soils are suitable for pasture. The hazard of erosion is severe in unprotected areas and is the major management concern. The use of proper stocking rates and the use of rotational grazing are the major pasture management needs.

These soils have moderate to high potential for trees. Erosion control on logging roads and skid trails is a major management concern. Placing the roads and trails on the contour will help to control this erosion. Slope limits the use of equipment on these soils.

Slope, the stones on the surface, and the limited depth to bedrock limit these soils for most types of community development.

The capability subclass is VIs.

CkF—Calvin, high base substratum-Berks stony silt loams, 30 to 70 percent slopes. These soils are very steep and well drained. They are on side slopes dissected by many small drainageways. Stones cover about 1 to 3 percent of the surface. The areas range from 15 to 250 acres. They are about 60 percent Calvin stony silt loam, high base substratum; 25 percent Berks stony silt loam; and 15 percent other soils. The Calvin and Berks soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Calvin soils is dark reddish brown and reddish brown shaly silt loam 5 inches thick. The subsoil is reddish brown and is 18 inches thick. The upper 9 inches of the subsoil is shaly silt loam, and the lower 9 inches is very channery silt loam. The substratum is reddish brown very channery silt loam that extends to bedrock at a depth of about 35 inches.

Typically, the surface layer of the Berks soils is very dark grayish brown and yellowish brown shaly silt loam 8 inches thick. The subsoil is 20 inches thick. The upper 13 inches of the subsoil is yellowish brown shaly silt loam, and the lower 7 inches is strong brown very shaly silt loam. The substratum is strong brown very channery silt loam that extends to bedrock at a depth of about 35 inches.

Included with these soils in mapping are a few small areas of well drained Gilpin, Dekalb, Jefferson, and Shouns soils. Also included are a few small areas of deep soils, moderately steep soils, soils that do not have stones on the surface, and exposed bedrock.

The available water capacity and permeability of these Calvin soils are moderate. Runoff is very rapid, and natural fertility is moderate. These Calvin soils are medium acid or strongly acid in unlimed areas. Bedrock at a depth of 20 to 40 inches restricts the root zone of some types of plants.

The available water capacity of these Berks soils is very low or low, and permeability is moderate or moderately rapid. Runoff is very rapid, and natural fertility is low. These Berks soils are strongly acid or very strongly acid in unlimed areas. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

Slope and the stones on the surface make these soils unsuitable for cultivated crops or hay and difficult to manage for pasture. Most areas are wooded, and the soils have moderate to high potential for trees. Erosion control on logging roads and skid trails is the major management concern. Placing the roads and trails on the contour helps to control this erosion. Slope limits the use of equipment.

Slope, the stones on the surface, and the depth to bedrock limit these soils for most types of community development.

The capability subclass is VIIs.

CID—Caneyville silt loam, very rocky, 15 to 30 percent slopes. This soil is moderately steep and well drained. It is on ridgetops and side slopes. The areas range from 15 to 40 acres. Some areas are dissected by small drainageways, and some have limestone sinkholes. Exposed bedrock covers 3 to 10 percent of the surface.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil extends to bedrock at a depth of 31 inches. The upper 4 inches of the subsoil is strong brown silty clay loam, and the lower 20 inches is yellowish red silty clay.

Included with this soil in mapping are small areas of Frederick and Murrill soils. Also included are areas of deep soils, shallow soils, and steep and very steep soils. Included soils make up about 30 percent of the unit.

The available water capacity of this Caneyville soil is moderate. Permeability is moderately slow in the subsoil. Runoff is rapid, and natural fertility is moderate or high. In unlimed areas this soil is medium acid to very strongly acid in the surface layer and upper part of the subsoil and medium acid or slightly acid in the lower part of the subsoil. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

Slope and the exposed rock on the surface restrict the use of farm machinery and make the soil unsuitable for cultivated crops or hay. The soil is suited to pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. The use of proper stocking rates and the use of rotational grazing are major pasture management needs.

This soil has moderate or moderately high potential for trees. Erosion control on logging roads and skid trails is a major management concern. Placing the roads and trails on the contour helps to control this erosion. The exposed rock and slope limit the use of equipment.

Slope, the exposed rock, the moderately slow permeability, and the depth to bedrock limit this soil for most types of community development.

The capability subclass is VIs.

CIF—Caneyville silt loam, very rocky, 30 to 60 percent slopes. These soils are very steep and well drained. They are on ridgetops and side slopes. The areas range from 25 to 250 acres. Some areas are dissected by small drainageways, and some have limestone sinkholes. Exposed bedrock covers 3 to 10 percent of the surface.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsoil extends to bedrock at a depth of 29 inches. The upper 4 inches of the subsoil is strong brown silty clay loam, and the lower 19 inches is yellowish red silty clay.

Included with this soil in mapping are small areas of Frederick and Murrill soils. Also included are areas of deep soils, shallow soils, and moderately steep soils and a few areas where exposed rock covers 10 to 15 percent of the surface. Included soils make up about 35 percent of the unit.

The available water capacity of this Caneyville soil is moderate. Permeability is moderately slow in the subsoil. Runoff is rapid, and natural fertility is moderate or high. In unlimed areas the soil is medium acid to very strongly acid in the surface layer and upper part of the subsoil and medium acid or slightly acid in the lower part of the subsoil. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

Slope and the exposed rock make this soil unsuitable for cultivated crops or hay and difficult to manage for pasture. The soil has moderate or moderately high potential for trees. Erosion control on logging roads and skid trails is a major management concern. Placing the roads and trails on the contour helps to control this erosion. The exposed rock and slope limit the use of equipment.

Slope, the exposed rock, the moderately slow permeability, and the depth to bedrock limit this soil for most types of community development.

The capability subclass is VIIs.

Cm—Chagrin loam. This soil is nearly level and well drained. It is on flood plains that are subject to common flooding. Slopes range from 0 to 3 percent. The areas are generally long and narrow and range from about 5 to 15 acres.

Typically, the surface layer is dark grayish brown loam about 10 inches thick. The subsoil is dark brown loam 26 inches thick. The substratum is brown and dark brown sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of well drained Kanawha soils, moderately well drained Lobdell soils, and somewhat poorly drained Orrville soils. Also included are a few small areas of gently sloping soils. Included soils make up about 15 percent of the unit.

The available water capacity of this Chagrin soil is high. Permeability is moderate throughout. Runoff is slow, and natural fertility is high. In unlimed areas the soil is medium acid to neutral. The depth to bedrock is greater than 60 inches.

This soil is suited to cultivated crops and to hay and pasture. Most of the acreage is farmed, and cultivated crops can be grown continuously, but the soil needs the protection of a cover crop. Crops in some areas are subject to damage from flooding. Mixing the residue from the cover crop into the soil helps to maintain fertility and tilth. The use of proper stocking rates and the use of rotational grazing are major pasture management needs.

This soil has very high potential for trees, but only a small acreage is wooded.

The hazard of flooding limits the soil for most types of community development.

The capability subclass is IIw.

CnD—Clymer-Gilpin complex, 15 to 30 percent slopes. These soils are moderately steep and well drained. They are on ridgetops and benches. The areas range from about 10 to 75 acres. They are about 45 percent Clymer loam, 40 percent Gilpin silt loam, and 15 percent other soils. The Clymer and Gilpin soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Clymer soils is very dark gray loam about 3 inches thick underlain by 7 inches of yellowish brown channery loam. The subsoil is 28 inches thick. The upper 11 inches of the subsoil is yellowish brown channery heavy loam, the next 8 inches is yellowish brown channery sandy clay loam, and the lower 9 inches is strong brown very channery sandy clay loam. The substratum is yellowish brown very channery sandy loam that extends to bedrock at a depth of about 46 inches.

Typically, the surface layer of the Gilpin soils is dark brown and yellowish brown silt loam 6 inches thick. The subsoil is 23 inches thick. The upper 10 inches of the subsoil is yellowish brown light silty clay loam, and the lower 13 inches is strong brown channery light silty clay loam. The substratum is strong brown channery silty clay loam that extends to bedrock, which is at a depth of about 36 inches.

Included with these soils in mapping are a few small areas of well drained Berks, Dekalb, and Lily soils. Also included are a few small areas of strongly sloping soils, steep soils, and stony or very stony soils.

Available water capacity is moderate in these Clymer soils and low or moderate in these Gilpin soils. Permeability is moderate in both soils, and natural fertility is low or moderate. Runoff is rapid. In unlimed areas the soils are strongly acid to extremely acid. The depth to bedrock is 40 to 60 inches or more in the Clymer soils. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches in the Gilpin soils.

Slope limits the suitability of these soils for cultivated crops; the soils are better suited to hay or pasture. The hazard of erosion is severe on unprotected areas and is a major management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and returning crop residue to the soil help to control erosion and maintain fertility and tilth in cultivated areas. The use of proper stocking rates and the use of rotational grazing are the major pasture management needs.

These soils have moderately high to high potential for trees. Erosion control on logging roads and skid trails is a major management concern. Placing the roads and trails on the contour helps to control this erosion. Slope limits the use of equipment.

Slope and the depth to bedrock limit these soils for most types of community development.

The capability subclass is IVe.

CnF—Clymer-Gilpin complex, 30 to 70 percent slopes. These soils are very steep and well drained. They are on narrow ridges and hillsides. The areas range from about 20 to 250 acres. They are about 45 percent Clymer loam, 35 percent Gilpin silt loam, and 20 percent other soils. The Clymer and Gilpin soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Clymer soils is very dark gray loam about 2 inches thick underlain by 7 inches of yellowish brown channery loam. The subsoil is 30 inches thick. The upper 12 inches of the subsoil is yellowish brown channery heavy loam, the next 5 inches is yellowish brown channery sandy clay loam, and the lower 13 inches is strong brown very channery sandy clay loam. The substratum is yellowish brown very channery sandy loam that extends to bedrock at a depth of about 48 inches.

Typically, the surface layer of the Gilpin soils is dark brown and yellowish brown silt loam 6 inches thick. The subsoil is 21 inches thick. The upper 9 inches of the subsoil is yellowish brown light silty clay loam, and the

lower 12 inches is strong brown channery silty clay loam. The substratum is strong brown channery silty clay loam that extends to bedrock at a depth of about 34 inches.

Included with these soils in mapping are a few small areas of well drained Berks, Dekalb, Jefferson, and Lily soils and moderately well drained Buchanan and Ernest soils. Also included are a few small areas of moderately steep soils and stony or very stony soils.

Available water capacity is moderate in these Clymer soils and low or moderate in these Gilpin soils. Permeability is moderate in both soils, and natural fertility is low or moderate. Runoff is very rapid. In unlimed areas the soils are strongly acid to extremely acid. The depth to bedrock is 40 to 60 inches or more in the Clymer soils. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches in the Gilpin soils.

Slope makes these soils unsuitable for cultivated crops or hay and difficult to manage for pasture. Most areas are wooded, and the soils have moderately high or high potential for trees. Erosion control on logging roads and skid trails is the major management concern. Placing the roads and trails on the contour helps to control this erosion. Slope limits the use of equipment.

Slope and the depth to bedrock limit these soils for most types of community development.

The capability subclass is VIIe.

CtC—Coolville and Latham silt loams, 3 to 15 percent slopes. These soils are strongly sloping and gently sloping and are moderately well drained. They are on ridgetops and benches. The areas range from about 5 to 50 acres. Some are made up of Coolville soils, some of Latham soils, and some of both. The Coolville and Latham soils were mapped together because they have no major differences in use and management. The total average of this unit is about 55 percent Coolville silt loam, 35 percent Latham silt loam, and 20 percent other soils.

Typically, the surface layer of the Coolville soils is dark brown silt loam about 8 inches thick. The subsoil is 35 inches thick. The upper 5 inches of the subsoil is strong brown silty clay loam; the next 7 inches is yellowish red light silty clay; the next 11 inches is yellowish red, mottled silty clay; and the lower 12 inches is strong brown, mottled light silty clay. The substratum is strong brown, mottled shaly heavy silty clay loam to a depth of 60 inches or more.

Typically, the surface layer of the Latham soils is dark brown silt loam about 6 inches thick. The subsoil is strong brown and is 20 inches thick. The upper 7 inches of the subsoil is silty clay loam, and the lower 13 inches is mottled silty clay and shaly silty clay. The substratum is strong brown, mottled shaly silty clay loam that extends to bedrock at a depth of about 36 inches.

Included with these soils in mapping are a few small areas of well drained Gilpin and Lily soils and moderately well drained Tilsit soils. Also included are a few small areas of moderately steep soils and severely eroded soils.

Available water capacity is moderate or high in these Coolville soils and moderate in these Latham soils. The permeability of the subsoil is slow or very slow in both soils. Runoff is medium to rapid on these soils, and natural fertility is low or moderate. The soils have a seasonal high water table about 1-1/2 to 3-1/2 feet below the surface that restricts the root zone of some plants. In unlimed areas the soils are strongly acid to extremely acid. The depth to bedrock is 40 inches or more in the Coolville soils. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches in the Latham soils.

These soils are suited to cultivated crops and to hay and pasture. The hazard of erosion is severe in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. The use of proper stocking rates, the use of rotational grazing, and deferment of grazing in the spring until the soil is reasonably firm are major pasture management needs.

These soils have moderately high potential for trees. Erosion control on logging roads and skid trails is a management concern, and placing the roads and trails on the contour helps to control erosion. The use of equipment is restricted during wet seasons because the soils are soft.

Slope, the slow and very slow permeability, and the seasonal high water table limit these soils for most types of community development. The depth to bedrock in the Latham soils is an additional limitation.

The capability subclass is IIIe.

CtD—Coolville and Latham silt loams, 15 to 25 percent slopes. These soils are moderately steep and moderately well drained. They are on ridgetops and benches. The areas are about 5 to 30 acres. Some are made up of Coolville soils, some of Latham soils, and some of both. The Coolville and Latham soils were mapped together because they have no major differences in use and management. The total acreage of this unit is about 50 percent Coolville silt loam, 30 percent Latham silt loam, and 20 percent other soils.

Typically, the surface layer of the Coolville soils is dark brown silt loam about 7 inches thick. The subsoil is 34 inches thick. The upper 5 inches of the subsoil is strong brown silty clay loam; the next 6 inches is yellowish red light silty clay; the next 12 inches is yellowish red, mottled silty clay; and the lower 11 inches is strong brown, mottled light silty clay. The substratum is strong brown, mottled shaly heavy silty clay loam to a depth of 60 inches or more.

Typically, the surface layer of the Latham soils is dark brown silt loam about 5 inches thick. The subsoil is

strong brown and is 19 inches thick. The upper 7 inches of the subsoil is silty clay loam, and the lower 12 inches is mottled silty clay and shaly silty clay. The substratum is strong brown, mottled shaly silty clay loam that extends to bedrock at a depth of about 34 inches.

Included with these soils in mapping are a few small areas of well drained Gilpin and Lily soils and moderately well drained Tilsit soils. Also included are a few small areas of strongly sloping soils, steep soils, and severely eroded soils.

Available water capacity is moderate or high in these Coolville soils and moderate in these Latham soils. The permeability of the subsoil is slow or very slow in both soils. Runoff is medium to rapid on these soils, and natural fertility is low or moderate. The soils have a seasonal high water table about 1-1/2 to 3-1/2 feet below the surface that restricts the root zone of some plants. In unlimed areas the soils are strongly acid to extremely acid. The depth to bedrock is 40 inches or more in the Coolville soils. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches in the Latham soils.

These soils have limited suitability for cultivated crops; the soils are better suited to hay or pasture. The hazard of erosion is severe on unprotected areas and is a major management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. The use of proper stocking rates, the use of rotational grazing, and deferment of grazing in the spring until the soil is reasonably firm are major pasture management needs.

These soils have moderately high potential for trees. Erosion control on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour helps to control this erosion. The use of equipment is restricted during wet seasons because the soils are soft.

Slope, the slow and very slow permeability, and the seasonal high water table limit these soils for most types of community development. The depth to bedrock in the Latham soils is an additional limitation.

The capability subclass is IVe.

CuF—Culleoka silt loam, 30 to 65 percent slopes. This soil is very steep and well drained. It is on ridgetops and hillsides, some of which are dissected by small drainageways. The areas range from about 5 to 30 acres.

Typically, the surface layer is dark yellowish brown silt loam about 3 inches thick. The subsoil extends to bedrock at a depth of 29 inches. The upper 11 inches of the subsoil is yellowish brown silt loam and heavy silt loam, the next 8 inches is yellowish brown shaly silty clay loam, and the lower 7 inches is strong brown shaly silty clay loam.

Included with this soil in mapping are a few small areas of well drained Westmoreland and Gilpin soils. Also included are a few small areas of shallow soils and moderately steep soils. Included soils make up about 20 percent of the unit.

The available water capacity of this Culleoka soil is moderate. The permeability is moderate or moderately rapid in the surface layer and subsoil. Runoff is very rapid, and natural fertility is moderate. In unlimed areas the soil is medium acid or strongly acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

Slope makes this soil unsuitable for cultivated crops or hay and difficult to manage for pasture. The soil has high potential for trees. Erosion control on logging roads and skid trails is a major management concern. Placing the roads and trails on the contour helps to control this erosion. Slope limits the use of equipment.

Slope and the depth to bedrock limit this soil for most types of community development.

The capability subclass is VIIe.

DeC—Dekalb channery fine sandy loam, 3 to 15 percent slopes. This soil is strongly sloping and gently sloping and is well drained. It is mostly on broad ridgetops. The areas range from about 5 to 30 acres.

Typically, the surface layer is very dark grayish brown and grayish brown channery fine sandy loam about 8 inches thick. The subsoil is 22 inches thick. The upper 17 inches of the subsoil is brownish yellow channery sandy loam, and the lower 5 inches is a strong brown very channery sandy loam. The substratum is strong brown very channery sandy loam that extends to bedrock at a depth of about 33 inches.

Included with this soil in mapping are a few small areas of well drained Lily and Gilpin soils. Also included are a few small areas of moderately steep soils and stony soils. Included soils make up about 15 percent of the unit.

The available water capacity of this Dekalb soil is low or very low. Permeability is moderately rapid or rapid in the surface layer and subsoil. Runoff is medium to rapid, and natural fertility is low. In unlimed areas the soil is strongly acid to extremely acid. The root zone of some types of plants is restricted by bedrock, which is at a depth of 20 to 40 inches.

This soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is severe in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. The use of proper stocking rates and the use of rotational grazing are major pasture management needs. Deferred or restricted grazing is required in some dry seasons to maintain the plant cover.

This soil has moderately high potential for trees. Erosion control on logging roads and skid trails is a

major management concern. Placing the roads and trails on the contour will help to control this erosion.

Slope and the depth to bedrock limit this soil for most types of community development.

The capability subclass is IIIe.

DeD—Dekalb channery fine sandy loam, 15 to 30 percent slopes. This soil is moderately steep and well drained. It is on ridgetops and on benches that are commonly dissected by drainageways. The areas range from about 10 to 40 acres.

Typically, the surface layer is very dark grayish brown and grayish brown channery fine sandy loam about 8 inches thick. The subsoil is 20 inches thick. The upper 12 inches of the subsoil is brownish yellow channery sandy loam, and the lower 8 inches is strong brown very channery sandy loam. The substratum is strong brown very channery sandy loam that extends to bedrock at a depth of about 34 inches.

Included with this soil in mapping are a few small areas of well drained Gilpin, Jefferson, and Lily soils. Also included are a few small areas of strongly sloping soils, steep soils, stony soils, and exposed bedrock. Included areas make up about 20 percent of the unit.

The available water capacity of this Dekalb soil is low or very low. Permeability is moderately rapid or rapid in the surface layer and subsoil. Runoff is rapid, and natural fertility is low. In unlimed areas the soil is strongly acid to extremely acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

This soil has limited suitability for cultivated crops; it is better suited to hay or pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. Minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. Slope limits the use of farm machinery. Proper stocking rates and rotational grazing are the major pasture management needs. Deferred or restricted grazing is required in some dry seasons.

This soil has moderate or moderately high potential for trees, and most of the acreage is wooded or reverting to woody species. Erosion on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour helps to control this erosion. Slope limits the use of equipment.

Slope and the depth to bedrock limit this soil for most types of community development.

The capability subclass is IVe.

DgD—Dekalb-Gilpin-Jefferson stony complex, 15 to 35 percent slopes. This complex consists of moderately steep or steep, well drained soils on ridgetops, in coves, on benches, and on hillsides. Drainageways commonly dissect the benches and hillsides. Stones cover about 1 to 3 percent of the surface of the unit. The areas range from about 20 to 80 acres. They are about 30 percent Dekalb stony sandy loam, 25 percent Gilpin stony silt loam, 25 percent Jefferson stony loam, and 20 percent other soils. The Dekalb, Gilpin, and Jefferson soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Dekalb soils is very dark gray and light brownish gray channery sandy loam about 10 inches thick. The subsoil is yellowish brown and extends to bedrock at a depth of 28 inches. The upper 10 inches of the subsoil is channery sandy loam, and the lower 8 inches is very channery sandy loam.

Typically, the surface layer of the Gilpin soils is dark brown and yellowish brown channery silt loam about 7 inches thick. The subsoil is strong brown and is 21 inches thick. The upper 8 inches of the subsoil is channery light silty clay loam, and the lower 13 inches is channery silty clay loam. The substratum is strong brown very channery silty clay loam that extends to bedrock at a depth of about 36 inches.

Typically, the surface layer of the Jefferson soils is dark grayish brown channery loam about 3 inches thick underlain by 6 inches of brown channery fine sandy loam. The subsoil is yellowish brown and is 36 inches thick. The upper 18 inches of the subsoil is heavy loam, and the lower 18 inches is channery loam. The substratum is strong brown very channery loam to a depth of 60 inches or more.

Included with these soils in mapping are a few small areas of well drained Berks, Clymer, and Lily soils and a few small areas of moderately well drained Buchanan and Ernest soils. Also included are a few small areas of soils with no stones on the surface and areas of exposed bedrock.

The available water capacity is low or very low in the Dekalb soils, low in the Gilpin soils, and moderate or high in the Jefferson soils. Permeability is moderately rapid or rapid in the Dekalb soils, moderate in the Gilpin soils, and moderately rapid in the Jefferson soils. Runoff is rapid on all three soils. Natural fertility is low in the Dekalb and Jefferson soils and low or moderate in the Gilpin soils. In unlimed areas the Dekalb and Gilpin soils are strongly acid to extremely acid and the Jefferson soils are strongly acid or very strongly acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches in the Dekalb and Gilpin soils. The depth to bedrock is more than 60 inches in the Jefferson soils.

Slope and the stones on the surface restrict the use of farm equipment and make the soils unsuitable for cultivated crops or hay. The hazard of erosion is severe in unprotected areas and is a major management concern. Proper stocking rates and rotational grazing are major pasture management needs.

These soils have moderate to high potential for trees, and most of the acreage is wooded. Erosion on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour will help to control this erosion. Slope limits the use of equipment.

Slope, the depth to bedrock, and the stones on the surface limit these soils for most types of community development.

The capability subclass is VIs.

DgF—Dekalb-Gilpin-Jefferson stony complex, 35 to 80 percent slopes. This complex consists of very steep, well drained soils on ridgetops, in coves, and on hillsides. Stones cover 1 to 3 percent of the surface. The areas range from about 25 to 200 acres. They are about 35 percent Dekalb stony sandy loam, 25 percent Gilpin stony silt loam, 20 percent Jefferson stony loam, and 20 percent other soils. The Dekalb, Gilpin, and Jefferson soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Dekalb soils is very dark gray and light brownish gray channery sandy loam about 9 inches thick. The subsoil is yellowish brown and extends to bedrock at a depth of 28 inches. The upper 12 inches of the subsoil is channery sandy loam, and the lower 7 inches is very channery sandy loam.

Typically, the surface layer of the Gilpin soils is dark brown and yellowish brown channery silt loam about 6 inches thick. The subsoil is strong brown and is 19 inches thick. The upper 9 inches of the subsoil is channery light silty clay loam, and the lower 10 inches is channery silty clay loam. The substratum is strong brown very channery silty clay loam that extends to bedrock at a depth of about 35 inches.

Typically, the surface layer of the Jefferson soils is dark grayish brown channery loam about 3 inches thick underlain by brown channery fine sandy loam about 5 inches thick. The subsoil is yellowish brown and is 36 inches thick. The upper 20 inches of the subsoil is loam, and the lower 16 inches is channery loam. The substratum is strong brown very channery loam to a depth of 60 inches or more.

Included with these soils in mapping are a few small areas of well drained Berks, Clymer, and Lily soils and a few small areas of moderately well drained Buchanan and Ernest soils. Also included are a few small areas of soils with no stones on the surface, moderately steep soils, and exposed bedrock.

The available water capacity is low or very low in the Dekalb soils, low in the Gilpin soils, and moderate or high in the Jefferson soils. Permeability is moderately rapid or rapid in the Dekalb soils, moderate in the Gilpin soils, and moderately rapid in the Jefferson soils. Runoff is very rapid on all three soils. Natural fertility is low in the Dekalb and Jefferson soils and low or moderate in the Gilpin soils. In unlimed areas the Dekalb and Gilpin soils are strongly acid to extremely acid, and the Jefferson soils are strongly acid or very strongly acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches in the Dekalb and Gilpin soils. The depth to bedrock is more than 60 inches in the Jefferson soils.

Slope and the stones on the surface restrict the use of farm equipment and make the soils unsuitable for cultivated crops or hay and difficult to manage for pasture. The soils have moderate to high potential for trees, and most of the acreage is wooded. Erosion on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour will help control this erosion. Slope limits the use of equipment.

Slope, the depth to bedrock, and the stones on the surface limit these soils for most types of community development.

The capability subclass is VIIs.

DrF—Dekalb-Rock outcrop complex, 15 to 65 percent slopes. This complex consists of moderately steep to very steep, well drained soils that are so intermingled with areas of exposed bedrock that it was not practical to map the soils and rock separately. Stones cover 1 to 3 percent of the surface of the soil. The areas of the complex range from about 10 to 40 acres and are on ridgetops and sideslopes. The complex is about 50 percent Dekalb stony sandy loam, 35 percent exposed bedrock, and 15 percent other soils.

Typically, the surface layer of the Dekalb soil is very dark grayish brown and grayish brown channery sandy loam about 7 inches thick. The subsoil is 18 inches thick. The upper 7 inches of the subsoil is brownish yellow channery sandy loam, and the lower 11 inches is strong brown very channery sandy loam. The substratum is strong brown very channery sandy loam that extends to bedrock at a depth of about 31 inches.

Included with this soil in mapping are a few small areas of well drained Berks, Clymer, Gilpin, and Jefferson soils and moderately well drained Buchanan and Ernest soils. Also included are a few small areas of shallow soils.

This Dekalb soil has low or very low available water capacity and moderately rapid or rapid permeability. Runoff is rapid or very rapid, and natural fertility is low. In unlimed areas this soil is strongly acid to extremely acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

Slope and the stones and exposed rock on the surface restrict the use of farm equipment and make this complex unsuitable for cultivated crops or hay and difficult to manage for pasture. The complex has moderate or moderately high potential for trees, and most areas are wooded. Erosion control on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour helps to control erosion. The slope, exposed rock, and stones severely limit the use of timber equipment and, along with the depth to bedrock, limit the complex for most types of community development.

The capability subclass is VIIs.

ErB—Ernest silt loam, 3 to 8 percent slopes. This soil is gently sloping and moderately well drained. It is on foot slopes and along drainageways. The areas range from about 5 to 25 acres.

Typically, the surface layer is dark yellowish brown silt loam about 9 inches thick. The subsoil is 29 inches thick. The upper 15 inches of the subsoil is yellowish brown silty clay loam that is mottled in the lower part. The lower 14 inches is a very firm layer of strong brown, mottled silt loam. The substratum is strong brown, mottled channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of well drained Berks, Gilpin, and Jefferson soils; moderately well drained Buchanan soils; and poorly drained Atkins soils. Also included are a few small areas of stony soils and strongly sloping soils. Included soils make up about 25 percent of the unit.

The available water capacity of this Ernest soil is moderate. Permeability is moderate above the firm part of the subsoil and slow in the firm part. This soil has a seasonal high water table about 1-1/2 to 3 feet below the surface which restricts the root zone of some types of plants. Runoff is medium, and natural fertility is moderate. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is greater than 60 inches.

This soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is severe in unprotected areas and is a management concern. Some places have small wet areas that need drainage for crops, and some other areas need diversions to intercept runoff from higher areas. Cultivating on the contour, using a crop sequence that includes hay, delaying tillage until the soil is reasonably dry, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. The use of proper stocking rates, the use of rotational grazing, and the deferment of grazing until the soil is reasonably firm are major pasture management needs.

This soil has high potential for trees, but only a small acreage is wooded. Erosion on logging roads and skid trails is a management concern, and placing the roads and trails on the contour helps to control this erosion. The use of equipment is restricted during wet seasons because the soil is soft.

The seasonal high water table, the slow permeability in the firm part of the subsoil, and a frost-action potential are the main limitations of this soil for community development.

The capability subclass is IIe.

ErC—Ernest silt loam, 8 to 15 percent slopes. This soil is strongly sloping and moderately well drained. It is on foot slopes and along drainageways. The areas range from 5 to 15 acres.

Typically, the surface layer is dark yellowish brown silt loam about 9 inches thick. The subsoil is 29 inches thick. The upper 15 inches of the subsoil is yellowish brown silty clay loam that is mottled in the lower part. The lower 14 inches is a very firm layer of strong brown, mottled silt loam. The substratum is strong brown, mottled channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of well drained Berks, Gilpin, and Jefferson soils; moderately well drained Buchanan soils; and poorly drained Atkins soils. Also included are a few small areas of stony soils, gently sloping soils, and moderately steep soils. Included soils make up about 20 percent of the unit.

The available water capacity of this Ernest soil is moderate. Permeability is moderate above the firm part of the subsoil and slow in the firm part. This soil has a seasonal high water table about 1-1/2 to 3 feet below the surface which restricts the root zone of some types of plants. Runoff is rapid, and natural fertility is moderate. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is greater than 60 inches.

This soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. Some places have small wet areas that need drainage for crops, and some areas need diversions to intercept runoff from higher areas. Using minimum tillage, planting contour strips (fig. 6), using a crop sequence that includes hay, delaying tillage until the soil is reasonably dry, maintaining sod in drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. The use of proper stocking rates, the use of rotational grazing, and deferment of grazing until the soil is reasonably firm are major pasture management needs.

This soil has high potential for trees. Erosion on logging roads and skid trails is a management concern, and placing the roads and trails on the contour helps to control this erosion.

Slope, the seasonal high water table, the slow permeability in the firm part of the subsoil, and a frost-action potential are the main limitations of this soil for community development.

The capability subclass is IIIe.

ErD—Ernest silt loam, 15 to 30 percent slopes. This soil is moderately steep and moderately well drained. It is on foot slopes and drainageways. The areas range from about 15 to 25 acres.

Typically, the surface layer is dark yellowish brown silt loam about 7 inches thick. The subsoil is 31 inches thick. The upper 17 inches of the subsoil is yellowish brown silty clay loam that is mottled in the lower part. The lower 14 inches is a very firm layer of strong brown, mottled silt loam. The substratum is strong brown, mottled channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of well drained Berks, Jefferson, and Gilpin soils and moderately well drained Buchanan soils. Also included are a few small areas of stony soils, strongly

Figure 6.—A contour strip in an area of Ernest silt loam.

sloping soils, and steep soils. Included soils make up about 20 percent of the unit.

The available water capacity of this Ernest soil is moderate. Permeability is moderate above the firm part of the subsoil and slow in the firm part. This soil has a seasonal high water table about 1-1/2 to 3 feet below the surface which restricts the root zone of some types of plants. Runoff is rapid, and natural fertility is medium. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is greater than 60 inches.

This soil has limited suitability for cultivated crops; it is better suited to hay or pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. Diversions are needed in places to intercept runoff from higher areas. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, delaying tillage until the soil is reasonably dry, maintaining sod in drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. The use of proper stocking rates, the use of rotational grazing, and deferment of grazing until the soil is reasonably firm are major pasture management needs.

This soil has high potential for trees. Erosion on logging roads and skid trails is a major management concern. Placing the roads and trails on the contour helps to control this erosion. Slope limits the use of equipment, and its use is further restricted during wet seasons because the soil is soft.

Slope, the seasonal high water table, the slow permeability in the firm part of the subsoil, and a frost-action potential are the main limitations of this soil for community development.

The capability subclass is IVe.

EuC—Ernest and Buchanan stony soils, 3 to 15 percent slopes. This unit consists of strongly sloping to gently sloping, moderately well drained soils on foot slopes and along drainageways. Stones cover 1 to 3 percent of the surface of these soils. The areas range

from about 10 to 20 acres. The total acreage of this unit is about 40 percent Ernest soils, 30 percent Buchanan soils, and 30 percent other soils. Some areas consist entirely of Ernest soils, some of Buchanan soils, and some of both. The Ernest and Buchanan soils were mapped together because they have no major differences in use and management.

Typically, the surface layer of the Ernest soils is dark grayish brown silt loam about 3 inches thick underlain by brown loam about 4 inches thick. The subsoil is 31 inches thick. The upper 17 inches of the subsoil is yellowish brown silty clay loam that is mottled in the lower part. The lower 14 inches is a very firm layer of strong brown, mottled silt loam. The substratum is strong brown, mottled channery silt loam to a depth of 60 inches or more.

Typically, the surface layer of the Buchanan soils is dark grayish brown and brown loam about 7 inches thick. The subsoil is yellowish brown and is 40 inches thick. The upper 19 inches of the subsoil is channery loam that is mottled in the lower part. The lower 21 inches is a very firm layer of mottled channery heavy loam and channery light clay loam. The substratum is strong brown, mottled channery clay loam to a depth of 60 inches or more.

Included with these soils in mapping are a few small areas of well drained Clymer, Dekalb, Jefferson, and Gilpin soils and poorly drained Atkins soils. Also included are a few small areas of soils that do not have stones on the surface, soils that do not have a very firm layer in the subsoil, and moderately steep soils.

Available water capacity is moderate in these Ernest soils and low or moderate in these Buchanan soils. Both soils have moderate permeability above the firm part of the subsoil and slow permeability in the firm part. The soils have medium or rapid runoff and low to moderate natural fertility. In unlimed areas the Ernest soils are strongly acid or very strongly acid and the Buchanan soils are strongly acid to extremely acid. These soils have a seasonal high water table about 1-1/2 to 3 feet below the surface which restricts the root zone of some types of plants. The depth to bedrock is generally greater than 60 inches in both soils.

The stones on the surface restrict the use of farm equipment and make the soils unsuitable for cultivated crops or hay. The soils are suited to pasture. The hazard of erosion is severe in unprotected areas and is a management concern. Proper stocking rates and rotational grazing are major management needs.

These soils have high potential for trees. Erosion on logging roads and skid trails is a management concern, and placing the roads and trails on the contour helps to control this erosion. The use of equipment is restricted during wet seasons because the soils are soft.

The stones on the surface, the slope, the slow permeability in the firm part of the subsoil, and the seasonal high water table limit these soils for most types of community development.

The capability subclass is VIs.

EuD—Ernest and Buchanan stony soils, 15 to 30 percent slopes. This unit consists of moderately steep, moderately well drained soils on foot slopes and along drainageways. Stones cover 1 to 3 percent of the surface of these soils. The areas range from about 10 to 25 acres. The total acreage of this unit is about 40 percent Ernest soils, 35 percent Buchanan soils, and 25 percent other soils. Some areas consist entirely of Ernest soils, some of Buchanan soils, and some of both. The Ernest and Buchanan soils were mapped together because they have no major differences in use and management.

Typically, the surface layer of the Ernest soils is dark grayish brown silt loam about 3 inches thick underlain by brown loam about 4 inches thick. The subsoil is 31 inches thick. The upper 17 inches of the subsoil is yellowish brown silty clay loam that is mottled in the lower part. The lower 14 inches is a very firm layer of strong brown, mottled silt loam. The substratum is strong brown, mottled channery silt loam to a depth of 60 inches or more.

Typically, the surface layer of the Buchanan soils is dark grayish brown and pale brown loam about 7 inches thick. The subsoil is yellowish brown and is 38 inches thick. The upper 18 inches of the subsoil is channery loam that is mottled in the lower part. The lower 20 inches is a very firm layer of mottled channery heavy loam and channery light clay loam. The substratum is strong brown, mottled channery clay loam to a depth of 60 inches or more.

Included with these soils in mapping are a few small areas of well drained Clymer, Dekalb, Jefferson, and Gilpin soils. Also included are a few small areas of soils with no stones on the surface, soils that do not have a firm layer in the subsoil, and strongly sloping soils and steep soils.

Available water capacity is moderate in these Ernest soils and low or moderate in these Buchanan soils. Both soils have moderate permeability above the firm part of the subsoil and slow permeability in the firm part. The soils have rapid runoff and low to moderate natural fertility. In unlimed areas the Ernest soils are strongly acid or very strongly acid and the Buchanan soils are strongly acid to extremely acid. These soils have a seasonal high water table about 1-1/2 to 3 feet below the surface which restricts the root zone of some types of plants. The depth to bedrock is generally greater than 60 inches in both soils.

Slope and the stones on the surface restrict the use of farm equipment and make the soils unsuitable for cultivated crops or hay. The soils are suited to pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. Proper stocking rates and rotational grazing are major pasture management needs.

These soils have high potential for trees, and most areas are wooded. Erosion on logging roads and skid

trails is a major management concern. Placing the roads and trails on the contour helps to control this erosion. Slope limits the use of equipment, and its use is further limited during wet seasons because the soils are soft.

The stones on the surface, slope, the slow permeability in the firm part of the subsoil, and the seasonal high water table limit these soils for most types of community development.

The capability subclass is VIs.

FcD—Frederick very cherty loam, 15 to 30 percent slopes. This soil is moderately steep and well drained. It is on ridgetops and hillsides. The areas range from about 25 to 50 acres.

Typically, the surface layer is dark gray and yellowish brown very cherty loam 20 inches thick. The subsoil extends to a depth of 72 inches or more. The upper 8 inches of the subsoil is yellowish brown loam, the next 6 inches is strong brown clay loam, the next 20 inches is strong brown clay, and the lower 18 inches is yellowish red silty clay.

Included with this soil in mapping are a few small areas of well drained Murrill and Caneyville soils. Also included are a few small areas of soils with more chert fragments in the subsoil than this Frederick soil, a few areas of exposed bedrock, a few stony soils, areas of strongly sloping soils, and areas of steep soils. Included soils make up about 20 percent of the unit.

The available water capacity of this Frederick soil is moderate or high. Permeability is moderate in the subsoil. Runoff is rapid, and natural fertility is moderate. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is greater than 72 inches.

Slope and the chert fragments in this soil restrict the use of farm equipment and make the soil unsuitable for cultivated crops or hay. The soil is suited to pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. Use of proper stocking rates and rotational grazing are major pasture management needs.

This soil has high potential for trees, and most of the acreage is wooded. Erosion on logging roads and skid trails is a major management concern. Placing the roads and trails on the contour helps to control erosion. Slope limits the use of timber equipment.

Slope, low strength, and a shrink-swell potential are the main limitations of this soil for most types of community development.

The capability subclass is VIs.

FcF—Frederick very cherty loam, 30 to 60 percent slopes. This soil is very steep and well drained. It is on ridgetops and hillsides. The areas range from about 25 to 50 acres.

Typically, the surface layer is dark gray and yellowish brown very cherty loam 18 inches thick. The subsoil extends to a depth of 72 inches or more. The upper 6 inches of the subsoil is yellowish brown loam, the next 8 inches is strong brown clay loam, the next 20 inches is strong brown clay, and the lower 20 inches is yellowish red clay.

Included with this soil in mapping are a few small areas of well drained Murrill and Caneyville soils. Also included are a few small areas of soils with more chert fragments in the subsoil than this Frederick soil, a few areas of exposed bedrock, and a few small areas of moderately steep soils. Included soils make up about 20 percent of the unit.

The available water capacity of this Frederick soil is moderate or high. Permeability is moderate in the subsoil. Runoff is very rapid, and natural fertility is moderate. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is greater than 72 inches.

Slope and the chert fragments make this soil unsuitable for cultivated crops or hay and difficult to manage for pasture. Most areas are used for woodland. The soil has high potential for trees. Erosion on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour helps to control erosion. Slope limits the use of timber equipment.

Slope, low strength, and a shrink-swell potential are the main limitations of this soil for community development.

The capability subclass is VIIs.

FkC—Frederick silt loam, 3 to 15 percent slopes. This soil is strongly sloping and gently sloping and is well drained. It is on ridgetops and hillsides. The areas range from about 5 to 20 acres.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsoil is 44 inches thick. The upper 4 inches of the subsoil is yellowish brown light silty clay loam, the next 16 inches is strong brown heavy silty clay loam, and the lower 24 inches is yellowish red silty clay. The substratum is yellowish red, mottled silty clay to a depth of 72 inches or more.

Included with this soil in mapping are a few small areas of well drained Caneyville soils, very cherty soils, severely eroded soils, and exposed bedrock. Included soils make up about 15 percent of the unit.

The available water capacity of this Frederick soil is moderate or high. Permeability is moderate in the subsoil. Runoff is medium to rapid, and natural fertility is moderate. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is greater than 72 inches.

This soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is moderate or severe in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates and rotational grazing are major pasture management needs.

This soil has high potential for trees, but only a small acreage is wooded. Erosion control on logging roads and skid trails is a management concern. Placing roads and trails on the contour helps to control erosion.

Slope, low strength, and a shrink-swell potential are the main limitations of this soil for community development.

The capability subclass is IIIe.

FrC—Frederick cherty silt loam, 3 to 15 percent slopes. This soil is strongly sloping and gently sloping and is well drained. It is on ridgetops. The areas range from about 5 to 15 acres.

Typically, the surface layer is dark brown and yellowish brown cherty silt loam 12 inches thick. The subsoil is 55 inches thick. The upper 4 inches of the subsoil is strong brown light silty clay loam, the next 8 inches is strong brown heavy silty clay loam, the next 13 inches is yellowish red clay, and the lower 30 inches is yellowish red silty clay. The substratum is yellowish red, mottled silty clay to a depth of 72 inches or more.

Included with this soil in mapping are small areas of well drained Murrill and Caneyville soils. Also included are small areas of very cherty soils and moderately steep soils. Included soils make up about 15 percent of the unit.

The available water capacity of this Frederick soil is moderate or high. Permeability is moderate in the subsoil. Runoff is medium to rapid, and natural fertility is moderate. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is greater than 72 inches.

This soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is moderate or severe in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates and rotational grazing are major pasture management needs.

This soil has high potential for trees, but only a small acreage is wooded. Erosion on logging roads and skid trails is a management concern. Placing the roads and trails on the contour helps to control erosion.

Slope, low strength, and a shrink-swell potential are the main limitations of this soil for community development.

The capability subclass is IIIe.

FrD—Frederick cherty silt loam, 15 to 30 percent slopes. This soil is moderately steep and well drained. It is on ridgetops and hillsides. The areas range from about 10 to 25 acres.

Typically, the surface layer is dark brown and yellowish brown cherty silt loam 11 inches thick. The subsoil is 55 inches thick. The upper 4 inches of the subsoil is strong brown light silty clay loam, the next 7 inches is strong brown heavy silty clay loam, the next 14 inches is yellowish red clay, and the lower 30 inches is yellowish red silty clay. The substratum is yellowish red, mottled silty clay to a depth of 72 inches or more.

Included with this soil in mapping are small areas of well drained Murrill and Caneyville soils. Also included are small areas of very cherty soils, strongly sloping soils, and steep soils. Included soils make up about 15 percent of the unit.

The available water capacity of this Frederick soil is moderate or high. Permeability is moderate in the subsoil. Runoff is rapid, and natural fertility is moderate. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is greater than 72 inches.

This soil has limited suitability for cultivated crops; it is better suited to hay and pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and returning crop residue to the soil help to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates and rotational grazing are major pasture management needs.

This soil has high potential for trees. Erosion on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour helps to control erosion. Slope limits the use of equipment.

Slope, low strength, and a shrink-swell potential are the main limitations of this soil for community development.

The capability subclass is IVe.

FrF—Frederick cherty silt loam, 30 to 60 percent slopes. This soil is very steep and well drained. It is on hillsides and narrow ridgetops. The areas range from about 10 to 30 acres.

Typically, the surface layer is dark brown and yellowish brown cherty silt loam 13 inches thick. The subsoil is 52 inches thick. The upper 4 inches of the subsoil is strong brown light silty clay loam, the next 7 inches is strong brown heavy silty clay loam, the next 13 inches is yellowish red clay, and the lower 28 inches is yellowish red silty clay. The substratum is yellowish red, mottled silty clay to a depth of 72 inches or more.

Included with this soil in mapping are a few small areas of well drained Murrill and Caneyville soils. Also included are a few small areas of very cherty soils, severely eroded soils, exposed bedrock, and moderately steep soils. Included soils make up about 20 percent of the unit.

The available water capacity of this Frederick soil is moderate or high. Permeability is moderate in the subsoil. Runoff is very rapid, and natural fertility is moderate. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is greater than 72 inches.

Slope makes this soil unsuitable for cultivated crops or hay and difficult to manage for pasture. Most areas are used for woodland, and the soil has high potential for trees. Erosion on logging roads and skid trails is a major management concern. Placing the roads and trails on the contour helps to control erosion. Slope limits the use of timber equipment.

Slope, low strength, and a shrink-swell potential are the main limitations of this soil for community development.

The capability subclass is VIIe.

GaB—Gilpin silt loam, 3 to 8 percent slopes. This soil is gently sloping and well drained. It is on ridgetops and on benches dissected by drainageways. The areas range from about 5 to 25 acres.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil is 23 inches thick. The upper 9 inches of the subsoil is yellowish brown light silty clay loam, and the lower 14 inches is strong brown shaly silty clay loam. The substratum is strong brown very shaly silty clay loam that extends to bedrock at a depth of about 35 inches.

Included with this soil in mapping are a few small areas of well drained Berks, Clymer, and Lily soils and moderately well drained Coolville and Latham soils. Also included are a few small areas of nearly level soils and strongly sloping soils. Included soils make up about 15 percent of the unit.

The available water capacity and permeability of this Gilpin soil are moderate. Runoff is medium, and natural fertility is low or moderate. In unlimed areas the soil is strongly acid to extremely acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

This soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is moderate in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. The use of proper stocking rates and the use of rotational grazing are major pasture management needs.

This soil has high potential for trees, and some of the acreage is wooded. Erosion on logging roads and skid trails is a management concern. Placing the roads and trails on the contour helps to control this erosion.

The depth to bedrock limits this soil for most types of community development.

The capability subclass is IIe.

GaC—Gilpin silt loam, 8 to 15 percent slopes. This soil is strongly sloping and well drained. It is on ridgetops and on benches that are dissected by drainageways. The areas range from about 5 to 30 acres.

Typically, the surface is brown silt loam about 6 inches thick. The subsoil is 24 inches thick. The upper 10 inches of the subsoil is yellowish brown light silty clay loam, and the lower 14 inches is strong brown shaly silty clay loam. The substratum is strong brown very shaly silty clay loam that extends to bedrock at a depth of about 35 inches.

Included with this soil in mapping are a few small areas of well drained Berks, Clymer, and Lily soils and moderately well drained Coolville and Latham soils. Also included are a few small areas of gently sloping soils and moderately steep soils. Included soils make up about 20 percent of the unit.

The available water capacity and permeability of this Gilpin soil are moderate. Runoff is rapid, and natural fertility is low or moderate. In unlimed areas the soil is strongly acid to extremely acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

This soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is severe in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates and rotational grazing are major pasture management needs.

This soil has high potential for trees, and some of the acreage is wooded. Erosion on logging roads and skid trials is a management concern. Placing the roads and trails on the contour helps to control this erosion.

Slope and the depth to bedrock limit this soil for most types of community development.

The capability subclass is IIIe.

GaD—Gilpin silt loam, 15 to 25 percent slopes. This soil is moderately steep and well drained. It is on ridgetops and side slopes and on benches dissected by drainageways. The areas range from about 10 to 35 acres.

Typically, the surface is brown silt loam about 5 inches thick. The subsoil is 25 inches thick. The upper 11 inches of the subsoil is yellowish brown light silty clay loam, and the lower 14 inches is strong brown shaly silty clay loam. The substratum is strong brown very shaly silty clay loam that extends to bedrock at a depth of about 35 inches.

Included with this soil in mapping are a few small areas of well drained Berks, Clymer, and Lily soils and moderately well drained Coolville and Latham soils. Also included are a few small areas of strongly sloping soils and steep soils. Included soils make up about 20 percent of the unit.

The available water capacity and permeability of this Gilpin soil are moderate. Runoff is rapid, and natural fertility is low or moderate. In unlimed areas the soil is strongly acid to extremely acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

This soil has limited suitability for cultivated crops; it is better suited to hay or pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates and rotational grazing are major pasture management needs.

This soil has moderately high or high potential for trees. Erosion on logging roads and skid trails is a major management concern. Placing the roads and trails on the contour helps to control this erosion. Slope limits the use of equipment.

Slope and the depth to bedrock limit this soil for most types of community development.

The capability subclass is IVe.

GbC—Gilpin-Berks shaly silt loams, 8 to 15 percent slopes. These soils are strongly sloping and well drained. They are on ridgetops and benches. The areas range from about 5 to 30 acres. They are about 55 percent Gilpin shaly silt loam, 30 percent Berks shaly silt loam, and 15 percent other soils. The Gilpin and Berks soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Gilpin soils is dark brown shaly silt loam about 5 inches thick. The subsoil is 25 inches thick. The upper 7 inches of the subsoil is yellowish brown silt loam, the next 9 inches is yellowish brown silty clay loam, and the lower 9 inches is strong brown shaly silty clay loam. The substratum is strong brown shaly silty clay loam that extends to bedrock at a depth of about 38 inches.

Typically, the surface layer of the Berks soils is dark brown shaly silt loam about 5 inches thick. The subsoil is yellowish brown and is 25 inches thick. The upper 15 inches of the subsoil is shaly silt loam, and the lower 10 inches is very shaly silt loam. The substratum is strong brown very channery silt loam that extends to bedrock at a depth of about 37 inches.

Included with these soils in mapping are a few small areas of well drained Calvin high base substratum, Clymer, Lily, and Weikert soils. Also included are a few areas of moderately steep soils and stony soils.

The available water capacity is low or moderate in these Gilpin soils and low or very low in these Berks soils. Permeability of the surface layer and subsoil is moderate in the Gilpin soils and moderate to moderately rapid in the Berks soils. Runoff is rapid on both soils. Natural fertility is low or moderate in the Gilpin soils and low in the Berks soils. In unlimed areas the Gilpin soils are strongly acid to extremely acid and the Berks soils are strongly acid or very strongly acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches in both soils.

These soils are suited to cultivated crops and to hay and pasture. The hazard of erosion is severe in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates and rotational grazing are the major pasture management needs.

These soils have moderately high or high potential for trees. Erosion on logging roads and skid trails is a management concern, and placing the roads and trails on the contour helps to control erosion.

Slope and the depth to bedrock are the main limitations of these soils for community development.

The capability subclass is IIIe.

GbC3—Gilpin-Berks shaly silt loams, 8 to 15 percent slopes, severely eroded. These soils are strongly sloping and well drained. They are on ridgetops and benches. The areas range from about 5 to 15 acres. They are about 50 percent Gilpin shaly silt loam, 30 percent Berks shaly silt loam, and 20 percent other soils. The Gilpin and Berks soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Gilpin soils is brown shaly silt loam about 3 inches thick. The subsoil is 22 inches thick. The upper 5 inches of the subsoil is yellowish brown silt loam, the next 9 inches is yellowish brown silty clay loam, and the lower 8 inches is strong brown shaly silty clay loam. The substratum is strong brown shaly silty clay loam that extends to bedrock at a depth of about 33 inches.

Typically, the surface layer of the Berks soils is dark yellowish brown shaly silt loam about 3 inches thick. The subsoil is yellowish brown and is 21 inches thick. The upper 13 inches of the subsoil is shaly silt loam, and the lower 8 inches is very shaly silt loam. The substratum is strong brown very channery silt loam that extends to bedrock at a depth of about 31 inches.

Included with these soils in mapping are a few small areas of well drained Calvin high base substratum, Clymer, Lily, and Weikert soils. Also included are a few small areas of stony soils.

The available water capacity is low or moderate in these Gilpin soils and low or very low in these Berks soils. Permeability is moderate in the Gilpin soils and moderate or moderately rapid in the Berks soils. Runoff is rapid on both soils. Natural fertility is low or moderate in the Gilpin soils, and low in the Berks soils. In unlimed areas the Gilpin soils are strongly acid to extremely acid and the Berks soils are strongly acid or very strongly acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches in both soils.

These soils have limited suitability for cultivated crops; the soils are better suited to hay or pasture. The hazard of erosion is very severe on unprotected areas. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help

to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates and rotational grazing are major pasture management needs. Seeding a permanent cover on bare areas will help to control erosion.

These soils have moderately high or high potential for trees. Erosion control on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour helps to control erosion.

Slope and the depth to bedrock are the main limitations of these soils for community development.

The capability subclass is IVe.

GbD—Gilpin-Berks shaly silt loams, 15 to 30 percent slopes. These soils are moderately steep and well drained. They are on ridgetops, benches, and side slopes. The areas range from about 10 to 100 acres. They are about 45 percent Gilpin shaly silt loam, 40 percent Berks shaly silt loam, and 15 percent other soils. The Gilpin and Berks soils are so intermingled that it was not practical to map them separately.

Typically, the surface of the Gilpin soils is dark brown shaly silt loam about 3 inches thick underlain by 4 inches of yellowish brown loam. The subsoil is 22 inches thick. The upper 5 inches of the subsoil is yellowish brown silt loam, the next 9 inches is yellowish brown silty clay loam, and the lower 8 inches is strong brown shaly silty clay loam. The substratum is strong brown shaly silty clay loam that extends to bedrock at a depth of about 37 inches.

Typically, the surface layer of the Berks soils is dark brown and yellowish brown shaly silt loam 8 inches thick. The subsoil is yellowish brown and is 21 inches thick. The upper 13 inches of the subsoil is shaly silt loam, and the lower 8 inches is very shaly silt loam. The substratum is strong brown very channery silt loam that extends to bedrock at a depth of about 36 inches.

Included with these soils in mapping are a few small areas of well drained Calvin high base substratum, Clymer, and Dekalb soils. Also included are a few small areas of stony soils and very steep soils.

The available water capacity is low or moderate in these Gilpin soils and low or very low in these Berks soils. Permeability is moderate in the Gilpin soils, and moderate or moderately rapid in the Berks soils. Runoff is rapid on both soils. Natural fertility is low or moderate in the Gilpin soils and low in the Berks soils. In unlimed areas the Gilpin soils are strongly acid to extremely acid and the Berks soils are strongly acid or very strongly acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches in both soils.

These soils have limited suitability for cultivated crops; the soils are better suited to hay or pasture. The hazard of erosion is severe on unprotected areas and is a major management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates and rotational grazing are major pasture management needs.

These soils have moderate to high potential for trees. Erosion on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour helps to control erosion. Slope limits the use of equipment.

Slope and the depth to bedrock are the main limitations of these soils for community development.

The capability subclass is IVe.

GbD3—Gilpin-Berks shaly silt loams, 15 to 35 percent slopes, severely eroded. These soils are moderately steep and steep and are well drained. They are on ridgetops, benches, and side slopes. The areas range from about 10 to 50 acres. They are about 45 percent Gilpin shaly silt loam, 40 percent Berks shaly silt loam, and 15 percent other soils. The Gilpin and Berks soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Gilpin soils is brown shaly silt loam about 3 inches thick. The subsoil is 22 inches thick. The upper 5 inches of the subsoil is yellowish brown silt loam, the next 9 inches is yellowish brown silty clay loam, and the lower 8 inches is strong brown shaly silty clay loam. The substratum is strong brown shaly silty clay loam that extends to bedrock at a depth of about 33 inches.

Typically, the surface layer of the Berks soils is dark yellowish brown shaly silt loam about 3 inches thick. The subsoil is yellowish brown and is 21 inches thick. The upper 13 inches of the subsoil is shaly silt loam, and the lower 8 inches is very shaly silt loam. The substratum is strong brown very channery silt loam that extends to bedrock at a depth of about 31 inches.

Included with these soils in mapping are a few small areas of well drained Calvin high base substratum, Clymer, Lily, and Weikert soils. Also included are a few small areas of stony soils and very steep soils.

The available water capacity is low or moderate in these Gilpin soils and low or very low in these Berks soils. Permeability is moderate in the Gilpin soils and moderate or moderately rapid in the Berks soils. Runoff is rapid or very rapid on both soils. Natural fertility is low or moderate in the Gilpin soils and low in the Berks soils. In unlimed areas the Gilpin soils are strongly acid to extremely acid and the Berks soils are strongly acid or very strongly acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches in both soils.

Slope makes these soils unsuitable for cultivated crops or hay, but the soils are suited to pasture. Proper stocking rates and rotational grazing are major pasture management needs. Seeding a permanent cover on bare areas will help to control erosion.

These soils have moderate to high potential for trees. Erosion on logging roads and skid trails is a major

management concern, and placing the roads and trails on the contour helps to control erosion. Slope limits the use of equipment.

Slope and the depth to bedrock are the main limitations of these soils for community development.

The capability subclass is VIe.

GbF—Gilpin-Berks shaly silt loams, 30 to 70 percent slopes. These soils are very steep and well drained. They are on hillsides. The areas range from about 10 to 250 acres. They are about 40 percent Gilpin shaly silt loam, 40 percent Berks shaly silt loam, and 20 percent other soils. The Gilpin and Berks soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Gilpin soils is dark brown shaly silt loam about 2 inches thick underlain by 4 inches of yellowish brown loam. The subsoil is 21 inches thick. The upper 6 inches of the subsoil is yellowish brown silt loam, the next 8 inches is yellowish brown light silty clay loam, and the lower 7 inches is strong brown shaly light silty clay loam. The substratum is strong brown shaly light silty clay loam that extends to bedrock at a depth of about 36 inches.

Typically, the surface layer of the Berks soils is very dark grayish brown and yellowish brown shaly silt loam 7 inches thick. The subsoil is yellowish brown and is 21 inches thick. The upper 13 inches of the subsoil is shaly silt loam, and the lower 8 inches is very shaly silt loam. The substratum is strong brown very channery silt loam that extends to bedrock at a depth of about 35 inches.

Included with these soils in mapping are a few small areas of well drained Calvin high base substratum, Clymer, and Dekalb soils. Also included are a few small areas of stony soils and moderately steep soils.

The available water capacity is low or moderate in these Gilpin soils and low or very low in these Berks soils. Permeability is moderate in the Gilpin soils and moderate or moderately rapid in the Berks soils. Runoff is very rapid on both soils. Natural fertility is low or moderate in the Gilpin soils and low in the Berks soils. In unlimed areas the Gilpin soils are strongly acid to extremely acid and the Berks soils are strongly acid or very strongly acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches in both soils.

Slope makes these soils unsuitable for cultivated crops or hay and difficult to manage for pasture. Most areas are used for woodland, and the soils have moderate to high potential for trees. Erosion on logging roads and skid trails is a major management concern. Placing the roads and trails on the contour helps to control erosion. Slope limits the use of equipment.

Slope and the depth to bedrock are the main limitations of these soils for community development.

The capability subclass is VIIe.

GbF3—Gilpin-Berks shaly silt loams, 35 to 70 percent slopes, severely eroded. These soils are very steep and well drained. They are on hillsides. The areas range from about 15 to 50 acres. They are about 40 percent Gilpin shaly silt loam, 40 percent Berks shaly silt loam, and 20 percent other soils. The Gilpin and Berks soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Gilpin soils is very dark yellowish brown shaly silt loam about 1 inch thick. The subsoil is 22 inches thick. The upper 5 inches of the subsoil is yellowish brown silt loam, the next 9 inches is yellowish brown silty clay loam, and the lower 8 inches is strong brown shaly silty clay loam. The substratum is strong brown shaly silty clay loam that extends to bedrock at a depth of about 32 inches.

Typically, the surface layer of the Berks soils is dark grayish brown shaly silt loam about 1 inch thick. The subsoil is yellowish brown and is 21 inches thick. The upper 13 inches of the subsoil is shaly silt loam, and the lower 8 inches is very shaly silt loam. The substratum is strong brown very channery silt loam that extends to bedrock at a depth of about 29 inches.

Included with these soils in mapping are a few small areas of well drained Calvin high base substratum, Clymer, Dekalb, and Weikert soils. Also included are a few small areas of stony soils and moderately steep soils.

The available water capacity is low or moderate in these Gilpin soils and low or very low in these Berks soils. Permeability is moderate in the Gilpin soils and moderate or moderately rapid in the Berks soils. Runoff is very rapid on both soils. Natural fertility is low or moderate in the Gilpin soils and low in the Berks soils. In unlimed areas the Gilpin soils are strongly acid to extremely acid and the Berks soils are strongly acid or very strongly acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches in both soils.

Slope makes these soils unsuitable for cultivated crops or hay and difficult to manage for pasture. Most areas are used for woodland, and these soils have moderate to high potential for trees. Erosion on logging roads and skid trails is a major management concern. Placing the roads and trails on the contour helps to control erosion. Slope limits the use of equipment.

Slope and the depth to bedrock are the main limitations of these soils for community development.

The capability subclass is VIIe.

JsD—Jefferson stony loam, 15 to 35 percent slopes. This soil is moderately steep and steep and is well drained. It is on foot slopes, around the heads of drainageways, and in coves. Stones cover 1 to 3 percent of the surface of the soil. The areas range from about 5 to 40 acres.

Typically, the surface layer is very dark grayish brown and brown channery loam 9 inches thick. The subsoil is yellowish brown and is 37 inches thick. The upper 6 inches of the subsoil is heavy loam, and the lower 31

inches is channery heavy loam and channery loam. The substratum is yellowish brown, mottled very channery loam to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of well drained Clymer, Dekalb, and Gilpin soils and moderately well drained Buchanan and Ernest soils. Also included are a few small areas of strongly sloping soils. Included soils make up 20 percent of the unit.

The available water capacity of this Jefferson soil is moderate or high. Permeability is moderately rapid. Runoff is rapid, and natural fertility is low. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is greater than 60 inches.

Slope and the stones on the surface restrict the use of farm equipment and make this soil unsuitable for cultivated crops or hay, but the soil is suited to pasture. The hazard of erosion is severe or very severe in unprotected areas and is a major management concern. Proper stocking rates and rotational grazing are major pasture management needs.

This soil has moderately high or high potential for trees, and most areas are wooded. Erosion on logging roads and skid trails is a major management concern. Placing the roads and trails on the contour helps to control erosion. Slope limits the use of timber equipment.

Slope and stones on the surface limit this soil for most types of community development.

The capability subclass is VIs.

JsF—Jefferson stony loam, 35 to 60 percent slopes. This soil is very steep and well drained. It is on foot slopes, around the heads of drainageways, and in coves. Stones cover 1 to 3 percent of the surface of the soil. The areas range from about 40 to 80 acres.

Typically, the surface layer is very dark grayish brown and brown channery loam 8 inches thick. The subsoil is yellowish brown and is 37 inches thick. The upper 10 inches of the subsoil is heavy loam, and the lower 27 inches is channery heavy loam and channery loam. The substratum is yellowish brown, mottled very channery loam to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of well drained Clymer, Dekalb, and Gilpin soils and moderately steep soils. Included soils make up about 25 percent of the unit.

The available water capacity of this Jefferson soil is moderate or high. Permeability is moderately rapid. Runoff is rapid, and natural fertility is low. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is greater than 60 inches.

Slope and the stones on the surface make this soil unsuitable for cultivated crops or hay and difficult to manage for pasture. The soil has moderately high or high potential for trees, and most areas are wooded. Erosion on logging roads and skid trails is a major management concern. Placing roads and trails on the contour helps to control erosion. Slope limits the use of timber equipment.

Slope and the stones on the surface limit this soil for most types of community development.

The capability subclass is VIIs.

Ka—Kanawha fine sandy loam. This soil is nearly level and well drained. It is on low terraces and high flood plains that are subject to rare flooding. The areas range from 10 to 75 acres.

Typically, the surface layer is dark brown fine sandy loam about 7 inches thick. The subsoil is 45 inches thick. The upper 5 inches of the subsoil is brown fine sandy loam, and the lower 40 inches is reddish brown loam and fine sandy loam. The substratum is yellowish red sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of well drained Chagrin soils, moderately well drained Lobdell and Monongahela soils, and somewhat poorly drained Orrville soils. Also included are a few soils with a surface layer of loam, a few soils that are less than 40 inches deep to gravel, and a few soils with a darker, thicker surface layer than this Kanawha soil. Included soils make up about 15 percent of the unit.

The available water capacity of this Kanawha soil is high. Permeability is moderate in the subsoil. Runoff is slow, and natural fertility is high. In unlimed areas the soil is strongly acid or medium acid in the surface layer and upper part of the subsoil, and medium acid to neutral in the lower part of the subsoil and in the substratum. The depth to bedrock is greater than 60 inches.

This soil is well suited to cultivated crops and to hay and pasture. Most of the acreage is farmed. Cultivated crops can be grown continuously, but the soil needs the protection of a cover crop. Mixing crop residue into the soil helps to maintain fertility and tilth in cultivated areas. Proper stocking rates and rotational grazing are major pasture management needs.

This soil has high potential for trees, but only a small acreage is wooded. The hazard of flooding is the main limitation of this soil for community development.

The capability class is I.

LdF—Lehew-Dekalb very stony sandy loams, 15 to 65 percent slopes. These soils are moderately steep to very steep and are well drained. They are mostly on the northwestern slopes of East River Mountain. Stones cover about 3 to 15 percent of the surface, and drainageways dissect some areas. The areas range from about 65 to 200 acres. They are about 60 percent Lehew very stony sandy loam, 25 percent Dekalb very stony sandy loam, and 15 percent other soils. The Lehew and Dekalb soils are so intermingled that it was not practical to map them separately.

Typically, the Lehew soils have a surface layer of dark brown and brown channery sandy loam 10 inches thick. The subsoil is reddish brown very channery sandy loam 17 inches thick. The substratum is reddish brown very channery sandy loam that extends to bedrock at a depth of about 33 inches.

Typically, the Dekalb soils have a surface layer of very dark grayish brown and grayish brown channery sandy loam 8 inches thick. The subsoil is 22 inches thick. The upper 17 inches of the subsoil is yellowish brown channery sandy loam, and the lower 5 inches is strong brown very channery sandy loam. The substratum is strong brown very channery sandy loam that extends to bedrock at a depth of about 33 inches.

Included with these soils in mapping are a few small areas of well drained Clymer, Jefferson, and Murrill soils and moderately well drained Buchanan and Ernest soils. Also included are a few small areas of soils with no stones on the surface and a few small areas of exposed bedrock.

The available water capacity is very low to moderate in these Lehew and Dekalb soils. Permeability is moderately rapid or rapid throughout the Lehew soils and moderately rapid or rapid in the upper part of the Dekalb soils. Runoff is rapid or very rapid on both soils, and natural fertility is low. In unlimed areas the Lehew soils are strongly acid or very strongly acid and the Dekalb soils are strongly acid to extremely acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches in both soils.

Slope and the stones on the surface make these soils unsuitable for cultivated crops or hay and difficult to manage for pasture. The soils have moderate or moderately high potential for trees, and most of the acreage is wooded. Erosion on logging roads and skid trails is a major management concern. Placing the roads and trails on the contour helps to control erosion. Slope limits the use of timber equipment.

Slope, the depth to bedrock, and the stones on the surface limit these soils for most types of community development.

The capability subclass is VIIs.

LIB—Lily loam, 3 to 8 percent slopes. This soil is gently sloping and well drained. It is on ridgetops and benches. The areas range from about 5 to 20 acres.

Typically, the surface layer is brown loam about 8 inches thick. The subsoil is 20 inches thick. The upper 8 inches of the subsoil is strong brown sandy clay loam, and the lower 12 inches is yellowish red clay loam. The substratum is strong brown channery sandy clay loam that extends to bedrock at a depth of 33 inches.

Included with this soil in mapping are a few small areas of well drained Gilpin, Clymer, and Dekalb soils and moderately well drained Coolville, Latham, and Tilsit soils. Also included are a few small areas of strongly sloping soils and stony soils. Included soils make up about 20 percent of the unit.

The available water capacity of this Lily soil is moderate. Permeability is moderately rapid in the subsoil. Runoff is medium, and natural fertility is low. In unlimed areas this soil is strongly acid to extremely acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

This soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is moderate in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates and rotational grazing are pasture management needs.

This soil has moderate potential for trees, but only a small acreage is wooded. Erosion control on logging roads and skid trails is a management concern. Placing the roads and trails on the contour helps to control erosion.

The depth to bedrock is the main limitation of this soil for community development.

The capability subclass is IIe.

LIC—Lily loam, 8 to 15 percent slopes. This soil is strongly sloping and well drained. It is on ridgetops and benches. The areas range from about 5 to 30 acres.

Typically, the surface layer is brown loam about 8 inches thick. The subsoil is 17 inches thick. The upper 3 inches of the subsoil is strong brown sandy clay loam, and the lower 14 inches is yellowish red clay loam. The substratum is strong brown channery sandy clay loam that extends to bedrock at a depth of about 30 inches.

Included with this soil in mapping are a few small areas of well drained Berks, Gilpin, and Dekalb soils and moderately well drained Coolville, Latham, and Tilsit soils. Also included are a few small areas of gently sloping soils, moderately steep soils, stony soils, and severely eroded soils. Included soils make up about 20 percent of the unit.

The available water capacity of this Lily soil is moderate. Permeability is moderately rapid in the subsoil. Runoff is rapid, and natural fertility is low. In unlimed areas the soil is strongly acid to extremely acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

This soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is severe in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates and rotational grazing are the major pasture management needs.

This soil has moderate potential for trees, but only a small acreage is wooded. Erosion on logging roads and skid trails is a management concern. Placing the roads and trails on the contour will help to control erosion.

The depth to bedrock is the main limitation of this soil for community development.

The capability subclass is IIIe.

LlD—Lily loam, 15 to 25 percent slopes. This soil is moderately steep and well drained. It is on ridgetops and benches. The areas range from about 10 to 40 acres.

Typically, the surface is brown loam about 6 inches thick. The subsoil is 17 inches thick. The upper 5 inches of the subsoil is strong brown sandy clay loam, and the lower 12 inches is yellowish red clay loam. The substratum is strong brown channery sandy clay loam that extends to bedrock at a depth of 28 inches.

Included with this soil in mapping are a few small areas of well drained Gilpin, Clymer, and Dekalb soils and moderately well drained Coolville, Latham, and Tilsit soils. Also included are a few small areas of strongly sloping soils, steep soils, and stony soils. Included soils make up about 25 percent of the unit.

The available water capacity of this Lily soil is moderate. Permeability is moderately rapid in the subsoil. Runoff is rapid, and natural fertility is low. In unlimed areas the soil is strongly acid to extremely acid. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

This soil has limited suitability for cultivated crops; it is better suited to hay and pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates and rotational grazing are major pasture management needs.

This soil has moderate potential for trees, but only a small acreage is wooded. Erosion on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour helps to control erosion. Slope limits the use of equipment.

Slope and the depth to bedrock are the main limitations of this soil for community development.

The capability subclass is IVe.

Lo—Lobdell loam. This soil is nearly level and moderately well drained. It is on flood plains subject to common flooding. Slopes range from 0 to 3 percent. The areas are long and narrow and range from about 5 to 15 acres.

Typically, the surface layer is dark brown loam about 10 inches thick. The subsoil is 25 inches thick. The upper 10 inches of the subsoil is dark yellowish brown loam, and the lower 15 inches is yellowish brown heavy loam. The substratum is brown loam to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of well drained Chagrin and Kanawha soils and somewhat poorly drained Orrville soils. Also included are a few small areas of gently sloping soils. Included soils make up about 20 percent of the unit.

The available water capacity of this Lobdell soil is high. Permeability is moderate in the surface layer and subsoil and moderately rapid in the substratum. Runoff is slow, and natural fertility is high. A seasonal high water table about 2 to 3-1/2 feet below the surface restricts the root zone of some types of plants. In unlimed areas the soil is medium acid or slightly acid. The depth to bedrock is greater than 60 inches.

This soil is suited to cultivated crops and to hay and pasture. Some small areas are wet and need artificial drainage, and crops in some areas are subject to damage from flooding. Cultivated crops can be grown continuously, but the soil needs the protection of a cover crop. Delaying tillage until the soil is reasonably dry and mixing the residue from the cover crop into the soil help to maintain fertility and tilth in cultivated areas. Proper stocking rates, rotational grazing, and deferment of grazing in the spring until the soil is reasonably firm are major pasture management needs.

This soil has very high potential for trees, but only a small acreage is wooded. The use of equipment is limited during wet seasons because the soil is soft.

The hazard of flooding, the seasonal high water table, and a frost-action potential limit this soil for community development.

The capability subclass is IIw.

MgB—Monongahela silt loam, 3 to 8 percent slopes. This soil is gently sloping and moderately well drained. It is on stream terraces that are above the overflow line. The areas range from about 5 to 25 acres.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is yellowish brown and extends to bedrock at a depth of about 60 inches. The upper 13 inches of the subsoil is loam and heavy loam, and the lower 39 inches is a very firm layer of mottled light clay loam and clay loam.

Included with this soil in mapping are a few small areas of well drained Kanawha soils, moderately well drained Ernest soils, and poorly drained Tygart Variant soils. Also included are a few soils that are similar to this Monongahela soil but that do not have a firm layer in the subsoil, a few small areas that have a surface layer of loam, and a few small areas of strongly sloping soils. Included soils make up about 20 percent of the unit.

The available water capacity of this Monongahela soil is moderate. Permeability is moderate in the upper layers and moderately slow or slow in the firm part of the subsoil. A seasonal high water table about 1-1/2 to 3 feet below the surface restricts the root zone of some types of plants. Runoff is medium, and natural fertility is low. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is generally 60 inches or more.

This soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is moderate in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using cover crops and hay in the crop sequence, maintaining sod in shallow drainageways, and mixing crop residue into the

soil help to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates, rotational grazing, and deferment of grazing until the soil is reasonably dry are the major pasture management needs.

This soil has moderately high potential for trees, but only a small acreage is wooded. Erosion on logging roads and skid trails is a management concern. Placing the roads and trails on the contour helps to control erosion.

The seasonal high water table and moderately slow or slow permeability are the main limitations of this soil for community development.

The capability subclass is IIe.

MgC—Monongahela silt loam, 8 to 15 percent slopes. This soil is strongly sloping and moderately well drained. It is on stream terraces that are above the overflow line. The areas range from about 5 to 20 acres.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is yellowish brown and extends to bedrock at a depth of about 60 inches. The upper 14 inches of the subsoil is yellowish brown loam and heavy loam, and the lower 38 inches is a very firm layer of mottled light clay loam and clay loam.

Included with this soil in mapping are a few small areas of well drained Kanawha soils, moderately well drained Ernest soils, and poorly drained Tygart Variant soils. Also included are a few soils that are similar to this soil but that do not have a firm layer in the subsoil, a few small areas that have a surface layer of loam, a few small areas of gently sloping soils, and a few small areas of moderately steep soils. Included soils make up about 25 percent of the unit.

The available water capacity of this Monongahela soil is moderate. Permeability is moderate in the upper layers and moderately slow or slow in the firm part of the subsoil. Runoff is medium, and natural fertility is low. A seasonal high water table about 1-1/2 to 3 feet below the surface restricts the root zone of some types of plants. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is generally 60 inches or more.

The soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is severe in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates, rotational grazing, and deferment of grazing until the soil is reasonably dry are the major pasture management needs.

This soil has moderately high potential for trees, but only a small acreage is wooded. Erosion on logging roads and skid trails is a management concern. Placing the roads and trails on the contour helps to control erosion.

The seasonal high water table and moderately slow or slow permeability are the main limitations of this soil for community development.

The capability subclass is IIIe.

MsD—Murrill stony loam, 15 to 30 percent slopes. This soil is moderately steep and well drained. It is on hillsides, on benches, and in coves. Stones cover 1 to 3 percent of the surface of the soil. The areas range from about 10 to 100 acres.

Typically, the surface layer is dark grayish brown and brown channery loam 9 inches thick. The subsoil extends to a depth of 72 inches or more. The upper 26 inches of the subsoil is strong brown channery loam, the next 25 inches is yellowish red channery loam and channery clay loam, and the lower 12 inches is yellowish red channery silty clay.

Included with this soil in mapping are a few small areas of well drained Dekalb, Frederick, Jefferson, Lehew, and Westmoreland soils. Also included are a few small areas of soils with no stones on the surface, strongly sloping soils, and steep soils. Included soils make up about 20 percent of the unit.

The available water capacity of this Murrill soil is moderate or high. Permeability is moderate in the surface layer and upper part of the subsoil. Runoff is rapid, and natural fertility is moderate. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is greater than 72 inches.

Slope and the stones on the surface restrict the use of farm equipment and make this soil unsuitable for cultivated crops or hay, but the soil is suited to pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. Proper stocking rates and rotational grazing are major pasture management needs.

This soil has moderately high potential for trees, and most areas are wooded. Erosion on logging roads and skid trails is a management concern, and placing the roads and trails on the contour helps to control erosion. Slope limits the use of equipment.

Slope and the stones on the surface limit this soil for most types of community development.

The capability subclass is VIs.

MsF—Murrill stony loam, 30 to 60 percent slopes. This soil is very steep and well drained. It is on hillsides and in coves. Stones cover 1 to 3 percent of the surface of the soil. The areas range from about 40 to 100 acres.

Typically, the surface layer is dark grayish brown and brown channery loam 11 inches thick. The subsoil extends to a depth of 72 inches or more. The upper 21 inches of the subsoil is strong brown channery loam and heavy loam, the next 28 inches is yellowish red channery heavy loam and clay loam, and the lower 12 inches is yellowish red channery silty clay.

Included with this soil in mapping are a few small areas of well drained Dekalb, Frederick, Jefferson,

Lehew, and Westmoreland soils. Also included are a few small areas of soils with no stones on the surface, soils where stones cover more than 3 percent of the surface, and soils with boulders on the surface. A few small areas are moderately steep. Included soils make up about 25 percent of the unit.

The available water capacity of this Murrill soil is moderate or high. Permeability is moderate in the surface layer and upper part of the subsoil. Runoff is rapid, and natural fertility is moderate. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is greater than 72 inches.

Slope and the stones on the surface make this soil unsuitable for cultivated crops or hay and difficult to manage for pasture. The soil has moderately high potential for trees, and most areas are wooded. Erosion on logging roads and skid trails is a major management concern. Placing the roads and trails on the contour helps to control erosion. Slope limits the use of timber equipment.

Slope and the stones on the surface limit this soil for most types of community development.

The capability subclass is VIIs.

MuC—Murrill channery silt loam, 5 to 15 percent slopes. This soil is strongly sloping and well drained. It is on benches and in coves. The areas range from about 5 to 10 acres.

Typically, the surface layer is dark brown channery silt loam about 8 inches thick underlain by 4 inches of dark brown channery loam. The subsoil extends to a depth of 72 inches or more. The upper 25 inches of the subsoil is strong brown channery loam, the next 23 inches is yellowish red channery loam and channery clay loam, and the lower 12 inches is yellowish red channery silty clay.

Included with this soil in mapping are a few small areas of well drained Dekalb, Frederick, and Lehew soils. Also included are a few small areas of stony soils, moderately well drained soils, gently sloping soils, and moderately steep soils. Included soils make up about 20 percent of the unit.

The available water capacity of this Murrill soil is moderate or high. Permeability is moderate in the surface layer and upper part of the subsoil. Runoff is medium or rapid, and natural fertility is moderate. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is greater than 72 inches.

This soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is moderate or severe in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth. Proper stocking rates and rotational grazing are major pasture management needs.

This soil has moderately high potential for trees, and most areas are wooded. Erosion on logging roads and skid trails is a management concern. Placing roads and trails on the contour helps to control erosion.

Slope and a frost-action potential limit this soil for most types of community development.

The capability subclass is IIIe.

MuD—Murrill channery silt loam, 15 to 30 percent slopes. This soil is moderately steep and well drained. It is on hillsides, benches, and foot slopes. The areas range from about 5 to 15 acres.

Typically, the surface layer is dark brown channery silt loam about 6 inches thick underlain by 4 inches of dark brown channery loam. The subsoil extends to a depth of 72 inches or more. The upper 25 inches of the subsoil is strong brown channery loam, the next 25 inches is yellowish red channery loam and channery clay loam, and the lower 12 inches is yellowish red channery silty clay.

Included with this soil in mapping are a few small areas of well drained Dekalb, Frederick, and Lehew soils. Also included are a few small areas of stony soils, moderately well drained soils, strongly sloping soils, and steep soils. Included soils make up about 25 percent of the unit.

The available water capacity of this Murrill soil is moderate or high. Permeability is moderate in the surface layer and upper part of the subsoil. Runoff is rapid, and natural fertility is moderate. In unlimed areas the soil is strongly acid or very strongly acid. The depth to bedrock is greater than 72 inches.

This soil has limited suitability for cultivated crops; it is better suited to hay and pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates and rotational grazing are major pasture management needs.

This soil has moderately high potential for trees. Erosion on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour helps to control erosion. Slope limits the use of equipment.

Slope limits this soil for most types of community development.

The capability subclass is IVe.

Oa—Orrville silt loam. This soil is nearly level and somewhat poorly drained. It is on flood plains that are subject to common flooding. Slopes range from 0 to 3 percent. The areas are mostly long and narrow and range from about 5 to 25 acres.

Typically, the surface layer is dark grayish brown silt loam about 10 inches thick. The subsoil is brown and grayish brown, mottled silt loam 21 inches thick. The substratum is grayish brown, mottled silt loam to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of well drained Chagrin soils and moderately well drained Lobdell soils. Also included are a few small areas of moderately deep soils and gently sloping soils. Included soils make up about 20 percent of the unit.

The available water capacity of this Orrville soil is high. Permeability is moderate in the surface layer and subsoil and moderately rapid in the substratum. Runoff is slow, and natural fertility is high. A seasonal high water table about 1 to 2-1/2 feet below the surface restricts the root zone of some types of plants. In unlimed areas the soil is medium acid or slightly acid. The depth to bedrock is greater than 60 inches.

This soil is suited to cultivated crops but is better suited to hay or pasture plants that tolerate wetness. Artificial drainage is needed for most cultivated crops (fig. 7), and flooding is a hazard. Using minimum tillage, using a crop sequence that includes hay, delaying tillage until the soil is reasonably dry, and mixing crop residue into the soil help to maintain fertility and tilth in cultivated areas.

This soil has high potential for trees, but only a small acreage is wooded. The use of equipment is restricted during wet seasons because the soil is soft.

The hazard of flooding and the seasonal high water table limit this soil for community development.

The capability subclass is IIIw.

Figure 7.—Tile drainage in an area of Orrville silt loam.

Ob—Orrville-Lobdell complex. This complex consists of nearly level, moderately well drained and somewhat poorly drained soils on flood plains that are subject to common flooding. Slopes range from 0 to 3 percent. The areas are long and narrow and range from 5 to 15 acres. They consist of about 45 percent Orrville silt loam, 40 percent Lobdell loam, and 15 percent other soils. The Orrville soils are generally on a slightly lower part of the flood plain than the Lobdell soils, but the two soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Orrville soils is dark grayish brown silt loam about 10 inches thick. The subsoil is brown and grayish brown, mottled silt loam 21 inches thick. The substratum is grayish brown, mottled silt loam to a depth of 60 inches or more.

Typically, the surface layer of the Lobdell soils is dark brown loam about 10 inches thick. The subsoil is 25 inches thick. The upper 10 inches of the subsoil is dark yellowish brown loam, and the lower 15 inches is yellowish brown, mottled heavy loam. The substratum is brown, mottled loam to a depth of 60 inches or more.

Included with these soils in mapping are a few small areas of well drained Chagrin and Kanawha soils. Also included are a few small areas of gently sloping soils.

The available water capacity of these Orrville and Lobdell soils is high. Permeability is moderate in the surface layer and subsoil, and runoff is low. Natural fertility is high. A seasonal high water table at a depth of about 1 to 2-1/2 feet in the Orrville soils and 2 to 3-1/2 feet in the Lobdell soils restricts the root zone of some types of plants. In unlimed areas both soils are medium acid or slightly acid. The depth to bedrock is greater than 60 inches.

These soils are suited to cultivated crops but are better suited to hay or pasture plants that tolerate wetness. The Orrville soils need artificial drainage for crops. Using minimum tillage, using a crop sequence that includes hay, delaying tillage until the soils are reasonably dry, and mixing crop residue into the soils help to maintain fertility and tilth in cultivated areas. Flooding is a hazard to crops on these soils. The use of proper stocking rates, the use of rotational grazing, and deferment of grazing until the soils are firm are major pasture management needs.

These soils have high or very high potential for trees that tolerate wetness, but only a small acreage is wooded. The use of equipment is restricted during wet seasons because the soils are soft.

The hazard of flooding and the seasonal high water table limit these soils for community development.

The capability subclass is IIIw.

ShB—Shouns silt loam, 3 to 8 percent slopes. This soil is gently sloping and well drained. It is on foot slopes and around the heads of drainageways. The areas are long and wind along the slope base and are generally fan shaped around the heads of drainageways. The areas range from 5 to 15 acres.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is 44 inches thick. The upper 14 inches of the subsoil is yellowish red loam, the next 16 inches is yellowish red channery clay loam, and the lower 14 inches is red clay loam. The substratum is reddish brown channery clay loam that extends to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of well drained Chagrin soils and moderately well drained Ernest and Lobdell soils. Also included are a few small areas of strongly sloping soils, stony soils, and soils that have a very firm layer. Included soils make up about 30 percent of the unit.

The available water capacity of this Shouns soil is moderate or high. Permeability is moderate in the surface layer and subsoil. Runoff is medium, and natural fertility is moderate or high. In unlimed areas the soil is strongly acid or medium acid. The depth to bedrock is greater than 60 inches.

This soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is moderate in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates and rotational grazing are pasture management needs.

This soil has moderately high potential for trees, but only a small acreage is wooded. Erosion on logging roads and skid trails is a management concern. Placing the roads and trails on the contour helps to control erosion.

Slope and low strength are the main limitations of this soil for community development.

The capability subclass is IIe.

ShC—Shouns silt loam, 8 to 15 percent slopes. This soil is strongly sloping and well drained. It is on foot slopes and around the heads of drainageways. The areas range from about 5 to 25 acres.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is 40 inches thick. The upper 13 inches of the subsoil is yellowish red loam, the next 15 inches is yellowish red channery clay loam, and the lower 12 inches is red clay loam. The substratum is reddish brown channery clay loam that extends to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of well drained Chagrin, Calvin high base substratum, and Berks soils and moderately well drained Lobdell and Ernest soils. Also included are a few small areas of moderately steep soils, gently sloping soils, stony soils, and soils that have a very firm layer. Included soils make up about 20 percent of the unit.

The available water capacity of this Shouns soil is moderate or high. Permeability is moderate in the surface layer and subsoil. Runoff is rapid, and natural fertility is moderate or high. In unlimed areas the soil is strongly acid or medium acid. The depth to bedrock is greater than 60 inches.

This soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is severe in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates and rotational grazing are major pasture management needs.

This soil has moderately high potential for trees, but only a small acreage is wooded. Erosion on logging roads and skid trails is a management concern. Placing the roads and trails on the contour helps to control erosion.

Slope and low strength are the main limitations of this soil for community development.

The capability subclass is IIIe.

ShD—Shouns silt loam, 15 to 30 percent slopes. This soil is moderately steep and well drained. It is on foot slopes and around the heads of drainageways. The areas range from about 5 to 50 acres.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil is 40 inches thick. The upper 12 inches of the subsoil is yellowish red loam, the next 14 inches is yellowish red channery clay loam, and the lower 14 inches is red clay loam. The substratum is reddish brown channery clay loam that extends to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of well drained Calvin high base substratum, Berks, and Gilpin soils and moderately well drained Ernest soils. Also included are a few small areas of steep soils, strongly sloping soils, stony soils, and soils that have a very firm layer. Included soils make up about 25 percent of the unit.

The available water capacity of this Shouns soil is moderate or high. Permeability is moderate in the surface layer and subsoil. Runoff is rapid, and natural fertility is moderate or high. In unlimed areas the soil is strongly acid or medium acid. The depth to bedrock is greater than 60 inches.

This soil has limited suitability for cultivated crops; it is better suited to hay or pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility

and tilth in cultivated areas. Proper stocking rates and rotational grazing are major pasture management needs.

This soil has moderately high potential for trees, and about half of the acreage is wooded. Erosion on logging roads and skid trails is a major management concern. Placing the roads and trails on the contour helps to control erosion. Slope limits the use of equipment.

Slope is the main limitation of this soil for community development.

The capability subclass is IVe.

StC—Shouns stony silt loam, 3 to 15 percent slopes. This soil is strongly sloping and gently sloping and is well drained. It is on foot slopes and around the heads of drainageways. Stones cover 1 to 3 percent of the surface of the soil. The areas range from about 5 to 50 acres.

Typically, the surface layer is reddish brown silt loam about 7 inches thick. The subsoil is 41 inches thick. The upper 13 inches of the subsoil is yellowish red loam, the next 16 inches is yellowish red channery clay loam, and the lower 12 inches is red clay loam. The substratum is reddish brown channery clay loam that extends to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of well drained Berks, Calvin high base substratum, and Jefferson soils and moderately well drained Buchanan and Ernest soils. Also included are a few small areas of moderately steep soils, soils that have a very firm layer, and soils with no stones on the surface. Included soils make up about 25 percent of the unit.

The available water capacity of this Shouns soil is moderate or high. Permeability is moderate in the surface layer and subsoil. Runoff is medium or rapid, and natural fertility is moderate or high. In unlimed areas the soil is strongly acid or medium acid. The depth to bedrock is greater than 60 inches.

The stones on the surface restrict the use of farm equipment and make the soil unsuitable for cultivated crops or hay, but the soil is suitable for pasture. The hazard of erosion is moderate or severe in unprotected areas. Proper stocking rates and rotational grazing are major pasture management concerns.

This soil has moderately high potential for trees. Erosion on logging roads and skid trails is a management concern. Placing the roads and trails on the contour helps to control erosion.

Slope and the stones on the surface are the main limitation of this soil for community development.

The capability subclass is VIs.

StD—Shouns stony silt loam, 15 to 30 percent slopes. This soil is moderately steep and well drained. It is on foot slopes and around the heads of drainageways. Stones cover 1 to 3 percent of the surface of the soil. The areas range from about 10 to 80 acres.

Typically, the surface layer is reddish brown silt loam about 6 inches thick. The subsoil is 40 inches thick. The upper 12 inches of the subsoil is yellowish red loam, the next 14 inches is yellowish red channery clay loam, and the lower 14 inches is red clay loam. The substratum is reddish brown channery clay loam that extends to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of well drained Berks, Calvin high base substratum, and Jefferson soils and moderately well drained Buchanan and Ernest soils. Also included are a few small areas of strongly sloping soils, steep soils, soils that have a very firm layer, and soils with no stones on the surface. Included soils make up about 25 percent of the unit.

The available water capacity of this Shouns soil is moderate or high. Permeability is moderate in the surface layer and subsoil. Runoff is rapid, and natural fertility is moderate or high. In unlimed areas the soil is strongly acid or medium acid. The depth to bedrock is greater than 60 inches.

Slope and the stones on the surface restrict the use of farm equipment and make the soil unsuitable for cultivated crops or hay, but the soil is suited to pasture. The hazard of erosion is severe in unprotected areas. Proper stocking rates and rotational grazing are major pasture management concerns.

This soil has moderately high potential for trees. Erosion on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour helps to control erosion. Slope limits the use of equipment.

Slope and the stones on the surface are the main limitation of this soil for community development.

The capability subclass is VIs.

TtB—Tilsit silt loam, 3 to 8 percent slopes. This soil is gently sloping and moderately well drained. It is on upland plateaus and ridges. The areas range from about 5 to 50 acres.

Typically, the surface layer is dark grayish brown silt loam about 7 inches thick. The subsoil is yellowish brown and extends to bedrock at a depth of 51 inches. The upper 6 inches of the subsoil is silt loam, and the next 11 inches is heavy loam. The lower 27 inches is a very firm layer of mottled heavy loam and silty clay loam.

Included with this soil in mapping are a few small areas of well drained Gilpin and Lily soils and moderately well drained Coolville and Latham soils. Also included are a few small areas of soils that are finer textured in the lower part of the subsoil than this Tilsit soil, a few soils with a higher sand content, and a few strongly sloping soils. Included soils make up about 20 percent of the unit.

The available water capacity of this Tilsit soil is moderate. Permeability is slow in the firm part of the subsoil. Runoff is medium, and natural fertility is low. A seasonal high water table about 1-1/2 to 2-1/2 feet below the surface restricts the root zone of some types of plants. In unlimed areas the soil is strongly acid to

extremely acid. The depth to bedrock is greater than 40 inches.

This soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is moderate in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. The use of proper stocking rates, rotational grazing, and deferment of grazing until the soil is reasonably dry are pasture management needs.

This soil has moderately high potential for trees, but only a small acreage is wooded. Erosion on logging roads and skid trails is a management concern. Placing the roads and trails on the contour helps to control erosion.

The seasonal high water table and slow permeability are the main limitations of this soil for community development.

The capability subclass is IIe.

TtC—Tilsit silt loam, 8 to 15 percent slopes. This soil is strongly sloping and moderately well drained. It is on upland plateaus and ridges. The areas range from about 5 to 25 acres.

Typically, the surface layer is dark grayish brown silt loam about 7 inches thick. The subsoil is yellowish brown and extends to bedrock at a depth of 47 inches. The upper 5 inches of the subsoil is silt loam, and the next 10 inches is heavy loam. The lower 25 inches is a very firm layer of mottled heavy loam and silty clay loam.

Included with this soil in mapping are a few small areas of well drained Gilpin and Lily soils and moderately well drained Coolville and Latham soils. Also included are a few small areas of soils that are finer textured in the lower part of the subsoil than this Tilsit soil, a few soils with a higher sand content, a few small areas of moderately steep soils, and a few small areas of gently sloping soils. Included soils make up about 25 percent of the unit.

The available water capacity of this Tilsit soil is moderate. Permeability is slow in the firm part of the subsoil. Runoff is rapid, and natural fertility is low. A seasonal high water table about 1-1/2 to 2-1/2 feet below the surface restricts the root zone of some types of plants. In unlimed areas the soil is strongly acid to extremely acid. The depth to bedrock is greater than 40 inches.

The soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is severe in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and tilth in cultivated areas. Proper stocking rates, rotational grazing, and deferment of grazing until the soil is reasonably dry are pasture management needs.

This soil has moderately high potential for trees, but only a small acreage is wooded. Erosion on logging roads and skid trails is a management concern. Placing the roads and trails on the contour helps to control erosion.

Slope, the seasonal high water table, and the slow permeability are the main limitations of this soil for community development.

The capability subclass is IIIe.

Tv—Tygart Variant silt loam. This soil is nearly level and somewhat poorly drained. It is on stream terraces. Slopes are generally less than 2 percent. The areas range from about 5 to 40 acres.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The subsoil is brown and strong brown, mottled silty clay loam 48 inches thick. The substratum is strong brown, mottled clay loam to a depth of 72 inches or more.

Included with these soils in mapping are a few small areas of moderately well drained Monongahela soils. Also included are a few small areas of poorly drained soils, soils with a clayey subsoil, strongly acid soils, and soils with a very firm layer in the subsoil. Included soils make up about 30 percent of the unit.

The available water capacity of this Tygart Variant soil is moderate or high. Permeability in the subsoil is slow. Runoff is slow, and water is ponded on the surface of some areas. Natural fertility is moderate or low. A seasonal high water table about 1/2 foot to 1-1/2 feet below the surface restricts the root zone of some types of plants. In unlimed areas the soil is medium acid to neutral in the surface layer and upper part of the subsoil and medium acid to mildly alkaline in the lower part of the subsoil and in the substratum. The depth to bedrock is greater than 60 inches.

This soil is suited to cultivated crops but is better suited to hay or pasture plants that tolerate wetness. Artificial drainage is needed for most types of cultivated crops. Using minimum tillage, using a crop sequence that includes hay, delaying tillage until the soil is reasonably dry, and mixing crop residue into the soil help to maintain fertility and tilth in cultivated areas. The use of proper stocking rates, the use of rotational grazing, and deferment of grazing until the soil is firm are major pasture management needs.

This soil has high potential for trees, but only a small acreage is wooded. The use of equipment is restricted during wet seasons because the soil is soft.

The seasonal high water table and the slow permeability limit this soil for community development.

The capability subclass is IIIw.

U1—Udorthents, carbonaceous, low base. This soil consists of refuse material from coal mining operations. It is generally near mine openings or tipples. It is more than 50 percent carbon-rich muds and coarse fragments of coal, bone coal, or carbon-rich shales. The areas range from gently sloping to very steep.

No one pedon is representative of this map unit, but in one of the more common pedons the surface layer is black loam about 7 inches thick. It is underlain by 33 inches of black sandy loam.

Included with this soil in mapping are small areas of well drained Clymer, Dekalb, Gilpin, and Lily soils. Also included are a few small areas of Udorthents, mudstone and sandstone, high base, and Udorthents, sandstone and mudstone, low base. Included soils make up about 25 percent of the map unit.

The available water capacity of this soil is low to moderate. Permeability is moderately rapid or rapid. Runoff is medium to very rapid, and natural fertility is variable. In unlimed areas the soil is extremely acid to strongly acid. The depth to bedrock is 40 inches or more. The erosion hazard is moderate to very severe in unprotected areas.

This soil is not suited to cultivated crops or to hay or pasture and is difficult to manage for trees; the temperature of the surface layer is generally too high for plants. Establishing a plant cover to help control erosion and sedimentation is the main management concern. Mulching with hay or straw or covering the soil with a minimum of 6 inches of lighter colored soil material will reduce the temperature until plant growth is adequate to shade the surface. Establishing plant cover quickly requires the use of lime and fertilizer.

Onsite investigation and testing are necessary for determining the limitations of this soil for community development.

This unit is not assigned to a capability subclass.

U2—Udorthents, smooth. This unit consists mostly of mixed soil material and rock fragments from areas that have been excavated, graded, or filled. The unit is mainly along Interstate 77 and Route 460 in the western part of the survey area. Slopes range from nearly level to vertical. The cut areas are commonly uneven, and bedrock is exposed in places. The original features of the soils in this unit have been so altered or obscured that identifiable soils make up less than 20 percent of the unit. Onsite investigation is necessary to determine the suitability of this unit for any proposed use.

This unit is not assigned to a capability subclass.

U3—Udorthents, mudstone and sandstone, high base. These areas consist of soils that have been surface mined for coal. The soils are on hillsides in the northwestern part of the survey area. The areas are long and narrow and follow the contour of the hill. In most places, this unit consists of a high wall, a bench, and an outslope (fig. 8). The high walls that have not been reduced are vertical and range in height from 10 to 50 feet. The benches are gently sloping to strongly sloping and are about 30 to 180 feet wide. The outslopes are moderately steep to very steep and are variable in width.

No one pedon is representative of this map unit, but a description of one of the more common pedons follows. The soils on benches have a surface layer of yellowish brown channery silt loam about 5 inches thick. The next 9 inches is yellowish brown very channery heavy loam. The next 19 inches is yellowish brown very channery light silty clay loam. The lower 10 inches is yellowish brown channery heavy silt loam. The soil is mottled throughout.

The coarse-fragment content of the soils ranges from 30 to 65 percent in the upper 10 inches and from 40 to 75 percent between depths of 10 and 40 inches. Mudstone makes up about 55 percent of the coarse-fragment content, sandstone about 40 percent, and other rock types about 5 percent. The outslope generally contains more large stones and boulders than the bench.

Included with these soils in mapping are a few small areas of well drained Clymer, Dekalb, and Gilpin soils. A few small areas of minesoils, in which more than 65 percent of the coarse fragments are either sandstone or more than 65 percent are mudstone, are also included. Included soils make up about 25 percent of the unit.

The available water capacity, permeability, and natural fertility of these Udorthents are variable. Runoff is medium or rapid on the benches and very rapid on the high walls and outslopes. In unlimed areas the soils are

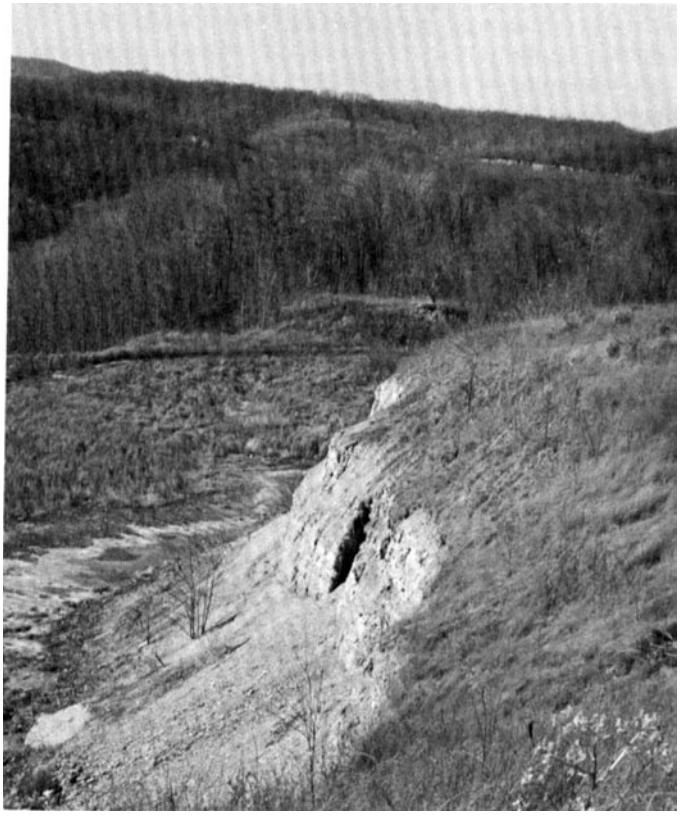


Figure 8.—The high wall and bench on an area of Udorthents, mudstone and sandstone, high base.

medium acid or slightly acid. The erosion hazard is moderate to very severe on unprotected areas.

These soils are not suited to cultivated crops. The soils have limited suitability for hay, but the benches are better suited to pasture. The use of proper stocking rates to maintain desirable grasses and legumes and the use of rotational grazing are major pasture management needs.

This soil is well suited to woodland and wildlife habitat. A few areas are used for housing, but onsite investigation and testing are necessary to determine the suitability for community development.

This unit is not assigned to a capability subclass.

U4—Udorthents, sandstone and mudstone, low base. These areas consist of soils that have been surface mined in the Beckley and Fire Creek coal seams. The soils are on hillsides in the northwestern part of Mercer County. The areas are long and narrow and follow the contour of the hill. Most areas consist of a high wall, a bench, and an outslope. The high walls that have not been reduced are vertical and are 15 to 50 feet high. The benches are gently sloping to strongly sloping and are 25 to 150 feet wide. The outslopes are moderately steep to very steep and are variable in width.

No one pedon is representative of this map unit, but a description of one of the more common pedons follows. The soils on benches have a surface layer of very dark grayish brown channery silt loam about 2 inches thick. The next 16 inches is dark yellowish brown very channery loam, and the lower 22 inches is dark yellowish brown very channery sandy loam.

The coarse-fragment content in the soil ranges from 30 to 65 percent in the upper 10 inches and from 40 to 75 percent between depths of 10 and 40 inches. Sandstone makes up about 55 percent of the coarse-fragment content, mudstone about 40 percent, and other rock types about 5 percent. Generally there are more large stones and boulders on the outslope than on the bench.

Included with these soils in mapping are a few small areas of well drained Clymer, Dekalb, Gilpin, and Lily soils. A few small areas of minesoils, in which more than 65 percent of the coarse fragments are either sandstone or mudstone, are also included. Included soils make up about 25 percent of the unit.

The available water capacity, permeability, and natural fertility of these Udorthents are variable. Runoff is medium or rapid on the benches and very rapid on the high walls and outslopes. In unlimed areas the soils are extremely acid to strongly acid. The erosion hazard is moderate to very severe in unprotected areas.

These soils are not suited to cultivated crops. The soils have limited suitability for hay, but the benches are better suited to pasture. The use of proper stocking rates to maintain desirable grasses and legumes and the use of rotational grazing are major pasture management needs.

These soils are well suited to woodland and wildlife habitat. Onsite investigation and testing are necessary to determine suitability for community development.

This unit is not assigned to a capability subclass.

Ud—Udifluvents and Psamments, frequently flooded. This unit consists of nearly level to strongly sloping, excessively drained to moderately well drained soils on flood plains that are subject to frequent flooding. The areas are generally long and narrow and range from about 5 to 20 acres. The acreage of this unit is about 50 percent Udifluvents, 30 percent Psamments, and 20 percent other soils. Some units are made up of Udifluvents, some of Psamments, and some of both. The Udifluvents and Psamments were mapped together because they have no major differences in use and management.

In one of the more common pedons, the surface layer of the Udifluvents is dark brown loam about 8 inches thick. The substratum is yellowish brown loam and extends to a depth of about 48 inches or more.

In one of the more common pedons, the surface layer of the Psamments is brown loamy sand about 6 inches thick. The substratum is yellowish brown loamy sand and extends to a depth of about 48 inches or more.

Included with these soils in mapping are a few small areas of well drained Chagrin soils, moderately well drained Lobdell soils, and somewhat poorly drained Orrville soils. Also included are a few small areas of moderately steep soils.

The available water capacity is moderate in the Udifluvents and low or very low in the Psamments. Permeability is moderate in the Udifluvents and rapid in the Psamments. Runoff is slow on both soils. Natural fertility is moderate or high in the Udifluvents and low in the Psamments. In unlimed areas both soils are medium acid to neutral. The depth to bedrock ranges from 48 to 60 inches or more in both soils.

Frequent flooding makes these soils unsuitable for cultivated crops or hay. The soils are suited to pasture. Proper stocking rates and rotational grazing are the major pasture management needs.

These soils have moderately high potential for trees, and most of the acreage is wooded. The hazard of flooding limits the soils for most types of community development.

This unit is not assigned to a capability subclass.

UeC—Urban land-Ernest complex, 3 to 15 percent slopes. This complex consists of areas covered by urban structures and strongly sloping or gently sloping, moderately well drained soils. The areas are on foot slopes and along drainageways. They consist of about 45 percent urbanized areas, 25 percent Ernest silt loam, and 30 percent other soils. The urbanized areas and Ernest soils are in such an intricate pattern that it was not practical to map them separately.

Typically, the surface layer of the Ernest soils is dark brown silt loam about 6 inches thick. The subsoil is 31

inches thick. The upper 16 inches of the subsoil is yellowish brown, mottled silty clay loam. The lower 15 inches is a very firm layer of strong brown, mottled silt loam. The substratum is mottled, strong brown channery silt loam to a depth of 60 inches or more.

Included with this complex in mapping are a few small areas of well drained Shouns soils and moderately well drained Monongahela and Buchanan soils. Also included are areas of Udorthents, smooth.

These Ernest soils have moderate available water capacity. Permeability is slow in the firm part of the subsoil. Runoff is rapid or medium, and natural fertility is moderate. A seasonal high water table at a depth of about 1-1/2 to 3 feet restricts the root zone of some types of plants. In unlimed areas the soils are strongly acid or very strongly acid. The hazard of erosion is severe in unprotected areas. The depth to bedrock is greater than 60 inches.

Slope, the seasonal high water table, and the slow permeability are the main limitations of the Ernest soils for community development.

This unit is not assigned to a capability subclass.

UfD—Urban land-Frederick complex, 15 to 35 percent slopes. This complex consists of areas covered by urban structures and moderately steep or steep, well drained soils. The areas are on the uplands, and some are dissected by drainageways. The areas are about 40 percent urbanized, 30 percent Frederick cherty silt loam, and 30 percent other soils. The urbanized areas and Frederick soils are in such an intricate pattern that it was not practical to map them separately.

Typically, the surface layer of the Frederick soils is dark brown and yellowish brown cherty silt loam 11 inches thick. The subsoil extends to a depth of 72 inches or more. The upper 4 inches of the subsoil is strong brown light silty clay loam. The next 7 inches is strong brown heavy silty clay loam. The next 13 inches is yellowish red clay, and the lower 47 inches is red silty clay.

Included with this complex in mapping are a few small areas of well drained Caneyville and Westmoreland soils. Also included are a few small areas of strongly sloping soils, very steep soils, and Udorthents, smooth.

These Frederick soils have moderate or high available moisture capacity. Permeability is moderate. Runoff is rapid or very rapid, and natural fertility is moderate. In unlimed areas the soils are strongly or very strongly acid. The hazard of erosion is severe in unprotected areas. The depth to bedrock is greater than 72 inches.

Slope, low strength, and a shrink-swell potential are the main limitations of the Frederick soils for community development.

This unit is not assigned to a capability subclass.

UgE—Urban land-Gilpin-Berks complex, 15 to 35 percent slopes. This complex consists of areas covered by urban structures and steep or moderately steep, well drained Gilpin and Berks soils. The areas are on uplands, and some are dissected by drainageways. The areas are about 40 percent urbanized, 20 percent Gilpin shaly silt loam, 15 percent Berks shaly silt loam, and 25 percent other soils. The urbanized areas and the Gilpin and Berks soils are in such an intricate pattern that it was not practical to map them separately.

Typically, the surface layer of the Gilpin soils is dark brown shaly silt loam about 6 inches thick. The subsoil is 22 inches thick. The upper 5 inches of the subsoil is yellowish brown silt loam. The next 9 inches is yellowish brown silty clay loam. The lower 8 inches is strong brown shaly silty clay loam. The substratum is strong brown shaly silty clay loam that extends to bedrock at a depth of about 36 inches.

Typically, the surface layer of the Berks soils is dark brown shaly silt loam about 4 inches thick. The subsoil is yellowish brown shaly silt loam and very shaly silt loam 21 inches thick. The substratum is strong brown very channery silt loam that extends to bedrock at a depth of about 32 inches.

Included with this complex in mapping are a few small areas of well drained Dekalb, Lily, Jefferson, and Weikert soils. Also included are a few small areas of very steep soils, strongly sloping soils, and Udorthents, smooth.

Available water capacity is low or moderate in these Gilpin soils and low or very low in these Berks soils. Permeability is moderate in the Gilpin soils and moderate or moderately rapid in the Berks soils. Runoff is rapid or very rapid on both soils. Natural fertility is low or moderate in the Gilpin soils and low in the Berks soils. In unlimed areas the Gilpin soils are strongly acid to extremely acid and the Berks soils are strongly acid or very strongly acid. The hazard of erosion is severe or very severe on unprotected areas. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches in both soils.

Slope and the depth to bedrock are the main limitations of these Gilpin and Berks soils for community development.

This unit is not assigned to a capability subclass.

UlC—Urban land-Lily complex, 3 to 15 percent slopes. This complex consists of areas covered by urban structures and strongly sloping to gently sloping, well drained soils. The areas are on uplands. They are about 45 percent urbanized areas, 25 percent Lily loam, and 30 percent other soils. The urbanized areas and Lily soils are in such an intricate pattern that it was not practical to map them separately.

Typically, the surface layer of the Lily soils is brown loam about 6 inches thick. The subsoil is 17 inches thick. The upper 3 inches of the subsoil is strong brown sandy clay loam, and the lower 14 inches is yellowish red clay loam. The substratum is strong brown channery sandy clay loam that extends to bedrock at a depth of about 30 inches.

Included with this complex in mapping are a few small areas of well drained Berks, Calvin, Dekalb, and Gilpin

soils and moderately well drained Tilsit soils. Also included are a few small areas of moderately steep soils and small areas of Udorthents, smooth.

The Lily soils have moderate available water capacity. Permeability is moderately rapid. Runoff is rapid or medium, and natural fertility is low. In unlimed areas the soils are strongly acid to extremely acid. The erosion hazard is severe in unprotected areas. The root zone of some types of plants is restricted by bedrock at a depth of 20 to 40 inches.

Slope and the depth to bedrock are the main limitations of the Lily soils for community development.

This unit is not assigned to a capability subclass.

UmD—Urban land-Murrill complex, 5 to 25 percent slopes. This complex consists of areas covered by urban structures and moderately steep to gently sloping, well drained soils. The areas are on foot slopes. They are about 45 percent urbanized areas, 25 percent Murrill channery silt loam, and 30 percent other soils. The urbanized areas and Murrill soils are in such an intricate pattern that it was not practical to map them separately.

Typically, the surface layer of the Murrill soils is dark grayish brown channery silt loam about 6 inches thick underlain by 4 inches of brown channery loam. The subsoil extends to a depth of 72 inches or more. The upper 26 inches of the subsoil is strong brown channery loam, the next 25 inches is yellowish red channery loam and channery clay loam, and the lower 11 inches is yellowish red channery silty clay.

Included with this complex in mapping are a few small areas of well drained Westmoreland and Frederick soils. Also included are a few small areas of steep soils and Udorthents, smooth.

The Murrill soils have moderate or high available water capacity. Permeability is moderate. Runoff is rapid or medium, and natural fertility is moderate. In unlimed areas the soils are strongly acid or very strongly acid. The hazard of erosion is severe in unprotected areas. The depth to bedrock is greater than 72 inches.

Slope is the main limitation of the Murrill soils for community development.

This unit is not assigned a capability subclass.

Uo—Urban land-Orrville-Lobdell complex. This complex consists of areas covered by urban structures; nearly level, somewhat poorly drained Orrville soils; and nearly level, moderately well drained Lobdell soils. The areas are on flood plains. They are about 40 percent urbanized areas, 20 percent Orrville silt loam, 15 percent Lobdell loam, and 25 percent other soils. The urbanized areas and the Orrville and Lobdell soils are in such an intricate pattern that it was not practical to map them separately.

Typically, the surface layer of the Orrville soils is dark grayish brown silt loam about 10 inches thick. The subsoil is brown and grayish brown, mottled silt loam 21 inches thick. The substratum is grayish brown, mottled silt loam to a depth of 60 inches or more.

Typically, the surface layer of the Lobdell soils is dark brown loam about 10 inches thick. The subsoil is 25 inches thick. The upper 10 inches of the subsoil is dark yellowish brown loam, and the lower 15 inches is yellowish brown, mottled heavy loam. The substratum is brown, mottled loam to a depth of 60 inches or more.

Included with this complex in mapping are a few small areas of well drained Chagrin soils and Udifluvents and Psamments and moderately well drained Ernest and Monongahela soils. Also included are a few small areas of gently sloping soils and a few areas of Udorthents, smooth.

These Orrville and Lobdell soils have high available water capacity. Permeability is moderate in both, and runoff is slow. Natural fertility is high. A seasonal high water table at a depth of 1 to 2-1/2 feet in the Orrville soils and 2 to 3-1/2 feet in the Lobdell soils restricts the root zone of some types of plants. In unlimed areas both soils are medium acid or slightly acid. The depth to bedrock is greater than 60 inches in both soils.

A hazard of flooding and the seasonal high water table limit these soils for community development.

This unit is not assigned a capability subclass.

WeC—Westmoreland silt loam, 3 to 15 percent slopes. This soil is strongly sloping or gently sloping and is well drained. It is on uplands. The areas range from about 5 to 15 acres.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil is strong brown and is 30 inches thick. The upper 18 inches of the subsoil is strong light silty clay loam, and the lower 12 inches is shaly light silty clay loam. The substratum is strong brown very shaly light silty clay loam that extends to bedrock at a depth of 49 inches.

Included with this soil in mapping are a few small areas of well drained Caneyville, Culleoka, and Frederick soils. Also included are a few small areas of moderately steep soils. Included soils make up about 15 percent of the unit.

The available water capacity of this Westmoreland soil is moderate or high. Permeability is moderate. Runoff is medium or rapid, and natural fertility is moderate or high. In unlimed areas the soil is medium acid or strongly acid. The depth to bedrock is 40 to 72 inches.

This soil is suited to cultivated crops and to hay and pasture. The hazard of erosion is severe in unprotected areas and is a management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and good tilth in cultivated areas. Proper stocking rates and rotational grazing are pasture management needs.

This soil has high potential for trees. Erosion on logging roads and skid trails is a major management concern. Placing the roads and trails on the contour helps to control erosion.

The depth to bedrock is the main limitation of this soil for most types of community development.

The capability subclass is IIIe.

WeD—Westmoreland silt loam, 15 to 30 percent slopes. This soil is moderately steep and well drained. It is on ridgetops and hillsides. The areas range from about 10 to 25 acres.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil is 28 inches thick. The upper 16 inches of the subsoil is brown light silty clay loam, and the lower 12 inches is strong brown shaly light silty clay loam. The substratum is strong brown very shaly light silty clay loam that extends to bedrock at a depth of 47 inches.

Included with this soil in mapping are a few small areas of well drained Caneyville, Culleoka, and Frederick soils. Also included are a few small areas of severely eroded soils, strongly sloping soils, and steep soils. Included soils make up about 20 percent of the unit.

The available water capacity of this Westmoreland soil is moderate or high. Permeability is moderate. Runoff is rapid, and natural fertility is moderate or high. In unlimed areas the soil is medium acid or strongly acid. The depth to bedrock is 40 to 72 inches.

This soil has limited suitability for cultivated crops; it is better suited to hay or pasture. The hazard of erosion is severe in unprotected areas and is a major management concern. Using minimum tillage, planting contour strips, using a crop sequence that includes hay, maintaining sod in shallow drainageways, and mixing crop residue into the soil help to control erosion and maintain fertility and good tilth in cultivated areas. Proper stocking rates and rotational grazing are major pasture management needs.

This soil has moderately high or high potential for trees. Erosion on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour will help to control erosion. Slope limits the use of equipment.

Slope and the depth to bedrock limit this soil for most types of community development.

The capability subclass is IVe.

WeF—Westmoreland silt loam, 30 to 65 percent slopes. This soil is very steep and well drained. It is on hillsides and ridgetops. The areas range from about 20 to 30 acres.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil is strong brown and is 27 inches thick. The upper 18 inches of the subsoil is light silty clay loam, and the lower 9 inches is shaly light silty clay loam. The substratum is strong brown very shaly light silty clay loam that extends to bedrock at a depth of 46 inches.

Included with this soil in mapping are a few small areas of well drained Caneyville, Culleoka, and Frederick soils. Also included are a few small areas of severely eroded soils and moderately steep soils. Included soils make up about 25 percent of the unit.

The available water capacity of this Westmoreland soil is moderate or high. Permeability is moderate. Runoff is very rapid, and natural fertility is moderate or high. In unlimed areas the soil is medium acid or strongly acid. The depth to bedrock is 40 to 72 inches.

Slope makes this soil unsuitable for cultivated crops or hay and difficult to manage for pasture.

The soil has moderately high or high potential for trees. Erosion on logging roads and skid trails is a major management concern, and placing the roads and trails on the contour will help to control erosion. Slope limits the use of equipment.

Slope and the depth to bedrock limit this soil for most types of community development.

The capability subclass is VIIe.

use and management of the soils

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

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

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

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

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

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

crops and pasture

Dixie Shreve, resource conservationist, Soil Conservation Service, assisted with the preparation of this section.

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

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

Some general principles of management apply throughout the survey area to all soils suitable for farm crops and pasture, though individual soils or groups of soils require different kinds of management. The general principles of management are described in the following paragraphs.

Most of the soils in Mercer and Summers Counties have a moderate or low supply of basic plant nutrients, making the application of lime and fertilizer necessary. The amounts to be applied depend on the type of soil, cropping history, the type of crop grown, the level of desired yield, and the results of laboratory analysis of soil samples.

The organic matter content is low in most soils in the survey area, and it is not feasible to build it to a higher level. It is important, however, to maintain the current level by adding farm manure, by returning crop residue to the soil, and by growing sod crops, cover crops, and green-manure crops.

Tillage tends to break down soil structure and should be kept to the minimum necessary to prepare the seedbed and control weeds. Maintaining the organic matter content of the plow layer also helps to protect the structure.

The Atkins soils in this survey area need artificial drainage to make them suitable for cultivated crops, hay, and pasture. Soils that have a subsoil with a firm layer, such as Tilsit soils, or a clayey texture, such as Coolville soils, are difficult to drain with tile. Such soils generally respond better to open-ditch drainage.

Runoff and erosion occur mainly while a cultivated crop is growing or soon after it has been harvested. All of the gently sloping and steeper soils in the survey area that are cultivated are subject to erosion and thus require a suitable cropping system for erosion control. The main management needs of such a system include the proper rotation of crops, minimum tillage, mulch planting, using crop residue, growing cover crops and green-manure crops, and using lime and fertilizer (fig. 9). Other major erosion-control practices are contour

cultivation, contour stripcropping, and using grassed waterways. The effectiveness of a particular combination of these measures differs from one soil to another, but different combinations can be equally effective on the same soil.

Using the soils for pasture is effective in controlling erosion in most areas. A high level of pasture management, including fertilization, control of grazing, and careful selection of pasture mixtures, is needed on some soils to provide enough ground cover to prevent erosion. Grazing is controlled by rotating the livestock from one pasture field to another and by providing idle periods for the pasture to allow for regrowth of the plants. Some soils need pasture mixtures that require the least renovation to maintain good ground cover and forage for grazing.

The local representative of the Soil Conservation Service can provide information and assistance in choosing suitable practices for the management of the soils for crops and pasture.

yields per acre

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

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

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties;

Figure 9.—A cover crop of rye and a contour strip on an area of Gilpin silt loam.

appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

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

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

land capability classification

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

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit (*5*). Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

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

Class I soils have slight limitations that restrict their use.

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

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

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

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

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

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

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

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

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

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

The acreage of soils in each capability class and subclass is shown in table 6. The capability classification of each map unit is given in the section "Detailed soil map units."

woodland management and productivity

Lewis Rowan, woodland conservationist, Soil Conservation Service, assisted with the preparation of this section.

Commercial forests cover approximately 189,000 acres in Mercer County and 159,000 acres in Summers County, or 71 percent of the total survey area (*3*). Most of the woodland has been cut at least once, leaving low- to average-quality second-growth timber (fig. 10).

The common commercial forest types and their percentage of wooded area are: oak-hickory, 66 percent; maple-beech-birch, 24 percent; other hardwoods, 7 percent; and Virginia pine-pitch pine, 3 percent.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x*

Figure 10.—Second-growth upland oaks and white pine on an area of Gilpin-Berks silt loams.

indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, t, d, c, s, f, and r.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

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

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

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

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade where there are openings in the tree canopy. The invading plants compete with native plants or planted seedlings. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* indicates that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed to control undesirable plants.

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

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

recreation

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil

properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

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

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

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

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

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

wildlife habitat

Gary Gwinn, biologist, Soil Conservation Service, assisted with the preparation of this section.

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

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

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

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

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

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

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil

properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, and beggarweed.

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

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

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

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

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

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

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

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

engineering

Thomas Purkey and James Dove, engineers, Soil Conservation Service, assisted with the preparation of this section.

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

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

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

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

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

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

Figure 11.—The sandstone bedrock in this area of Lily loam hinders excavation.

small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

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

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

building site development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high

water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction (fig. 11). Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

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

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

sanitary facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

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

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

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

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

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

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

and covered daily with a thin layer of soil from a source away from the site.

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

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

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

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

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

construction materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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

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

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

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

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

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

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

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

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and

fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

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

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

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

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

water management

James Dove, engineer, Soil Conservation Service, assisted with the preparation of this section.

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

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

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

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

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

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

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

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

soil properties

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

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps.

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

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

engineering index properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

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

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

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

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

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

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

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

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

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

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

physical and chemical properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

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

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

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

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

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

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

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

soil and water features

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

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

The four hydrologic soil groups are:

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

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

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

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

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

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

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

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

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

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

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

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

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

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

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

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*6*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 17, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

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

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

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

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

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

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

soil series and their morphology

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

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*4*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*6*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

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

Atkins series

The Atkins series consists of deep, poorly drained soils formed in alluvial material washed mainly from acid soils on uplands. The Atkins soils are on flood plains of the Allegheny Plateau. Slopes range from 0 to 3 percent.

Atkins soils are on the landscape with moderately well drained Buchanan and Ernest soils but do not have the fragipan typical of the Buchanan and Ernest soils.

Typical pedon of Atkins silt loam, in a pasture about 500 yards north of route 55/15, about 0.7 mile west of its intersection with WV Route 20, at Lerona, Mercer County:

Ap—0 to 9 inches, dark gray (10YR 4/1) silt loam; common medium root stains and dark brown (7.5YR 4/4) and strong brown (7.5YR 5/6) mottles; moderate medium granular structure; friable; many roots; few black concretions; slightly acid; abrupt smooth boundary.

B21g—9 to 16 inches, gray (10YR 6/1) silt loam; common fine yellowish brown (7.5YR 5/8) mottles; weak very coarse prismatic structure; friable; pale brown silt coatings on faces of peds; few roots; few black concretions; very strongly acid; clear smooth boundary.

B22g—16 to 41 inches, light gray (10YR 7/1) silt loam; many coarse strong brown (7.5YR 5/8) mottles; weak very coarse prismatic structure; friable; pale brown silt coatings on faces of peds; few roots; very strongly acid; clear smooth boundary.

Cg—41 to 60 inches, mixed light gray (10YR 6/1) and strong brown (7.5YR 5/8) silty clay loam; massive, tending toward very coarse prismatic structure; friable; pale brown silt coatings on faces of peds; very strongly acid.

The solum thickness ranges from 35 to 50 inches, and the depth to bedrock ranges from 40 to 60 inches or more. There are commonly no coarse fragments of gravel in the solum, but the content is as much as 15 percent in some pedons and more in the C horizon. In unlimed areas the soils are strongly acid or very strongly acid in the subsoil.

The A horizon has hue of 10YR, value of 4 through 7, and chroma of 1 or 2.

The B horizon has hue of 10YR, value of 4 through 7, and chroma of 1 or 2. It is silt loam, loam, or light silty clay loam.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 0 through 8. It is silt loam, loam, or light silty clay loam. Some pedons have a IIC horizon of sand or gravel below a depth of 3 feet.

Berks series

The Berks series consists of moderately deep, well drained soils formed in acid material weathered from shale, siltstone, and some sandstone. The Berks soils are on ridgetops, benches, and hillsides. Slopes range from 3 to 70 percent but are dominantly 30 to 70 percent.

The Berks soils are on the landscape with well drained Calvin high base substratum, Culleoka, Gilpin, Shouns, Weikert, and Westmoreland soils and moderately well drained Ernest soils. The Berks soils are less red than the Calvin high base substratum or Shouns soils, have more coarse fragments than the Culleoka or Gilpin soils, and are more acid than the Culleoka soils. The Berks soils are shallower and have more coarse fragments than the Shouns; are deeper than the Weikert soils; are shallower, have more coarse fragments, and are more acid than the Westmoreland soils; and are shallower, have more coarse fragments, and do not have the fragipan typical of the Ernest soils. The Berks soils are in complex map units with Calvin high base substratum, Gilpin, and Weikert soils and with Urban land.

Typical pedon of Berks shaly silt loam, in a wooded area of Calvin, high base substratum-Berks shaly silt loams, 30 to 70 percent slopes, 80 yards east of route 44/7, 1.9 miles north of its intersection with WV Route 20, Summers County:

O1—2 inches to 0, hardwood leaf litter.

A1—0 to 1 inch, very dark grayish brown (10YR 3/2) shaly silt loam; moderate fine granular structure; very friable; many roots; 15 percent coarse fragments; very strongly acid; abrupt wavy boundary.

A2—1 to 7 inches, yellowish brown (10YR 5/4) shaly silt loam; weak fine and medium granular structure; friable; many roots; 15 percent coarse fragments; very strongly acid; clear wavy boundary.

B21—7 to 13 inches, yellowish brown (10YR 5/6) shaly silt loam; weak and moderate medium subangular blocky structure; friable; common roots; 25 percent coarse fragments; very strongly acid; clear wavy boundary.

B22—13 to 20 inches, yellowish brown (10YR 5/8) shaly silt loam; weak medium subangular blocky structure; friable; common roots; 35 percent coarse fragments; very strongly acid; clear irregular boundary.

B3—20 to 28 inches, yellowish brown (10YR 5/8) very shaly silt loam; weak fine subangular blocky structure; friable; common roots; 60 percent coarse fragments; very strongly acid; clear wavy boundary.

C—28 to 35 inches, strong brown (7.5YR 5/6) very channery silt loam; massive; friable; few roots; 80 percent coarse fragments; very strongly acid; clear wavy boundary.

R—35 inches, weathered olive brown shale and siltstone.

The solum thickness ranges from 18 to 36 inches, and the depth to bedrock is 20 to 40 inches. Coarse fragments dominantly of shale and siltstone make up about 15 to 50 percent of the A horizon, 25 to 75 percent of individual subhorizons of the B horizon, and 60 to 90 percent of the C horizon. The A and B horizons are strongly acid or very strongly acid in unlimed areas.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 2 through 4.

The B and C horizons have hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 3 to 8. The B horizon is shaly, very shaly, channery, or very channery counterparts of silt loam or loam. The C horizon is very shaly or very channery counterparts of silt loam or loam.

Buchanan series

The Buchanan series consists of deep, moderately well drained soils formed in acid colluvial material

derived from sandstone, siltstone, and some shale. The Buchanan soils are on foot slopes, along drainageways, and in coves. Slopes range from 3 to 30 percent but are dominantly 3 to 15 percent.

The Buchanan soils are on the landscape with well drained Dekalb soils, moderately well drained Ernest soils, and poorly drained Atkins soils. The Buchanan soils have a fragipan which is not a characteristic of the Dekalb or Atkins soils, are deeper and have fewer coarse fragments than the Dekalb soils, and have more sand than the Ernest soils. The Buchanan soils are in undifferentiated map units with stony Ernest soils.

Typical pedon of Buchanan loam, in a wooded area of Ernest and Buchanan very stony soils, 3 to 15 percent slopes, 150 yards southeast of route 7/1, 0.25 mile west of its intersection with route 7/2, and 1.5 miles northeast of Kegley, Mercer County:

O1—1 inch to 0, hardwood leaf litter.
A1—0 to 2 inches, dark grayish brown (10YR 4/2) loam; weak fine granular structure; very friable; many roots; 10 percent coarse fragments; strongly acid; abrupt wavy boundary.
A2—2 to 7 inches, pale brown (10YR 6/3) loam; weak fine granular structure; very friable; many roots; 10 percent coarse fragments; strongly acid; abrupt wavy boundary.
B1—7 to 12 inches, yellowish brown (10YR 5/4) channery loam; weak fine and medium subangular blocky structure; friable; many roots; 15 percent coarse fragments; strongly acid; clear wavy boundary.
B21t—12 to 17 inches, yellowish brown (10YR 5/6) channery loam; moderate medium subangular blocky structure; friable; common roots; few discontinuous clay films on faces of peds and in pores; 20 percent coarse fragments; strongly acid; clear wavy boundary.
B22t—17 to 26 inches, yellowish brown (10YR 5/6) channery heavy loam; few light gray (10YR 7/2) and reddish yellow (7.5YR 6/6) mottles; moderate medium subangular blocky structure; firm; few roots; common discontinuous clay films on faces of peds and in pores; 30 percent coarse fragments; strongly acid; gradual wavy boundary.
Bx1—26 to 37 inches, yellowish brown (10YR 5/6) channery heavy loam; common light gray (10YR 7/2) and reddish yellow (7.5YR 6/6) mottles; weak very coarse prismatic structure parting to weak coarse subangular blocky; very firm and brittle; few discontinuous clay films; 40 percent coarse fragments; strongly acid; gradual wavy boundary.
Bx2—37 to 47 inches, yellowish brown (10YR 5/6) channery light clay loam; common light gray (10YR 7/2) and reddish yellow (7.5YR 6/6) mottles; weak very coarse prismatic structure parting to weak coarse subangular blocky; very firm and brittle; few discontinuous clay films; 40 percent coarse fragments; strongly acid; gradual wavy boundary.
C—47 to 60 inches, strong brown (7.5YR 5/6) channery clay loam; many light gray (10YR 7/1) and yellowish red (5YR 5/6) mottles; massive; firm; 30 percent coarse fragments; strongly acid.

The solum thickness ranges from 40 to 60 inches, and the depth to bedrock is generally greater than 60 inches. The depth to the fragipan is 20 to 30 inches. Coarse fragments dominantly of sandstone and siltstone make up about 10 to 35 percent of the A horizon, 10 to 40 percent of individual subhorizons of the B horizon, and 10 to 60 percent of individual subhorizons of the Bx and C horizons. In unlimed areas the A and B horizons are extremely acid to strongly acid.

The A horizon has hue of 10YR or 7.5YR, value of 3 through 6, and chroma of 1 through 4.

The B1 and B2 horizons have hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 through 6. They are loam, clay loam, sandy clay loam, silt loam, or their channery counterparts.

The Bx horizon has hue of 10YR through 5YR, value of 4 through 6, and chroma of 3 through 6. It is loam, clay loam, sandy clay loam, silt loam, or their very channery counterparts.

The C horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 1 through 8. It is loam, clay loam, sandy clay loam, silt loam, or their very channery counterparts.

Calvin series

The Calvin series consists of moderately deep, well drained soils formed in acid and lime-influenced material weathered from shale, siltstone, and some sandstone. The Calvin soils are on ridgetops, benches, and hillsides. Slopes range from 3 to 70 percent but are dominantly 30 to 70 percent.

The Calvin soils in this survey area are a high base substratum phase of the Calvin series. Map units CaC and CaD have a marginal argillic horizon and are a taxadjunct to the Calvin high base substratum soils.

The Calvin soils are on the landscape with well drained Berks, Gilpin, and Shouns soils. The Calvin soils are redder than the Berks or Gilpin soils, have more coarse fragments than the Gilpin soils, and are shallower and have more fragments than the Shouns soils. The Calvin soils are mostly in complex map units with the Berks soils.

Typical pedon of Calvin shaly silt loam, high base substratum, in a wooded area of Calvin, high base substratum-Berks shaly silt loams, 30 to 70 percent slopes, 50 feet south of route 44/20, 0.5 mile west of its intersection with route 44/7, Summers County:

O1—2 inches to 0, hardwood leaf litter.
A1—0 to 1 inch, dark reddish brown (5YR 3/4) shaly silt loam; moderate fine granular structure; very friable; many roots; 15 percent coarse fragments; strongly acid; abrupt clear boundary.

A2—1 to 5 inches, reddish brown (2.5YR 4/4) shaly silt loam; weak fine and medium granular structure; friable; many roots; 15 percent coarse fragments; strongly acid; clear wavy boundary.
B2—5 to 14 inches, reddish brown (2.5YR 4/4) shaly heavy silt loam; weak and moderate medium subangular blocky structure; friable; common roots; common continuous clay films in pores and few discontinuous clay films on faces of peds; 30 percent coarse fragments; strongly acid; clear wavy boundary.
B3—14 to 23 inches, reddish brown (2.5YR 4/4) very channery silt loam; weak fine and medium subangular blocky structure; friable; common roots; 55 percent coarse fragments; strongly acid; clear irregular boundary.
C—23 to 35 inches, reddish brown (2.5YR 4/4) very channery silt loam; massive; friable; few roots; 75 percent coarse fragments; strongly acid; clear irregular boundary.
Cr—35 inches, weathered reddish brown siltstone.

The solum thickness ranges from 20 to 35 inches, and the depth to bedrock ranges from 20 to 40 inches. Coarse fragments dominantly of shale and siltstone make up about 15 to 25 percent in the A horizon, 25 to 55 percent of individual subhorizons of the B horizon, and 40 to 80 percent of the C horizon. In unlimed areas the A and B horizons are medium acid to very strongly acid.

The A horizon has hue of 7.5YR or 5YR, value of 3 through 5, and chroma of 2 through 4. It is silt loam or shaly silt loam.

The B and C horizons have hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 through 6. They are shaly, very shaly, channery, or very channery counterparts of silt loam, light silty clay loam, loam, or light clay loam.

Caneyville series

The Caneyville series consists of moderately deep, well drained soils that formed in material weathered from limestone. The Caneyville soils are on ridgetops and side slopes along the base of East River Mountain. Slopes range from 15 to 60 percent but are dominantly 30 to 60 percent.

The Caneyville soils are on the landscape with well drained Frederick, Murrill, and Weikert soils. The Caneyville soils are shallower than the Frederick or Murrill soils; have more clay in the upper part of the solum than the Murrill soils; and are deeper, have more clay, and have fewer coarse fragments than the Weikert soils.

Typical pedon of Caneyville silt loam, 30 to 60 percent slopes, in a pasture 100 yards west of a railroad bridge across the East River and WV Route 12, 1 mile east of the Ingleside exchange of I-77:

Ap—0 to 6 inches, brown (10YR 5/3) silt loam; moderate fine and medium granular structure; friable; many roots; 2 percent coarse fragments; strongly acid; clear wavy boundary.
B1t—6 to 10 inches, strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; common roots; common discontinuous clay films on faces of peds; 2 percent coarse fragments; strongly acid; clear wavy boundary.
B21t—10 to 18 inches, yellowish red (5YR 5/6) silty clay; moderate medium subangular blocky and angular blocky structure; firm; common roots; many discontinuous clay films on faces of peds; 2 percent coarse fragments; medium acid; clear wavy boundary.
B22t—18 to 26 inches, yellowish red (5YR 4/6) silty clay; common brown (10YR 5/3) mottles; moderate medium subangular blocky and angular blocky structure; firm; common roots; many discontinuous clay films on faces of peds; 2 percent coarse fragments; medium acid; clear wavy boundary.
B3t—26 to 29 inches, yellowish red (5YR 5/6) silty clay; common brown (10YR 5/3) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; common roots; many discontinuous clay films on faces of peds; 5 percent coarse fragments; neutral; clear irregular boundary.
R—29 inches, hard limestone bedrock.

The solum thickness and depth to bedrock range from 20 to 40 inches. Coarse fragments of limestone, chert, or sandstone make up about 0 to 10 percent of the profile. In unlimed areas the soils are very strongly acid to medium acid in the A horizon and upper part of the B horizon, medium acid or slightly acid in the lower part of the B horizon, and slightly acid or neutral in the C horizon.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 through 4.

The B1 horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 4 through 6. It is silty clay loam, silt loam, or loam.

The B2, B3, and C horizons have hue of 2.5YR through 10YR, value of 4 or 5, and chroma of 4 through 6. They are silty clay or clay. A part of the B2 horizon generally has hue of 5YR or 2.5YR.

Chagrin series

The Chagrin series consists of deep, well drained soils that formed in alluvial material washed from acid and lime-influenced soils on uplands. The Chagrin soils are on flood plains. Slopes range from 0 to 3 percent.

Chagrin soils are on the landscape with well drained Kanawha soils, moderately well drained Lobdell soils, and somewhat poorly drained Orrville soils. The Chagrin soils are flooded more frequently than the Kanawha soils.

Typical pedon of Chagrin loam, in a cornfield 200 yards east of the Greenbrier River, 100 yards west of the C&O Railroad, and 1/2 mile south of Alderson Federal Prison for Women, Summers County:

Ap—0 to 10 inches, dark grayish brown (10YR 4/2) loam; moderate fine and medium granular structure; friable; many roots; neutral; abrupt wavy boundary.
B2—10 to 24 inches, dark brown (7.5YR 4/4) loam; weak medium and coarse subangular blocky structure; friable; common roots; neutral; gradual wavy boundary.
B3—24 to 36 inches, dark brown (7.5YR 4/4) loam; weak coarse and medium subangular blocky structure; very friable; common roots; neutral; gradual wavy boundary.
C—36 to 60 inches, dark brown (7.5YR 4/4) and brown (7.5YR 5/4) sandy loam; single grain; very friable; few roots; neutral.

The solum thickness ranges from 24 to 48 inches, and the depth to bedrock is greater than 60 inches. Coarse fragments make up about 0 to 15 percent of the solum. The A and B horizons are medium acid to neutral in unlimed areas.

The A horizon has hue of 10YR, value of 4, and chroma of 2 or 3.

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

The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 through 4. It is sandy loam, loam, or silt loam.

Clymer series

The Clymer series consists of deep, well drained soils formed in acid material weathered from sandstone, siltstone, and some shale. The Clymer soils are on ridgetops, benches, and side slopes mostly in the northwestern part of Mercer County. Slopes range from 15 to 70 percent but are dominantly 30 to 70 percent.

Clymer soils are on the landscape with well drained Gilpin, Jefferson, and Lily soils. The Clymer soils are deeper than the Gilpin or Lily soils and shallower than the Jefferson soils. The Clymer soils in this survey area are mapped only in complex map units with Gilpin soils.

Typical pedon of Clymer loam, in a wooded area of Clymer-Gilpin complex, 30 to 70 percent slopes, along route 52/1, approximately 0.5 mile north of its intersection with US Route 52, near Coaldale, Mercer County:

O1—2 inches to 0, hardwood leaf litter.
A1—0 to 2 inches, very dark gray (10YR 3/1) loam; weak fine granular structure; very friable; many roots; 10 percent coarse fragments; strongly acid; abrupt smooth boundary.
A2—2 to 9 inches, yellowish brown (10YR 5/4) channery loam; weak fine and medium subangular blocky and weak medium granular structure; friable; many roots; 20 percent coarse fragments; very strongly acid; clear wavy boundary.
B21t—9 to 21 inches, yellowish brown (10YR 5/8) channery heavy loam; moderate medium subangular blocky structure; friable and firm; common roots; few discontinuous clay films on faces of peds; 30 percent coarse fragments; very strongly acid; gradual wavy boundary.
B22t—21 to 26 inches, yellowish brown (10YR 5/8) channery sandy clay loam; moderate medium subangular blocky structure; firm; few roots; few discontinuous clay films on faces of peds; 30 percent coarse fragments; very strongly acid; gradual wavy boundary.
B3t—26 to 36 inches, strong brown (7.5YR 5/8) very channery sandy clay loam; weak fine and medium subangular blocky structure; friable and firm; few roots; few discontinuous clay films on faces of peds; 60 percent coarse fragments; very strongly acid; gradual wavy boundary.
C—36 to 48 inches, yellowish brown (10YR 5/6) very channery sandy loam; pockets of strong brown (7.5YR 5/6) sandy clay loam; massive; firm; 85 percent coarse fragments; very strongly acid; clear wavy boundary.
R—48 inches, yellowish brown weathered sandstone.

The solum thickness ranges from 24 to 40 inches, and the depth to bedrock ranges from 40 to 60 inches or more. Coarse fragments dominantly of sandstone make up about 10 to 65 percent of individual subhorizons of the B horizon and from 20 to 85 percent of the C horizon. In unlimed areas the A and B horizons are strongly acid to extremely acid.

The A horizon has hue of 10YR, value of 2 through 5, and chroma of 1 through 6.

The B horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 4 through 8. It is loam, sandy clay loam, clay loam, sandy loam, or their channery or very channery counterparts.

The C horizon has hue of 7.5YR through 10YR, value of 4 through 6, and chroma of 4 through 6. It is channery or very channery counterparts of sandy loam or loam.

Coolville series

The Coolville series consists of deep, moderately well drained soils formed in acid material weathered mainly from shale. The Coolville soils are on ridgetops and benches. Slopes range from 3 to 25 percent but are dominantly 3 to 15 percent.

Coolville soils are on the landscape with well drained Lily soils and moderately well drained Latham and Tilsit soils. The Coolville soils are deeper and have more clay than the Lily soils, are deeper than the Latham or Tilsit soils, and have more clay than and do not have the fragipan typical of the Tilsit soils. Coolville soils in this survey area are mapped only with Latham soils.

Typical pedon of Coolville silt loam, in an area of Coolville and Latham silt loams, 3 to 15 percent slopes, in a hayfield along route 44, approximately 200 yards from its intersection with WV Route 20, Mercer County:

Ap—0 to 8 inches, dark brown (10YR 4/3) silt loam; moderate medium granular structure; friable; many roots; 5 percent coarse fragments; neutral; clear wavy boundary.
B21t—8 to 13 inches, strong brown (7.5YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; friable; many roots; common discontinuous clay films on faces of peds; 5 percent coarse fragments; medium acid; clear wavy boundary.
IIB22t—13 to 20 inches, yellowish red (5YR 5/6) light silty clay; strong fine and medium subangular blocky structure; friable; common roots; many discontinuous clay films on faces of peds; 5 percent coarse fragments; very strongly acid; clear wavy boundary.
IIB23t—20 to 31 inches, yellowish red (5YR 4/8) silty clay; common distinct pinkish gray (7.5YR 6/2) and reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; firm; common roots; many discontinuous clay films on faces of peds; 5 percent coarse fragments; very strongly acid; gradual wavy boundary.
IIB3t—31 to 43 inches, strong brown (7.5YR 5/6) light silty clay; many prominent light gray (N 7/0), red (2.5YR 4/8), and olive yellow (2.5YR 6/6) mottles; moderate medium and coarse subangular blocky structure; firm; few roots; few clay films on faces of peds; 10 percent coarse fragments; very strongy acid; gradual wavy boundary.
IIC—43 to 60 inches, strong brown (7.5YR 5/6) shaly heavy silty clay loam; many prominent light gray (N 7/0), red (2.5YR 4/8), and olive yellow (2.5YR 6/6) mottles; weak platy structure; firm; 15 percent coarse fragments; very strongly acid.

The solum thickness ranges from 40 to 60 inches, and the depth to bedrock is greater than 40 inches. There generally are no coarse fragments in the A and B2 horizons, but soft shale makes up about 2 to 15 percent of the IIB2 horizon and up to 30 percent of the IIB3 horizon. In unlimed areas the soils are strongly acid to extremely acid.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The B2 has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 6.

The IIB2 horizon has hue of 7.5YR through 2.5YR, value of 4 or 5, and chroma of 4 through 8. It is silty clay or clay.

The IIB3 horizon has hue of 7.5YR through 2.5YR, value of 4 through 8, and chroma of 1 through 8. It is silty clay, clay, or their shaly counterparts.

The IIC horizon has hue of 10YR through 2.5YR, value of 4 through 8, and chroma of 1 through 8. It is silty clay loam to clay or their shaly counterparts.

Culleoka series

The Culleoka series consists of moderately deep, well drained soils formed in lime-influenced material weathered from shale, siltstone, and some limestone and sandstone. The Culleoka soils are on ridgetops, benches, and hillsides. Slopes range from 30 to 65 percent.

Culleoka soils are on the landscape with well drained Berks, Gilpin, and Westmoreland soils. The Culleoka soils contain fewer coarse fragments and are less acid than the Berks soils, are less acid than the Gilpin soils, and are shallower than the Westmoreland soils.

Typical pedon the Culleoka silt loam, 30 to 65 percent slopes, in a pasture 50 yards north of a meadow and 300 yards north of a farm house, across from the church at the northeast end of Pinnacle Lake, Mercer County:

Ap—0 to 3 inches, dark yellowish brown (10YR 4/4) silt loam; moderate fine granular structure; friable; many roots; 5 percent coarse fragments; medium acid; clear wavy boundary.
B1—3 to 7 inches, yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; many roots; 10 percent coarse fragments; medium acid; clear wavy boundary.
B21t—7 to 14 inches, yellowish brown (10YR 5/6) heavy silt loam; moderate medium and fine subangular blocky structure; friable; common roots; 10 percent coarse fragments; common discontinuous clay films on faces of peds; medium acid; clear wavy boundary.
B22t—14 to 22 inches, yellowish brown (10YR 5/6) shaly silty clay loam; moderate medium subangular blocky structure; friable; common roots; 30 percent coarse fragments; common discontinuous clay films on faces of peds; medium acid; clear wavy boundary.
B23t—22 to 29 inches, strong brown (7.5YR 5/6) shaly silty clay loam; moderate fine and medium subangular blocky structure; friable; common roots; 20 percent coarse fragments; many discontinuous clay films on faces of peds; medium acid; abrupt wavy boundary.
R—29 inches, soft gray shale.

The solum thickness ranges from 20 to 37 inches, and the depth to bedrock is 20 to 40 inches. Coarse fragments of shale and siltstone make up about 5 to 15 percent of the A horizon, 10 to 35 percent of the B horizon, and 25 to 80 percent of the C horizon. In unlimed areas the soils are medium acid or strongly acid.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 through 4.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6. It is silt loam, silty clay loam, or their shaly or channery counterparts.

The C horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 4 through 6. It is shaly, very shaly, channery, or very channery counterparts of silt loam, silty clay loam, or loam.

Dekalb series

The Dekalb series consists of moderately deep, well drained soils formed in acid material weathered mainly from sandstone. The Dekalb soils are on ridgetops, benches, and side slopes. Slopes range from 3 to 80 percent but are dominantly 35 to 80 percent.

Dekalb soils are on the landscape with well drained Gilpin, Jefferson, Lehew, and Murrill soils and moderately well drained Buchanan soils. The Dekalb soils have more coarse fragments and more sand than the Gilpin soils; are less red than the Lehew soils; are shallower and have more coarse fragments than the Jefferson and Murrill soils; are shallower and have more coarse fragments than the Buchanan soils; and do not have the fragipan typical of the Buchanan soils.

The Dekalb soils in this survey area are mostly mapped with stony Gilpin and Jefferson soils, very stony Lehew soils, and Rock outcrop.

Typical pedon of Dekalb channery sandy loam, in a wooded area of Dekalb-Gilpin-Jefferson very stony complex, 35 to 80 percent slopes, on the northwest side of Black Oak Mountain, 250 yards southeast of route 71/4, 1 mile east of the Rock Post Office, Mercer County:

O1—1 inch to 0, hardwood leaf litter.
A1—0 to 4 inches, very dark gray (10YR 3/1) channery sandy loam; weak fine granular structure; very friable; many roots; 40 percent coarse fragments; very strongly acid; clear irregular boundary.
A2—4 to 9 inches, light brownish gray (10YR 6/2) channery sandy loam; weak fine granular structure; very friable; many roots; 40 percent coarse fragments; very strongly acid; clear wavy boundary.
B2—9 to 21 inches, yellowish brown (10YR 5/6) channery sandy loam; weak fine and medium subangular blocky structure; friable; many roots; 45 percent coarse fragments; very strongly acid; clear wavy boundary.
B3—21 to 28 inches, yellowish brown (10YR 5/4) very channery sandy loam; weak fine and medium subangular blocky structure; friable; common roots; 55 percent coarse fragments; very strongly acid; abrupt wavy boundary.
R—28 inches, weathered sandstone bedrock.

The solum thickness and depth to bedrock range from 20 to 40 inches. Coarse fragments of sandstone make up about 15 to 60 percent of individual subhorizons of the solum and 50 to 90 percent of the C horizon. In unlimed areas the A and B horizons are strongly acid to extremely acid.

The A horizon has hue of 10YR, value of 3 through 6, and chroma of 1 through 3. It is channery sandy loam or channery fine sandy loam.

The B horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 or 6. It is channery or very channery counterparts of sandy loam or loam.

The C horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 or 6. It is very channery or very flaggy sandy loam.

Ernest series

The Ernest series consists of deep, moderately well drained soils formed in acid colluvial material from shale, siltstone, and some sandstone. The Ernest soils are on foot slopes, on colluvial fans, and along drainageways. Slopes range from 3 to 30 percent but are dominantly 8 to 15 percent.

Ernest soils are on the landscape with well drained Berks and Gilpin soils, moderately well drained Buchanan soils, and poorly drained Atkins soils. The Ernest soils have less sand than the Buchanan soils; are deeper than the Berks or Gilpin soils; have a fragipan which is not a characteristic of the Berks, Gilpin, or Atkins soils; and have fewer coarse fragments than the Berks soils. Some Ernest soils in this survey area are mapped with Urban land, and some are mapped with stony Buchanan soils.

Typical pedon of Ernest silt loam, 8 to 15 percent slopes, in a hayfield about 0.3 mile northwest of Pettry, Mercer County:

Ap—0 to 9 inches, dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; friable; many roots; neutral; abrupt wavy boundary
B21t—9 to 16 inches, yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; common roots; few discontinuous clay films on faces of peds; very strongly acid; clear wavy boundary.
B22t—16 to 24 inches, yellowish brown (10YR 5/6) silty clay loam; few fine strong brown (7.5YR 5/8) mottles and common medium light gray (10YR 7/1) mottles; moderate medium and coarse subangular blocky structure; firm; few roots; few discontinuous clay films on faces of peds; 5 percent coarse fragments; very strongly acid; clear irregular boundary.
Bx—24 to 38 inches, strong brown (7.5YR 5/6) silt loam; many light gray (10YR 7/1) mottles; very coarse prismatic structure; very firm and brittle; yellowish brown (10YR 5/6) silt and clay films on faces of prisms; few roots; 5 percent coarse fragments; very strongly acid; clear smooth boundary.
C—38 to 60 inches, strong brown (7.5YR 5/6) channery silt loam; many medium light gray (10YR 7/1) and

Figure 12.—An area of Frederick soils near the base of East River Mountain.

brown (10YR 5/3) mottles; massive; firm; 15 percent coarse fragments; very strongly acid.

The solum thickness ranges from 36 to 60 inches, and the depth to bedrock is generally greater than 60 inches. The depth to the fragipan ranges from 20 to 30 inches. Coarse fragments dominantly of siltstone and shale make up about 5 to 20 percent of the B2 horizon and as much as 30 percent of the Bx horizon and C horizons. In unlimed areas the A and B horizons are very strongly acid or strongly acid.

The A horizon has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 2 through 4.

The B2 horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 3 through 6. It is silty clay loam or silt loam or their channery or shaly counterparts.

The Bx horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 3 through 6. It is silt loam, silty clay loam, clay loam, or their channery or shaly counterparts.

The C horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 2 through 6. It is silt loam through silty clay or their channery or shaly counterparts.

Frederick series

The Frederick series consists of deep, well drained soils formed in material weathered mainly from limestone. The Frederick soils in this survey area are a taxadjunct because they have a thinner B2t horizon than is defined in the range for the series and the very cherty units have a thicker A horizon. The Frederick soils are on ridgetops and on side slopes mostly along the base of East River Mountain (fig. 12). Slopes range from 3 to 60 percent but are dominantly 30 to 60 percent.

The Frederick soils are on the landscape with well drained Caneyville, Murrill, and Weikert soils. The Frederick soils are deeper than the Caneyville soils; have more clay in the upper part of the solum than the Murrill soils; and are deeper, have more clay, and have fewer coarse fragments than the Weikert soils.

Typical pedon of Frederick cherty silt loam, 30 to 60 percent slopes, 75 yards north of U.S. Route 290, 0.5 mile east of its intersection with U.S. Route 460 and 12 feet south of highway right-of-way fence, Mercer County:

Ap—0 to 8 inches, dark brown (10YR 4/2) cherty silt loam; moderate medium and fine granular structure; friable; many roots; 40 percent coarse fragments; strongly acid; abrupt wavy boundary.
A2—8 to 13 inches, yellowish brown (10YR 5/6) cherty silt loam; weak medium granular and weak fine and medium subangular blocky structure; friable; common roots; 30 percent coarse fragments; strongly acid; clear wavy boundary.
B1t—13 to 17 inches, strong brown (7.5YR 5/8) light silty clay loam; moderate fine and medium subangular blocky structure; friable; common roots; few discontinuous clay films on faces of peds; 10 percent coarse fragments; strongly acid; clear wavy boundary.
B21t—17 to 24 inches, strong brown (7.5YR 5/8) heavy silty clay loam; moderate fine and medium subangular blocky structure; firm; common roots; common clay films on faces of peds; 2 percent coarse fragments; strongly acid; clear wavy boundary.
B22t—24 to 37 inches, yellowish red (5YR 5/8) clay; common brownish yellow (10YR 7/8) mottles; moderate fine and medium angular blocky and subangular blocky structure; firm; few roots; many continuous clay films on faces of peds; 2 percent coarse fragments; strongly acid; clear wavy boundary.
B3t—37 to 65 inches, yellowish red (5YR 5/8) silty clay; common reddish yellow (7.5YR 6/6), very pale brown (10YR 7/4), and pink (7.5YR 7/3) mottles; moderate coarse prismatic structure parting to very thick platy; firm; few roots; many continuous clay films on faces of peds; common slickensides; few white weathered coarse fragments; strongly acid; clear irregular boundary.
C—65 to 72 inches, yellowish red (5YR 5/8) silty clay; common strong brown (7.5YR 5/6), light brown (7.5YR 6/4), and brownish yellow (10YR 6/6) mottles; massive; firm; many white weathered coarse fragments; common black concretions and coatings; strongly acid.

The solum thickness ranges from 60 to 80 inches or more, and the depth to bedrock is greater than 72 inches. Coarse fragments of dominantly chert make up about 0 to 60 percent of the A horizon and 0 to 45 percent of individual subhorizons of the B horizon. In unlimed areas the soils are strongly acid or very strongly acid.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 through 6. It is cherty silt loam, very cherty loam, or silt loam.

The B1 horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 4 through 8. It is silt loam or silty clay loam or their cherty counterparts.

The B2 horizon has hue of 2.5YR through 7.5YR, value of 4 or 5, and chroma of 6 through 8. It is silty clay, clay, heavy silty clay loam, heavy clay loam, or their cherty counterparts.

The C horizon has hue of 5YR, value of 4 or 5, and chroma of 6 through 8. It is silty clay or clay.

Gilpin series

The Gilpin series consists of moderately deep, well drained soils formed in acid material weathered from shale, siltstone, and some sandstone. The Gilpin soils are on ridgetops, benches, and side slopes. Slopes range from 3 to 70 percent but are dominantly 30 to 70 percent.

The Gilpin soils are on the landscape with well drained Berks, Calvin high base substratum, Clymer, Culleoka, Dekalb, Jefferson, and Westmoreland soils and moderately well drained Ernest soils. The Gilpin soils have fewer coarse fragments than the Berks, Calvin high base substratum, or Dekalb soils and have less sand than the Dekalb soils. The Gilpin soils are not as red as Calvin high base substratum soils; are more acid than the Culleoka or Westmoreland soils; are shallower than the Clymer, Jefferson, or Westmoreland soils; and are shallower than and do not have the fragipan typical of the Ernest soils.

Typical pedon of Gilpin shaly silt loam, in a wooded area of Gilpin-Berks shaly silt loams, 30 to 70 percent slopes, 60 feet east of U.S. Routes 19 and 21, 0.6 mile north of their intersection with route 19/7, Mercer County:

O1—2 inches to 0, hardwood leaf litter.
A1—0 to 2 inches, dark brown (10YR 3/3) shaly silt loam; moderate medium granular structure; very friable; many roots; 15 percent coarse fragments; strongly acid; abrupt wavy boundary.
A2—2 to 6 inches, yellowish brown (10YR 5/4) loam; weak fine and medium granular structure; friable; many roots; 10 percent coarse fragments; strongly acid; clear wavy boundary.
B1—6 to 12 inches, yellowish brown (10YR 5/8) silt loam; weak fine and medium subangular blocky structure; friable; many roots; 10 percent coarse fragments; strongly acid; clear wavy boundary.
B21t—12 to 20 inches, yellowish brown (10YR 5/8) light silty clay loam; moderate fine and medium subangular blocky structure; friable; many roots; common clay films on faces of peds and in pores; 10 percent coarse fragments; strongly acid; clear wavy boundary.
B22t—20 to 27 inches, strong brown (7.5YR 5/8) shaly light silty clay loam; moderate fine and medium subangular blocky structure; friable; common roots;

common clay films on faces of peds and in pores; 15 percent coarse fragments; strongly acid; clear irregular boundary.
C—27 to 35 inches, strong brown (7.5YR 5/8) shaly light silty clay loam; massive; friable; common roots; few clay films on coarse fragments and in pores; 30 percent coarse fragments; strongly acid; clear irregular boundary.
R—35 inches, weathered yellow shale.

The solum thickness ranges from 20 to 35 inches, and the depth to bedrock is 20 to 40 inches. Coarse fragments of shale, siltstone, and some sandstone make up about 5 to 40 percent of individual subhorizons of the solum and 30 to 90 percent of the C horizon. In unlimed areas the A and B horizons are strongly acid to extremely acid.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 2 through 4. It is silt loam or shaly silt loam.

The B horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 through 8. It is heavy silt loam, light silty clay loam, heavy loam, or their shaly or channery counterparts.

The C horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 through 8. It is shaly, channery, very shaly, or very channery counterparts of silt loam, light silty clay loam, or loam.

Jefferson series

The Jefferson series consists of deep, well drained soils formed in acid colluvial material derived from sandstone, siltstone, and some shale. The Jefferson soils are on foot slopes along the base of steep slopes, are along drainageways, and are in coves. Slopes range from 15 to 60 percent but are dominantly 30 to 60 percent.

Jefferson soils are on the landscape with well drained Clymer, Dekalb, and Gilpin soils. The Jefferson soils are deeper than those soils and have fewer coarse fragments than the Dekalb soils.

Typical pedon of Jefferson stony loam, 15 to 35 percent slopes, in a wooded area 60 feet north of route 1/5, 0.5 mile east of its intersection with route 19/5, Mercer County:

O1—2 inches to 0, hardwood leaf litter.
A1—0 to 4 inches, very dark grayish brown (10YR 3/2) channery loam; moderate fine and medium granular structure; very friable; many roots; 15 percent coarse fragments; strongly acid; clear wavy boundary.
A2—4 to 9 inches, brown (10YR 5/3) channery loam; moderate fine granular structure and weak fine and medium subangular blocky; very friable; many roots; 15 percent coarse fragments; strongly acid; clear wavy boundary.
B21t—9 to 15 inches, yellowish brown (10YR 5/6) heavy loam; moderate fine and medium subangular blocky structure; friable; common roots; few clay films on faces of peds; 10 percent coarse fragments; strongly acid; clear wavy boundary.
B22t—15 to 28 inches, yellowish brown (10YR 5/6) channery heavy loam; moderate medium subangular blocky structure; friable; common roots; few discontinuous clay films on faces of peds; 15 percent coarse fragments; strongly acid; clear wavy boundary.
B23t—28 to 37 inches, yellowish brown (10YR 5/8) channery loam; moderate medium subangular blocky structure; friable and firm; few roots; few discontinuous clay films on faces of peds; 15 percent coarse fragments; strongly acid; clear wavy boundary.
B3—37 to 46 inches, yellowish brown (10YR 5/6) channery loam; few fine and medium light yellowish brown (2.5YR 6/4) and reddish yellow (7.5YR 6/8) mottles; weak coarse subangular blocky structure; friable and firm; few roots; 40 percent coarse fragments; strongly acid; gradual irregular boundary.
C—46 to 60 inches, strong brown (7.5YR 5/6) very channery loam; few fine and medium light yellowish brown (10YR 6/4) and light brownish gray (10YR 6/2) mottles; massive; friable and firm; 65 percent coarse fragments; strongly acid.

The solum thickness ranges from 40 to 60 inches, and the depth to bedrock is greater than 72 inches. Coarse fragments dominantly of sandstone and siltstone make up about 15 to 35 percent of the soil to a depth of about 3 feet and 20 to 80 percent below a depth of 3 feet. The A and B horizons are strongly acid or very strongly acid in unlimed areas.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 1 through 4.

The B horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 through 8. It is channery counterparts of heavy loam, sandy clay loam, or clay loam.

The C horizon has hue of 10YR through 5YR, value of 4 or 5, and chroma of 4 through 8. It is channery or very channery counterparts of loam, fine sandy loam, sandy loam, sandy clay loam, or clay loam.

Kanawha series

The Kanawha series consists of deep, well drained soils formed in alluvial material washed from acid and lime-influenced soils on uplands. The Kanawha soils are on high flood plains and low terraces mostly along the Greenbrier River, New River, and Bluestone River. Slopes range from 0 to 3 percent.

Kanawha soils are on the landscape with well drained Chagrin soils, moderately well drained Lobdell and Monongahela soils, and somewhat poorly drained Orrville and Tygart Variant soils. The Kanawha soils are

flooded less frequently than the Chagrin, Lobdell, or Orrville soils and do not have the fragipan typical of the Monongahela soils.

Typical pedon of Kanawha fine sandy loam, about 100 yards southeast of the Greenbrier River, about 150 yards northwest of WV Route 29 and 0.7 mile northeast of WV Route 12, near the County 4-H Camp, Summers County:

Ap—0 to 7 inches, dark brown (10YR 4/3) fine sandy loam; moderate medium granular structure; friable; many roots; 5 percent gravel; neutral; clear wavy boundary.
B1—7 to 12 inches, brown (7.5YR 5/4) fine sandy loam; weak medium subangular blocky structure; friable; common roots; 5 percent gravel; neutral; clear wavy boundary.
B21t—12 to 22 inches, reddish brown (5YR 5/4) loam; moderate medium and coarse subangular blocky structure; friable; few roots; common discontinuous clay films on faces of peds; 5 percent gravel; neutral; clear wavy boundary.
B22t—22 to 40 inches, reddish brown (5YR 5/4) loam; few black coatings; moderate medium and coarse subangular blocky structure; friable; few roots; common discontinuous clay films on faces of peds; 5 percent gravel; slightly acid; gradual wavy boundary.
B3t—40 to 52 inches, reddish brown (5YR 4/4) fine sandy loam; weak coarse subangular blocky structure; friable; few roots; few discontinuous clay films on faces of peds; few black coatings; 5 percent gravel; medium acid; clear wavy boundary.
C—52 to 60 inches, yellowish red (5YR 4/6) sandy loam; few pockets of loamy sand; massive; friable; medium acid.

The solum thickness ranges from 40 to 72 inches, and the depth to bedrock is greater than 72 inches. Coarse fragments of gravel make up about 0 to 15 percent of the solum and 0 to 30 percent of the C horizon. In unlimed areas the soils are strongly acid or medium acid in the A and B1 horizons and in the upper part of the B2 horizon, and medium acid to neutral in the lower part of the B2 horizon and in the B3 and C horizons.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 through 4.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 8; or it has hue of 5YR, value of 4 or 5, and chroma of 4 or 6. It is mainly loam, silt loam, light clay loam, or sandy clay loam, and in some areas it has subhorizons of fine sandy loam.

The C horizon has hue of 10YR through 5YR, value of 4 or 5, and chroma of 3 through 6. It is sandy loam, loam, light sandy clay loam, or their channery counterparts. In some pedons the C horizon is stratified sandy loam and loamy sand.

Latham series

The Latham series consists of moderately deep, moderately well drained soils formed in acid material weathered mainly from shale. The Latham soils are on ridgetops and benches. Slopes range from 3 to 25 percent but are dominantly 3 to 15 percent.

Latham soils are on the landscape with well drained Lily soils and moderately well drained Coolville and Tilsit soils. The Latham soils are shallower than the Coolville soils, have more clay than the Lily soils, and are shallower and have more clay than the Tilsit soils and do not have the fragipan typical of Tilsit soils. The Latham soils in this survey area are mapped only with Coolville soils.

Typical pedon of Latham silt loam, in a pasture of Coolville and Latham silt loams, 3 to 15 percent slopes, north of route 44/4 and south of its intersection with route 44, near Lerona, Mercer County:

Ap—0 to 6 inches, dark brown (10YR 4/3) silt loam; moderate fine and medium granular structure; friable; many roots; very strongly acid; clear wavy boundary.
B21t—6 to 13 inches, strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; many roots; many discontinuous clay films on faces of peds; very strongly acid; clear wavy boundary.
IIB22t—13 to 19 inches, strong brown (7.5YR 5/6) silty clay; common medium grayish brown (10YR 5/2) and dark red (2.5YR 3/6) mottles; moderate medium and coarse subangular blocky structure; firm; common roots; many discontinuous clay films on faces of peds; very strongly acid; clear wavy boundary.
IIB3t—19 to 26 inches, strong brown (7.5YR 5/6) shaly silty clay; common medium grayish brown (10YR 5/2) and red (2.5YR 4/6) mottles; weak medium subangular blocky structure; firm; common discontinuous clay films on faces of peds; 15 percent coarse fragments; very strongly acid; gradual wavy boundary.
IIC—26 to 36 inches, strong brown (7.5YR 5/6) shaly silty clay loam; many medium and coarse grayish brown (10YR 5/2) and dark red (2.5YR 3/6) mottles; massive, some platyness inherited from shale; firm; 40 percent coarse fragments; very strongly acid; gradual wavy boundary.
Cr—36 inches, soft shale.

The solum thickness ranges from 20 to 40 inches, and the depth to bedrock ranges from 30 to 40 inches. Coarse fragments dominantly of shale make up about 0 to 15 percent of the B horizon and 25 to 80 percent of the C horizon. In unlimed areas the A and B horizons are strongly acid to extremely acid.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4.

The B horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 3 through 6. It is silty clay loam or silt loam.

The IIB horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 2 through 8. It is silty clay, clay, silty clay loam, or their shaly counterparts.

The C horizon is silty clay loam, silty clay, or their shaly or very shaly counterparts.

Lehew series

The Lehew series consists of moderately deep, well drained soils formed in acid material weathered mainly from sandstone and some siltstone and shale. The Lehew soils are on ridgetops, benches, and side slopes along the top of East River Mountain. Slopes range from 15 to 65 percent.

Lehew soils are on the landscape with well drained Dekalb and Murrill soils. The Lehew soils are redder than the Dekalb soils and are shallower and have more coarse fragments than the Murrill soils.

Typical pedon of Lehew channery sandy loam, in a wooded area of Lehew-Dekalb very stony sandy loams, 15 to 65 percent slopes, top of East River Mountain, behind Bluestone High School, Mercer County:

A1—0 to 3 inches, dark brown (7.5YR 3/2) channery sandy loam; weak fine granular structure; very friable; many roots; many pores; 35 percent coarse fragments; strongly acid; abrupt smooth boundary.

A2—3 to 10 inches, brown (7.5YR 4/2) channery sandy loam; weak fine granular structure; friable; many roots; many pores; 35 percent coarse fragments; strongly acid; clear wavy boundary.

B2—10 to 27 inches, reddish brown (5YR 4/4) very channery sandy loam; weak medium subangular blocky structure; friable; common roots; common pores; 50 percent coarse fragments; very strongly acid; clear wavy boundary.

C—27 to 33 inches, reddish brown (5YR 4/4) very channery sandy loam; massive; slightly firm; few roots; few pores; 80 percent coarse fragments; very strongly acid.

R—33 inches, fractured sandstone.

The solum thickness ranges from 15 to 30 inches, and the depth to bedrock ranges from 20 to 40 inches. Coarse fragments dominantly of sandstone and siltstone make up about 15 to 40 percent of individual subhorizons of the A horizon, 20 to 60 percent of individual subhorizons of the B horizon, and 35 to 90 percent of the C horizon. In unlimed areas the soils are very strongly acid or strongly acid.

The A horizon has hue of 10YR through 5YR, value of 3 or 4, and chroma of 1 through 4.

The B horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 through 6. It is channery or very channery counterparts of sandy loam, fine sandy loam, or loam.

The C horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 2 through 4.

Lily series

The Lily series consists of moderately deep, well drained soils formed in acid material weathered mainly from sandstone. The Lily soils are on ridgetops and benches. Slopes range from 3 to 25 percent but are dominantly 8 to 15 percent.

Lily soils are on the landscape with well drained Clymer soils and moderately well drained Coolville, Latham, and Tilsit soils. The Lily soils are shallower than the Clymer, Coolville, or Tilsit soils; have less clay than Coolville or Latham soils; and do not have the fragipan typical of the Tilsit soils.

Typical pedon of Lily loam, 8 to 15 percent slopes, in a field 0.5 mile north of the Mercer County Airport:

Ap—0 to 8 inches, brown (10YR 4/3) loam; moderate medium granular structure; very friable; many roots; medium acid; abrupt smooth boundary.

B21t—8 to 11 inches, strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; common roots; few discontinuous clay films on faces of peds; strongly acid; gradual smooth boundary.

B22t—11 to 25 inches, yellowish red (5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few roots; many discontinuous clay films on faces of peds; 5 percent coarse fragments; strongly acid; clear wavy boundary.

C—25 to 30 inches, strong brown (7.5YR 5/6) channery sandy clay loam; massive; firm; few roots; few discontinuous clay films on coarse fragments; 35 percent coarse fragments; strongly acid; clear smooth boundary.

R—30 inches, yellowish red fractured and weathered sandstone.

The solum thickness and depth to bedrock range from 20 to 40 inches.

Coarse fragments of dominantly sandstone make up 0 to 10 percent of the A horizon, 0 to 10 percent of the part of the B horizon that is at a depth of less than 24 inches, 0 to 35 percent of the part of the B horizon that is at a depth of more than 24 inches, and 0 to 35 percent of the C horizon. In unlimed areas the A and B horizons are strongly acid to extremely acid.

The A horizon has hue of 7.5YR or 10YR, value of 3 through 6, and chroma of 2 through 4.

The B horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 4 through 6. It is sandy clay loam, clay loam, or loam. Some pedons have a B3 or B3t horizon.

The C horizon has hue of 2.5YR through 10YR, value of 5 or 6, and chroma of 4 through 8. It is sandy clay loam, loam, sandy loam, or their channery counterparts.

Lobdell series

The Lobdell series consists of deep, moderately well drained soils formed in alluvial material washed from acid and lime-influenced soils on uplands. The Lobdell soils are on flood plains. Slopes range from 0 to 3 percent.

Lobdell soils are on the landscape with well drained Chagrin and Kanawha soils and somewhat poorly drained Orrville soils. The Lobdell soils are flooded more frequently than the Kanawha soils.

Typical pedon of Lobdell loam, 0 to 3 percent slopes, in a pasture 50 yards from Rich Creek, 0.75 mile from the Spanishburg Post Office, Mercer County:

Ap—0 to 10 inches, dark brown (10YR 4/3) loam; moderate fine and medium granular structure; friable; many roots; neutral; clear wavy boundary.
B2—10 to 20 inches, dark yellowish brown (10YR 4/4) loam; moderate medium subangular blocky structure; friable; many roots; medium acid; gradual wavy boundary.
B3—20 to 35 inches, yellowish brown (10YR 5/4) heavy loam; few fine and medium grayish brown (10YR 5/2) and strong brown (7.5YR 5/8) mottles; weak medium and coarse subangular blocky structure; friable; common roots; medium acid; gradual wavy boundary.
C—35 to 60 inches, brown (10YR 5/3) loam; many medium grayish brown (10YR 5/2) and pale brown (10YR 6/3) mottles; massive; few roots; medium acid.

The solum thickness ranges from 24 to 40 inches, and the depth to bedrock is greater than 60 inches. Gravel makes up about 0 to 15 percent or the A and B horizons. In unlimed areas the soils are medium acid or slightly acid.

The A horizon has hue of 10YR, value of 4, and chroma of 2 or 3.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 3 or 4. It is mainly loam or silt loam and has thin subhorizons of sandy loam and clay loam.

The C horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 through 4. It is loam, silt loam, sandy loam, or clay loam.

Monongahela series

The Monongahela series consists of deep, moderately well drained soils formed in old alluvial material washed mainly from acid soils on uplands. The Monongahela soils are on high terraces mainly along the New River, Greenbrier River, and Bluestone River. Slopes range from 3 to 15 percent but are dominantly 3 to 8 percent.

Monongahela soils are on the landscape with well drained Kanawha soils and somewhat poorly drained Tygart Variant soils. The Monongahela soils have a fragipan which is not a characteristic of the Kanawha or Tygart Variant soils.

Typical pedon of Monongahela silt loam, 3 to 8 percent slopes, about 20 feet east of field road under a power line, Barger Springs Nursery, Summers County:

Ap—0 to 8 inches, dark brown (10YR 4/3) silt loam; moderate fine and medium granular structure; friable; many roots; less than 5 percent gravel; neutral; abrupt wavy boundary.
B21t—8 to 13 inches, yellowish brown (10YR 5/4) loam; weak fine and medium subangular blocky structure; friable; common roots; few discontinuous clay films on faces of peds and in pores; less than 5 percent gravel; few black concretions; medium acid; clear wavy boundary.
B22t—13 to 21 inches, yellowish brown (10YR 5/6) heavy loam; moderate medium subangular blocky structure; friable; common roots; few discontinuous clay films on faces of peds and in pores; less than 5 percent gravel; few black concretions; medium acid; clear wavy boundary.
Bx1—21 to 28 inches, yellowish brown (10YR 5/4) light clay loam; common fine and medium strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; weak very coarse prismatic structure parting to medium subangular blocky; firm and brittle; few roots; common discontinuous clay films on faces of prisms and in pores; less than 5 percent gravel; common black concretions; strongly acid; clear wavy boundary.
Bx2—28 to 35 inches, yellowish brown (10YR 5/6) clay loam; common fine and medium strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; weak very coarse prismatic structure parting to fine and medium angular and subangular blocky; very firm and brittle; many continuous clay films on faces of peds and in pores; less than 5 percent gravel; many black concretions and coatings; strongly acid; clear wavy boundary.
Bx3—35 to 60 inches, yellowish brown (10YR 5/6) clay loam; common medium strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; weak very coarse prismatic structure parting to medium and coarse subangular blocky; very firm and brittle; many discontinuous clay films on faces of prisms; less than 5 percent gravel; few black concretions; very strongly acid; gradual wavy boundary.
R—60 inches, sandstone.

The solum thickness ranges from 40 to 72 inches, and the depth to bedrock is generally 60 inches or more. The depth to the fragipan ranges from 18 to 30 inches. In unlimed areas the A and B horizons are strongly acid or very strongly acid.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The B2 horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 4 through 8. It is loam, silt loam, light silty clay loam, clay loam, or sandy clay loam.

The Bx horizon has hue of 7.5YR through 2.5Y, value of 5 or 6, and chroma of 2 through 6. It is clay loam, sandy clay loam, loam, or silt loam.

The C horizon has hue of 7.5YR through 2.5Y, value of 5 through 7, and chroma of 2 through 8. It is sandy loam, loam, sandy clay loam, or clay loam.

Murrill series

The Murrill series consists of deep, well drained soils formed partly in acid colluvial material derived mainly from sandstone and siltstone and partly in the underlying residual material weathered mainly from limestone. The Murrill soils are on foot slopes, hillsides, and fans mainly along East River Mountain. Slopes range from 5 to 60 percent but are dominantly 30 to 60 percent.

Murrill soils are on the landscape with well drained Caneyville, Dekalb, Frederick, and Lehew soils. The Murrill soils are deeper than the Caneyville, Dekalb, or Lehew soils; have less clay in the upper part of the profile than the Caneyville or Frederick soils; and are deeper and have fewer coarse fragments than the Dekalb or Lehew soils.

Typical pedon of Murrill stony loam, 30 to 60 percent slopes, in a wooded area 200 yards south of U.S. Route 460, 1.1 miles west of its intersection with Cumberland Road:

O1—2 inches to 0, hardwood leaf litter.

A1—0 to 5 inches, dark grayish brown (10YR 4/2) channery loam; moderate fine granular structure; very friable; many roots; 15 percent coarse fragments; strongly acid; gradual wavy boundary.

A2—5 to 11 inches, brown (10YR 5/3) channery loam; weak fine and medium granular structure; very friable; many roots; 15 percent coarse fragments; strongly acid; clear wavy boundary.

B1—11 to 17 inches, strong brown (7.5YR 5/6) channery loam; weak fine and medium subangular blocky structure; friable; common roots; 15 percent coarse fragments; strongly acid; clear wavy boundary.

B21t—17 to 25 inches, strong brown (7.5YR 5/6) channery loam; moderate fine and medium subangular blocky structure; firm; few roots; few discontinuous clay films on faces of peds; 25 percent coarse fragments; strongly acid; clear wavy boundary.

B22t—25 to 32 inches, strong brown (7.5YR 5/6) channery heavy loam; moderate fine and medium subangular blocky structure; firm; few roots; few discontinuous clay films on faces of peds; 25 percent coarse fragments; strongly acid; clear wavy boundary.

B23t—32 to 41 inches; yellowish red (5YR 5/6) channery heavy loam; moderate medium subangular blocky structure; firm; few roots; few discontinuous clay films on faces of peds; 30 percent coarse fragments; strongly acid; clear wavy boundary.

IIB24t—41 to 50 inches, yellowish red (5YR 5/6) channery light clay loam; moderate medium and coarse subangular blocky structure; firm; few roots; common discontinuous clay films on faces of peds; 30 percent coarse fragments; strongly acid; clear wavy boundary.

IIB25t—50 to 60 inches, yellowish red (5YR 5/6) channery clay loam; common fine and medium strong brown (7.5YR 5/8) mottles; moderate medium and coarse subangular blocky structure; firm; few roots; many discontinuous clay films on faces of peds; 20 percent coarse fragments; strongly acid; clear wavy boundary.

IIB26t—60 to 72 inches, yellowish red (5YR 5/6) channery silty clay; many fine and medium strong brown (7.5YR 5/8) and red (2.5YR 5/8) mottles; moderate fine and medium subangular blocky structure; firm; few roots; many discontinuous clay films on faces of peds; common black concretions and coatings; 20 percent coarse fragments; strongly acid.

The solum thickness is 60 inches or more, and the depth to bedrock is greater than 72 inches. The depth to the IIB horizon ranges from 36 to 65 inches. Coarse fragments make up about 10 to 30 percent of the upper part of the solum and 0 to 25 percent of the IIB horizon. In unlimed areas the soils are strongly acid or very strongly acid.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 2 through 4. It is channery loam or channery silt loam.

The B1 and B2 horizons have hue of 10YR through 5YR, value of 4 through 6, and chroma of 4 through 6. They are loam, clay loam, sandy clay loam, silt loam, or silty clay loam or their channery counterparts.

The IIB horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 4 through 8. It is silty clay, clay, silty clay loam, clay loam, or their channery counterparts.

Orrville series

The Orrville series consists of deep, somewhat poorly drained soils formed in alluvial material washed from acid and lime-influenced soils on uplands. The Orrville soils are on flood plains. Slopes range from 0 to 3 percent.

Orrville soils are on the landscape with well drained Chagrin and Kanawha soils. The Orrville soils are flooded more frequently than the Kanawha soils.

Typical pedon of Orrville silt loam, 0 to 3 percent slopes, in a hayfield along Wolf Creek, 75 yards from Wolf Creek Road, 200 yards from its intersection with U.S. Routes 19 and 21, Mercer County:

Ap—0 to 10 inches, dark grayish brown (10YR 4/2) silt loam; weak fine and medium granular structure; friable; many roots; neutral; clear smooth boundary.
B1—10 to 15 inches, brown (10YR 5/3) silt loam; many grayish brown (10YR 5/2) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky and moderate medium prismatic structure; friable; common roots; neutral; clear wavy boundary.
B2g—15 to 31 inches, grayish brown (10YR 5/2) silt loam; many strong brown (7.5YR 5/6) and brown (10YR 5/3) mottles; weak coarse and very coarse prismatic structure; friable; few roots; medium acid; gradual wavy boundary.
Cg—31 to 60 inches, grayish brown (10YR 5/2) silt loam; many strong brown (7.5YR 5/6) and light brown (7.5YR 6/4) mottles; massive; friable; few roots; medium acid.

The solum thickness ranges from 24 to 40 inches, and the depth to bedrock is greater than 60 inches. Coarse fragments of gravel make up about 0 to 15 percent of the solum. In unlimed areas the A and B horizons are medium acid or slightly acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2.

The B horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 through 4. It is silt loam, loam, or light clay loam.

The C horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 through 4. It is silt loam, loam, sandy loam, silty clay loam, or clay loam.

Psamments

Psamments consist of deep, well drained and somewhat excessively drained soils that formed in acid and lime-influenced alluvial material washed from soils on uplands. Psamments are on flood plains. Slopes range from 0 to 15 percent but are dominantly 0 to 3 percent.

Psamments are on the landscape and are mapped with Udifluvents. Psamments have more sand than Udifluvents.

Because of the variability of Psamments, a typical pedon is not given. The depth to bedrock ranges from 48 inches to 60 inches or more. Gravel makes up 0 to 15 percent of the surface layer and 0 to 35 percent of individual underlying layers. In unlimed areas the soils are medium acid to neutral.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 through 4. It is loamy sand, sand, sandy loam, or loam.

The underlying horizons have hue of 10YR or 7.5YR, value of 5, and chroma of 3 through 8. They are dominantly loamy sand, sand, or their gravelly counterparts, but they are stratified in some areas with thin layers of sandy loam and loam.

Shouns series

The Shouns series consists of deep, well drained soils formed in acid colluvial or alluvial material derived from shale, siltstone, and some sandstone. The Shouns soils are on foot slopes and along drainageways. Slopes range from 3 to 30 percent but are dominantly 8 to 30 percent.

Shouns soils are on the landscape with well drained Berks and Calvin high base substratum soils. The Shouns soils are deeper and redder and have fewer coarse fragments than the Berks soils and are deeper and have fewer coarse fragments than the Calvin high base substratum soils.

Typical pedon of Shouns silt loam, 8 to 15 percent slopes, in a hayfield 125 yards west of the intersection of routes 3/6 and 3/5, Summers County:

Ap—0 to 8 inches, dark brown (7.5YR 4/4) silt loam; weak fine and medium granular structure; friable; many roots; 10 percent coarse fragments; medium acid; abrupt smooth boundary.
B1—8 to 14 inches, yellowish red (5YR 4/6) loam; weak medium subangular blocky structure; friable; many roots; 10 percent coarse fragments; medium acid; clear wavy boundary.
B21—14 to 21 inches, yellowish red (5YR 5/6) heavy loam; moderate fine and medium subangular blocky structure; friable; common roots; common discontinuous clay films on faces of peds; 10 percent coarse fragments; strongly acid; clear wavy boundary.
B22t—21 to 36 inches, yellowish red (5YR 4/6) channery clay loam; moderate medium subangular blocky structure; friable and firm; few roots; many discontinuous clay films on faces of peds; 15 percent coarse fragments; strongly acid; clear wavy boundary.
B3t—36 to 48 inches, red (2.5YR 4/6) clay loam; weak medium and coarse prismatic structure parting to weak coarse subangular blocky; friable and firm; few roots; many discontinuous clay films on faces of peds; 10 percent coarse fragments; strongly acid; clear irregular boundary.
C—48 to 60 inches, reddish brown (2.5YR 4/4) channery clay loam; common distinct yellowish red (5YR 5/8) and brownish yellow (10YR 6/8) mottles; massive; firm; many black concretions; 15 percent coarse fragments; strongly acid.

The solum thickness ranges from 45 to 80 inches, and the depth to bedrock is greater than 60 inches. Coarse fragments of shale, siltstone, or sandstone make up about 0 to 15 percent of the A, B1, and B2 horizons and 10 to 30 percent of the B3 and C horizons. In unlimed areas the A and B horizons are strongly acid or medium acid.

The A horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 3 through 6. It is silt loam or very stony silt loam.

The B and C horizons have hue of mainly 2.5YR or 5YR, value of 4 or 5, and chroma of 4 through 8. They are clay loam, loam, silty clay loam, or silt loam and their channery or shaly counterparts. In some pedons the C horizon has hue of 7.5YR or 10YR.

Tilsit series

The Tilsit series consists of deep, moderately well drained soils formed in acid materials weathered mostly from siltstone and some shale and sandstone. The Tilsit soils are on broad ridgetops of the Allegheny Plateau. Slopes range from 3 to 15 percent but are dominantly 3 to 8 percent.

Tilsit soils are on the landscape with well drained Lily soils and moderately well drained Coolville and Latham soils. The Tilsit soils have a fragipan which is not a characteristic of those soils, have less clay than the Coolville or Latham soils, and are deeper than the Latham or Lily soils.

Typical pedon of Tilsit silt loam, 3 to 8 percent slopes, in an idle field along route 44/4, 50 yards west of the road and 1 mile south of its intersection with route 44, near Lerona, Mercer County:

Ap—0 to 7 inches, dark grayish brown (10YR 5/3) silt loam; weak fine and medium granular structure; friable; many roots; strongly acid; abrupt smooth boundary.

B1t—7 to 13 inches, yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; common roots; few discontinuous clay films on peds; strongly acid; clear wavy boundary.

B21t—13 to 17 inches, yellowish brown (10YR 5/8) heavy loam; moderate fine and medium subangular blocky structure; friable; few roots; common discontinuous clay films on faces of peds and in pores; strongly acid; clear wavy boundary.

B22t—17 to 24 inches, yellowish brown (10YR 5/8) heavy loam; moderate fine and medium subangular blocky structure; friable; few roots; many discontinuous clay films on faces of peds and in pores; strongly acid; clear wavy boundary.

Bx1—24 to 31 inches, yellowish brown (10YR 5/6) heavy loam; common medium light grayish brown (2.5YR 6/2) and strong brown (7.5YR 5/6) mottles; weak very coarse prismatic structure parting to moderate medium subangular blocky; firm and brittle; many discontinuous clay films on faces of peds and in pores; strongly acid; clear wavy boundary.

Bx2—31 to 37 inches, yellowish brown (10YR 5/6) silty clay loam; many medium red (2.5YR 5/8) and light grayish brown (2.5Y 6/2) mottles; weak very coarse prismatic structure parting to weak coarse subangular blocky; very firm and brittle; common discontinuous clay films on faces of peds; and in pores; strongly acid; gradual wavy boundary.

Bx3—37 to 51 inches, yellowish brown (10YR 5/6) silty clay loam; many medium light grayish brown (2.5Y 6/2) mottles; weak very coarse prismatic structure parting to weak medium and coarse subangular blocky; firm and brittle; common discontinuous clay films on faces of peds and in pores; strongly acid; clear irregular boundary.

R—51 inches, soft weathered bedrock.

The solum thickness ranges from 40 to 60 inches, and the depth to bedrock ranges from 40 to 60 inches or more. The depth to the fragipan ranges from 18 to 28 inches. Coarse fragments dominantly of shale and siltstone make up about 0 to 10 percent of the solum and 10 to 15 percent of the C horizon. In unlimed areas the soils are strongly acid to extremely acid.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3.

The B1, B2, and Bx horizons have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 through 8. The B1 horizon is silt loam or loam, and the B2 and Bx horizons are loam, silt loam, or silty clay loam.

The C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 through 8. It is silt loam, loam, sandy clay loam, clay loam, or silty clay loam.

Tygart Variant

The Tygart Variant consists of deep, somewhat poorly drained soils formed in alluvial material washed from acid and lime-influenced soils on uplands. The Tygart Variant soils are on stream terraces mainly along the New River, the Greenbrier River, and the Bluestone River. Slopes range from 0 to 3 percent.

Tygart Variant soils are on the landscape with well drained Kanawha soils and moderately well drained Monongahela soils. The Tygart Variant soils do not have the fragipan typical of the Monongahela soils.

Typical pedon of Tygart Variant silt loam, in the northeast corner of White Pine field, about 15 feet from the field boundary and 50 feet south of a drainage ditch, Barger Springs Nursery, Summers County:

Ap—0 to 9 inches, dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; common roots; less than 5 percent gravel; slightly acid; clear wavy boundary.

B1t—9 to 13 inches, brown (10YR 5/3) silty clay loam; many fine and medium strong brown (7.5YR 5/8) and light brownish gray (2.5YR 6/2) mottles; light brownish gray (10YR 6/2) ped faces; weak medium subangular blocky structure; friable; common roots; common clay films on faces of peds; less than 5 percent coarse fragments; slightly acid; clear wavy boundary.

B21t—13 to 17 inches, strong brown (7.5YR 5/6) silty clay loam; many fine and medium strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; light brownish gray (10YR 6/2) ped faces; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few roots; common clay films on faces of peds; less than 5 percent coarse fragments; slightly acid; clear wavy boundary.

B22t—17 to 28 inches, strong brown (7.5YR 5/6) silty clay loam; many medium strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; light brownish gray (10YR 6/2) ped faces; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few roots; many discontinuous clay films on faces of peds; less than 5 percent coarse fragments; slightly acid; clear wavy boundary.

B23t—28 to 42 inches, brown (7.5YR 5/4) silty clay loam; many medium strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; light brownish gray (10YR 6/2) ped faces; weak medium prismatic and weak medium subangular blocky structure; firm; few roots; many discontinuous clay films on faces of peds; less than 5 percent coarse fragments; neutral; gradual wavy boundary.

B3t—42 to 57 inches, strong brown (7.5YR 5/6) silty clay loam; many medium strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; light brownish gray (10YR 6/2) ped faces; weak coarse prismatic structure; firm; few roots; many discontinuous clay films on faces of peds; less than 5 percent coarse fragments; mildly alkaline; gradual wavy boundary.

C—57 to 72 inches, strong brown (7.5YR 5/6) clay loam; many medium strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; massive; firm; 10 percent coarse fragments; mildly alkaline.

The solum thickness ranges from 45 to 70 inches, and the depth to bedrock is greater than 60 inches. Coarse fragments of gravel make up about 0 to 10 percent of the solum and 0 to 25 percent of the C horizon. In unlimed areas, the soils are medium acid to neutral in the A, B1, and B2 horizons and medium acid to mildly alkaline in the B3 and C horizons.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4.

The B and C horizons have hue of 10YR or 7.5YR, value of 5 through 7, and chroma of 2 through 8. The B horizon is light silty clay loam, silt loam, or loam. The C horizon is clay loam, loam, sandy loam, or their gravelly counterparts and is commonly stratified.

Udifluvents

Udifluvents consist of deep, well drained and moderately well drained soils that formed in acid and lime-influenced alluvial material washed from soils on uplands. Udifluvents are on flood plains. Slopes range from 0 to 15 percent but are dominantly 0 to 3 percent.

Udifluvents are on the landscape and are mapped with Psamments. Udifluvents have less sand than Psamments.

Because of the variability of Udifluvents, a typical pedon is not given. The depth to bedrock ranges from 48 inches to 60 inches or more. Coarse fragments make up 0 to 15 percent of the surface layer and 0 to 35 percent of individual underlying horizons. In unlimed areas the soils are medium acid to neutral.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 through 4. It is silt loam, loam, or fine sandy loam.

The underlying horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 8. They are silt loam, loam, fine sandy loam, sandy loam, or their gravelly counterparts.

Udorthents

Udorthents consist of a mixture of soil and rock materials that have been drastically disturbed by man. Most Udorthents consist of cut and fill areas along highways and other construction sites and areas that have been surface mined for coal. The cut and fill areas are dominantly along U.S. 460, Interstate 77, and the West Virginia Turnpike. The surface-mined areas are mostly in the northwestern part of the survey area.

Udorthents, cut and fill, are highly variable, and thus a typical pedon is not given. They consist mostly of mixed soil and rock material that has been excavated, graded, or filled. Coarse fragments vary in size, kind, and amount. In most places the soil material has been transported several hundred yards from the cut area to the fill site. Cut and fill areas are on uplands and terraces, and the fill areas are on flood plains.

Udorthents, carbonaceous, low base, are mostly areas of waste from deep mining for coal. The dominant coarse fragments are coal, bone coal, and carbon-rich shales. A typical pedon is not given. Udorthents, mudstone and sandstone, high base (pH 5.5 to 8.0), and Udorthents, sandstone and mudstone, low base (pH 4.0 to 5.5), are areas that have been surface mined for coal. They contain a mixture of rock types with no type making up more than 65 percent of the total coarse-fragment content of the control section. The dominant fragments are mudstone and sandstone. These soils must have at least three of the following properties to constitute a minesoil:

1. Coarse fragments constitute at least 10 percent of the volume of the control section, and they are disordered so that more than 50 percent will have their long axis at an angle of at least 10 percent relative to any plane in the profile. The test for disorder should exclude fragments with a diameter of less than 3/4 inch or more than 10 inches and should be based on numbers of coarse fragments rather than volume.

2. Mottles occur without regard to depth or spacing in the profile. The mottling involves color differences of at least two color chips in the standard Munsell soil color charts. This mottling occurs among fines as well as within coarse fragments or between fines and coarse fragments.
3. If coarse fragments are fissile, the edges are frayed or splintery rather than smooth.
4. If coarse fragments bridge across voids as a result of the placement of materials, there are discontinuous irregular pores larger than texture porosity. Such voids are formed consistently but vary in frequency, prominence, and size.
5. The profile has a thin surface horizon or a horizon immediately below a surface pavement of coarse fragments that contains a higher percentage of fines than any other horizon in the profile in the control section. This horizon ranges from 1 to 4 inches in thickness in most minesoils, but it may be thicker in minesoils where topsoil has been added.
6. The profile has local pockets of materials, excluding single coarse fragments, that range from 3 to 40 inches in the horizontal diameter. These pockets have no lateral continuity and are the result of the original placement of materials and not postdepositional processes. They may differ from surrounding material in color (2 or more Munsell color chips), soil texture, particle size class, or dominant rock type constituting the coarse fragments.
7. Artifacts are present (paper, wire, logs, cans, glass, etc.).
8. Coaly coarse fragments occur in noncarbolithic spoils.
9. Oxidizable carbon is irregularly distributed with depth and not associated with stratification (laboratory determination).

Following is a reference pedon of Udorthents, mudstone and sandstone, high base (pH 5.5 to 8.0), in a mined area of the Pocahontas Number 6 seam east of Springton in Mercer County, West Virginia:

Layer 1—0 to 5 inches, yellowish brown (10YR 5/4) channery silt loam; common medium and fine strong brown (7.5YR 5/8), dark grayish brown (10YR 4/2), and light gray (10YR 7/1) mottles; weak fine granular structure; friable; many roots; 40 percent coarse fragments (70 percent mudstone, 25 percent sandstone, 5 percent coal and other fragments); medium acid; clear wavy boundary.
Layer 2—5 to 14 inches, yellowish brown (10YR 5/6) very channery heavy loam; few medium and fine strong brown (7.5YR 5/8) mottles; massive; firm; common roots; 60 percent coarse fragments (55 percent mudstone, 45 percent sandstone); medium acid; clear wavy boundary.
Layer 3—14 to 33 inches, yellowish brown (10YR 5/4) very channery light silty clay loam; many medium and fine strong brown (7.5YR 5/8), red (2.5YR 4/6), and light gray (10YR 7/1) mottles; massive; firm; few roots; 55 percent coarse fragments (50 percent mustone, 45 percent sandstone, 5 percent coal and other fragments); slightly acid; clear wavy boundary.
Layer 4—33 to 43 inches, yellowish brown (10YR 5/8) channery heavy silt loam; pockets of clay loam and silty clay loam; common medium and fine strong brown (7.5YR 5/8), gray (N 7/0), and dark yellowish brown (10YR 4/4) mottles; massive; friable; 40 percent coarse fragments (55 percent mudstone, 45 percent sandstone); slightly acid.

Weikert series

The Weikert series consists of shallow, well drained soils formed in acid material weathered from shale, siltstone, and some sandstone. The Weikert soils are on ridgetops, benches, and hillsides along the base of East River Mountain. Slopes range from 35 to 70 percent.

Weikert soils are on the landscape with well drained Berks, Caneyville, and Frederick soils. The Weikert soils are shallower than the Berks soils and are shallower and have less clay and more coarse fragments than the Caneyville or Frederick soils. The Weikert soils in this survey area are mapped only with Berks soils.

Typical pedon of Weikert shaly silt loam, in an area of Berks-Weikert shaly silt loams, 35 to 70 percent slopes, near Bluefield Stadium, in Bluefield:

A1—0 to 1 inch, very dark grayish brown (10YR 3/2) shaly silt loam; weak fine granular structure; very friable; many roots; 35 percent coarse fragments; strongly acid; clear wavy boundary.
A2—1 to 6 inches, dark yellowish brown (10YR 4/4) shaly silt loam; weak fine granular structure; very friable; many roots; 35 percent coarse fragments; strongly acid; clear wavy boundary.
B2—6 to 12 inches, yellowish brown (10YR 5/6) very shaly silt loam; weak fine and medium subangular blocky structure; very friable; common roots; 50 percent coarse fragments; strongly acid; clear wavy boundary.
C—12 to 15 inches, yellowish brown (10YR 5/6) very shaly silt loam; massive; friable; few roots; 75 percent coarse fragments; strongly acid; clear wavy boundary.
R—15 inches, black, grayish, and olive shale.

The solum thickness ranges from 8 to 20 inches, and the depth to bedrock ranges from 10 to 20 inches. Coarse fragments dominantly of shale and siltstone make up about 20 to 50 percent of the A horizon, 30 to 65 percent of the B horizon, and 60 to 85 percent of the C horizon. In unlimed areas the soil is strongly acid or very strongly acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 through 4. The B and C horizons have hue of 10YR, value of 4 through 6, and chroma of 3 through 6.

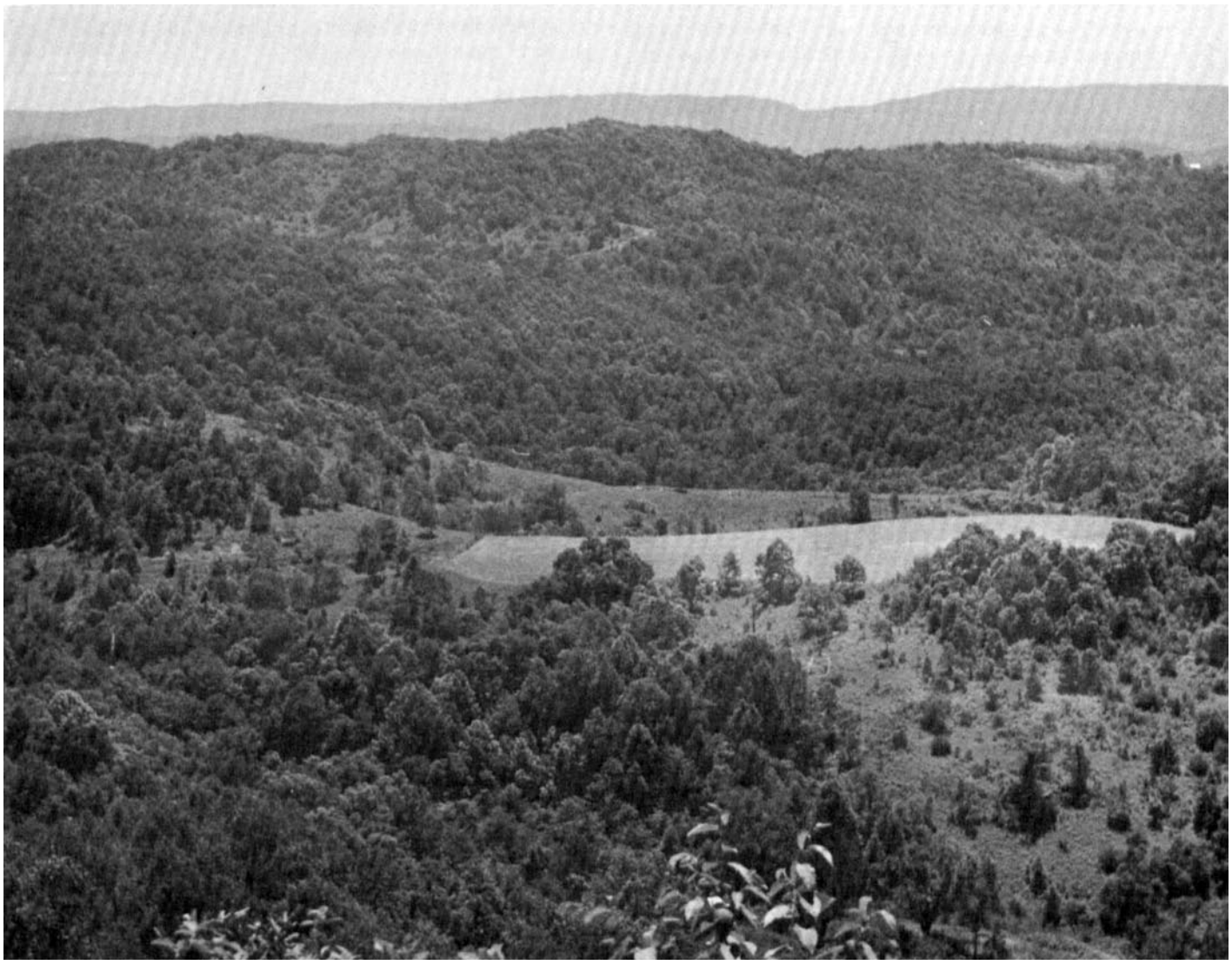


Figure 13.—A typical area of Westmoreland soils.

The B horizon is shaly, very shaly, channery, or very channery counterparts of silt loam or loam. The C horizon is very shaly or very channery counterparts of silt loam or loam.

Westmoreland series

The Westmoreland series consists of deep, well drained soils formed in lime-influenced material weathered from shale, siltstone, sandstone, and limestone. The Westmoreland soils are on ridgetops, benches, and hillsides (fig. 13). Slopes range from 3 to 65 percent but are dominantly 30 to 65 percent.

Westmoreland soils are on the landscape with well drained Berks, Culleoka, and Gilpin soils. The Westmoreland soils are deeper and less acid than the Berks or Gilpin soils, have fewer coarse fragments than the Berks soils, and are deeper than the Culleoka soils.

Typical pedon of Westmoreland silt loam, 30 to 65 percent slopes, in a pasture about 450 yards northeast of WV Route 71 and 0.7 mile north of Sandlick, Mercer County:

Ap—0 to 9 inches, dark brown (10YR 4/3) silt loam; moderate fine and medium granular structure; friable; many roots; 10 percent coarse fragments; neutral; abrupt wavy boundary.

B21t—9 to 18 inches, strong brown (7.5YR 5/6) light silty clay loam; moderate medium subangular blocky

structure; friable; common roots; common discontinuous clay films on faces of peds; 10 percent coarse fragments; slightly acid; clear wavy boundary.

B22t—18 to 27 inches, strong brown (7.5YR 5/8) light silty clay loam; moderate medium and coarse subangular blocky structure; friable; common roots; common discontinuous clay films on faces of peds; 10 percent coarse fragments; medium acid; clear wavy boundary.

B3t—27 to 36 inches, strong brown (7.5YR 5/8) shaly silty clay loam; weak coarse subangular blocky structure; friable; few roots; few discontinuous clay films on faces of peds; 15 percent coarse fragments; medium acid; gradual wavy boundary.

C—36 to 46 inches, strong brown (7.5YR 5/6) very shaly light silty clay loam; massive; friable and firm; 50 percent coarse fragments; medium acid; clear wavy boundary.

R—46 inches, weathered shale and siltstone.

The solum thickness ranges from 20 to 40 inches, and the depth to bedrock is 40 to 72 inches. Coarse fragments mainly of shale and siltstone make up about 5 to 15 percent of the A horizon, 5 to 30 percent of the upper part of the B horizon, 10 to 60 percent of the lower part of the B horizon, and 45 to 80 percent of the C horizon. In unlimed areas the soils are medium acid or strongly acid.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 2 or 3.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 8. It is light silty clay loam or silt loam or their shaly or channery counterparts.

The C horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 through 8. It is shaly or very shaly, channery or very channery counterparts of silt loam, light silty clay loam, or loam.

morphology of soils

The result of the soil-forming processes can be observed in the different layers, or soil horizons, in the soil profile. The profile extends from the surface downward to materials that are little changed by soil-forming processes. Most soils contain three major horizons, called the A, B and C horizons. These horizons can be further subdivided by the use of numbers and letters to indicate changes within the major horizon. The A and B horizons are the major areas of biological activity.

The A horizon is the surface layer. It is the layer that has the maximum accumulation of organic matter. It is also the layer of maximum leaching, or eluviation, of iron, soluble salts, and clay. The A horizon commonly has granular structure.

The B horizon underlies the A horizon and is commonly called the subsoil. It is the horizon of maximum accumulation, or illuviation, of clay, iron, aluminum, or other materials leached from the surface layer. The B horizon commonly has blocky structure and is generally more firm and lighter in color than the A horizon.

The C horizon is below the A and B horizons. It consists of material that is modified by weathering but is altered little by the soil-forming processes.

In this survey area, many processes are involved in the formation of soil horizons. The most important of these are the accumulation of organic matter, the leaching of soluble salts, the reduction and transfer of iron, the formation and translocation of clay minerals, and the formation of structure. Such processes are continually taking place and have been for thousands of years.

Most of the well drained and moderately well drained soils on uplands in the survey area have a yellowish brown, strong brown, or reddish brown B horizon. These colors are caused mainly by iron oxides. The B horizon of these soils has blocky structure and generally has translocated clay minerals.

A layer called a fragipan has formed in the B horizon of some moderately well drained soils on gently sloping and strongly sloping uplands, gently sloping to moderately steep foot slopes, and gently sloping and strongly sloping terraces. This layer is dense and brittle, is mottled, and has slow or very slow permeability to water and air.

Gray colors are common in soils that are moderately well drained to poorly drained. These colors are the result of intense reduction of iron during soil formation, a process called gleying.

formation of the soils

The origin and development of soils in Mercer and Summers Counties are discussed in this section. The five factors of soil formation are listed, and their influence on the soils is described.

factors of soil formation

The soils of Mercer and Summers Counties have formed from the interaction of five major factors: parent material, time, climate, living organisms, and topography. Each factor modifies the effects of the other factors. Parent material, topography, and time are mostly responsible for producing differences among the soils in this survey area. Climate and living organisms generally show their influences throughout broad areas and are uniform throughout this survey area.

parent material, time, and climate

The character of the parent material strongly influences the time required for soil formation and the nature of the soil produced. The soils of the survey area formed in residual, colluvial, and alluvial materials.

Most of the soils in the survey area formed in residual material from shale, siltstone, sandstone, and some limestone. The residual material is the oldest parent material in the survey area. Some of the soils that formed in residual material, such as the Tilsit soils, are moderately well developed. In some places, however, the soil-forming factors have been retarded by clayey material, resistant rock, or steepness of slopes. Dekalb soils, for example, formed under such conditions and are less developed than some of the soils that formed in younger parent material.

Colluvial material moved downslope from residual soils. It is on foot slopes and at the head of drainageways. Colluvial material is younger than residual material, but soil-forming processes have had considerable time to act on the material. Many additions, losses, and alterations have taken place. The resulting soils, such as Ernest soils, are strongly leached and moderately well developed.

The alluvial parent material on terraces and flood plains has washed from soils formed in residual and colluvial parent materials. The soil-forming factors have had considerable time to act on the material on the terraces. Many additions, losses, and alterations have taken place. The resulting soils, such as Monongahela soils, are strongly leached and moderately well developed. The alluvial deposits on the flood plains are the youngest parent material in the survey area. Most of the material is physically well suited to soil formation, but the soil-forming processes have had little time to act. The soils on the flood plains are generally weakly developed. Examples of such soils are the Chagrin and Lobdell soils.

Climate is generally relatively uniform throughout the survey area. It is not responsible for any major differences in the soils; however, it does cause the development of layers in the soil profile. A detailed description of climate is given in the section "General nature of the area."

living organisms

The living organisms that affect soil formation include vegetation, animals, bacteria, and fungi. The kind and amount of organisms are generally responsible for the amount of organic matter, color of the surface layer, and, in part, the amount of nutrients. Earthworms and burrowing animals help keep the soil open and porous, and they mix organic matter and mineral material. Bacteria and fungi decompose organic matter, thus releasing nutrients for plant food. Some bacteria fix nitrogen and add to soil fertility. Man has greatly influenced the surface layer by activities such as clearing and plowing.

topography

Topography affects soil formation by its effect on the amount of water moving through the soil, the amount of runoff, and the degree of erosion.

Gently sloping and strongly sloping soils have had a large amount of water moving through them. This condition favors the development of a uniform depth and the formation of a moderately well developed or well developed profile. On the steep and very steep hillsides, less water moves through the soil and more runoff occurs. This condition causes the development of a variable depth to bedrock and a less well developed profile. The topography on flood plains and young terraces is favorable for soil formation, and formation in such areas is progressing at a rapid rate.

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glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 2.4
Low	2.4-3.2
Moderate	3.2-5.2
High	>5.2

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

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

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

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Carbolith. Dark-colored sedimentary rocks that will make a black or very dark (Munsell value of 3 or less) streak or powder. Carbolith material includes coal not scheduled for mining, impure waste coal, bone coal, high-carbon shales, and high-carbon muds. In general, this material contains at least 25 percent carbonaceous matter oxidizable at 350 degrees to 400 degrees C.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

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 vegetation. 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 fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

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

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—
Loose.—Noncoherent when dry or moist; does not hold together in a mass.
Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.
Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or arresting grazing for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic

crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.
Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Fissile. Having a tendency to split along parallel planes into layers less than 5mm thick.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

High base. Minesoils with a pH of 5.5 to 8.0 at a depth of 10 to 40 inches or at a depth of 10 inches to bedrock if bedrock is at a depth of less than 40 inches.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:
O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration 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

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as

well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

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

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

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

Low base. Minesoils with a pH of 4.0 to 5.5 at a depth of 10 to 40 inches or at a depth of 10 inches to bedrock if bedrock is at a depth of less than 40 inches.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minesoil. A young soil in recently deposited earth materials resulting from deep mining, surface mining, or other earth-moving operations.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mudrock. A broad term for a sedimentary rock dominated by silt-size and/or clay-size particles. The term is used when a rock cannot be definitely distinguished as either a mudstone or shale. Mudrock can be further subdivided into hard mudrock (moist hardness greater than 2.5) or normal mudrock (moist hardness less than 2.5). Mudrock contains as much as 50 percent sand-size particles if properties are judged to be dominated by silt and/or clay. Mudrock may contain any proportion of carbonates so long as properties are dominantly silt and/or clay when rubbed in water.

Mudstone. A nonfissile mudrock dominated by silt-size and/or clay-size particles. Mudstone has a moist hardness of less than 2.5 (can be scratched with fingernail) and differs from shale because of its nonfissile nature. Mudstones contain as much as 50 percent sand-size particles if properties are judged to be dominated by silt and/or clay.

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Open space. A relatively undeveloped green or wooded area provided mainly within an urban area to minimize feelings of congested living.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that

water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

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

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

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

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

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

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. A mudrock that appears predominantly fissile (having a tendency to split along parallel planes into layers less than 5mm thick). Shale can be further subdivided into hard shale (moist hardness greater than 2.5) and normal shale (moist hardness less than 2.5). Shale differs from mudstone because of its fissile nature.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

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

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

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

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

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

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

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

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by melt water streams, in a glacial lake or other body of still water in front of a glacier.

Very low base. Minesoils with a pH less than 4.0 at a depth of 10 to 40 inches or at a depth of 10 inches to bedrock if bedrock is at a depth of less than 40 inches.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
Recorded in the period 1951-73 at Flat Top, West Virginia											
January	36.6	19.4	28.0	63	-11	13	3.40	1.90	4.62	9	12.2
February	38.7	20.6	29.7	63	-7	30	3.77	2.18	5.06	9	13.8
March	46.1	27.0	36.5	72	6	93	4.24	2.61	5.71	10	12.5
April	58.4	37.4	47.9	79	18	252	4.01	2.80	5.11	10	1.9
May	66.9	46.6	56.8	80	28	521	4.35	2.93	5.64	10	.0
June	73.0	53.2	63.2	84	36	696	3.50	2.19	4.67	8	.0
July	75.9	57.9	66.9	86	42	834	4.30	2.88	5.59	9	.0
August	75.3	56.8	66.1	85	41	809	3.50	2.38	4.52	7	.0
September	70.3	50.7	60.5	84	31	615	3.31	1.75	4.59	7	.0
October	60.3	39.9	50.1	77	20	322	2.84	1.31	4.07	7	1.3
November	47.9	29.8	38.9	69	6	63	3.07	2.11	3.95	8	4.1
December	39.1	22.6	30.9	65	-5	51	3.69	2.03	5.04	9	9.3
Yearly:											
Average	57.4	38.5	48.0	---	---	---	---	---	---	---	---
Extreme	---	---	---	87	-12	---	---	---	---	---	---
Total	---	---	---	---	---	4,299	43.98	38.70	49.09	103	55.1

See footnote at end of table.

TABLE 1.--TEMPERATURE AND PRECIPITATION--Continued

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
Recorded in the period 1951-77 at Bluestone Lake, West Virginia											
January	41.5	21.9	31.7	69	-4	51	2.45	1.38	3.32	7	5.6
February	45.3	23.7	34.5	69	2	57	2.65	1.28	3.75	7	5.5
March	54.0	30.7	42.4	81	14	173	3.59	2.12	4.91	8	3.9
April	65.8	39.3	52.6	86	24	378	3.09	1.94	4.13	8	.2
May	75.0	48.8	61.9	90	31	679	3.57	2.11	4.87	8	.0
June	81.4	57.0	69.2	94	42	876	3.04	1.81	4.14	7	.0
July	85.0	61.6	73.3	95	50	1,032	3.86	2.47	5.12	8	.0
August	83.9	61.6	72.8	94	50	1,017	3.05	1.96	4.02	6	.0
September	78.3	54.8	66.6	92	38	798	2.95	1.56	4.08	6	.0
October	67.4	42.5	54.9	85	25	462	2.43	.99	3.59	5	.0
November	54.7	32.1	43.4	76	14	133	2.18	1.34	2.92	6	.9
December	43.8	24.9	34.3	69	5	64	2.59	1.34	3.59	6	4.6
Yearly:											
Average	64.7	41.6	53.1	---	---	---	---	---	---	---	---
Extreme	---	---	---	96	-4	---	---	---	---	---	---
Total	---	---	---	---	---	5,720	35.45	31.17	39.60	82	20.7

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Recorded in the period 1951-73 at Flat Top, West Virginia			
Last freezing temperature in spring:			
1 year in 10 later than--	April 29	May 10	May 22
2 years in 10 later than--	April 24	May 4	May 16
5 years in 10 later than--	April 14	April 23	May 4
First freezing temperature in fall:			
1 year in 10 earlier than--	October 15	October 1	September 22
2 years in 10 earlier than--	October 20	October 6	September 26
5 years in 10 earlier than--	October 29	October 16	October 5
Recorded in the period 1951-77 at Bluestone Lake, West Virginia			
Last freezing temperature in spring:			
1 year in 10 later than--	April 8	April 20	May 12
2 years in 10 later than--	April 3	April 17	May 6
5 years in 10 later than--	March 24	April 11	April 26
First freezing temperature in fall:			
1 year in 10 earlier than--	October 26	October 18	October 8
2 years in 10 earlier than--	November 1	October 22	October 13
5 years in 10 earlier than--	November 11	October 31	October 21

TABLE 3.--GROWING SEASON

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
Recorded in the period 1951-73 at Flat Top, West Virginia			
9 years in 10	175	151	131
8 years in 10	183	159	139
5 years in 10	197	175	152
2 years in 10	212	191	166
1 year in 10	219	200	173
Recorded in the period 1951-77 at Bluestone Lake, West Virginia			
9 years in 10	210	187	155
8 years in 10	217	192	162
5 years in 10	231	202	177
2 years in 10	245	212	192
1 year in 10	252	217	200

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Mercer county	Summers county	Total--	
				Area	Extent
		Acres	Acres	Acres	Pct
At	Atkins silt loam	510	890	1,400	0.3
BwF	Berks-Weikert shaly silt loams, 35 to 70 percent slopes	7,160	0	7,160	1.4
CaC	Calvin silt loam, high base substratum, 3 to 15 percent slopes	510	3,190	3,700	0.7
CaD	Calvin silt loam, high base substratum, 15 to 25 percent slopes	30	1,640	1,670	0.3
CbC	Calvin, high base substratum-Berks shaly silt loams, 3 to 15 percent slopes	1,760	2,170	3,930	0.8
CbC3	Calvin, high base substratum-Berks shaly silt loams, 8 to 15 percent slopes, severely eroded	1,520	410	1,930	0.4
CbD	Calvin, high base substratum-Berks shaly silt loams, 15 to 30 percent slopes	4,920	15,950	20,870	4.2
CbD3	Calvin, hgih base substratum-Berks shaly silt loams, 15 to 35 percent slopes, severely eroded	4,210	3,890	8,100	1.6
CbF	Calvin, high base substratum-Berks shaly silt loams, 30 to 70 percent slopes	14,810	46,710	61,520	12.2
CbF3	Calvin, high base substratum-Berks shaly silt loams, 35 to 70 percent slopes, severely eroded	3,610	6,260	9,870	2.0
CkD	Calvin, high base substratum-Berks stony silt loams, 15 to 30 percent slopes	570	1,630	2,200	0.4
CkF	Calvin, high base substratum-Berks stony silt loams, 30 to 70 percent slopes	13,970	37,020	50,990	10.2
ClD	Caneyville silt loam, very rocky, 15 to 30 percent slopes	1,620	50	1,670	0.3
ClF	Caneyville silt loam, very rocky, 30 to 60 percent slopes	3,960	50	4,010	0.8
Cm	Chagrin loam	870	1,530	2,400	0.5
CnD	Clymer-Gilpin complex, 15 to 30 percent slopes	4,460	0	4,460	0.9
CnF	Clymer-Gilpin complex, 30 to 70 percent slopes	24,480	0	24,480	4.9
CtC	Coolville and Latham silt loams, 3 to 15 percent slopes	2,100	1,390	3,490	0.7
CtD	Coolville and Latham silt loams, 15 to 25 percent slopes	790	580	1,370	0.3
CuF	Culleoka silt loam, 30 to 65 percent slopes	880	400	1,280	0.3
DeC	Dekalb channery fine sandy loam, 3 to 15 percent slopes	640	1,570	2,210	0.4
DeD	Dekalb channery fine sandy loam, 15 to 30 percent slopes	820	870	1,690	0.3
DgD	Dekalb-Gilpin-Jefferson stony complex, 15 to 35 percent slopes	5,230	3,530	8,760	1.8
DgF	Dekalb-Gilpin-Jefferson stony complex, 35 to 80 percent slopes	12,640	10,070	22,710	4.5
DrF	Dekalb-Rock outcrop complex, 15 to 65 percent slopes	510	0	510	0.1
ErB	Ernest silt loam, 3 to 8 percent slopes	2,330	1,670	4,000	0.8
ErC	Ernest silt loam, 8 to 15 percent slopes	3,150	1,660	4,810	1.0
ErD	Ernest silt loam, 15 to 30 percent slopes	300	100	400	0.1
EuC	Ernest and Buchanan stony soils, 3 to 15 percent slopes	4,150	2,020	6,170	1.2
EuD	Ernest and Buchanan stony soils, 15 to 30 percent slopes	1,770	1,010	2,780	0.6
FcD	Frederick very cherty loam, 15 to 30 percent slopes	430	0	430	0.1
FcF	Frederick very cherty loam, 30 to 60 percent slopes	2,430	0	2,430	0.5
FkC	Frederick silt loam, 3 to 15 percent slopes	310	240	550	0.1
FrC	Frederick cherty silt loam, 3 to 15 percent slopes	270	0	270	0.1
FrD	Frederick cherty silt loam, 15 to 30 percent slopes	900	0	900	0.2
FrF	Frederick cherty silt loam, 30 to 60 percent slopes	1,250	0	1,250	0.3
GaB	Gilpin silt loam, 3 to 8 percent slopes	220	1,700	1,920	0.4
GaC	Gilpin silt loam, 8 to 15 percent slopes	2,640	6,010	8,650	1.7
GaD	Gilpin silt loam, 15 to 25 percent slopes	2,020	2,470	4,490	0.9
GbC	Gilpin-Berks shaly silt loams, 8 to 15 percent slopes	4,170	2,300	6,470	1.3
GbC3	Gilpin-Berks shaly silt loams, 8 to 15 percent slopes, severely eroded	870	110	980	0.2
GbD	Gilpin-Berks shaly silt loams, 15 to 30 percent slopes	14,300	7,040	21,340	4.3
GbD3	Gilpin-Berks shaly silt loams, 15 to 35 percent slopes, severely eroded	2,370	1,230	3,600	0.7
GbF	Gilpin-Berks shaly silt loams, 30 to 70 percent slopes	40,760	14,960	55,720	11.0
GbF3	Gilpin-Berks shaly silt loams, 35 to 70 percent slopes, severely eroded	2,400	650	3,050	0.6
JsD	Jefferson stony loam, 15 to 35 percent slopes	2,320	800	3,120	0.6
JsF	Jefferson stony loam, 35 to 60 percent slopes	380	1,940	2,320	0.5
Ka	Kanawha fine sandy loam	200	1,840	2,040	0.4
LdF	Lehew-Dekalb very stony sandy loams, 15 to 65 percent slopes	3,060	0	3,060	0.6
LlB	Lily loam, 3 to 8 percent slopes	1,590	3,220	4,810	1.0
LlC	Lily loam, 8 to 15 percent slopes	9,730	5,570	15,300	3.1
LlD	Lily loam, 15 to 25 percent slopes	7,430	1,830	9,260	1.9
Lo	Lobdell loam	990	390	1,380	0.3
MgB	Monongahela silt loam, 3 to 8 percent slopes	720	2,300	3,020	0.6
MgC	Monongahela silt loam, 8 to 15 percent slopes	120	1,120	1,240	0.2

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Mercer county	Summers county	Total--	
				Area	Extent
		Acres	Acres	Acres	Pct
MsD	Murrill stony loam, 15 to 30 percent slopes	840	0	840	0.2
MsF	Murrill stony loam, 30 to 60 percent slopes	5,350	0	5,350	1.1
MuC	Murrill channery silt loam, 5 to 15 percent slopes	740	0	740	0.1
MuD	Murrill channery silt loam, 15 to 30 percent slopes	700	0	700	0.1
Oa	Orrville silt loam	1,580	110	1,690	0.3
Ob	Orrville-Lobdell complex	2,420	270	2,690	0.5
ShB	Shouns silt loam, 3 to 8 percent slopes	360	1,090	1,450	0.3
ShC	Shouns silt loam, 8 to 15 percent slopes	1,730	5,570	7,300	1.5
ShD	Shouns silt loam, 15 to 30 percent slopes	510	2,770	3,280	0.7
StC	Shouns stony silt loam, 3 to 15 percent slopes	670	3,250	3,920	0.8
StD	Shouns stony silt loam, 15 to 30 percent slopes	400	6,290	6,690	1.3
TtB	Tilsit silt loam, 3 to 8 percent slopes	7,700	4,310	12,010	2.4
TtC	Tilsit silt loam, 8 to 15 percent slopes	1,140	1,120	2,260	0.5
Tv	Tygart Variant silt loam	300	330	630	0.1
U1	Udorthents, carbonaceous, low base	280	0	280	0.1
U2	Udorthents, smooth	1,110	110	1,220	0.2
U3	Udorthents, mudstone and sandstone, high base	6,720	110	6,830	1.4
U4	Udorthents, sandstone and mudstone, low base	270	0	270	0.1
Ud	Udifluvents and Psamments, frequently flooded	120	1,290	1,410	0.3
UeC	Urban land-Ernest complex, 3 to 15 percent slopes	880	130	1,010	0.2
UfD	Urban land-Frederick complex, 15 to 35 percent slopes	830	0	830	0.2
UgE	Urban land-Gilpin-Berks complex, 15 to 35 percent slopes	990	0	990	0.2
UlC	Urban land-Lily complex, 3 to 15 percent slopes	1,210	0	1,210	0.2
UmD	Urban land-Murrill complex, 15 to 25 percent slopes	300	0	300	0.1
Uo	Urban land-Orrville-Lobdell complex	670	0	670	0.1
WeC	Westmoreland silt loam, 3 to 15 percent slopes	160	430	590	0.1
WeD	Westmoreland silt loam, 15 to 35 percent slopes	280	190	470	0.1
WeF	Westmoreland silt loam, 30 to 65 percent slopes	1,680	200	1,880	0.4
	Water	780	3,410	4,190	0.8
	Total	266,880	232,960	499,840	100.0

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn	Oats	Wheat	Grass-legume hay	Alfalfa hay	Kentucky bluegrass
	Bu	Bu	Bu	Ton	Ton	AUM*
At---------- Atkins	100	60	---	3.0	---	4.5
BwF---------- Berks-Weikert	---	---	---	---	---	---
CaC---------- Calvin	90	65	35	3.0	4.0	4.5
CaD---------- Calvin	85	60	30	2.5	3.5	4.0
CbC---------- Calvin-Berks	85	60	35	3.0	3.5	4.0
CbD, CbC3---------- Calvin-Berks	80	55	30	2.5	3.0	3.5
CbD3, CkD---------- Calvin-Berks	---	---	---	---	---	3.0
CbF, CbF3, CkF---------- Calvin-Berks	---	---	---	---	---	---
ClD---------- Caneyville	---	---	---	---	---	4.5
ClF---------- Caneyville	---	---	---	---	---	---
Cm---------- Chagrin	125	75	45	4.5	5.0	5.5
CnD---------- Clymer-Gilpin	90	60	35	3.0	3.5	4.0
CnF---------- Clymer-Gilpin	---	---	---	---	---	---
CtC---------- Coolville and Latham	80	60	35	3.0	3.5	4.0
CtD---------- Coolville and Latham	70	55	35	2.5	3.0	3.5
CuF---------- Culleoka	---	---	---	---	---	---
DeC---------- Dekalb	75	55	35	2.5	3.0	4.0
DeD---------- Dekalb	70	50	30	2.0	3.0	3.0
DgD---------- Dekalb-Gilpin-Jefferson	---	---	---	---	---	3.0
DgF---------- Dekalb-Gilpin-Jefferson	---	---	---	---	---	---
DrF---------- Dekalb-Rock outcrop	---	---	---	---	---	---
ErB---------- Ernest	100	65	40	3.0	3.5	4.5

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Oats	Wheat	Grass-legume hay	Alfalfa hay	Kentucky bluegrass
	Bu	Bu	Bu	Ton	Ton	AUM*
ErC---------- Ernest	95	60	35	3.0	3.5	4.0
ErD---------- Ernest	90	55	35	2.5	3.0	3.5
EuC---------- Ernest and Buchanan	---	---	---	---	---	3.5
EuD---------- Ernest and Buchanan	---	---	---	---	---	3.0
FcD---------- Frederick	---	---	---	---	---	3.0
FcF---------- Frederick	---	---	---	---	---	---
FkC---------- Frederick	120	70	40	3.0	4.5	4.5
FrC---------- Frederick	100	70	40	3.0	4.5	4.5
FrD---------- Frederick	80	60	35	3.0	4.0	4.5
FrF---------- Frederick	---	---	---	---	---	---
GaB---------- Gilpin	90	65	40	3.0	3.5	4.5
GaC---------- Gilpin	85	60	35	3.0	3.5	4.5
GaD---------- Gilpin	80	55	30	2.5	3.0	4.0
GbC---------- Gilpin-Berks	80	60	35	3.0	3.5	4.0
GbD, GbC3---------- Gilpin-Berks	75	55	30	2.5	3.0	3.5
GbD3---------- Gilpin-Berks	---	---	---	---	---	3.0
GbF, GbF3---------- Gilpin-Berks	---	---	---	---	---	---
JsD---------- Jefferson	---	---	---	---	---	4.0
JsF---------- Jefferson	---	---	---	---	---	---
Ka---------- Kanawha	135	80	50	3.5	5.0	5.5
LdF---------- Lehew-Dekalb	---	---	---	---	---	---
LlB---------- Lily	95	65	40	3.5	4.0	4.5
LlC---------- Lily	85	60	35	3.0	3.5	4.5

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Oats	Wheat	Grass-legume hay	Alfalfa hay	Kentucky bluegrass
	Bu	Bu	Bu	Ton	Ton	AUM*
LlD---- Lily	70	55	30	2.5	3.0	4.0
Lo---- Lobdell	120	80	45	4.0	4.5	5.0
MgB---- Monongahela	110	65	40	3.0	3.5	4.5
MgC---- Monongahela	90	60	35	3.0	3.0	4.5
MsD---- Murrill	---	---	---	---	---	3.5
MsF---- Murrill	---	---	---	---	---	---
MuC---- Murrill	110	70	40	3.0	4.0	4.5
MuD---- Murrill	95	60	35	3.0	4.0	4.5
Oa---- Orrville	110	75	---	4.5	---	5.0
Ob---- Orrville-Lobdell	115	80	---	4.5	---	5.0
ShB---- Shouns	90	75	50	4.0	4.5	5.0
ShC---- Shouns	85	70	45	4.0	4.5	5.0
ShD---- Shouns	75	65	40	3.5	4.0	4.5
StC, StD---- Shouns	---	---	---	---	---	4.0
TtB---- Tilsit	100	65	40	---	3.0	4.5
TtC---- Tilsit	90	60	35	---	3.0	4.5
Tv---- Tygart Variant	100	60	---	3.0	---	4.5
Ud---- Udifluvents and Psamments	---	---	---	---	---	---
U1**, U2**---- Udorthents	---	---	---	---	---	---
U3---- Udorthents, mudstone and sandstone	---	---	---	---	---	---
U4---- Udorthents, Sandstone and Mudstone	---	---	---	---	---	---
UeC---- Urban land-Ernest	---	---	---	---	---	---
UfD---- Urban land-Frederick	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Oats	Wheat	Grass-legume hay	Alfalfa hay	Kentucky bluegrass
	Bu	Bu	Bu	Ton	Ton	AUM*
UgE---------- Urban land-Gilpin-Berks	---	---	---	---	---	---
UlC---------- Urban land-Lily	---	---	---	---	---	---
UmD---------- Urban land-Murrill	---	---	---	---	---	---
Uo---------- Urban land-Orrville-Lobdell	---	---	---	---	---	---
WeC---------- Westmoreland	100	70	40	3.0	4.0	4.5
WeD---------- Westmoreland	85	65	35	3.0	4.0	4.0
WeF---------- Westmoreland	---	---	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Dashes indicate no acreage]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I:				
Mercer County	200	---	---	---
Summers County	1,840	---	---	---
II:				
Mercer County	14,780	12,920	1,960	---
Summers County	16,210	14,290	1,920	---
III:				
Mercer County	33,980	29,170	4,810	---
Summers County	33,940	32,340	1,600	---
IV:				
Mercer County	39,850	39,850	---	---
Summers County	33,960	33,960	---	---
V:				
Mercer County	---	---	---	---
Summers County	---	---	---	---
VI:				
Mercer County	24,580	6,580	---	18,000
Summers County	23,700	5,120	---	18,580
VII:				
Mercer County	139,330	97,030	---	42;300
Summers County	118,260	69,180	---	49,080
VIII:				
Mercer County	---	---	---	---
Summers County	---	---	---	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available. Ratings given for "Plant competition" are for conifers]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
At---------- Atkins	1w	Slight	Severe	Severe	Severe	Pin oak----------	100	Eastern white pine, white spruce.
						Loblolly pine-------	83	
						Sweetgum----------	95	
						Eastern cottonwood--	105	
						Red maple----------	---	
						American sycamore---	---	
BwF*:								
Berks---------- (North Aspect)	4f	Moderate	Severe	Moderate	Slight	Northern red oak----	61	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak----------	61	
						Virginia pine-------	70	
						Shortleaf pine------		
						Eastern white pine--		
Weikert---------- (North Aspect)	4d	Moderate	Severe	Severe	Slight	Northern red oak----	56	Eastern white pine, shortleaf pine, Virginia pine.
						Virginia pine-------	60	
						Eastern white pine--	70	
BwF*:								
Berks---------- (South Aspect)	5f	Moderate	Severe	Moderate	Slight	Scarlet oak---------	54	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						White oak----------	60	
						Virginia pine-------	60	
						Pitch pine----------	---	
Weikert---------- (South Aspect)	5d	Moderate	Severe	Severe	Slight	Scarlet oak---------	48	Virginia pine, shortleaf pine.
						Virginia pine-------	52	
						Eastern white pine	62	
CaC---------- Calvin	2o	Slight	Slight	Slight	Severe	Northern red oak----	80	Eastern white pine, Norway spruce, black walnut, Japanese larch, black locust, yellow-poplar.
						Cucumbertree--------	80	
						Black cherry--------	80	
						Sugar maple---------	---	
						Yellow-poplar-------	90	
						Black locust--------	---	
						Black walnut--------	---	
CaD---------- Calvin (North Aspect)	2r	Moderate	Moderate	Slight	Severe	Northern red oak----	80	Eastern white pine, Norway spruce, black walnut, Japanese larch, black locust, yellow-poplar.
						Cucumbertree--------	80	
						Black cherry--------	80	
						Sugar maple---------	---	
						Yellow-poplar-------	90	
						Black locust--------	---	
						Black walnut--------	---	
CaD---------- Calvin (South Aspect)	3r	Moderate	Moderate	Moderate	Moderate	Northern red oak----	70	Eastern white pine, Norway spruce, Japanese larch, black locust.
						Black oak----------	70	
						Black cherry--------	70	
						Yellow-poplar-------	---	
						Virginia pine-------	---	
CbC*, CbC3*:								
Calvin----------	2o	Slight	Slight	Slight	Severe	Northern red oak----	80	Eastern white pine, Norway spruce, black walnut, Japanese larch, black locust, yellow-poplar.
						Cucumbertree--------	80	
						Black cherry--------	80	
						Sugar maple---------	---	
						Yellow-poplar-------	90	
						Black locust--------	---	
						Black walnut--------	---	
Berks----------	3f	Slight	Slight	Moderate	Moderate	Northern red oak----	70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak----------	70	
						Virginia pine-------	70	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
CbD*:								
Calvin (North Aspect)	2r	Moderate	Moderate	Slight	Severe	Northern red oak	80	Eastern white pine, Norway spruce, black walnut, Japanese larch, black locust, yellow-poplar.
						Cucumbertree	80	
						Black cherry	80	
						Sugar maple	---	
						Yellow-poplar	90	
						Black locust	---	
						Black walnut	---	
Berks (North Aspect)	3f	Slight	Moderate	Moderate	Moderate	Northern red oak	70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak	70	
						Virginia pine	70	
CbD*:								
Calvin (South Aspect)	3r	Moderate	Moderate	Moderate	Moderate	Northern red oak	70	Eastern white pine, Norway spruce, Japanese larch, black locust.
						Black oak	70	
						Black cherry	70	
						Yellow-poplar	---	
						Virginia pine	---	
Berks (South Aspect)	4f	Slight	Moderate	Moderate	Slight	Scarlet oak	60	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						White oak	60	
						Virginia pine	60	
CbD3*:								
Calvin (North Aspect)	2r	Moderate	Moderate	Slight	Severe	Northern red oak	80	Eastern white pine, Norway spruce, black walnut, Japanese larch, black locust, yellow-poplar.
						Cucumbertree	80	
						Black cherry	80	
						Sugar maple	---	
						Yellow-poplar	90	
						Black locust	---	
						Black walnut	---	
Berks (North Aspect)	3f	Slight	Moderate	Moderate	Moderate	Northern red oak	70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak	70	
						Virginia pine	70	
CbD3*:								
Calvin (South Aspect)	3r	Moderate	Moderate	Moderate	Moderate	Northern red oak	70	Eastern white pine, Norway spruce, Japanese larch, black locust.
						Black oak	70	
						Black cherry	70	
						Yellow-poplar	---	
						Virginia pine	---	
Berks (South Aspect)	4f	Slight	Moderate	Moderate	Slight	Scarlet oak	60	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak	60	
						Virginia pine	60	
CbF*:								
Calvin (North Aspect)	2r	Severe	Severe	Slight	Severe	Northern red oak	80	Eastern white pine, Norway spruce, black walnut, Japanese larch, black locust, yellow-poplar.
						Cucumbertree	80	
						Black cherry	80	
						Sugar maple	---	
						Yellow-poplar	90	
						Black locust	---	
						Black walnut	---	
Berks (North Aspect)	3f	Moderate	Severe	Moderate	Moderate	Northern red oak	70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak	70	
						Virginia pine	70	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
CbF*:								
Calvin (South Aspect)	3r	Severe	Severe	Moderate	Moderate	Northern red oak	70	Eastern white pine, Norway spruce, Japanese larch, black locust.
						Black oak	70	
						Black cherry	70	
						Yellow-poplar	---	
						Virginia pine	---	
Berks (South Aspect)	4f	Moderate	Severe	Moderate	Slight	Scarlet oak	60	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak	60	
						Virginia pine	60	
CbF3*:								
Calvin (North Aspect)	2r	Severe	Severe	Slight	Severe	Northern red oak	80	Eastern white pine, Norway spruce, black walnut, Japanese larch, black locust, yellow-poplar.
						Cucumbertree	80	
						Black cherry	80	
						Sugar maple	---	
						Yellow-poplar	90	
						Black locust	---	
						Black walnut	---	
Berks (North Aspect)	3f	Moderate	Severe	Moderate	Moderate	Northern red oak	70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak	70	
						Virginia pine	70	
CbF3*:								
Calvin (South Aspect)	3r	Severe	Severe	Moderate	Moderate	Northern red oak	70	Eastern white pine, Norway spruce, Japanese larch, black locust.
						Black oak	70	
						Black cherry	70	
						Yellow-poplar	---	
						Virginia pine	---	
Berks (South Aspect)	4f	Moderate	Severe	Moderate	Slight	Scarlet oak	60	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak	60	
						Virginia pine	60	
CkD*:								
Calvin (North Aspect)	2r	Moderate	Moderate	Slight	Severe	Northern red oak	80	Eastern white pine, Norway spruce, black walnut, Japanese larch, black locust, yellow-poplar.
						Cucumbertree	80	
						Black cherry	80	
						Sugar maple	---	
						Yellow-poplar	90	
						Black locust	---	
						Black walnut	---	
Berks (North Aspect)	3f	Slight	Moderate	Moderate	Moderate	Northern red oak	70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak	70	
						Virginia pine	70	
CkD*:								
Calvin (South Aspect)	3r	Moderate	Moderate	Moderate	Moderate	Northern red oak	70	Eastern white pine, Norway spruce, Japanese larch, black locust.
						Black oak	70	
						Black cherry	70	
						Yellow-poplar	---	
						Virginia pine	---	
Berks	4f	Slight	Moderate	Severe	Slight	Scarlet oak	60	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak	60	
						Virginia pine	60	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
CkF*: Calvin (North Aspect)	2r	Severe	Severe	Slight	Severe	Northern red oak Cucumbertree Black cherry Sugar maple Yellow-poplar Black locust Black walnut	80 80 80 --- 90 --- ---	Eastern white pine, Norway spruce, black walnut, Japanese larch, black locust, yellow-poplar.
Berks (North Aspect)	3f	Moderate	Severe	Moderate	Moderate	Northern red oak Black oak Virginia pine	70 70 70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
CkF*: Calvin (South Aspect)	3r	Severe	Severe	Moderate	Moderate	Northern red oak Black oak Black cherry Yellow-poplar Virginia pine	70 70 70 --- ---	Eastern white pine, Norway spruce, Japanese larch, black locust.
Berks (South Aspect)	4f	Moderate	Severe	Severe	Slight	Scarlet oak Black oak Virginia pine	60 60 60	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
ClD Caneyville (North Aspect)	3x	Moderate	Moderate	Moderate	Moderate	Yellow-poplar Black oak	80 66	Yellow-poplar, black walnut, Virginia pine.
ClD Caneyville (South Aspect)	4x	Moderate	Moderate	Moderate	Slight	Scarlet oak Eastern redcedar	65 45	Eastern redcedar, Virginia pine, eastern white pine, shortleaf pine, loblolly pine.
ClF Caneyville (North Aspect)	3x	Severe	Severe	Moderate	Moderate	Yellow-poplar Black oak	80 66	Yellow-poplar, black walnut, Virginia pine.
ClF Caneyville (South Aspect)	4x	Severe	Severe	Moderate	Slight	Scarlet oak Eastern redcedar	65 45	Eastern redcedar, Virginia pine, eastern white pine, shortleaf pine, loblolly pine.
Cm Chagrin	1o	Slight	Slight	Slight	Severe	Northern red oak Yellow-poplar Sugar maple White oak Black cherry White ash Black walnut	86 96 86 86 86 86 86	Eastern white pine, black walnut, yellow-poplar, white ash, red pine, northern red oak, white oak.
CnD*: Clymer (North Aspect)	2r	Slight	Moderate	Slight	Severe	Northern red oak Yellow-poplar Eastern white pine	83 95 80	Eastern white pine, black cherry, yellow-poplar, Virginia pine.
Gilpin (North Aspect)	2r	Moderate	Moderate	Slight	Severe	Northern red oak Yellow-poplar	80 95	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
CnD*: Clymer (South Aspect)	3r	Slight	Moderate	Slight	Moderate	Northern red oak Eastern white pine	72 ---	Eastern white pine, Virginia pine, yellow-poplar, black cherry.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
CnD*:								
Gilpin (South Aspect)	3r	Moderate	Moderate	Moderate	Moderate	Northern red oak Yellow-poplar	70 90	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
CnF*:								
Clymer (North Aspect)	2r	Moderate	Severe	Slight	Severe	Northern red oak Yellow-poplar Eastern white pine	83 95 ---	Eastern white pine, black cherry, yellow-poplar, Virginia pine.
Gilpin (North Aspect)	2r	Severe	Severe	Slight	Severe	Northern red oak Yellow-poplar	80 95	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
CnF*:								
Clymer (South Aspect)	3r	Moderate	Severe	Slight	Moderate	Northern red oak Eastern white pine	72 ---	Eastern white pine, Virginia pine.
Gilpin (South Aspect)	3r	Severe	Severe	Moderate	Moderate	Northern red oak Yellow-poplar	70 90	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
CtC*:								
Coolville	3o	Slight	Slight	Slight	Moderate	Northern red oak Shortleaf pine White oak Black cherry Black walnut Sugar maple White ash Yellow-poplar	66 68 --- --- --- --- --- ---	Eastern white pine, shortleaf pine, yellow-poplar, red pine, black walnut, white ash, white oak, northern red oak.
Latham	3c	Slight	Slight	Moderate	Moderate	Northern red oak Yellow-poplar Red maple Green ash	67 --- --- ---	Austrian pine, green ash, baldcypress, red maple, pin oak.
CtD*:								
Coolville	3r	Moderate	Moderate	Slight	Moderate	Northern red oak Shortleaf pine White oak Black cherry Black walnut Sugar maple White ash Yellow-poplar	66 68 --- --- --- --- --- ---	Eastern white pine, shortleaf pine, yellow-poplar, red pine, black walnut, white ash, white oak, northern red oak.
Latham	3c	Moderate	Moderate	Moderate	Moderate	Northern red oak Yellow-poplar Red maple Green ash	67 --- --- ---	Eastern white pine, red pine, yellow-poplar, green ash, red maple.
CuF Culleoka	2r	Severe	Severe	Slight	Severe	Yellow-poplar Northern red oak Loblolly pine Shortleaf pine Eastern redcedar	75 94 77 80 60	Eastern white pine, black walnut, yellow-poplar, shortleaf pine, Virginia pine, black locust.
DeC Dekalb	3o	Slight	Slight	Slight	Moderate	Northern red oak Black cherry White ash	72 70 70	Norway spruce, yellow-poplar, black cherry.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
DeD---------- Dekalb (North Aspect)	3r	Slight	Moderate	Slight	Moderate	Northern red oak----	72	Norway spruce, yellow-poplar, black cherry.
						Black cherry--------	83	
						Yellow-poplar-------	90	
DeD---------- Dekalb (South Aspect)	4r	Slight	Moderate	Slight	Slight	Northern red oak----	63	Eastern white pine, red pine, Virginia pine.
						Black cherry--------	60	
						Yellow-poplar-------	70	
DgD*:								
Dekalb---------- (North Aspect)	3r	Slight	Moderate	Slight	Moderate	Northern red oak----	72	Norway spruce, yellow-poplar, black cherry.
						Black cherry--------	83	
						Yellow-poplar-------	90	
Gilpin---------- (North Aspect)	2r	Moderate	Moderate	Slight	Severe	Northern red oak----	80	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar-------	95	
Jefferson--------- (North Aspect)	2r	Slight	Moderate	Slight	Severe	Northern red oak----	76	Eastern white pine, Virginia pine.
						Yellow-poplar	100	
DgD*:								
Dekalb---------- (South Aspect)	4r	Slight	Moderate	Slight	Slight	Northern red oak----	63	Eastern white pine, red pine, Virginia pine.
						Black cherry--------	60	
						Yellow-poplar-------	70	
Gilpin---------- (South Aspect)	3r	Moderate	Moderate	Moderate	Moderate	Northern red oak----	70	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar-------	90	
Jefferson--------- (South Aspect)	3r	Slight	Moderate	Slight	Moderate	Northern red oak----	62	Eastern white pine, Virginia pine.
						Yellow-poplar-------	100	
DgF*:								
Dekalb---------- (North Aspect)	3r	Moderate	Severe	Slight	Moderate	Northern red oak----	72	Norway spruce, yellow-poplar, black cherry.
						Black cherry--------	83	
						Yellow-poplar-------	90	
Gilpin---------- (North Aspect)	2r	Severe	Severe	Slight	Severe	Northern red oak----	80	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar-------	95	
Jefferson--------- (North Aspect)	2r	Moderate	Severe	Slight	Severe	Northern red oak----	76	Eastern white pine, Virginia pine.
						Yellow-poplar-------	100	
DgF*:								
Dekalb---------- (South Aspect)	4r	Moderate	Severe	Slight	Slight	Northern red oak----	63	Eastern white pine, red pine, Virginia pine.
						Black cherry--------	60	
						Yellow-poplar-------	70	
Gilpin---------- (South Aspect)	3r	Severe	Severe	Moderate	Moderate	Northern red oak----	70	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar-------	90	
Jefferson--------- (south Aspect)	3r	Moderate	Severe	Slight	Moderate	Northern red oak----	62	Eastern white pine, Virginia pine.
						Yellow-poplar-------	100	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
DrF*: Dekalb (North Aspect)	3r	Moderate	Severe	Slight	Moderate	Northern red oak Black cherry Yellow-poplar	72 83 90	Norway spruce, yellow-poplar, black cherry.
Rock outcrop.								
DrF*: Dekalb (South Aspect)	4r	Moderate	Severe	Slight	Slight	Northern red oak Black cherry Yellow-poplar	63 60 70	Eastern white pine, red pine, Virginia pine.
DrF*: Rock outcrop.								
ErB--Ernest	2w	Slight	Moderate	Slight	Severe	Northern red oak Yellow-poplar White ash Black walnut Sugar maple Black cherry	80 89 80 --- 80 80	Eastern white pine, Norway spruce, Japanese larch.
ErC--Ernest	2w	Moderate	Moderate	Slight	Severe	Northern red oak Yellow-poplar White ash Black walnut Sugar maple Black cherry	80 89 80 --- 80 80	Eastern white pine, Norway spruce, Japanese larch.
ErD--Ernest	2w	Severe	Moderate	Slight	Severe	Northern red oak Yellow-poplar White ash Black walnut Sugar maple Black cherry	80 89 80 --- 80 80	Eastern white pine, Norway spruce, Japanese larch.
EuC*: Ernest	2w	Moderate	Moderate	Slight	Severe	Northern red oak Yellow-poplar White ash Black walnut Sugar maple Black cherry	80 89 80 --- 80 80	Eastern white pine, Norway spruce, Japanese larch.
Buchanan	2o	Slight	Slight	Slight	Severe	Northern red oak Yellow-poplar	80 90	Northern red oak, yellow-poplar, sugar maple, eastern white pine, European larch.
EuD*: Ernest	2w	Severe	Moderate	Slight	Severe	Northern red oak Yellow-poplar White ash Black walnut Sugar maple Black cherry	80 89 80 --- 80 80	Eastern white pine, Norway spruce, Japanese larch.
Buchanan	2r	Moderate	Moderate	Slight	Severe	Northern red oak Yellow-poplar	80 90	Northern red oak, yellow-poplar, sugar maple, eastern white pine, European larch.
FcD--Frederick	2c	Moderate	Moderate	Slight	Severe	Northern red oak Yellow-poplar Black locust White oak	84 90 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, Scotch pine.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
FcF---------- Frederick	2c	Severe	Severe	Slight	Severe	Northern red oak---- Yellow-poplar------- Black locust-------- White oak-----------	84 90 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, Scotch pine.
FkC---------- Frederick	2c	Slight	Moderate	Slight	Severe	Northern red oak---- Yellow-poplar------- Black locust-------- White oak----------- Black walnut--------	84 90 --- --- ---	Eastern white pine, yellow-poplar.
FrC---------- Frederick	2c	Slight	Moderate	Slight	Severe	Northern red oak---- Yellow-poplar------- Black locust-------- White oak-----------	84 90 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, Scotch pine.
FrD---------- Frederick	2c	Moderate	Moderate	Slight	Severe	Northern red oak---- Yellow-poplar------- Black locust-------- White oak-----------	84 90 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, Scotch pine.
FrF---------- Frederick	2c	Severe	Severe	Slight	Severe	Northern red oak---- Yellow-poplar------- Black locust-------- White oak-----------	84 90 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, Scotch pine.
GaB, GaC---------- Gilpin	2o	Slight	Slight	Slight	Severe	Northern red oak---- Yellow-poplar-------	80 95	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
GaD---------- Gilpin (North Aspect)	2r	Moderate	Moderate	Slight	Severe	Northern red oak---- Yellow-poplar-------	80 95	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
GaD---------- Gilpin (South Aspect)	3r	Moderate	Moderate	Moderate	Moderate	Northern red oak---- Yellow-poplar-------	70 90	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
GbC*, GbC3*: Gilpin----------	2o	Slight	Slight	Slight	Severe	Northern red oak---- Yellow-poplar-------	80 95	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
Berks----------	3f	Slight	Slight	Moderate	Moderate	Northern red oak---- Black oak---------- Virginia pine-------	70 70 70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
GbD*: Gilpin---------- (North Aspect)	2r	Moderate	Moderate	Slight	Severe	Northern red oak---- Yellow-poplar-------	80 95	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
Berks---------- (North Aspect)	3f	Slight	Moderate	Moderate	Moderate	Northern red oak---- Black oak---------- Virginia pine-------	70 70 70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
GbD*:								
Gilpin (South Aspect)	3r	Moderate	Moderate	Moderate	Moderate	Northern red oak Yellow-poplar	70 90	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
Berks (South Aspect)	4f	Slight	Moderate	Moderate	Slight	Scarlet oak Black oak Virginia pine	60 60 60	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
GbD3*:								
Gilpin (North Aspect)	2r	Moderate	Moderate	Slight	Severe	Northern red oak Yellow-poplar	80 95	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
Berks (North Aspect)	3f	Slight	Moderate	Moderate	Moderate	Northern red oak Black oak Virginia pine	70 70 70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
GbD3*:								
Gilpin (South Aspect)	3r	Moderate	Moderate	Moderate	Moderate	Northern red oak Yellow-poplar	70 90	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
Berks (South Aspect)	4f	Slight	Moderate	Moderate	Slight	Scarlet oak Black oak Virginia pine	60 60 60	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
GbF*:								
Gilpin (North Aspect)	2r	Severe	Severe	Slight	Severe	Northern red oak Yellow-poplar	80 95	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
Berks (North Aspect)	3f	Moderate	Severe	Moderate	Moderate	Northern red oak Black oak Virginia pine	70 70 70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
GbF*:								
Gilpin (South Aspect)	3r	Severe	Severe	Moderate	Moderate	Northern red oak Yellow-poplar	70 90	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
Berks (South)	4f	Moderate	Severe	Moderate	Slight	Scarlet oak Black oak Virginia pine	60 60 60	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
GbF3*:								
Gilpin (North Aspect)	2r	Severe	Severe	Slight	Severe	Northern red oak Yellow-poplar	80 95	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
Berks (North Aspect)	3f	Moderate	Severe	Moderate	Moderate	Northern red oak Black oak Virginia pine	70 70 70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
GbF3*: Gilpin (South Aspect)	3r	Severe	Severe	Moderate	Moderate	Northern red oak Yellow-poplar	70 90	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
GbF3*: Berks	4f	Moderate	Severe	Moderate	Slight	Scarlet oak Black oak Virginia pine	60 60 60	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
JsD Jefferson (North Aspect)	2r	Slight	Moderate	Slight	Severe	Northern red oak Yellow-poplar	76 100	Eastern white pine, Virginia pine.
JsD Jefferson (South Aspect)	3r	Slight	Moderate	Slight	Moderate	Northern red oak Yellow-poplar	62 100	Eastern white pine, Virginia pine.
JsF Jefferson (North Aspect)	2r	Moderate	Severe	Slight	Severe	Northern red oak Yellow-poplar	76 100	Eastern white pine, Virginia pine.
JsF Jefferson (South Aspect)	3r	Moderate	Severe	Slight	Moderate	Northern red oak Yellow-poplar	62 100	Eastern white pine, Virginia pine.
Ka Kanawha	2o	Slight	Slight	Slight	Severe	Northern red oak Black oak White oak Yellow-poplar White ash Black walnut Black locust	80 80 80 90 80 --- ---	Eastern white pine, yellow-poplar, black walnut, Norway spruce, black locust.
LdF*: Lehew (North Aspect)	3x	Moderate	Severe	Slight	Moderate	Northern red oak Virginia pine Eastern white pine	67 60 ---	Eastern white pine, Virginia pine, Japanese larch.
Dekalb (North Aspect)	3x	Moderate	Severe	Slight	Moderate	Northern red oak Black cherry Yellow-poplar	72 83 90	Norway spruce, yellow-poplar, black cherry.
LdF*: Lehew (South Aspect)	4x	Moderate	Severe	Moderate	Slight	Northern red oak Virginia pine Eastern white pine	58 50 ---	Eastern white pine, Virginia pine, Japanese larch.
Dekalb (South Aspect)	4x	Moderate	Severe	Slight	Slight	Northern red oak Black cherry Yellow-poplar	66 82 75	Eastern white pine, red pine, Virginia pine.
LlB, LlC Lily	4o	Slight	Slight	Slight	Slight	Shortleaf pine Virginia pine	63 65	Loblolly pine, shortleaf pine, Virginia pine, white oak.
LlD Lily	4r	Moderate	Moderate	Slight	Slight	Shortleaf pine Virginia pine	63 65	Loblolly pine, shortleaf pine, Virginia pine, white oak.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
Lo Lobdell	1o	Slight	Slight	Slight	Severe	Northern red oak Yellow-poplar Sugar maple Black walnut White oak Black cherry White ash	87 96 --- --- --- --- ---	Eastern white pine, black walnut, yellow-poplar, white ash, red pine, northern red oak, white oak.
MgB Monongahela	3o	Slight	Slight	Slight	Moderate	Northern red oak Yellow-poplar Eastern white pine Virginia pine White ash Black walnut	70 85 72 66 --- ---	Eastern white pine.
MgC Monongahela	3o	Moderate	Slight	Slight	Moderate	Northern red oak Yellow-poplar Eastern white pine Virginia pine White ash Black walnut	70 85 72 66 --- ---	Eastern white pine.
MsD Murrill	3r	Slight	Moderate	Slight	Moderate	Northern red oak Yellow-poplar White ash Eastern white pine Black walnut	72 94 70 80 ---	Eastern white pine, yellow-poplar, black walnut, Norway spruce, Japanese larch.
MsF Murrill	3r	Moderate	Severe	Slight	Moderate	Northern red oak Yellow-poplar White ash Eastern white pine Black walnut	72 94 70 80 ---	Eastern white pine, yellow-poplar, black walnut, Norway spruce, Japanese larch.
MuC Murrill	3o	Slight	Slight	Slight	Moderate	Northern red oak Yellow-poplar White ash Eastern white pine Black walnut	72 94 70 80 ---	Eastern white pine, yellow-poplar, black walnut, Norway spruce, Japanese larch.
MuD Murrill	3r	Slight	Moderate	Slight	Moderate	Northern red oak Yellow-poplar White ash Eastern white pine Black walnut	72 94 70 80 ---	Eastern white pine, yellow-poplar, black walnut, Norway spruce, Japanese larch.
Oa Orrville	2o	Slight	Slight	Slight	Severe	Pin oak Northern red oak Yellow-poplar Sugar maple White oak Black walnut Black cherry White ash	85 80 90 80 --- --- --- ---	Eastern white pine, yellow-poplar, black walnut, red pine, white ash, white oak.
Ob*: Orrville	2o	Slight	Slight	Slight	Severe	Pin oak Northern red oak Yellow-poplar Sugar maple White oak Black walnut Black cherry White ash	85 80 90 80 --- --- --- ---	Eastern white pine, yellow-poplar, black walnut, red pine, white ash, white oak.
Lobdell	1o	Slight	Slight	Slight	Severe	Northern red oak Yellow-poplar Sugar maple Black walnut White oak Black cherry White ash	87 96 --- --- --- --- ---	Eastern white pine, black walnut, yellow-poplar, white ash, red pine, northern red oak, white oak.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
ShB, ShC---------- Shouns	2o	Slight	Slight	Slight	Moderate	Yellow-poplar------- Shortleaf pine------ Loblolly pine------- Virginia pine------- Eastern white pine-- Black walnut-------- Northern red oak----	90 70 80 70 80 --- 80	Yellow-poplar, eastern white pine, black walnut.
ShD---------- Shouns	2r	Moderate	Moderate	Moderate	Moderate	Northern red oak---- Yellow-poplar------- Shortleaf pine------ Loblolly pine------- Virginia pine------- Eastern white pine-- Black walnut--------	80 90 70 80 70 80 ---	Yellow-poplar, Eastern white pine, balck walnut.
StC---------- Shouns	2o	Slight	Slight	Slight	Moderate	Yellow-poplar------- Shortleaf pine------ Loblolly pine------- Virginia pine------- Northern red oak---- Eastern white pine--	90 70 80 70 80 80	Yellow-poplar, eastern white pine, black walnut.
StD---------- Shouns	2r	Moderate	Moderate	Slight	Moderate	Yellow-poplar------- Shortleaf pine------ Loblolly pine------- Virginia pine------- Northern red oak---- Eastern white pine--	90 70 80 70 80 80	Yellow-poplar, eastern white pine, black walnut.
TtB, TtC---------- Tilsit	3o	Slight	Slight	Slight	Moderate	Northern red oak---- Yellow-poplar------- Eastern white pine-- Virginia pine------- Shortleaf pine------	70 89 80 70 78	Eastern white pine, Virginia pine.
Tv---------- Tygart Variant	2w	Slight	Moderate	Severe	Severe	Northern red oak---- Yellow-poplar------- Red maple---------- White ash---------- Black oak----------	80 90 --- 80 80	Eastern white pine, Virginia pine, Japanese larch, Norway spruce.
UeC*: Urban land.								
Ernest----------	2w	Moderate	Moderate	Slight	Severe	Northern red oak---- Yellow-poplar------- White ash---------- Black walnut-------- Sugar maple--------- Black cherry--------	80 89 80 --- 80 80	Eastern white pine, Norway spruce, Japanese larch.
UfD*: Urban land.								
Frederick---------	2c	Moderate	Moderate	Slight	Severe	Northern red oak---- Yellow-poplar------- Black locust-------- White oak----------	76 86 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, Scotch pine.
UgE*: Urban land.								
Gilpin---------- (North Aspect)	2r	Moderate	Moderate	Slight	Severe	Northern red oak---- Yellow-poplar-------	80 95	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow- poplar.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
UgE*: Urban land.								
Berks (North Aspect)	3f	Slight	Moderate	Moderate	Moderate	Northern red oak Black oak Virginia pine	70 70 70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
UgE*: Urban land.								
Gilpin (South Aspect)	3r	Moderate	Moderate	Moderate	Moderate	Northern red oak Yellow-poplar	70 90	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
Berks (South Aspect)	4f	Slight	Moderate	Moderate	Slight	Scarlet oak Black oak Virginia pine	60 60 60	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
UlC*: Urban land.								
Lily	4o	Slight	Slight	Slight	Slight	Shortleaf pine Virginia pine	63 65	Virginia pine, Eastern white pine.
UmD*: Urban land.								
Murrill	3r	Slight	Moderate	Slight	Moderate	Northern red oak Yellow-poplar White ash Eastern white pine Black walnut	72 94 70 80 ---	Eastern white pine, yellow-poplar, black walnut, Norway spruce, Japanese larch.
Uo*: Urban land.								
Orrville	2o	Slight	Slight	Slight	Severe	Pin oak Northern red oak Yellow-poplar Sugar maple White oak Black walnut Black cherry White ash	85 80 90 80 --- --- --- ---	Eastern white pine, yellow-poplar, black walnut, red pine, white ash, white oak.
Lobdell	1o	Slight	Slight	Slight	Severe	Northern red oak Yellow-poplar Sugar maple Black walnut White oak Black cherry White ash	87 96 --- --- --- --- ---	Eastern white pine, black walnut, yellow-poplar, white ash, red pine, northern red oak, white oak.
WeC Westmoreland	2o	Slight	Slight	Slight	Severe	Northern red oak Yellow-poplar Eastern white pine	80 90 90	Eastern white pine, yellow-poplar, Virginia pine.
WeD Westmoreland (North Aspect)	2r	Moderate	Moderate	Slight	Severe	Northern red oak Yellow-poplar Eastern white pine	81 90 75	Black walnut, yellow-poplar, eastern white pine.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
WeD---------- Westmoreland (South Aspect)	3r	Moderate	Moderate	Slight	Moderate	Northern red oak----	70	Eastern white pine, Virginia pine, European larch.
						Yellow-poplar-------	80	
						Eastern white pine--	65	
WeF---------- Westmoreland (North Aspect)	2r	Severe	Severe	Slight	Severe	Northern red oak----	81	Black walnut, yellow-poplar, eastern white pine.
						Yellow-poplar-------	90	
						Eastern white pine--	75	
WeF---------- Westmoreland (South Aspect)	3r	Severe	Severe	Slight	Moderate	Northern red oak----	70	Eastern white pine, Virginia pine, European larch.
						Yellow-poplar-------	80	
						Eastern white pine--	65	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
At Atkins	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
BwF*:					
Berks	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope, small stones.
Weikert	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, depth to rock, small stones.	Severe: slope.	Severe: slope, thin layer, small stones.
CaC Calvin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, thin layer.
CaD Calvin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
CbC*, CbC3*:					
Calvin	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: slope, small stones, thin layer.
Berks	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: small stones, slope.	Slight	Severe: small stones.
CbD*, CbD3*:					
Calvin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Berks	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope.	Severe: slope, small stones.
CbF*, CbF3*:					
Calvin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Berks	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope, small stones.
CkD*:					
Calvin	Severe: slope.	Severe: slope.	Severe: slope, large stones, small stones.	Moderate: slope.	Severe: slope.
Berks	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope, large stones.	Moderate: slope.	Severe: slope, small stones.
CkF*:					
Calvin	Severe: slope.	Severe: slope.	Severe: slope, large stones, small stones.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CkF*:					
Berks	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.	Severe: slope.	Severe: slope, small stones.
ClD	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: erodes easily.	Severe: slope, depth to rock.
Caneyville					
ClF	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope, erodes easily.	Severe: slope, depth to rock.
Caneyville					
Cm	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
Chagrin					
CnD*:					
Clymer	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
CnF*:					
Clymer	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CtC*:					
Coolville	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
Latham	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: wetness, slope.
CtD*:					
Coolville	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Severe: slope.
Latham	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Severe: slope.
CuF	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Culleoka					
DeC	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: large stones.	Severe: small stones.
Dekalb					
DeD	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, large stones.	Severe: slope, small stones.
Dekalb					
DgD*:					
Dekalb	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones, large stones.	Moderate: slope, large stones.	Severe: slope, small stones.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
DgD*:					
Gilpin	Severe: slope.	Severe: slope.	Severe: slope, small stones, large stones.	Moderate: large stones, slope.	Severe: slope.
Jefferson	Severe: slope.	Severe: slope.	Severe: large stones, small stones, slope.	Moderate: slope.	Severe: slope.
DgF*:					
Dekalb	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones, large stones.	Severe: slope.	Severe: slope, small stones.
Gilpin	Severe: slope.	Severe: slope.	Severe: slope, small stones, large stones.	Severe: slope.	Severe: slope.
Jefferson	Severe: slope.	Severe: slope.	Severe: large stones, small stones, slope.	Severe: slope.	Severe: slope.
DrF*:					
Dekalb	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones, large stones.	Severe: slope.	Severe: slope, small stones.
Rock outcrop.					
ErB	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones.	Severe: erodes easily.	Moderate: large stones.
ErC	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: large stones, slope.
ErD	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
EuC*:					
Ernest	Moderate: slope, large stones, wetness.	Moderate: slope, large stones, wetness.	Severe: large stones, slope, small stones.	Slight	Moderate: small stones, large stones, slope.
Buchanan	Moderate: slope, wetness, large stones.	Moderate: slope, wetness, large stones.	Severe: large stones, slope, small stones.	Slight	Severe: small stones.
EuD*:					
Ernest	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope.
Buchanan	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
FcD---------- Frederick	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: slope, small stones.
FcF---------- Frederick	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.
FkC---------- Frederick	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
FrC---------- Frederick	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, small stones.
FrD---------- Frederick	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.
FrF---------- Frederick	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope, small stones.
GaB---------- Gilpin	Slight----------	Slight----------	Moderate: small stones, slope.	Slight----------	Moderate: thin layer.
GaC---------- Gilpin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope, thin layer.
GaD---------- Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
GbC*, GbC3*: Gilpin----------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: small stones, slope.	Slight----------	Moderate: slope, small stones, thin layer.
Berks----------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: small stones, slope.	Slight----------	Severe: small stones.
GbD*, GbD3*: Gilpin----------	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope.	Severe: slope.
Berks----------	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope.	Severe: slope, small stones.
GbF*, GbF3*: Gilpin----------	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope.
Berks----------	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope, small stones.
JsD---------- Jefferson	Severe: slope.	Severe: slope.	Severe: large stones, small stones, slope.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
JsF Jefferson	Severe: slope.	Severe: slope.	Severe: large stones, small stones, slope.	Severe: slope.	Severe: slope.
Ka Kanawha	Severe: flooding.	Slight	Slight	Slight	Slight.
LdF*: Lehew	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: slope, small stones, large stones.	Severe: slope, large stones.	Severe: slope, small stones.
Dekalb	Severe: slope, small stones, large stones.	Severe: slope, large stones, small stones.	Severe: slope, small stones, large stones.	Severe: slope, large stones.	Severe: slope, small stones.
L1B Lily	Slight	Slight	Moderate: slope, depth to rock.	Slight	Moderate: thin layer.
L1C Lily	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, thin layer.
L1D Lily	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Lo Lobdell	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Slight	Moderate: flooding.
MgB Monongahela	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight	Slight.
MgC Monongahela	Moderate: wetness, slope.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
MsD Murrill	Severe: slope.	Severe: slope.	Severe: slope, large stones, small stones.	Moderate: slope.	Severe: slope.
MsF Murrill	Severe: slope.	Severe: slope.	Severe: slope, large stones, small stones.	Severe: slope.	Severe: slope.
MuC Murrill	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: slope, small stones.
MuD Murrill	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Oa Orrville	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
Ob*: Orrville	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ob*: Lobdell	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Slight	Moderate: flooding.
ShB Shouns	Slight	Slight	Moderate: slope.	Slight	Slight.
ShC Shouns	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
ShD Shouns	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
StC Shouns	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Slight	Moderate: large stones, slope.
StD Shouns	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: slope.	Severe: slope.
TtB Tilsit	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
TtC Tilsit	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, wetness.
Tv Tygart Variant	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
U1*, U2*, U3*, U4*. Udorthents					
Ud: Udifluvents.					
Psamments.					
UeC*: Urban land.					
Ernest	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: large stones, small stones. slope.
UfD*: Urban land.					

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
UfD*:					
Frederick	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope, small stones.
UgE*:					
Urban land.					
Gilpin	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope.
Berks	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope, small stones.
UlC*:					
Urban land.					
Lily	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, thin layer.
UmD*:					
Urban land.					
Murrill	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Uo*:					
Urban land.					
Orrville	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
Lobdell	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Slight	Moderate: flooding.
WeC---------- Westmoreland	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
WeD---------- Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
WeF---------- Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
At---------- Atkins	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
BwF*: Berks----------	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Weikert----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
CaC---------- Calvin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
CaD---------- Calvin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CbC*, CbC3*: Calvin----------	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Berks----------	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
CbD*, CbD3*: Calvin----------	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Berks----------	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
CbF*, CbF3*, CkD*, CkF*: Calvin----------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Berks----------	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
ClD, ClF---------- Caneyville	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Cm---------- Chagrin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CnD*: Clymer----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Gilpin----------	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CnF*: Clymer----------	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Gilpin----------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
CtC*: Coolville----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
CtC*: Latham	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CtD*: Coolville	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Latham	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CuF: Culleoka	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
DeC: Dekalb	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
DeD: Dekalb	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
DgD*: Dekalb	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Gilpin	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Jefferson	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
DgF*: Dekalb	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Gilpin	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Jefferson	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
DrF*: Dekalb	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Rock outcrop.										
ErB: Ernest	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ErC: Ernest	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ErD: Ernest	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
EuC*, EuD*: Ernest	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Buchanan	Very poor.	Poor	Good	Good	---	Poor	Very poor.	Poor	Good	Very poor.
FcD: Frederick	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
FcF---- Frederick	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FkC, FrC---- Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FrD---- Frederick	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FrF---- Frederick	Very poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GaB---- Gilpin	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
GaC---- Gilpin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
GaD---- Gilpin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
GbC*: Gilpin----	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Berks----	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
GbD*, GbC3*: Gilpin----	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Berks----	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
GbF*, GbF3*, GbD3*: Gilpin----	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Berks----	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
JsD, JsF---- Jefferson	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Ka---- Kanawha	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LdF*: Lehew----	Very poor.	Very poor.	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Dekalb----	Very poor.	Very poor.	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
LlB---- Lily	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LlC---- Lily	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LlD---- Lily	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Lo---- Lobdell	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
MgB---- Monongahela	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MgC---- Monongahela	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MsD---- Murrill	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
MsF---- Murrill	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
MuC---- Murrill	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MuD---- Murrill	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Oa---- Orrville	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Ob*:										
Orrville----	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Lobdell----	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
ShB, ShC---- Shouns	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ShD---- Shouns	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
StC, StD---- Shouns	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
TtB---- Tilsit	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TtC---- Tilsit	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Tv---- Tygart Variant	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
U1*, U2*, U3*, U4*. Udorthents										
Ud*:										
Udifluvents.										
Psamments.										
UeC*:										
Urban land.										
Ernest----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
UfD*:										
Urban land.										
Frederick----	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
UgE*: Urban land.										
Gilpin	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Berks	Very poor.	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
UlC*: Urban land.										
Lily	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
UmD*: Urban land.										
Murrill	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Uo*: Urban land.										
Orrville	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Lobdell	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
WeC--- Westmoreland	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WeD--- Westmoreland	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WeF--- Westmoreland	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
At Atkins	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.
BwF*:						
Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
Weikert	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, thin layer, small stones.
CaC Calvin	Moderate: slope, depth to rock.	Moderate: slope, shrink-swell.	Moderate: slope, depth to rock, shrink-swell.	Severe: slope, slippage.	Severe: low strength.	Moderate: slope, thin layer.
CaD Calvin	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, low strength, slippage.	Severe: slope.
CbC*, CbC3*:						
Calvin	Moderate: slope, depth to rock.	Moderate: slope, shrink-swell.	Moderate: slope, depth to rock, shrink-swell.	Severe: slope, slippage.	Severe: low strength.	Moderate: slope, thin layer.
Berks	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.	Severe: small stones.
CbD*, CbD3*, CbF*, CbF3*:						
Calvin	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, low strength, slippage.	Severe: slope.
Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
CkD*, CkF*:						
Calvin	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, low strength, slippage.	Severe: slope.
Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
ClD, ClF Caneyville	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: low strength, slope, depth to rock.	Severe: slope, depth to rock.
Cm Chagrin	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
CnD*, CnF*:						
Clymer	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CnD*, CnF*: Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CtC*: Coolville	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: slope.
Latham	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: wetness, slope.
CtD*: Coolville	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Latham	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
CuF: Culleoka	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
DeC: Dekalb	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, large stones.	Moderate: slope, thin layer.
DeD: Dekalb	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
DgD*, DgF*: Dekalb	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Jefferson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
DrF*: Dekalb	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
Rock outcrop.						
ErB: Ernest	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Moderate: large stones, small stones.
ErC: Ernest	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: large stones, small stones, slope.
ErD: Ernest	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
EuC*:						
Ernest	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: small stones, large stones, slope.
Buchanan	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Severe: small stones.
EuD*:						
Ernest	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Buchanan	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
FcD, FcF Frederick	Severe: slope.	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope.	Severe: low strength, slope, shrink-swell.	Severe: slope, small stones.
FkC Frederick	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Severe: shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
FrC Frederick	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: slope.	Severe: low strength, shrink-swell.	Moderate: slope, small stones.
FrD, FrF Frederick	Severe: slope.	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope.	Severe: low strength, slope, shrink-swell.	Severe: slope, small stones.
GaB Gilpin	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Moderate: thin layer.
GaC Gilpin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, thin layer.
GaD Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
GbC*, GbC3*:						
Gilpin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, small stones.
Berks	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.	Severe: small stones.
GbD*, GbD3*, GbF*, GbF3*:						
Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
JsD, JsF Jefferson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ka---------- Kanawha	Slight---------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, low strength, frost action.	Slight.
LdF*: Lehew----------	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock, large stones.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
Dekalb----------	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock, large stones.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
LlB---------- Lily	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Moderate: thin layer.
LlC---------- Lily	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Moderate: slope, thin layer.
LlD---------- Lily	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lo---------- Lobdell	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action.	Moderate: flooding.
MgB---------- Monongahela	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.	Slight.
MgC---------- Monongahela	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: slope, low strength, wetness.	Moderate: slope.
MsD, MsF---------- Murrill	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MuC---------- Murrill	Moderate: slope.	Moderate: slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: slope, frost action, low strength.	Moderate: slope, small stones.
MuD---------- Murrill	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Oa---------- Orrville	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Moderate: wetness, flooding.
Ob*: Orrville----------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Moderate: wetness, flooding.
Lobdell----------	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action.	Moderate: flooding.
ShB---------- Shouns	Slight---------	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
ShC---------- Shouns	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
ShD---------- Shouns	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
StC---------- Shouns	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: large stones, slope.
StD---------- Shouns	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
TtB---------- Tilsit	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Severe: low strength.	Slight.
TtC---------- Tilsit	Severe: wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: slope.
Tv---------- Tygart Variant	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
U1*, U2*, U3*, U4*. Udorthents						
Ud*: Udifluvents.						
Psamments.						
UeC*: Urban land.						
Ernest----------	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: large stones, small stones, slope.
UfD*: Urban land.						
Frederick--------	Severe: slope.	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope.	Severe: low strength, slope, shrink-swell.	Severe: slope, small stones.
UgE*: Urban land.						
Gilpin----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Berks----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
UlC*: Urban land.						
Lily----------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Moderate: slope, thin layer.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
UmD*: Urban land.						
Murrill	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Uo*: Urban land.						
Orrville	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Moderate: wetness, flooding.
Lobdell	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness:	Severe: flooding.	Severe: flooding, frost action.	Moderate: flooding.
WeC---------- Westmoreland	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
WeD, WeF---------- Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
At Atkins	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Poor: wetness.
BwF*: Berks	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, area reclaim.
Weikert	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, area reclaim, seepage.
CaC Calvin	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
CaD Calvin	Severe: slope, depth to rock, slippage.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock, slippage.	Poor: slope, area reclaim.
CbC*, CbC3*: Calvin	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
Berks	Severe: depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.
CbD*, CbD3*: Calvin	Severe: slope, depth to rock, slippage.	Severe: slope, depth to rock.	Severe: depth to rock, slope, slippage.	Severe: slope, depth to rock, slippage.	Poor: slope, area reclaim.
Berks	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, area reclaim.
CbF*, CbF3*: Calvin	Severe: slope, depth to rock, slippage.	Severe: slope, depth to rock.	Severe: slope, depth to rock, slippage.	Severe: slope, depth to rock, slippage.	Poor: slope, area reclaim.
Berks	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, area reclaim.
CkD*: Calvin	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slippage.	Severe: slope, depth to rock, slippage.	Poor: slope, area reclaim.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CkD*: Berks	Severe: depth to rock, slope.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, area reclaim.
CkF*: Calvin	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock, slippage.	Severe: slope, depth to rock, slippage.	Poor: slope, area reclaim.
Berks	Severe: depth to rock, slope.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, area reclaim.
ClD, ClF Caneyville	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, slope.
Cm Chagrin	Severe: flooding.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Good.
CnD*, CnF*: Clymer	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.
CtC*: Coolville	Severe: wetness, percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, wetness, slope.	Poor: too clayey, hard to pack.
Latham	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, wetness, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
CtD*: Coolville	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Latham	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, wetness, slope.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
CuF Culleoka	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope.
DeC Dekalb	Severe: depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: seepage, depth to rock.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
DeD---------- Dekalb	Severe: slope, depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones, area reclaim.
DgD*, DgF*: Dekalb----------	Severe: slope, depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones, area reclaim.
Gilpin----------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Poor: slope, area reclaim, large stones.
Jefferson----------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
DrF*: Dekalb----------	Severe: slope, depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones, area reclaim.
Rock outcrop.					
ErB---------- Ernest	Severe: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Poor: small stones.
ErC---------- Ernest	Severe: percs slowly, wetness.	Severe: slope, wetness.	Moderate: slope, wetness.	Moderate: slope, wetness.	Poor: small stones.
ErD---------- Ernest	Severe: slope, percs slowly, wetness.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Poor: slope, small stones.
EuC*: Ernest----------	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: slope, wetness.	Moderate: slope, wetness.	Poor: small stones.
Buchanan----------	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: slope, wetness.	Poor: small stones.
EuD*: Ernest----------	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Poor: slope, small stones.
Buchanan----------	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: wetness, slope.	Severe: slope.	Poor: small stones, slope.
FcD---------- Frederick	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope, too clayey.
FcF---------- Frederick	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, too clayey.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
FkC---------- Frederick	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
FrC---------- Frederick	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
FrD---------- Frederick	Severe: slope.	Severe: slope.	Severe: too clayey, slope.	Severe: slope.	Poor: slope, too clayey.
FrF---------- Frederick	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, too clayey.
GaB---------- Gilpin	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
GaC---------- Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
GaD---------- Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.
GbC*, GbC3*: Gilpin----------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
Berks----------	Severe: depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.
GbD*, GbD3*, GbF*, GbF3*: Gilpin----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.
Berks----------	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, area reclaim.
JsD, JsF---------- Jefferson	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Ka---------- Kanawha	Moderate: flooding.	Severe: seepage, flooding.	Severe: seepage.	Moderate: flooding.	Good.
LdF*: Lehew----------	Severe: slope, depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones, area reclaim.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
LdF*: Dekalb	Severe: slope, depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones, area reclaim.
L1B Lily	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.
L1C Lily	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.
L1D Lily	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope.
Lo Lobdell	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness.
MgB Monongahela	Severe: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
MgC Monongahela	Severe: percs slowly, wetness.	Severe: slope, wetness.	Moderate: slope, wetness.	Moderate: slope, wetness.	Fair: small stones, wetness, slope.
MsD, MsF Murrill	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
MuC Murrill	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, small stones.
MuD Murrill	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Oa Orrville	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness.
Ob*: Orrville	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness.
Lobdell	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness.
ShB Shouns	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
ShC Shouns	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
ShD---------- Shouns	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
StC---------- Shouns	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
StD---------- Shouns	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
TtB---------- Tilsit	Severe: percs slowly, wetness.	Severe: wetness.	Severe: depth to rock, wetness.	Moderate: wetness, depth to rock.	Fair: area reclaim, too clayey.
TtC---------- Tilsit	Severe: percs slowly, wetness.	Severe: slope, wetness.	Severe: depth to rock, wetness.	Moderate: slope, wetness, depth to rock.	Fair: slope, too clayey, area reclaim.
Tv---------- Tygart Variant	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
U1*, U2*, U3*, U4*. Udorthents					
Ud*: Udifluvents.					
Psamments.					
UeC*: Urban land.					
Ernest----------	Severe: percs slowly, wetness.	Severe: slope, wetness.	Moderate: slope, wetness.	Moderate: slope, wetness.	Poor: small stones.
UfD*: Urban land.					
Frederick----------	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, too clayey.
UgE*: Urban land.					
Gilpin----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.
Berks----------	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, area reclaim.
UlC*: Urban land.					
Lily----------	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
UmD*: Urban land.					
Murrill	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Uo*: Urban land.					
Orrville	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness.
Lobdell	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness.
WeC Westmoreland	Moderate: slope, depth to rock, percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: slope, depth to rock.	Poor: small stones.
WeD, WeF Westmoreland	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
At Atkins	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
BwF*: Berks	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Weikert	Poor: slope, area reclaim.	Improbable: small stones.	Improbable: thin layer.	Poor: slope, small stones, area reclaim.
CaC Calvin	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CaD Calvin	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
CbC*, CbC3*: Calvin	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CbD*, CbD3*: Calvin	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CbF*, CbF3*: Calvin	Poor: slope, area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Berks	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CkD*: Calvin	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
CkF*: Calvin	Poor: slope, area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CkF*:				
Berks	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
ClD Caneyville	Poor: area reclaim, low strength.	Improbable: excess fines, depth to rock.	Improbable: excess fines, depth to rock.	Poor: too clayey, slope, depth to rock.
ClF Caneyville	Poor: area reclaim, low strength, slope.	Improbable: excess fines, depth to rock.	Improbable: excess fines, depth to rock.	Poor: too clayey, slope, depth to rock.
Cm Chagrin	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
CnD*:				
Clymer	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Gilpin	Fair: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
CnF*:				
Clymer	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Gilpin	Poor: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
CtC*:				
Coolville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
Latham	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CtD*:				
Coolville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Latham	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CuF Culleoka	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
DeC Dekalb	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
DeD Dekalb	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
DgD*:				
Dekalb	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Gilpin	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Jefferson	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
DgF*:				
Dekalb	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Gilpin	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Jefferson	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
DrF*:				
Dekalb	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Rock outcrop.				
ErB, ErC Ernest	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
ErD Ernest	Fair: low strength, wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
EuC*:				
Ernest	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Buchanan	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
EuD*:				
Ernest	Fair: low strength, wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope, area reclaim.
Buchanan	Fair: slope, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, area reclaim.
FcD Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
FcF---------- Frederick	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
FkC---------- Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, thin layer.
FrC---------- Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
FrD---------- Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
FrF---------- Frederick	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
GaB, GaC---------- Gilpin	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
GaD---------- Gilpin	Fair: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
GbC*, GbC3*:				
Gilpin----------	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Berks----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
GbD*, GbD3*:				
Gilpin----------	Fair: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Berks----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
GbF*, GbF3*:				
Gilpin----------	Poor: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Berks----------	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
JsD---------- Jefferson	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
JsF---------- Jefferson	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Ka---------- Kanawha	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
LdF*:				
Lehew----------	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
LdF*:				
Dekalb	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
L1B, L1C Lily	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
L1D Lily	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Lo Lobdell	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
MgB Monongahela	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
MgC Monongahela	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones.
MsD Murrill	Fair: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
MsF Murrill	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
MuC Murrill	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
MuD Murrill	Fair: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Oa Orrville	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Ob*:				
Orrville	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Lobdell	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
ShB Shouns	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
ShC Shouns	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope, too clayey.
ShD Shouns	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
StC Shouns	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, large stones, slope.
StD Shouns	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
TtB---------- Tilsit	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
TtC---------- Tilsit	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones.
Tv---------- Tygart Variant	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
U1*, U2*, U3*, U4*. Udorthents				
Ud*: Udifluvents.				
Psamments.				
UeC*: Urban land.				
Ernest----------	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
UfD*: Urban land.				
Frederick----------	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
UgE*: Urban land.				
Gilpin----------	Poor: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Berks----------	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
UlC*: Urban land.				
Lily----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
UmD*: Urban land.				
Murrill----------	Fair: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Uo*: Urban land.				
Orrville----------	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Uo*: Lobdell	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
WeC Westmoreland	Fair: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
WeD Westmoreland	Fair: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
WeF Westmoreland	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
At---------- Atkins	Severe: seepage.	Severe: piping, wetness.	Flooding, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
BwF*:					
Berks----------	Severe: seepage, slope.	Severe: seepage.	Deep to water----	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
Weikert----------	Severe: depth to rock, slope, seepage.	Severe: seepage, thin layer.	Deep to water----	Slope, depth to rock.	Slope, droughty.
CaC, CaD---------- Calvin	Severe: slope.	Severe: piping.	Deep to water----	Slope, depth to rock.	Slope, depth to rock.
CbC*, CbC3*, CbD*, CbD3*, CbF*, CbF3*:					
Calvin----------	Severe: slope.	Severe: piping.	Deep to water----	Slope, depth to rock.	Slope, depth to rock.
Berks----------	Severe: seepage, slope.	Severe: seepage.	Deep to water----	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
CkD*, CkF*:					
Calvin----------	Severe: slope.	Severe: piping.	Deep to water----	Slope, depth to rock.	Slope, depth to rock.
Berks----------	Severe: seepage, slope.	Severe: seepage.	Deep to water----	Slope, depth to rock, large stones.	Depth to rock, large stones, slope.
ClD, ClF---------- Caneyville	Severe: slope, depth to rock.	Severe: thin layer.	Deep to water----	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Cm---------- Chagrin	Moderate: seepage.	Severe: piping.	Deep to water----	Favorable--------	Favorable.
CnD*, CnF*:					
Clymer----------	Severe: slope.	Severe: piping.	Deep to water----	Slope, large stones.	Large stones, slope.
Gilpin----------	Severe: slope.	Severe: thin layer.	Deep to water----	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
CtC*, CtD*:					
Coolville--------	Severe: slope.	Moderate: thin layer, hard to pack, wetness.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
Latham----------	Severe: slope.	Severe: thin layer.	Percs slowly, depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
CuF---------- Culleoka	Severe: seepage, slope.	Severe: piping.	Deep to water----	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
DeC, DeD---------- Dekalb	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water----	Slope, large stones, depth to rock.	Slope, large stones, droughty.
DgD*, DgF*: Dekalb----------	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water----	Slope, depth to rock, large stones.	Slope, large stones, droughty.
Gilpin----------	Severe: slope.	Severe: thin layer.	Deep to water----	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Jefferson--------	Severe: seepage, slope.	Severe: piping.	Deep to water----	Slope, large stones.	Slope, large stones.
DrF*: Dekalb----------	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water----	Slope, depth to rock, large stones.	Slope, large stones, droughty.
Rock outcrop.					
ErB---------- Ernest	Moderate: slope.	Severe: piping.	Percs slowly, slope.	Erodes easily, rooting depth, percs slowly.	Erodes easily, rooting depth.
ErC, ErD---------- Ernest	Severe: slope.	Severe: piping.	Percs slowly, slope.	Slope, erodes easily, rooting depth.	Rooting depth, slope, erodes easily.
EuC*, EuD*: Ernest----------	Severe: slope.	Severe: piping.	Percs slowly, slope.	Slope, large stones, wetness.	Percs slowly, slope, rooting depth.
Buchanan---------	Severe: slope.	Severe: piping.	Percs slowly, slope.	Slope, percs slowly, rooting depth.	Slope, percs slowly, rooting depth.
FcD, FcF, FkC, FrC, FrD, FrF---- Frederick	Severe: slope.	Severe: hard to pack.	Deep to water----	Slope----------	Slope.
GaB---------- Gilpin	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Deep to water----	Depth to rock, large stones.	Depth to rock, large stones.
GaC, GaD---------- Gilpin	Severe: slope.	Severe: thin layer.	Deep to water----	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
GbC*, GbC3*, GbD*, GbD3*, GbF* GbF3*: Gilpin----------	Severe: slope.	Severe: thin layer.	Deep to water----	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
Berks----------	Severe: seepage, slope.	Severe: seepage.	Deep to water----	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
JsD, JsF---------- Jefferson	Severe: seepage, slope.	Severe: piping.	Deep to water----	Slope, large stones.	Slope, large stones.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
Ka---------- Kanawha	Moderate: seepage.	Severe: piping.	Deep to water----	Favorable--------	Favorable.
LdF*:					
Lehew----------	Severe: seepage, slope.	Severe: seepage, thin layer.	Deep to water----	Slope, large stones, depth to rock.	Slope, large stones, droughty.
Dekalb----------	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water----	Slope, depth to rock, large stones.	Slope, large stones, droughty.
L1B---------- Lily	Severe: seepage.	Severe: piping.	Deep to water----	Depth to rock----	Depth to rock.
L1C, L1D---------- Lily	Severe: seepage, slope.	Severe: piping.	Deep to water----	Slope, depth to rock.	Slope, depth to rock.
Lo---------- Lobdell	Severe: seepage.	Severe: piping.	Flooding---------	Erodes easily, wetness.	Erodes easily.
MgB---------- Monongahela	Moderate: seepage, slope.	Severe: piping.	Percs slowly, slope.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth, percs slowly.
MgC---------- Monongahela	Severe: slope.	Severe: piping.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
MsD, MsF, MuC, MuD---------- Murrill	Severe: slope.	Moderate: piping.	Deep to water----	Slope----------	Slope.
Oa---------- Orrville	Moderate: seepage.	Severe: piping, wetness.	Flooding---------	Erodes easily, wetness.	Wetness, erodes easily.
Ob*:					
Orrville----------	Moderate: seepage.	Severe: piping, wetness.	Flooding---------	Erodes easily, wetness.	Wetness, erodes easily.
Lobdell----------	Severe: seepage.	Severe: piping.	Flooding---------	Erodes easily, wetness.	Erodes easily.
ShB---------- Shouns	Moderate: seepage.	Severe: piping.	Deep to water----	Favorable--------	Favorable.
ShC---------- Shouns	Moderate: seepage.	Severe: piping.	Deep to water----	Slope----------	Slope.
ShD---------- Shouns	Severe: slope.	Severe: piping.	Deep to water----	Slope----------	Slope.
StC, StD---------- Shouns	Moderate: seepage.	Moderate: piping.	Deep to water----	Slope----------	Slope.
TtB---------- Tilsit	Moderate: depth to rock, seepage.	Severe: piping.	Percs slowly, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
TtC---------- Tilsit	Moderate: depth to rock, seepage.	Severe: piping.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
Tv---------- Tygart Variant	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, frost action.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
U1*, U2*, U3*, U4*. Udorthents					
Ud*: Udifluvents.					
Psamments.					
UeC*: Urban land.					
Ernest----------	Severe: slope.	Severe: piping.	Percs slowly, slope.	Slope, erodes easily, rooting depth.	Rooting depth, slope, erodes easily.
UfD*: Urban land.					
Frederick--------	Severe: slope.	Severe: hard to pack.	Deep to water----	Slope----------	Slope.
UgE*: Urban land.					
Gilpin----------	Severe: slope.	Severe: thin layer.	Deep to water----	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
Berks----------	Severe: seepage, slope.	Severe: seepage.	Deep to water----	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
UlC*: Urban land.					
Lily----------	Severe: seepage, slope.	Severe: piping.	Deep to water----	Slope, depth to rock.	Slope, depth to rock.
UmD*: Urban land.					
Murrill----------	Severe: slope.	Moderate: piping.	Deep to water----	Slope----------	Slope.
Uo*: Urban land.					
Orrville---------	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
Lobdell----------	Severe: seepage.	Severe: piping.	Flooding, frost action.	Erodes easily, wetness.	Erodes easily.
WeC, WeD, WeF----- Westmoreland	Severe: slope.	Severe: piping.	Deep to water----	Slope----------	Slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
At---------- Atkins	0-9	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	90-100	85-100	75-100	60-95	20-40	3-20
	9-41	Silty clay loam, silt loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-5	90-100	85-100	65-100	45-85	20-40	3-20
	41-60	Stratified silty clay loam to gravelly sandy loam.	SM, CL, GM, ML	A-2, A-4, A-6	0-15	60-100	60-100	50-95	30-85	20-40	1-15
BwF*:											
Berks----------	0-7	Shaly silt loam	GM, ML, GC, SC	A-2, A-4	0-20	50-80	45-70	40-60	30-55	25-36	5-10
	7-28	Shaly loam, very shaly loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	28-35	Shaly loam, very shaly loam, shaly silt loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
Weikert---------	0-6	Shaly silt loam	GM, ML, SM	A-1, A-2, A-4	0-10	35-70	35-70	25-65	20-55	30-40	4-10
	6-15	Weathered bedrock	GM, GP-GM	A-1, A-2	0-20	15-60	10-55	5-45	5-35	28-36	3-9
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CaC, CaD--------- Calvin	0-5	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-5	90-100	70-100	70-100	65-95	20-35	4-12
	5-23	Channery silt loam, channery silty clay loam, shaly silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-10	65-100	65-95	65-95	60-95	20-45	4-20
	23-35	Very channery silt loam, channery silt loam, shaly silty clay loam.	ML, CL, GC, GM	A-4, A-6	0-20	40-80	40-75	40-75	35-75	20-35	4-15
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
CbC*, CbC3*, CbD*, CbD3*, CbF*, CbF3*:											
Calvin---------	0-5	Shaly silt loam	ML, CL, CL-ML	A-4, A-6	0-10	70-95	65-90	65-90	60-90	20-35	4-12
	5-23	Channery silt loam, channery silty clay loam, shaly silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-10	65-100	65-95	65-95	60-95	20-45	4-20
	23-35	Very channery silt loam, channery silt loam, shaly silty clay loam.	ML, CL, GC, GM	A-4, A-6	0-20	40-80	40-75	40-75	35-75	20-35	4-15
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
Berks----------	0-7	Shaly silt loam	GM, ML, GC, SC	A-2, A-4	0-20	50-80	45-70	40-60	30-55	25-36	5-10
	7-28	Shaly loam, very shaly loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	28-35	Shaly loam, very shaly loam, shaly silt loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CkD*, CkF*:											
Calvin----------	0-5	Very stony silt loam.	ML, CL, CL-ML	A-4, A-6	3-10	70-95	65-90	65-90	60-90	20-35	4-12
	5-23	Channery silt loam, channery silty clay loam, shaly silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-10	65-100	65-95	65-95	60-95	20-45	4-20
	23-35	Very channery silt loam, channery silt loam, shaly silty clay loam.	ML, CL, GC, GM	A-4, A-6	0-20	40-80	40-75	40-75	35-75	20-35	4-15
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
Berks----------	0-7	Very stony silt loam.	GM, SM, GC, SC	A-2, A-4	15-30	40-80	35-70	30-60	25-45	25-36	5-10
	7-28	Shaly loam, very shaly loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	28-35	Shaly loam, very shaly loam, shaly silt loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
ClD, ClF--------- Caneyville	0-6		ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	6-10	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	10-29	Clay, silty clay	CH	A-7	0-3	90-100	85-100	75-100	65-100	50-75	30-45
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Cm---------- Chagrin	0-10	Loam----------	ML, CL, CL-ML	A-4	0	95-100	85-100	80-100	70-90	20-35	2-10
	10-36	Silt loam, loam, sandy loam.	ML, SM	A-4, A-2, A-6	0	90-100	75-100	55-90	30-80	20-40	NP-14
	36-60	Stratified silt loam to fine sand.	ML, SM	A-4, A-2	0	85-100	75-100	50-85	15-80	20-40	NP-10
CnD*, CnF*:											
Clymer----------	0-9	Loam----------	ML, SM	A-4	0-5	85-100	75-95	60-90	35-85	10-30	NP-9
	9-36	Sandy loam, channery loam, channery clay loam.	GM, SM, GC, ML	A-2, A-4	0-20	60-95	50-95	45-85	30-60	14-32	NP-9
	36-48	Channery loam, very channery loam, channery sandy loam.	GM, GP-GM, GC, SM	A-1, A-2, A-3, A-4	10-30	30-75	25-70	20-60	5-40	14-32	NP-9
	48	Weathered bedrock	---	---	---	---	---	---	---	---	---
Gilpin----------	0-6	Silt loam--------	CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	6-27	Channery loam, shaly silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	27-35	Channery loam, very channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CtC*, CtD*:											
Coolville	0-8	Silt loam	ML, CL-ML	A-4, A-6	0	90-100	85-100	80-100	70-90	25-40	4-12
	8-13	Silty clay loam	CL	A-7, A-6	0	95-100	90-100	85-100	80-95	35-48	15-25
	13-43	Clay, silty clay, silty clay loam.	CH	A-7	0-5	95-100	90-100	90-100	75-95	50-62	28-36
	43-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Latham	0-6	Silt loam	CL-ML, CL	A-4, A-6	0-5	85-100	70-100	70-100	65-90	20-35	5-12
	6-36	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-10	85-100	70-95	65-95	60-90	45-65	25-40
	36	Weathered bedrock	---	---	---	---	---	---	---	---	---
CuF Culleoka	0-7	Silt loam	ML, CL, CL-ML	A-4	0-5	90-100	85-100	70-100	55-95	<35	NP-10
	7-29	Channery silt loam, flaggy loam, silty clay loam.	ML, CL, CL-ML	A-6, A-4	5-25	80-95	75-95	65-95	55-90	20-40	2-20
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
DeC, DeD Dekalb	0-9	Channery sandy loam.	SM, GM, ML, CL-ML	A-2, A-4, A-1	0-30	50-90	45-80	40-75	20-55	15-32	NP-9
	9-21	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML, GM-GC	A-2, A-4, A-1	5-40	50-85	40-80	40-75	20-55	15-32	NP-9
	21-28	Channery sandy loam, flaggy sandy loam, very flaggy loamy sand.	SM, GM, SC, GC	A-2, A-4, A-1	10-50	45-85	25-75	20-65	15-40	15-32	NP-9
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
DgD*, DgF*:											
Dekalb	0-9	Very stony sandy loam.	SM, GM, ML, CL-ML	A-2, A-4, A-1	10-30	50-90	45-80	40-75	20-55	15-32	NP-9
	9-21	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML, GM-GC	A-2, A-4, A-1	5-40	50-85	40-80	40-75	20-55	15-32	NP-9
	21-28	Channery sandy loam, flaggy sandy loam, very flaggy loamy sand.	SM, GM, SC, GC	A-2, A-4, A-1	10-50	45-85	25-75	20-65	15-40	15-32	NP-9
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Gilpin	0-6	Very stony silt loam.	GC, CL, SC, CL-ML	A-2, A-4, A-6	10-40	50-90	45-85	35-75	30-70	20-40	4-15
	6-27	Shaly silt loam, channery loam, silty clay loam.	GM-GC, CL, CL-ML, SC	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	27-35	Channery loam, very channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
DgD*, DgF*:											
Jefferson-------	0-9	Very stony loam	SM, GM, ML, CL	A-2, A-4	5-20	65-90	60-90	50-80	30-60	20-35	2-10
	9-37	Channery loam, gravelly clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-2, A-4, A-6	5-20	75-90	70-90	50-80	30-70	15-35	2-15
	37-60	Very channery loam, gravelly clay loam, gravelly sandy clay loam.	GM, SM, ML, GM-GC	A-1, A-2, A-4	5-25	55-75	50-75	35-70	20-60	20-35	2-10
DrF*:											
Dekalb----------	0-9	Very stony sandy loam.	SM, GM, ML, CL-ML	A-2, A-4, A-1	10-30	50-90	45-80	40-75	20-55	15-32	NP-9
	9-21	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML, GM-GC	A-2, A-4, A-1	5-40	50-85	40-80	40-75	20-55	15-32	NP-9
	21-28	Channery sandy loam, flaggy sandy loam, very flaggy loamy sand.	SM, GM, SC, GC	A-2, A-4, A-1	10-50	45-85	25-75	20-65	15-40	15-32	NP-9
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
ErB, ErC, ErD---- Ernest	0-9	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-10	85-100	80-100	70-95	60-95	20-40	4-15
	9-24	Silty clay loam, silt loam, channery silt loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-15	75-95	70-95	65-90	55-90	25-50	6-22
	24-38	Channery silt loam, channery loam, silty clay loam.	ML, CL, GM, SC	A-4, A-6, A-7	0-20	70-95	55-95	55-90	45-90	20-45	4-18
	38-60	Channery silt loam, silt loam, silty clay loam.	ML, CL, GM, SC	A-4, A-6, A-7	0-20	70-95	45-95	45-90	40-90	25-50	6-22
EuC*, EuD*:											
Ernest----------	0-9	Very stony silt loam.	ML, CL, CL-ML	A-4, A-6	3-15	65-80	60-80	55-75	55-70	20-40	4-15
	9-24	Silty clay loam, silt loam, channery silt loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-15	75-95	70-95	65-90	55-90	25-50	6-22
	24-38	Channery silt loam, channery loam, silty clay loam.	ML, CL, GM, SC	A-4, A-6, A-7	0-20	70-95	55-95	55-90	45-90	20-45	4-18
	38-60	Channery silt loam, silt loam, silty clay loam.	ML, CL, GM, SC	A-4, A-6, A-7	0-20	70-95	45-95	45-90	40-90	25-50	6-22
Buchanan--------	0-7	Very stony loam	GM, ML, CL, CL-ML	A-2, A-4	3-20	50-90	45-75	40-75	30-65	20-35	2-11
	7-26	Gravelly loam, silt loam, gravelly sandy clay loam.	GM, ML, CL, SM	A-2, A-4	0-20	50-100	45-90	40-90	20-80	20-35	2-15
	26-60	Gravelly loam, loam, channery clay loam.	GM, ML, CL, SM	A-2, A-4, A-6	0-20	50-100	30-80	30-75	20-60	20-35	2-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
FcD, FcF---------- Frederick	0-13	Very cherty silt loam.	GM, GC	A-2, A-4, A-1	0-15	40-60	25-35	20-35	15-25	20-45	5-25
	13-17	Silt loam, silty clay loam, cherty silty clay loam.	ML, CL, GC	A-6, A-7	0-5	70-100	60-100	55-100	45-95	20-45	5-25
	17-72	Silty clay, clay, cherty clay.	CH, MH-CH	A-7	0-5	80-100	65-100	65-100	65-100	50-70	25-40
FkC---------- Frederick	0-13	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-5	80-100	75-100	75-95	75-90	<35	NP-15
	13-17	Silt loam, silty clay loam, cherty silty clay loam.	CL, CL-ML	A-6, A-7	0-5	80-100	60-100	55-100	50-95	20-45	5-25
	17-72	Silty clay, clay, cherty clay.	CH, MH-CH	A-7	0-5	80-100	65-100	65-100	65-100	50-70	25-40
FrC, FrD, FrF---- Frederick	0-13	Cherty silt loam	GM, GC, ML	A-4, A-6	0-10	50-80	45-75	40-75	35-70	<35	NP-15
	13-17	Silt loam, silty clay loam, cherty silty clay loam.	ML, CL, GC	A-6, A-7	0-5	70-100	60-100	55-100	45-95	20-45	5-25
	17-72	Silty clay, clay, cherty clay.	CH, MH-CH	A-7	0-5	80-100	65-100	65-100	65-100	50-70	25-40
GaB, GaC, GaD---- Gilpin	0-6	Silt loam--------	CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	6-27	Channery loam, shaly silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	27-35	Channery loam, very channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GbC*, GbC3*, GbD*, GbD3*, GbF*, GbF3*: Gilpin---------	0-6	Shaly silt loam	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-90	45-85	35-75	30-70	20-40	4-15
	6-27	Channery loam, shaly silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	27-35	Channery loam, very channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Berks----------	0-7	Shaly silt loam	GM, ML, GC, SC	A-2, A-4	0-20	50-80	45-70	40-60	30-55	25-36	5-10
	7-28	Shaly loam, very shaly loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	28-35	Shaly loam, very shaly loam, shaly silt loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
JsD, JsF--------- Jefferson	0-9	Very stony loam	SM, GM, ML, CL	A-2, A-4	5-20	65-90	60-90	50-80	30-60	20-35	2-10
	9-37	Channery loam, gravelly clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-2, A-4, A-6	5-20	75-90	70-90	50-80	30-70	15-35	2-15
	37-60	Very channery loam, gravelly clay loam, gravelly sandy clay loam.	GM, SM, ML, GM-GC	A-1, A-2, A-4	5-25	55-75	50-75	35-70	20-60	20-35	2-10
Ka----------	0-7	Fine sandy loam	SM, ML	A-2, A-4	0	80-100	75-100	45-85	25-55	<25	NP-5
Kanawha	7-12	Fine sandy loam, silt loam.	ML, CL, SM, SC	A-4, A-6, A-2	0	80-100	75-100	50-100	30-90	20-35	2-12
	12-52	Loam, sandy clay loam, clay loam.	SC, CL, ML, SM	A-2, A-4, A-6	0	80-100	75-100	60-100	25-80	20-40	4-15
	52-60	Fine sandy loam, gravelly fine sandy loam, sandy clay loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	60-100	55-100	40-95	20-60	20-35	2-12
LdF*: Lehew----------	0-10	Extremely stony sandy loam.	SM, GM, ML, CL-ML	A-2, A-4	20-50	50-90	45-80	40-75	20-55	15-30	NP-7
	10-27	Very channery sandy loam, channery fine sandy loam, channery loam.	SM, GM, GM-GC, SM-SC	A-2, A-4	5-40	45-75	30-65	20-55	10-40	15-30	NP-7
	27-33	Very channery sandy loam, very channery fine sandy loam, channery loam.	SM, GM, GM-GC, SM-SC	A-2, A-4	10-50	45-75	30-65	20-55	10-40	15-30	NP-7
	33	Weathered bedrock	---	---	---	---	---	---	---	---	---
Dekalb----------	0-9	Extremely stony sandy loam.	SM, GM, ML, CL-ML	A-2, A-4, A-1	15-30	50-90	45-80	40-75	20-55	15-32	NP-9
	9-21	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML, GM-GC	A-2, A-4, A-1	5-40	50-85	40-80	40-75	20-55	15-32	NP-9
	21-28	Channery sandy loam, flaggy sandy loam, very flaggy loamy sand.	SM, GM, SC, GC	A-2, A-4, A-1	10-50	45-85	25-75	20-65	15-40	15-32	NP-9
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
L1B, L1C, L1D---- Lily	0-8	Loam----------	ML	A-4	0-5	90-100	85-100	70-95	55-75	<35	NP-7
	8-25	Clay loam, sandy clay loam, loam.	SM, SC, ML, CL	A-4, A-6	0-5	90-100	85-100	75-100	40-80	<35	3-15
	25-30	Sandy clay loam, clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-4, A-2, A-6, A-1-B	0-10	65-100	50-100	40-95	20-75	<35	3-15
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lo----------	0-10	Loam----------	ML, CL-ML, CL	A-4	0	95-100	90-100	80-100	65-90	20-30	NP-8
Lobdell	10-35	Loam, silt loam	ML	A-4	0	90-100	80-100	70-95	55-85	20-35	NP-10
	35-60	Stratified sandy loam to silt loam.	ML, SM, CL-ML, CL	A-4	0	90-100	80-100	65-85	40-80	15-35	NP-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
MgB, MgC--------- Monongahela	0-8	Silt loam---------	ML, SM, CL-ML, SM-SC	A-4	0-5	90-100	85-100	75-100	45-90	20-35	1-10
	8-21	Silt loam, clay loam, gravelly loam.	ML, CL, CL-ML	A-4, A-6	0-15	90-100	80-100	75-100	70-90	20-40	5-15
	21-60	Silt loam, sandy clay loam, gravelly loam.	ML, CL, SM, SC	A-4, A-6	0-10	80-100	60-100	55-95	45-95	20-40	3-15
MsD, MsF--------- Murrill	0-11	Very stony loam	ML, CL, SC, SM-SC	A-4, A-6, A-2	3-15	65-80	50-70	45-65	30-65	20-40	3-15
	11-41	Channery silty clay loam, channery sandy clay loam, channery clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-15	65-85	60-70	55-65	50-65	25-50	5-25
	41-72	Clay loam, clay, channery clay loam.	CH, CL, MH	A-6, A-7	0-20	80-100	65-100	60-100	55-100	35-75	20-40
MuC, MuD--------- Murrill	0-11	Channery silt loam.	ML, GM, CL, SM-SC	A-4, A-6, A-2	0-5	65-80	55-70	45-65	30-65	20-40	3-15
	11-41	Channery silty clay loam, channery sandy clay loam, channery clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-15	65-85	60-70	55-65	50-65	20-50	5-25
	41-72	Clay loam, clay, channery clay loam.	CH, MH, CL	A-6, A-7	0-20	80-100	65-100	60-100	55-100	35-75	20-40
Oa--------------- Orrville	0-10	Silt loam---------	ML, CL-ML, CL	A-4	0	100	90-100	85-100	60-80	22-35	4-10
	10-31	Silt loam, loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6	0-2	95-100	75-100	70-95	45-90	20-40	2-16
	31-60	Stratified gravelly loamy sand to silt loam.	ML, CL, SM, SC	A-4, A-2	0-2	95-100	65-100	40-85	15-75	15-35	NP-10
Ob*: Orrville--------	0-10	Silt loam---------	ML, CL-ML, CL	A-4	0	100	90-100	85-100	60-80	22-35	4-10
	10-31	Silt loam, loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6	0-2	95-100	75-100	70-95	45-90	20-40	2-16
	31-60	Stratified gravelly loamy sand to silt loam.	ML, CL, SM, SC	A-4, A-2	0-2	95-100	65-100	40-85	15-75	15-35	NP-10
Lobdell----------	0-10	Loam-------------	ML, CL-ML, CL	A-4	0	95-100	90-100	80-100	65-90	20-30	NP-8
	10-35	Loam, silt loam	ML	A-4	0	90-100	80-100	70-95	55-85	20-35	NP-10
	35-60	Stratified sandy loam to silt loam.	ML, SM, CL-ML, CL	A-4	0	90-100	80-100	65-85	40-80	15-35	NP-10
ShB, ShC, ShD---- Shouns	0-8	Silt loam---------	ML, CL, CL-ML	A-4, A-6	0	80-100	75-100	65-95	55-90	15-30	3-12
	8-48	Silt loam, loam	ML, CL, CL-ML	A-4, A-6	0	80-100	75-100	70-95	60-90	15-35	5-15
	48-60	Silty clay loam, clay loam.	CL, ML	A-4, A-6	0	80-100	75-100	70-95	60-90	25-40	8-17
	76	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
StC, StD--------- Shouns	0-8	Very stony silt loam.	ML, CL, CL-ML	A-4, A-6	5-15	80-100	75-100	65-95	55-90	15-30	3-12
	8-48	Silty clay loam, clay loam.	CL, CL-ML	A-4, A-6	0-5	80-100	75-100	70-95	60-90	25-40	8-17
	48-60	Silty clay loam, clay loam, shaly clay loam.	CL, ML	A-4, A-6, A-7	10-25	75-100	65-90	60-85	50-75	30-45	10-20
TtB, TtC--------- Tilsit	0-7	Silt loam---------	ML, CL, CL-ML	A-4	0	90-100	85-100	75-100	60-100	20-35	4-10
	7-24	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	90-100	85-100	75-100	65-100	25-40	5-20
	24-51	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	90-100	85-100	75-100	65-100	25-45	5-25
	51	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Tv--------- Tygart Variant	0-9	Silt loam---------	ML, CL, CL-ML	A-4	0	85-100	80-100	75-100	70-90	20-35	3-10
	9-57	Silty clay loam, clay loam, silt loam.	CL, CL-ML, ML	A-4, A-6	0	90-100	85-100	80-100	65-85	25-40	4-15
	57-72	Stratified clay loam to gravelly sandy loam.	ML, CL, SM, SC	A-4, A-6, A-2	0	75-100	65-100	60-90	30-75	15-35	2-12
U1*, U2*, U3* U4*. Udorthents											
Ud*: Udifluvents.											
Psamments.											
UeC*: Urban land.											
Ernest----------	0-9	Silt loam---------	ML, CL, CL-ML	A-4, A-6	0-10	85-100	80-100	70-95	60-95	20-40	4-15
	9-24	Silty clay loam, silt loam, channery silt loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-15	75-95	70-95	65-90	55-90	25-50	6-22
	24-38	Channery silt loam, channery loam, silty clay loam.	ML, CL, GM, SC	A-4, A-6, A-7	0-20	70-95	55-95	55-90	45-90	20-45	4-18
	38-60	Channery silt loam, silt loam, silty clay loam.	ML, CL, GM, SC	A-4, A-6, A-7	0-20	70-95	45-95	45-90	40-90	25-50	6-22
UfD*: Urban land.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
UfD*:											
Frederick	0-13	Cherty silt loam	GM, GC, ML	A-4, A-6	0-10	50-80	45-75	40-75	35-70	<35	NP-15
	13-17	Silt loam, silty clay loam, cherty silty clay loam.	ML, CL, GC	A-6, A-7	0-5	70-100	60-100	55-100	45-95	20-45	5-25
	17-24	Silty clay, clay, cherty clay.	CH, MH-CH	A-7	0-5	80-100	65-100	65-100	65-100	50-70	25-40
	24-72	Clay, silty clay	CH, MH	A-7	0-5	90-100	85-100	70-100	60-95	60-85	25-55
UgE*:											
Urban land.											
Gilpin	0-6	Shaly silt loam	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-90	45-85	35-75	30-70	20-40	4-15
	6-27	Channery loam, shaly silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	27-35	Channery loam, very channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Berks	0-7	Shaly silt loam	GM, ML, GC, SC	A-2, A-4	0-20	50-80	45-70	40-60	30-55	25-36	5-10
	7-28	Shaly loam, very shaly loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	28-35	Shaly loam, very shaly loam, shaly silt loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
UlC*:											
Urban land.											
Lily	0-8	Loam	ML	A-4	0-5	90-100	85-100	70-95	55-75	<35	NP-7
	8-25	Clay loam, sandy clay loam, loam.	SM, SC, ML, CL	A-4, A-6	0-5	90-100	85-100	75-100	40-80	<35	3-15
	25-30	Sandy clay loam, clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-4, A-2, A-6, A-1-B	0-10	65-100	50-100	40-95	20-75	<35	3-15
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
UmD*:											
Urban land.											
Murrill	0-11	Channery silt loam.	ML, GM, CL, SM-SC	A-4, A-6, A-2	0-5	65-80	55-70	45-65	30-65	20-40	3-15
	11-41	Channery silty clay loam, channery sandy clay loam, channery clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-15	65-85	60-70	55-65	50-65	20-50	5-25
	41-72	Clay loam, clay, channery clay loam.	CH, MH, CL	A-6, A-7	0-20	80-100	65-100	60-100	55-100	35-75	20-40
Uo*:											
Urban land.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Uo*:											
Orrville	0-10	Silt loam	ML, CL-ML, CL	A-4	0	100	90-100	85-100	60-80	22-35	4-10
	10-31	Silt loam, loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6	0-2	95-100	75-100	70-95	45-90	20-40	2-16
	31-60	Stratified gravelly loamy sand to silt loam.	ML, CL, SM, SC	A-4, A-2	0-2	95-100	65-100	40-85	15-75	15-35	NP-10
Lobdell	0-10	Loam	ML, CL-ML, CL	A-4	0	95-100	90-100	80-100	65-90	20-30	NP-8
	10-35	Loam, silt loam	ML	A-4	0	90-100	80-100	70-95	55-85	20-35	NP-10
	35-60	Stratified sandy loam to silt loam.	ML, SM, CL-ML, CL	A-4	0	90-100	80-100	65-85	40-80	15-35	NP-10
WeC, WeD, WeF---- Westmoreland	0-9	Silt loam	ML, CL	A-4, A-6	0	85-100	80-100	75-95	60-95	---	---
	9-36	Silty clay loam, channery loam, shaly silt loam.	CL, ML, GM, GC	A-4, A-6, A-7	0-15	65-100	55-95	50-90	45-85	22-45	2-20
	36-46	Very channery loam, very channery silt loam, shaly silty clay loam.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	25-95	20-95	15-90	15-80	20-40	2-20
	46	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
At----------	0-9	0.6-2.0	0.14-0.22	4.5-5.5	Low----------	0.28	5
Atkins	9-41	0.06-2.0	0.14-0.18	4.5-5.5	Low----------	0.28	
	41-60	0.2-6.0	0.08-0.18	4.5-5.5	Low----------	0.28	
BwF*:							
Berks----------	0-7	0.6-6.0	0.08-0.12	3.6-6.5	Low----------	0.24	3
	7-28	0.6-6.0	0.04-0.10	3.6-6.5	Low----------	0.17	
	28-35	2.0-6.0	0.04-0.10	3.6-6.5	Low----------	0.17	
	35	---	---	---	----------	----	
Weikert---------	0-6	2.0-6.0	0.08-0.14	4.5-6.0	Low----------	0.28	2
	6-15	2.0-6.0	0.04-0.08	4.5-6.0	Low----------	0.28	
	15	---	---	---	----------	----	
CaC, CaD---------	0-5	0.6-2.0	0.16-0.20	4.5-6.0	Low----------	0.32	3
Calvin	5-23	0.6-2.0	0.12-0.16	4.5-6.0	Moderate-------	0.28	
	23-35	0.6-2.0	0.08-0.12	5.1-6.5	Low----------	0.28	
	35	---	---	---	----------	----	
CbC*, CbC3*, CbD*, CbD3*, CbF*, CbF3*:							
Calvin---------	0-5	0.6-2.0	0.14-0.18	4.5-6.0	Low----------	0.28	3
	5-23	0.6-2.0	0.12-0.16	4.5-6.0	Moderate-------	0.28	
	23-35	0.6-2.0	0.08-0.12	5.1-6.5	Low----------	0.28	
	35	---	---	---	----------	----	
Berks----------	0-7	0.6-6.0	0.08-0.12	3.6-6.5	Low----------	0.24	3
	7-28	0.6-6.0	0.04-0.10	3.6-6.5	Low----------	0.17	
	28-35	2.0-6.0	0.04-0.10	3.6-6.5	Low----------	0.17	
	35	---	---	---	----------	----	
CkD*, CkF*:							
Calvin---------	0-5	0.6-2.0	0.14-0.18	4.5-6.0	Low----------	0.28	3
	5-23	0.6-2.0	0.12-0.16	4.5-6.0	Moderate-------	0.28	
	23-35	0.6-2.0	0.08-0.12	5.1-6.5	Low----------	0.28	
	35	---	---	---	----------	----	
Berks----------	0-7	0.6-6.0	0.08-0.12	3.6-6.5	Low----------	0.17	3
	7-28	0.6-6.0	0.04-0.10	3.6-6.5	Low----------	0.17	
	28-35	2.0-6.0	0.04-0.10	3.6-6.5	Low----------	0.17	
	35	---	---	---	----------	----	
ClD, ClF---------	0-6	0.6-2.0	0.15-0.22	4.5-7.3	Low----------	0.43	3
Caneyville	6-10	0.2-0.6	0.12-0.18	4.5-7.3	Moderate-------	0.28	
	10-29	0.2-0.6	0.12-0.18	5.6-7.8	Moderate-------	0.28	
	29	---	---	---	----------	----	
Cm----------	0-10	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.32	5
Chagrin	10-36	0.6-2.0	0.14-0.20	5.6-7.3	Low----------	0.32	
	36-60	0.6-2.0	0.08-0.20	5.6-7.3	Low----------	0.32	
CnD*, CnF*:							
Clymer---------	0-9	0.6-2.0	0.10-0.16	3.6-5.5	Low----------	0.24	4
	9-36	0.6-2.0	0.08-0.14	3.6-5.5	Low----------	0.15	
	36-48	0.6-2.0	0.04-0.08	3.6-5.5	Low----------	0.15	
	48	---	---	---	----------	----	
Gilpin---------	0-6	0.6-2.0	0.12-0.18	3.6-5.5	Low----------	0.32	3
	6-27	0.6-2.0	0.10-0.16	3.6-5.5	Low----------	0.24	
	27-35	0.6-2.0	0.06-0.10	3.6-5.5	Low----------	0.24	
	35	---	---	---	----------	----	

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
CtC*, CtD*:							
Coolville	0-8	0.6-2.0	0.18-0.22	3.6-6.5	Low	0.43	4
	8-13	0.6-2.0	0.16-0.19	3.6-5.5	Moderate	0.43	
	13-43	<0.2	0.10-0.15	3.6-5.5	Moderate	0.32	
	43-60	---	---	---	---	----	
Latham	0-6	0.6-2.0	0.16-0.20	3.6-5.5	Low	0.43	3
	6-36	<0.2	0.11-0.15	3.6-5.5	Moderate	0.32	
	36	---	---	---	---	----	
CuF	0-7	0.6-6.0	0.14-0.20	5.1-6.0	Low	0.32	3
Culleoka	7-29	0.6-6.0	0.12-0.20	5.1-6.0	Low	0.28	
	29	---	---	---	---	----	
DeC, DeD	0-9	2.0-20	0.08-0.12	3.6-6.5	Low	0.17	3
Dekalb	9-21	2.0-20	0.06-0.12	3.6-5.5	Low	0.17	
	21-28	>6.0	0.05-0.10	3.6-5.5	Low	0.17	
	28	---	---	---	---	----	
DgD*, DgF*:							
Dekalb	0-9	2.0-20	0.08-0.12	3.6-6.5	Low	0.17	3
	9-21	2.0-20	0.06-0.12	3.6-5.5	Low	0.17	
	21-28	>6.0	0.05-0.10	3.6-5.5	Low	0.17	
	28	---	---	---	---	----	
Gilpin	0-6	0.6-2.0	0.08-0.14	3.6-5.5	Low	0.17	3
	6-27	0.6-2.0	0.10-0.16	3.6-5.5	Low	0.24	
	27-35	0.6-2.0	0.06-0.10	3.6-5.5	Low	0.24	
	35	---	---	---	---	----	
Jefferson	0-9	2.0-6.0	0.10-0.16	4.5-5.5	Low	0.28	4
	9-37	2.0-6.0	0.10-0.16	4.5-5.5	Low	0.28	
	37-60	2.0-6.0	0.08-0.14	4.5-5.5	Low	0.17	
DrF*:							
Dekalb	0-9	2.0-20	0.08-0.12	3.6-6.5	Low	0.17	3
	9-21	2.0-20	0.06-0.12	3.6-5.5	Low	0.17	
	21-28	>6.0	0.05-0.10	3.6-5.5	Low	0.17	
	28	---	---	---	---	----	
Rock outcrop.							
ErB, ErC, ErD	0-9	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.43	3
Ernest	9-24	0.6-2.0	0.12-0.16	4.5-5.5	Moderate	0.28	
	24-38	0.06-0.6	0.08-0.12	4.5-5.5	Low	0.28	
	38-60	0.06-0.6	0.08-0.12	4.5-5.5	Moderate	0.28	
EuC*, EuD*:							
Ernest	0-9	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.32	3
	9-24	0.6-2.0	0.12-0.16	4.5-5.5	Moderate	0.28	
	24-38	0.06-0.6	0.08-0.12	4.5-5.5	Low	0.28	
	38-60	0.06-0.6	0.08-0.12	4.5-5.5	Moderate	0.28	
Buchanan	0-7	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.24	3-2
	7-26	0.6-2.0	0.10-0.16	3.6-5.5	Low	0.24	
	26-60	0.06-0.2	0.06-0.10	3.6-5.5	Low	0.17	
FcD, FcF	0-13	2.0-6.0	0.10-0.16	4.5-6.0	Low	0.28	4
Frederick	13-17	0.6-2.0	0.12-0.18	4.5-6.0	Moderate	0.24	
	17-72	0.6-2.0	0.10-0.18	4.5-5.5	Moderate	0.24	
FkC	0-13	2.0-6.0	0.15-0.24	4.5-6.0	Low	0.32	4
Frederick	13-17	0.6-2.0	0.12-0.18	4.5-6.0	Moderate	0.24	
	17-72	0.6-2.0	0.09-0.18	4.5-5.5	Moderate	0.24	
FrC, FrD, FrF	0-13	2.0-6.0	0.12-0.20	4.5-6.0	Low	0.28	4
Frederick	13-17	0.6-2.0	0.12-0.18	4.5-6.0	Moderate	0.24	
	17-72	0.6-2.0	0.10-0.18	4.5-5.5	Moderate	0.24	

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
GaB, GaC, GaD----	0-6	0.6-2.0	0.12-0.18	3.6-5.5	Low----------	0.32	3
Gilpin	6-27	0.6-2.0	0.10-0.16	3.6-5.5	Low----------	0.24	
	27-35	0.6-2.0	0.06-0.10	3.6-5.5	Low----------	0.24	
	35	---	---	---	---	----	
GbC*, GbC3*, GbD*, GbD3*, GbF*, GbF3*:							
Gilpin----------	0-6	0.6-2.0	0.10-0.16	3.6-5.5	Low----------	0.28	3
	6-27	0.6-2.0	0.10-0.16	3.6-5.5	Low----------	0.24	
	27-35	0.6-2.0	0.06-0.10	3.6-5.5	Low----------	0.24	
	35	---	---	---	---	----	
Berks----------	0-7	0.6-6.0	0.08-0.12	3.6-6.5	Low----------	0.24	3
	7-28	0.6-6.0	0.04-0.10	3.6-6.5	Low----------	0.17	
	28-35	2.0-6.0	0.04-0.10	3.6-6.5	Low----------	0.17	
	35	---	---	---	---	----	
JsD, JsF---------	0-9	2.0-6.0	0.10-0.16	4.5-5.5	Low----------	0.28	4
Jefferson	9-37	2.0-6.0	0.10-0.16	4.5-5.5	Low----------	0.28	
	37-60	2.0-6.0	0.08-0.14	4.5-5.5	Low----------	0.17	
Ka----------	0-7	2.0-6.0	0.12-0.16	5.1-6.0	Low----------	0.24	4
Kanawha	7-12	0.6-2.0	0.12-0.20	5.1-6.0	Low----------	0.28	
	12-52	0.6-2.0	0.14-0.18	5.1-7.3	Low----------	0.32	
	52-60	0.6-6.0	0.10-0.18	5.6-7.3	Low----------	0.24	
LdF*:							
Lehew----------	0-10	2.0-20	0.08-0.12	4.5-5.5	Low----------	0.17	3
	10-27	2.0-20	0.06-0.10	4.5-5.5	Low----------	0.17	
	27-33	2.0-20	0.06-0.10	4.5-5.5	Low----------	0.17	
	33	---	---	---	---	----	
Dekalb----------	0-9	2.0-20	0.08-0.12	3.6-6.5	Low----------	0.17	3
	9-21	2.0-20	0.06-0.12	3.6-5.5	Low----------	0.17	
	21-28	>6.0	0.05-0.10	3.6-5.5	Low----------	0.17	
	28	---	---	---	---	----	
L1B, L1C, L1D----	0-8	0.6-6.0	0.13-0.18	3.6-5.5	Low----------	0.28	3
Lily	8-25	2.0-6.0	0.12-0.18	3.6-5.5	Low----------	0.28	
	25-30	2.0-6.0	0.08-0.17	3.6-5.5	Low----------	0.17	
	30	---	---	---	---	----	
Lo----------	0-10	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.37	5
Lobdell	10-35	0.6-2.0	0.17-0.22	5.1-7.3	Low----------	0.37	
	35-60	0.6-6.0	0.12-0.18	5.6-7.3	Low----------	0.37	
MgB, MgC----------	0-8	0.6-2.0	0.18-0.24	4.5-5.5	Low----------	0.43	3
Monongahela	8-21	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.43	
	21-60	0.06-0.6	0.08-0.12	4.5-5.5	Low----------	0.43	
MsD, MsF, MuC, MuD----------	0-11	0.6-2.0	0.12-0.16	4.5-6.0	Low----------	0.24	4
Murrill	11-41	0.6-2.0	0.10-0.14	4.5-6.0	Low----------	0.20	
	41-72	0.2-2.0	0.08-0.12	4.5-6.0	Moderate-------	0.28	
Oa----------	0-10	0.6-2.0	0.18-0.22	5.1-7.3	Low----------	0.37	5
Orrville	10-31	0.6-2.0	0.15-0.19	5.1-6.5	Low----------	0.37	
	31-60	0.6-6.0	0.08-0.15	5.1-7.3	Low----------	0.37	
Ob*:							
Orrville---------	0-10	0.6-2.0	0.18-0.22	5.1-7.3	Low----------	0.37	5
	10-31	0.6-2.0	0.15-0.19	5.1-6.5	Low----------	0.37	
	31-60	0.6-6.0	0.08-0.15	5.1-7.3	Low----------	0.37	
Lobdell----------	0-10	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.37	5
	10-35	0.6-2.0	0.17-0.22	5.1-7.3	Low----------	0.37	
	35-60	0.6-6.0	0.12-0.18	5.6-7.3	Low----------	0.37	

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
ShB, ShC, ShD----	0-8	0.6-2.0	0.13-0.20	5.1-6.0	Low----------	0.24	5
Shouns	8-48	0.6-2.0	0.12-0.20	5.1-6.0	Low----------	0.28	
	48-60	0.6-2.0	0.12-0.18	5.1-6.0	Low----------	0.28	
	76	---	---	---	----------	----	
StC, StD---------	0-8	0.6-2.0	0.13-0.20	5.1-6.0	Low----------	0.24	5
Shouns	8-48	0.6-2.0	0.12-0.18	5.1-6.0	Low----------	0.28	
	48-60	0.6-2.0	0.09-0.15	5.1-6.0	Low----------	0.28	
TtB, TtC---------	0-7	0.6-2.0	0.16-0.22	3.6-5.5	Low----------	0.43	3
Tilsit	7-24	0.6-2.0	0.16-0.22	3.6-5.5	Low----------	0.43	
	24-51	0.06-0.2	0.08-0.12	3.6-5.5	Low----------	0.43	
	51	---	---	---	----------	----	
Tv----------	0-9	0.6-2.0	0.14-0.20	5.6-7.3	Low----------	0.43	3
Tygart Variant	9-57	0.06-0.2	0.12-0.18	5.6-7.3	Moderate-------	0.37	
	57-72	0.2-2.0	0.08-0.16	5.6-7.8	Low----------	0.28	
U1*, U2*, U3*, U4*.							
Udorthents							
Ud*:							
Udifluvents.							
Psamments.							
UeC*:							
Urban land.							
Ernest----------	0-9	0.6-2.0	0.14-0.20	4.5-5.5	Low----------	0.43	3
	9-24	0.6-2.0	0.12-0.16	4.5-5.5	Moderate-------	0.28	
	24-38	0.06-0.6	0.08-0.12	4.5-5.5	Low----------	0.28	
	38-60	0.06-0.6	0.08-0.12	4.5-5.5	Moderate-------	0.28	
UfD*:							
Urban land.							
Frederick-------	0-13	2.0-6.0	0.12-0.20	4.5-6.0	Low----------	0.28	4
	13-17	0.6-2.0	0.12-0.18	4.5-6.0	Moderate-------	0.24	
	17-24	0.6-2.0	0.10-0.18	4.5-5.5	Moderate-------	0.24	
	24-72	0.6-2.0	0.10-0.18	4.5-5.5	High----------	0.24	
UgE*:							
Urban land.							
Gilpin----------	0-6	0.6-2.0	0.10-0.16	3.6-5.5	Low----------	0.28	3
	6-27	0.6-2.0	0.10-0.16	3.6-5.5	Low----------	0.24	
	27-35	0.6-2.0	0.06-0.10	3.6-5.5	Low----------	0.24	
	35	---	---	---	----------	----	
Berks-----------	0-7	0.6-6.0	0.08-0.12	3.6-6.5	Low----------	0.24	3
	7-28	0.6-6.0	0.04-0.10	3.6-6.5	Low----------	0.17	
	28-35	2.0-6.0	0.04-0.10	3.6-6.5	Low----------	0.17	
	35	---	---	---	----------	----	
UlC*:							
Urban land.							
Lily----------	0-8	0.6-6.0	0.13-0.18	3.6-5.5	Low----------	0.28	3
	8-25	2.0-6.0	0.12-0.18	3.6-5.5	Low----------	0.28	
	25-30	2.0-6.0	0.08-0.17	3.6-5.5	Low----------	0.17	
	30	---	---	---	----------	----	

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
UmD*:							
Urban land.							
Murrill---------	0-11	0.6-2.0	0.12-0.16	4.5-6.0	Low----------	0.24	4
	11-41	0.6-2.0	0.10-0.14	4.5-6.0	Low----------	0.20	
	41-72	0.2-2.0	0.08-0.12	4.5-6.0	Moderate-------	0.28	
Uo*:							
Urban land.							
Orrville--------	0-10	0.6-2.0	0.18-0.22	5.1-7.3	Low----------	0.37	5
	10-31	0.6-2.0	0.15-0.19	5.1-6.5	Low----------	0.37	
	31-60	0.6-6.0	0.08-0.15	5.1-7.3	Low----------	0.37	
Lobdell---------	0-10	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.37	5
	10-35	0.6-2.0	0.17-0.22	5.1-7.3	Low----------	0.37	
	35-60	0.6-6.0	0.12-0.18	5.6-7.3	Low----------	0.37	
WeC, WeD, WeF----	0-9	0.6-2.0	0.16-0.20	4.5-6.0	Low----------	0.37	3
Westmoreland	9-36	0.6-2.0	0.12-0.18	4.5-6.0	Low----------	0.28	
	36-46	0.6-2.0	0.06-0.10	5.1-6.0	Low----------	0.17	
	46	---	---	---	----------	----	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
At---------- Atkins	D	Occasional	Very brief	Sep-Jul	0-1.0	Apparent	Nov-Jun	>60	---	High-----	Moderate.
BwF*:											
Berks----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High.
Weikert----------	C/D	None--------	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate.
CaC, CaD---------- Calvin	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	Moderate.
CbC*, CbC3*, CbD*, CbD3*, CbF*, CbF3*, CkD*, CkF*:											
Calvin----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	Moderate.
Berks----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High.
ClD, ClF---------- Caneyville	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
Cm---------- Chagrin	B	Occasional	Brief-----	Nov-May	4.0-6.0	Apparent	Feb-Mar	>60	---	Low------	Moderate.
CnD*, CnF*:											
Clymer----------	B	None--------	---	---	>6.0	---	---	40-60	Hard	Low------	High.
Gilpin----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High.
CtC*, CtD*:											
Coolville--------	C	None--------	---	---	2.0-3.5	Perched	Feb-Apr	40-60	Soft	High-----	High.
Latham----------	D	None--------	---	---	1.5-3.0	Perched	Jan-Apr	20-40	Soft	High-----	High.
CuF---------- Culleoka	B	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	Moderate.
DeC, DeD---------- Dekalb	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	High.
DgD*, DgF*:											
Dekalb----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	High.
Gilpin----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High.
Jefferson--------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
DrF*:											
Dekalb----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	High.
Rock outcrop.											
ErB, ErC, ErD----- Ernest	C	None--------	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	Moderate	Moderate.
EuC*, EuD*:											
Ernest----------	C	None--------	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	Moderate	Moderate.
Buchanan---------	C	None--------	---	---	1.5-3.0	Perched	Nov-Mar	>60	---	High-----	High.
FcD, FcF, FkC, FrC, FrD, FrF---- Frederick	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
GaB, GaC, GaD----- Gilpin	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High.
GbC*, GbC3*, GbD*, GbD3*, GbF*, GbF3*: Gilpin----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High.
Berks----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High.
JsD, JsF---------- Jefferson	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
Ka---------- Kanawha	B	Rare--------	---	---	>6.0	---	---	>72	---	Low------	Moderate.
LdF*: Lehew----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	High.
Dekalb----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	High.
LlB, LlC, LlD----- Lily	B	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	High.
Lo---------- Lobdell	B	Occasional	Brief-----	Jan-Apr	2.0-3.5	Apparent	Dec-Apr	>60	---	Low------	Moderate.
MgB, MgC---------- Monongahela	C	None--------	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	High-----	High.
MsD, MsF, MuC, MuD---------- Murrill	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
Oa---------- Orrville	C	Occasional	Very brief to brief.	Nov-May	1.0-2.5	Apparent	Nov-Jun	>60	---	High-----	Moderate.
Ob*: Orrville---------	C	Occasional	Very brief to brief.	Nov-May	1.0-2.5	Apparent	Nov-Jun	>60	---	High-----	Moderate.
Lobdell----------	B	Occasional	Brief-----	Jan-Apr	2.0-3.5	Apparent	Dec-Apr	>60	---	Low------	Moderate.
ShB, ShC, ShD, StC, StD--------- Shouns	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
TtB, TtC---------- Tilsit	C	None--------	---	---	1.5-2.5	Perched	Jan-Apr	>40	Hard	High-----	High.
Tv---------- Tygart Variant	C	None--------	---	---	0.5-1.5	Perched	Dec-Apr	>60	---	High-----	---
U1*, U2*, U3*, U4*. Udorthents											

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
Ud*:											
Udifluvents.											
Psamments.											
UeC*:											
Urban land.											
Ernest----------	C	None--------	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	Moderate	Moderate.
UfD*:											
Urban land.											
Frederick--------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
UgE*:											
Urban land.											
Gilpin----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High.
Berks-----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High.
UlC*:											
Urban land.											
Lily------------	B	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	High.
UmD*:											
Urban land.											
Murrill----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
Uo*:											
Urban land.											
Orrville---------	C	Occasional	Very brief to brief.	Nov-May	1.0-2.5	Apparent	Nov-Jun	>60	---	High-----	Moderate.
Lobdell----------	B	Occasional	Brief-----	Jan-Apr	2.0-3.5	Apparent	Dec-Apr	>60	---	Low------	Moderate.
WeC, WeD, WeF----- Westmoreland	B	None--------	---	---	>6.0	---	---	>40	Hard	Low------	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Atkins	Fine-loamy, mixed, acid, mesic Typic Fluvaquents
Berks	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Buchanan	Fine-loamy, mixed, mesic Aquic Fragiudults
*Calvin	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Caneyville	Fine, mixed, mesic Typic Hapludalfs
Chagrin	Fine-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
Clymer	Fine-loamy, mixed, mesic Typic Hapludults
Coolville	Clayey, mixed, mesic Aquic Hapludults
Culleoka	Fine-loamy, mixed, mesic Ultic Hapludalfs
Dekalb	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Ernest	Fine-loamy, mixed, mesic Aquic Fragiudults
*Frederick	Clayey, mixed, mesic Typic Paleudults
Gilpin	Fine-loamy, mixed, mesic Typic Hapludults
Jefferson	Fine-loamy, siliceous, mesic Typic Hapludults
Kanawha	Fine-loamy, mixed, mesic Typic Hapludalfs
Latham	Clayey, mixed, mesic Aquic Hapludults
Lehew	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Lily	Fine-loamy, siliceous, mesic Typic Hapludults
Lobdell	Fine-loamy, mixed, mesic Fluvaquentic Eutrochrepts
Monongahela	Fine-loamy, mixed, mesic Typic Fragiudults
Murrill	Fine-loamy, mixed, mesic Typic Hapludults
Orrville	Fine-loamy, mixed, nonacid, mesic Aeric Fluvaquents
Psamments	Psamments
Shouns	Fine-loamy, mixed, mesic Typic Hapludults
Tilsit	Fine-silty, mixed, mesic Typic Fragiudults
Tygart Variant	Fine-loamy, mixed, mesic Aeric Ochraqualfs
Udifluvents	Udifluvents
Udorthents	Udorthents
Weikert	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Westmoreland	Fine-loamy, mixed, mesic Ultic Hapludalfs

*The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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