United States Department of Agriculture

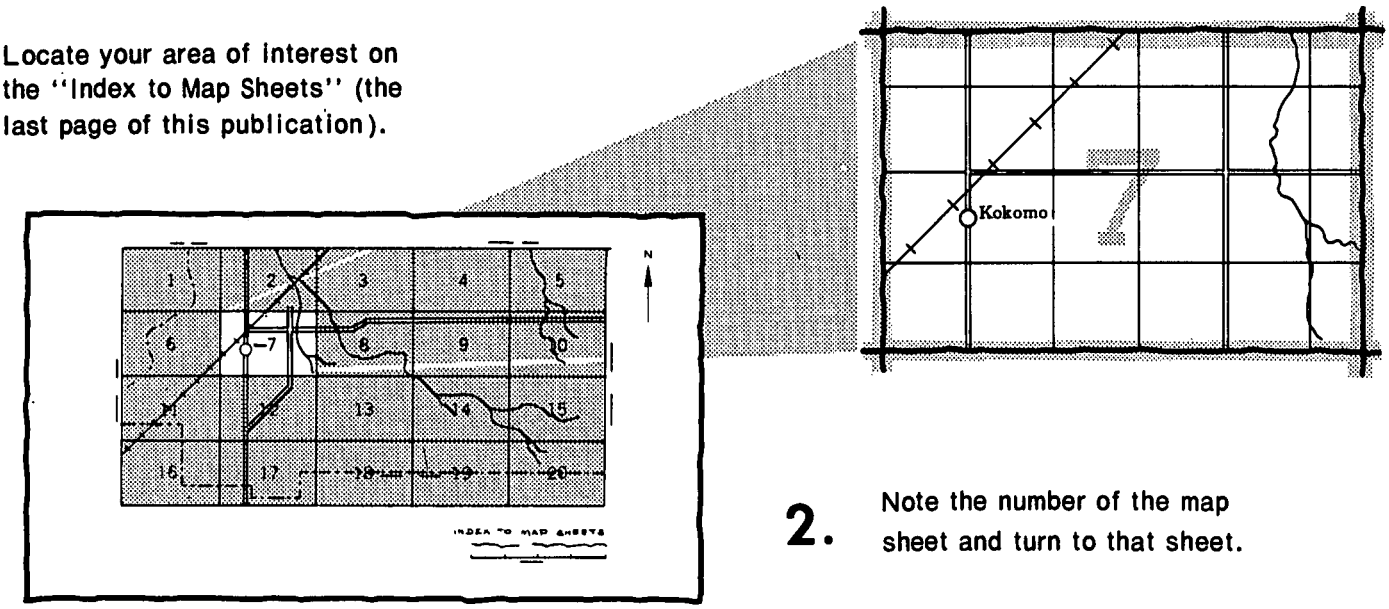
Soil Conservation Service

In Cooperation with The Pennsylvania State University, College of Agriculture and the Pennsylvania Department of Environmental Resources, State Conservation Commission

Soil Survey of Greene and Washington Counties Pennsylvania

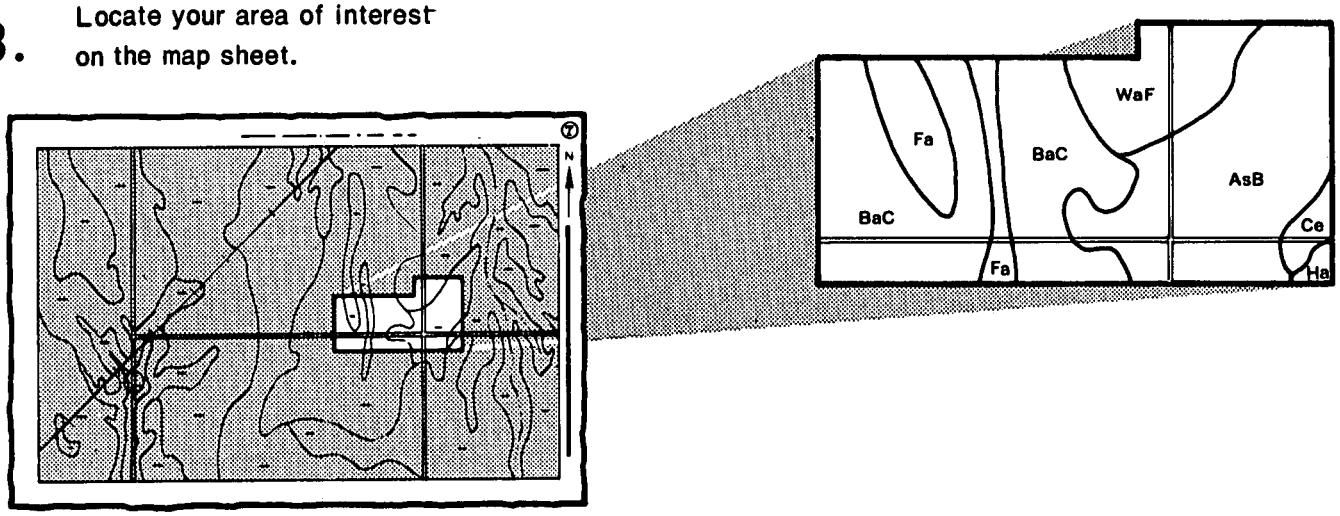
HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

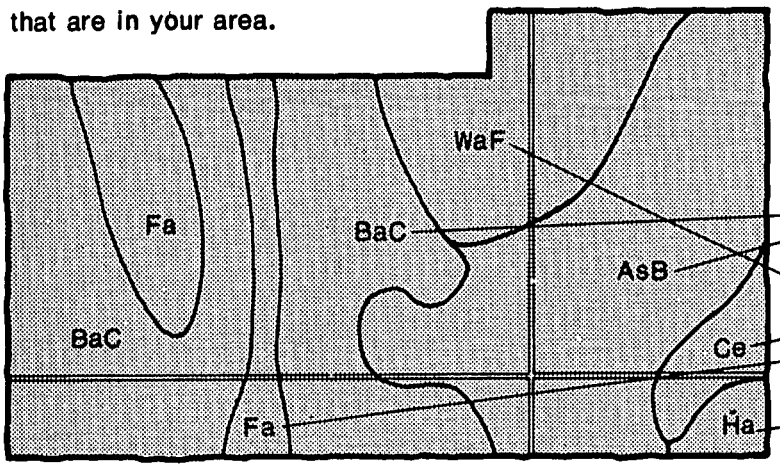


2. Note the number of the map sheet and turn to that sheet.

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



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

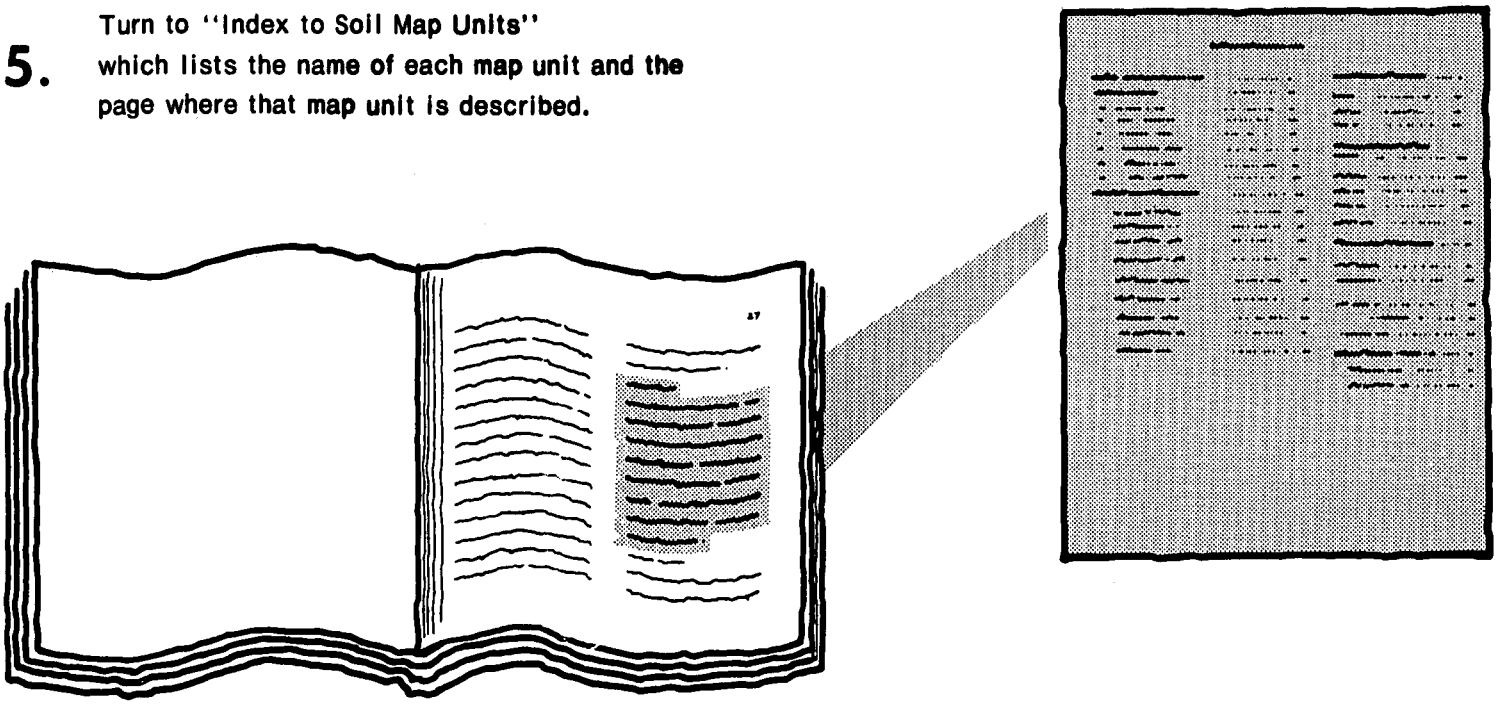


Symbols

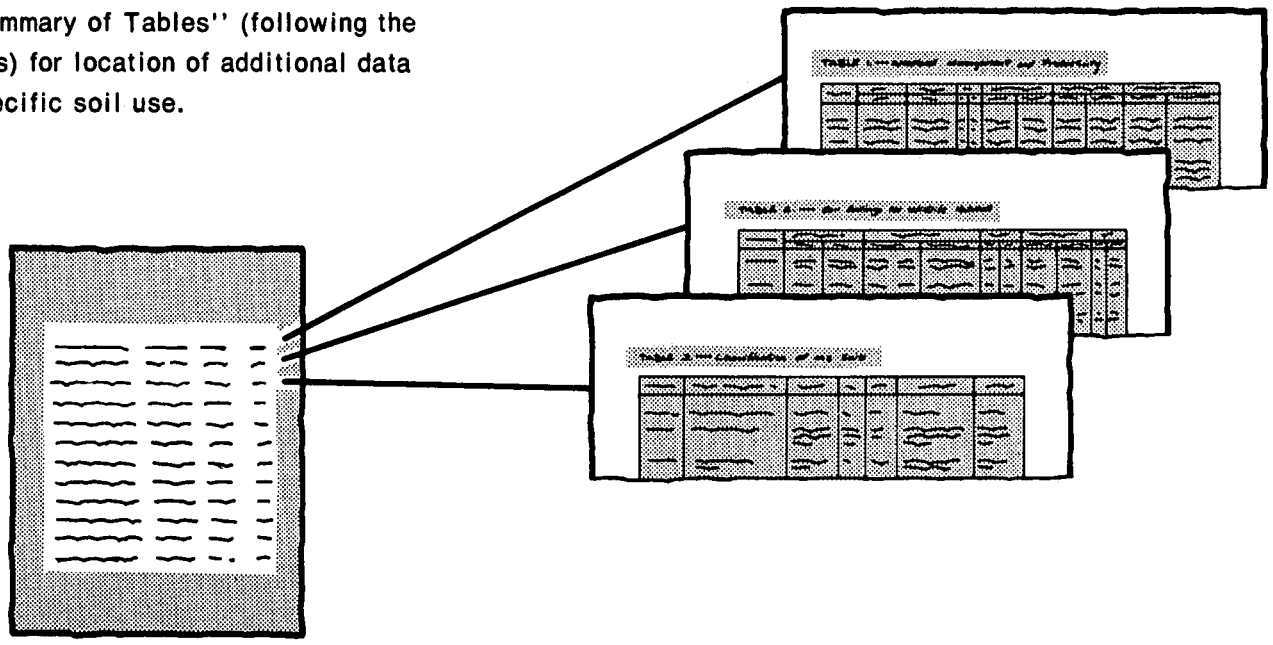
- AsB
- BaC
- Ce
- Fa
- Ha
- WaF

THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



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



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

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

Major fieldwork for this soil survey was performed in the period 1963-78. 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; The Pennsylvania State University, College of Agriculture; and the Pennsylvania Department of Environmental Resources, State Conservation Commission. The U.S. Department of Housing and Urban Development provided additional financial assistance. The survey is part of the technical assistance furnished to the Conservation Districts of Greene County and Washington County.

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

Cover: The hillside in this area is pastured Dormont silt loam, 15 to 25 percent slopes. The wooded area at the top of the hill is Culleoka silt loam, 3 to 8 percent slopes.

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soil series

Issued September 1983

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foreword

It is my pleasure to introduce the Soil Survey of Greene and Washington Counties. This report contains much information useful in land planning programs. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that certain land uses will have on the environment.

The soil survey has been prepared for many different users. Farmers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use it to help them understand, protect, and enhance the environment.

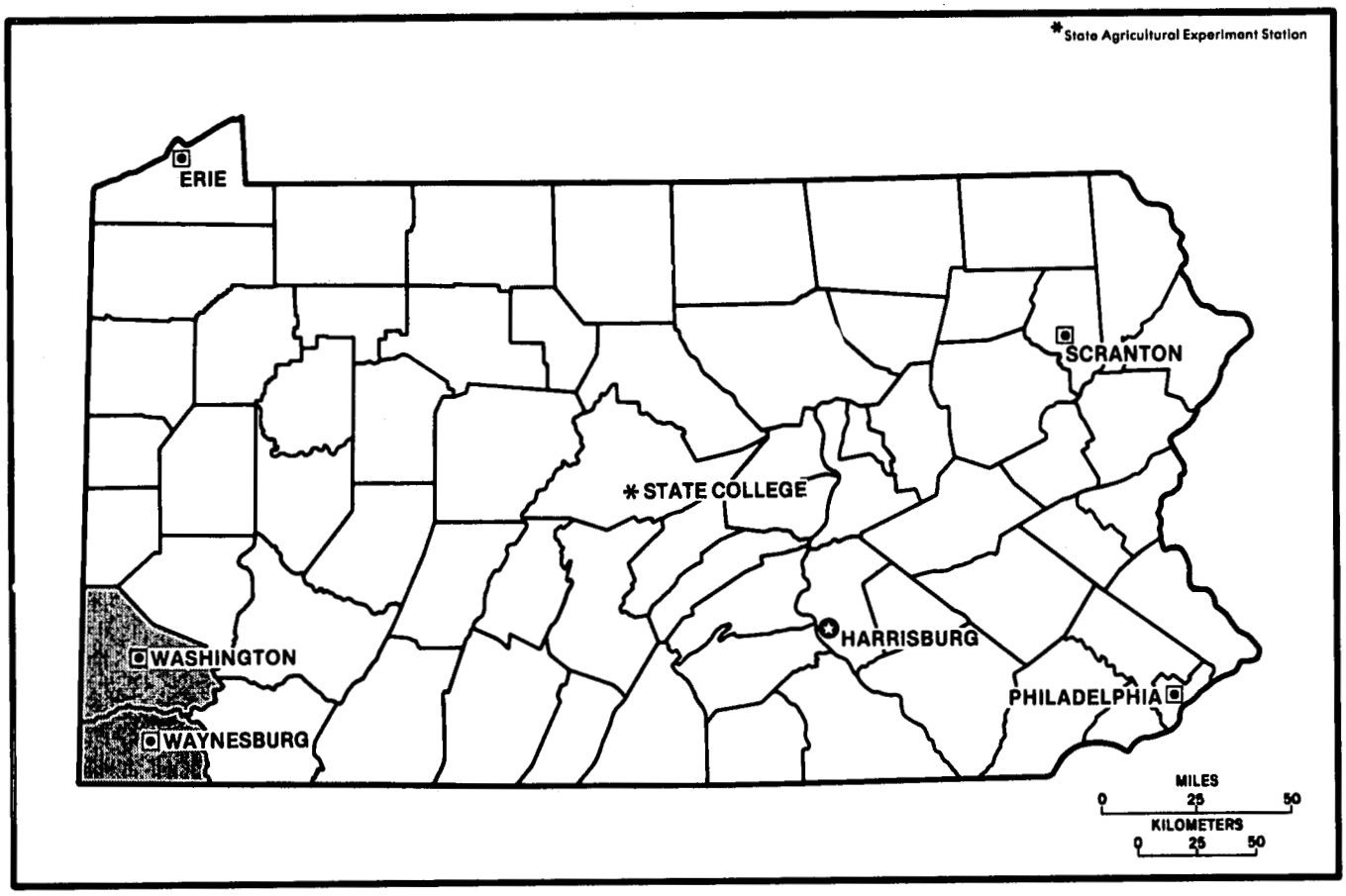
Great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding; they may be shallow to bedrock; they may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to onsite sewage disposal. A high water table makes a soil poorly suited for basements and underground utilities.

This report consists of two parts: (1) The first part includes the descriptions, potentials, hazards and limitations of all the soils in Greene and Washington Counties. (2) The second part includes detailed maps showing the soils of every acre of land in these counties.

It is impossible to explain all the ways that the soil survey may be used. Additional information and assistance can be obtained from your local office of the Soil Conservation Service or the Cooperative Extension Service.

I believe that the use of the information in this soil survey will help you to have a better environment and a better life. The widespread use of this information will greatly assist all of us in the conservation, development, and productive use of our soils, water, and related resources.

Graham T. Munkittrick
State Conservationist
Soil Conservation Service



Location of Greene and Washington Counties in Pennsylvania.

soil survey of
Greene and Washington Counties, Pennsylvania

By Daniel R. Seibert, Jay B. Weaver, R. Dennis Bush, David J. Belz, Dean D. Rector, Joseph S. Hallowich, and Robert G. Grubb, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service in cooperation with the Pennsylvania State University, College of Agriculture, and the Pennsylvania Department of Environmental Resources, State Conservation Commission

GREENE AND WASHINGTON COUNTIES are in the southwestern part of Pennsylvania. The area of the two counties is 920,960 acres, or 1,439 square miles. Census data in 1970 show a population of 246,966 for the two counties. Washington, with a population of 19,827, is the largest city in the survey area and is the county seat of Washington County. Waynesburg, the county seat of Greene County, has a population of 5,152. Other major towns are Canonsburg, Monongahela, Donora, and Charleroi in Washington County and Carmichaels, Greensboro, and Jefferson in Greene County.

The major industries in the area are steel manufacturing, mining, wholesale and retail trade, transportation, agriculture, and construction.

Forests cover about 44 percent of the land area, and crops and pasture cover 38 percent. The remaining 18 percent is used for urban development and industry.

The major highways in the survey area are Interstate Routes 70 and 79 and U.S. Routes 40, 19, and 22. Each county maintains a general airport, and several bus and rail lines provide service to the area.

Soil surveys of Greene County and Washington County were published in 1921 and 1910, respectively. This survey provides updated and additional information about the soils of the counties and has maps that show the distribution of the soils in greater detail.

general nature of the survey area

This section gives a brief description of the history and mineral resources of the survey area and provides data on the climate of Greene and Washington Counties.

history

Most of the settlement in the area of Greene and Washington Counties took place after the American Revolution. The area was subject to claim by Virginia until 1784, when a boundary line was agreed upon by Pennsylvania and Virginia. Most of the first settlers came from Virginia and Maryland.

Raising sheep and coal mining were the first major industries in the area. Both were established by the early part of the 19th century, and both remain important to the economy of the area.

mineral resources

The two-county survey area produced about 18 million tons of bituminous coal in 1977. Washington County led the coal-producing counties in Pennsylvania with a total of about 11 million tons. Most of the bituminous coal in the survey area is from deep mines, and some is from strip mines. The major coal zones are the Pittsburgh, Waynesburg, Sewickley, and Freeport zones.

The survey area had 583 oil wells in 1974. The total oil production from these wells was about 105,000 barrels.

Some of the mineral resources in the area provide material for construction. The major minerals of this type are limestone, which is also used agriculturally; sandstone used for crushed stone, building stone, dimension block, and flagstone; and clay suitable for bricks and pipe.

climate

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

Table 1 gives data on temperature and precipitation for the survey area as recorded at Claysville, Pennsylvania, in the period 1951 to 1970. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 30 degrees F, and the average daily minimum temperature is 19 degrees. The lowest temperature on record, which occurred at Claysville on January 29, 1963, is -27 degrees. In summer the average temperature is 69 degrees, and the average daily maximum temperature is 83 degrees. The highest recorded temperature, which occurred at Claysville on September 2, 1953, 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.

The total annual precipitation is 38 inches. Of this, 21 inches, or 55 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 12 inches. The heaviest 1-day rainfall during the period of record was 3.23 inches at Claysville on October 16, 1954. Thunderstorms occur on about 36 days each year, and most occur in summer.

Average seasonal snowfall is 31 inches. The greatest snow depth at any one time during the period of record was 16 inches. On an average of 16 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and 35 percent in winter. The prevailing wind is from the west-southwest. Average windspeed is highest, 11 miles per hour, in winter and spring.

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 "Detailed soil map units."

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

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

general soil map units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each 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 others 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.

descriptions of associations

1. Dormont-Culleoka association

Moderately well drained and well drained, deep and moderately deep, gently sloping to very steep soils; on hilltops, ridges, benches, and hillsides

This association consists of hills with benches and ridges (fig. 1). The hills generally have long slopes that commonly have slips. Most areas of this unit are drained by small streams that form drainageways between the hills. Slopes range from 3 to 50 percent.

Figure 1.—A typical landscape in the Dormont-Culleoka association.

This association makes up about 75 percent of the survey area. The association is about 40 percent Dormont soils, 30 percent Culleoka soils, and 30 percent minor soils (fig. 2).

The Dormont soils are dominantly on the hillsides and benches and commonly have slips on them. The soils are deep and moderately well drained and have a seasonal high water table at a depth of 24 to 30 inches. They formed in residuum of weathered shale, siltstone, limestone, and colluviuum.

The Culleoka soils are mostly on ridges and hilltops, but some areas are on hillsides. The soils are moderately deep and well drained. They formed in residuum of weathered limestone, sandstone, siltstone, and shale.

The minor soils are moderately well drained Guernsey

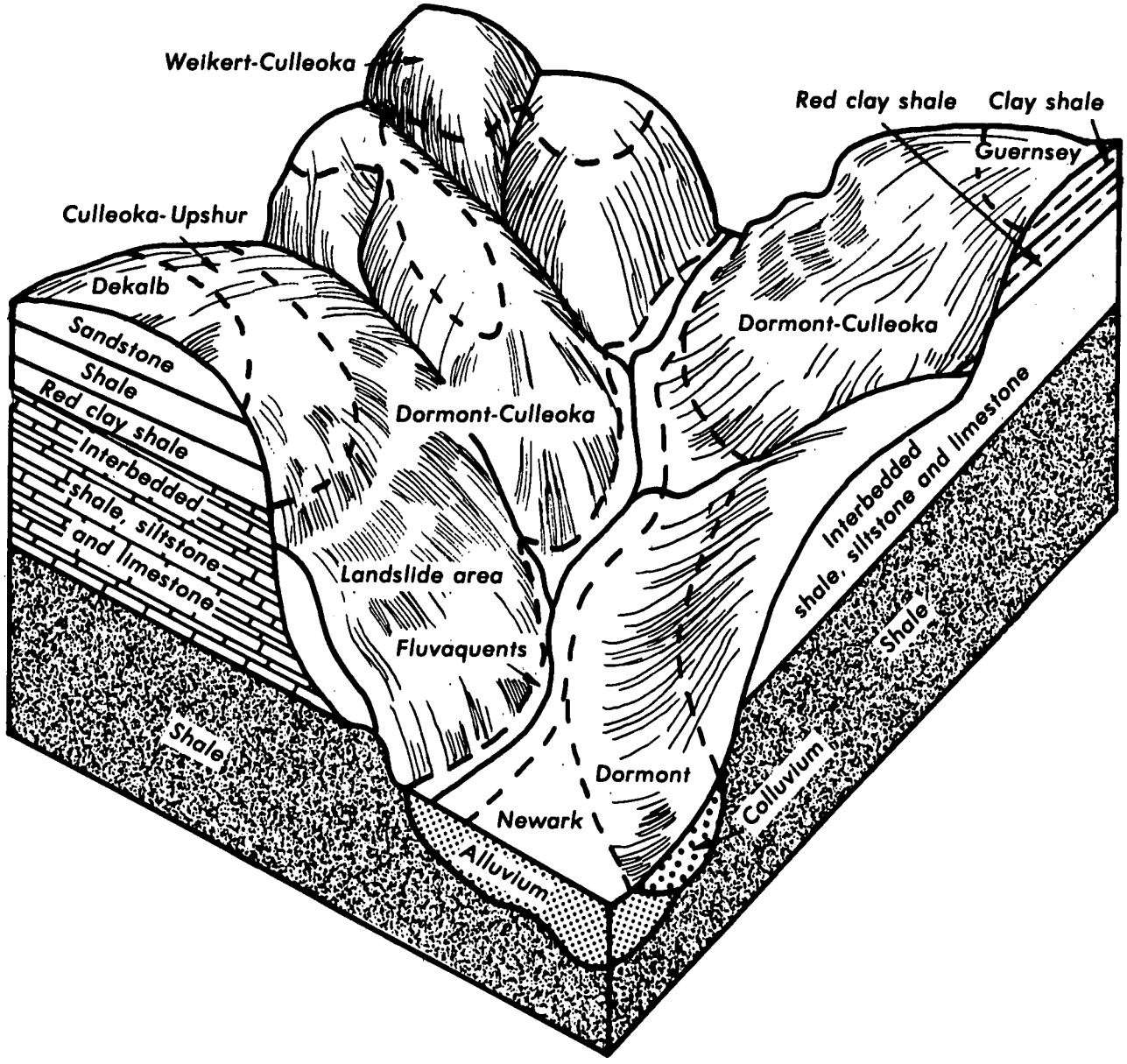


Figure 2.—Typical pattern of soils and underlying material in the Dormont-Culleoka association.

soils and well drained Upshur, Weikert, and Dekalb soils on hillsides and ridges; and Newark soils and Fluvaquents on flood plains.

Most of this unit is wooded or is reverting to a woodland of mixed hardwoods. Cleared areas on the steeper hillsides are used for pasture, and hay and corn are grown on the ridges and some of the wider areas of bottom land.

The less sloping areas of the association are suited to farming, but most of the acreage is steep or very steep. Most areas are suitable for trees. Slope, erosion, and a seasonal high water table are the main limitations for most uses of this association. The moderate depth to bedrock is an additional limitation for nonfarm uses.

2. Guernsey-Dormont-Culleoka association

Moderately well drained and well drained, deep and moderately deep, gently sloping to moderately steep soils; on hilltops, ridges, benches, and hillsides

This association consists of rolling hills and ridges (fig. 3). Areas are drained by small streams between the hills. The association is in Washington County and is one of the better farming areas in the survey area. Slopes are dominantly 3 to 25 percent.

This association makes up about 5 percent of the survey area. The association is about 35 percent Guernsey soils, 25 percent Dormont soils, 20 percent Culleoka soils, and 20 percent minor soils.

The Guernsey soils are on hillsides and hilltops that commonly have slips on them. The soils are deep and moderately well drained and have a seasonal high water table at a depth of 18 to 20 inches. They formed in residuum of weathered clay shale, siltstone, and limestone.

The Dormont soils are dominantly on hillsides and benches that commonly have slips on them. The soils are deep and moderately well drained and have a seasonal high water table at a depth of 24 to 30 inches. They formed in residuum of weathered shale, siltstone, limestone, and colluviuum.

The Culleoka soils are mostly on ridges and hilltops, but some areas are on hillsides. The soils are moderately deep and well drained. They formed in residuum of weathered limestone, sandstone, siltstone, and shale.

The minor soils are well drained Brooke, Weikert, and Upshur soils on hillsides and ridges; somewhat poorly drained Library soils on hilltops; and Newark soils and Fluvaquents on flood plains.

Figure 3.—A typical landscape in the Guernsey-Dormont-Culleoka association.

Most areas of this association are used for cultivated crops or hay. Steeper areas on hillsides that are cleared are used for pasture. Row crops, small grains, and hay crops are grown on the ridges, hillsides, and on the wider areas of bottom land. The uncleared acreage consists of steeper areas that are generally in mixed hardwoods.

The less sloping soils of this map unit are suited to farming. Erosion and seasonal high water tables are the main limitations. Practices to control erosion and improve drainage are needed in many areas.

The soils of this unit are suited to trees. Potential productivity is high. Slopes, erosion, and seasonal high water tables are the main limitations.

The soils of this unit have limitations for most nonfarm uses because of seasonal high water tables, slope, moderate depth to bedrock, and slow and moderately slow permeability.

3. Dormont-Culleoka-Newark association

Well drained to somewhat poorly drained, deep and moderately deep, nearly level to very steep soils; on hilltops, ridges, benches, hillsides, and flood plains

This association consists of hills and flood plains (fig. 4). The hills generally have long slopes that are benched and commonly have slips on them. The flood plains are between the hills and adjacent to larger streams. Slopes range from 0 to 50 percent.

Figure 4.—A typical landscape in the Dormont-Culleoka-Newark association.

This association makes up about 13 percent of the survey area. The association is about 27 percent Dormont soils, 22 percent Culleoka soils, 21 percent Newark soils, and 30 percent minor soils.

The Dormont soils are dominantly on hillsides and benches that commonly have slips on them. The soils are deep and moderately well drained and have a seasonal high water table at a depth of 24 to 30 inches. They formed in residuum of weathered shale, siltstone, and limestone and in adjacent colluviuum.

The Culleoka soils are mostly on ridges and hilltops, but some areas are on hillsides. The soils are moderately deep and well drained. They formed in residuum of weathered limestone, sandstone, siltstone, and shale.

The Newark soils are on flood plains. The soils are deep and somewhat poorly drained and have a seasonal high water table at a depth of 10 to 15 inches. They formed in alluvium derived from limestone, sandstone, siltstone, and shale.

The minor soils are moderately well drained Guernsey soils and well drained Upshur and Weikert soils on hillsides and ridges and Fluvaquents and Huntington soils on flood plains.

Most of this unit is wooded or reverting to a woodland of mixed hardwoods. Cleared areas on hillsides are used for pasture. Hay and corn are grown on the ridges; cultivated crops, hay, and pasture are grown on the flood plains.

The less sloping soils of the association are suited to farming, but the majority of the upland areas are steep or very steep. Slope, erosion, a seasonal high water table, and occasional flooding are the main limitations for most uses. The depth to bedrock is an additional limitation for some nonfarm uses.

4. Udorthents-Culleoka-Dormont association

Well drained to somewhat poorly drained, very shallow to deep, gently sloping to very steep soils; on hilltops, ridges, benches, and hillsides

This association consists of hills and areas disturbed by strip mining activities. The hills that have not been disturbed by mining activities have long, smooth slopes. Slopes range from 3 to 50 percent.

This association makes up about 4 percent of the survey area. The association is about 30 percent Udorthents, 25 percent Culleoka soils, 15 percent Dormont soils, and 30 percent minor soils.

Udorthents are in the areas used for strip mining. They are very shallow to deep and are well drained to somewhat poorly drained. They have a seasonal high water table at a depth of about 6 to 36 inches.

The Culleoka soils are mostly on ridges and hilltops, but some areas are on hillsides. The soils are moderately deep and well drained. They formed in residuum of weathered limestone, sandstone, siltstone, and shale.

The Dormont soils are dominantly on hillsides and benches and commonly have slips on them. The soils are deep and moderately well drained and have a seasonal high water table at a depth of 24 to 30 inches. They formed in residuum of weathered shale, siltstone, and limestone and in adjacent colluviuum.

The minor soils are moderately well drained Guernsey soils and well drained Upshur and Weikert soils on hillsides and ridges and Newark soils and Fluvaquents on flood plains.

Much of this association is strip mined. Areas that have not been strip mined are wooded or reverting to woodland. Some of the cleared areas are used for pasture and hay.

The less sloping soils of this association are suited to farming. Some areas of Udorthents are suited to farming if they are properly reclaimed. Most of the acreage of the association is suitable for trees. Slope, erosion, and the seasonal high water table are the main limitations for farming and woodland and, along with the shallow to moderate depth to bedrock and slow and moderately slow permeability, are the main limitations for community development.

5. Glenford-Dormont-Library association

Moderately well drained and somewhat poorly drained, deep, nearly level to sloping soils; on terraces and surrounding uplands

This association consists of terraces, hills, ridges, and benches. Slopes are dominantly 0 to 15 percent, but some areas are steeper.

This association makes up about 3 percent of the survey area. The association is about 45 percent Glenford soils, 35 percent Dormont soils, 8 percent Library soils, and 12 percent minor soils.

The Glenford soils are on terraces. The soils are deep and moderately well drained and have a seasonal high water table at a depth of 24 to 28 inches. They formed in slackwater alluvium derived from calcareous shale and sandstone.

The Dormont soils are dominantly on hillsides and benches that commonly have slips on them. The soils are deep and moderately well drained and have a seasonal high water table at a depth of 24 to 30 inches. They formed in residuum of weathered shale, siltstone, and limestone and in adjacent colluviuum.

The Library soils are mostly on uplands. The soils are deep and somewhat poorly drained and have a seasonal high water table at a depth of 10 to 15 inches. The soils formed in residuum of weathered clay shale, siltstone, and limestone. The areas in Greene County formed in slackwater alluvium derived from siltstone, calcareous shale, and limestone.

The minor soils are well drained Culleoka and Dekalb soils and moderately well drained Guernsey soils on

hillsides and ridges, poorly drained Purdy soils on terraces, and somewhat poorly drained and poorly drained Fluvaquents and somewhat poorly drained Newark soils on flood plains.

Most areas of this unit are cultivated or used for hay. Some of the acreage is used for community development. Cleared areas of the soils on steeper hillsides are used for pasture. Row crops, small grains, and hay are grown on the terraces. The uncleared acreage is in mixed hardwoods.

The less sloping soils are suited to farming, and most of the acreage is suitable for trees. Slope, erosion, and the seasonal high water table are the main limitations for farming and woodland and, along with the slow and moderately slow permeability, are the main limitations for community development.

detailed soil map units

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

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

A symbol identifying the soil precedes the map.unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses. In some instances the characteristics of different map units are so alike that the same description has been used for more than one unit. This is especially true of units that have the same series name. For example, in this survey area the map units CoB, CoC, and CoD are so similar, except for slope, that one description has been used for all three units. Any differences in the use and management of such units or in their characteristics are noted in the map unit description.

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, Dormont silt loam, 3 to 8 percent slopes, is one of several phases in the Dormont series.

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

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. Culleoka-Upshur complex, 3 to 8 percent slopes, is an example.

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

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

Table 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

AgB—Allegheny silt loam, 3 to 8 percent slopes.
AgC—Allegheny silt loam, 8 to 15 percent slopes.

These soils are deep and well drained. The areas are on terraces and range from about 2 to 30 acres.

Typically, the surface layer of these soils is dark brown silt loam about 8 inches thick. The subsoil is about 35 inches thick. The upper 4 inches is dark yellowish brown silt loam, and the lower 31 inches is yellowish brown loam. The substratum is yellowish brown loam to a depth of 72 inches.

Included with these soils in mapping are small areas of Glenford, Library, Culleoka, and Dekalb soils. Included soils make up about 25 percent of the acreage of unit AgB and 10 percent of the acreage of unit AgC.

The permeability of these Allegheny soils is moderate, and the available water capacity is high. Runoff is medium. Reaction in unlimed areas is strongly acid to extremely acid in the surface layer and subsoil. The hazard of erosion is moderate on unit AgB and severe on unit AgC.

These soils are used for cultivated crops, for hay and pasture, for woodland, and for community development. Most of the acreage of unit AgB is used for crops, and most of that of unit AgC is used for hay and pasture.

These soils are well suited to cultivated crops. Contour stripcropping and using minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Growing cover crops, returning crop residue to the soils, and using grasses and legumes in the cropping system help to maintain the organic matter content and tilth of the soils.

The soils are well suited to pasture. Overgrazing is the major pasture management concern. The use of proper stocking rates to maintain key plant species, pasture rotation, and periodic application of nutrients are the major pasture management practices.

The soils are well suited to trees, and the potential for woodland is high. Machine planting is practical on the larger areas.

Slope in the areas of unit AgC is the main limitation for most types of community development.

The capability subclass is IIe for unit AgB and IIIe for unit AgC; the woodland ordination symbol is 2o for both units.

BoB—Brooke silty clay loam, 3 to 8 percent slopes.

BoC—Brooke silty clay loam, 8 to 15 percent slopes.

These soils are moderately deep and well drained. Slopes generally range from 100 to 400 feet in length. The areas are on uplands and range from about 2 to 20 acres.

Typically, the surface layer of these soils is dark brown silty clay loam about 10 inches thick. The subsoil is dark brown silty clay and gravelly silty clay 13 inches thick. The substratum is brown cobbly clay 7 inches thick. Limestone bedrock is at a depth of 30 inches.

Included with these soils in mapping are small areas of Culleoka, Guernsey, Library, and Weikert soils. Also included are small areas of soils that are similar to these Brooke soils but that are more than 40 inches deep to bedrock. Included areas make up about 25 percent of each unit.

The permeability of these Brooke soils is slow, and the available water capacity is moderate. Runoff is medium on unit BoB and rapid on unit BoC. The reaction in unlimed areas is slightly acid to mildly alkaline in the surface layer and subsoil. The hazard of erosion is severe on unit BoB and very severe on unit BoC.

These soils are used for cultivated crops, for hay and pasture, for woodland, and for community development. Most of the acreage is used for crops and hay.

These soils are suited to cultivated crops, but they are difficult to till when wet. Contour stripcropping and using minimum tillage, cover crops, and hay in the crop rotation help to reduce runoff and control erosion. Growing cover crops, returning crop residue to the soil, and using grasses and legumes in the cropping system help maintain the organic matter content and tilth of the soils.

These soils are suited to pasture. Using equipment and allowing livestock to graze when the soil is wet causes compaction of the surface layer, thus increasing runoff and erosion. Overgrazing is a major pasture management concern. The use of proper stocking rates to maintain key plant species, pasture rotation, and periodic application of nutrients are major pasture management practices.

The soils are suitable for trees, and the potential for woodland is moderately high. Machine planting is practical in larger areas. Erosion and a high rate of seedling mortality are major hazards. Livestock graze many areas of woodland on these soils, further hindering the establishment and growth of young trees (fig. 5). The hazard of erosion in all areas and the slope in areas of unit BoC limit the use of equipment on these soils. Constructing roads on the contour of the more sloping areas helps to control erosion during timber harvesting.

The permeability, the clayey texture, and the depth to bedrock limit these soils for community development, especially for onsite sewage disposal. The low strength of the soil is a hazard for roads and buildings. Slope is an additional limitation for most nonfarm uses on unit BoC.

Figure 5.—This area of woodland on Brooke silty clay loam, 3 to 8 percent slopes, is used for grazing.

The capability subclass is IIIe for unit BoB and IVe for unit BoC; the woodland ordination symbol is 3c for both units.

BoD—Brooke silty clay loam, 15 to 25 percent slopes. This soil is moderately deep and well drained. Slopes generally range from 100 to 400 feet in length. The areas are on uplands and range from about 2 to 20 acres.

Typically, the surface layer of this soil is dark brown silty clay loam about 10 inches thick. The subsoil is dark brown silty clay and gravelly silty clay 13 inches thick. The substratum is brown cobbly clay 7 inches thick. Limestone bedrock is at a depth of 30 inches.

Included with this soil in mapping are small areas of Culleoka, Guernsey, Library, and Weikert soils. Also included are small areas of soils that are similar to this Brooke soil but that are more than 40 inches deep to bedrock. Included areas make up about 25 percent of the unit.

The permeability of this Brooke soil is slow, and the available water capacity is moderate. Runoff is very rapid. The reaction in unlimed areas is slightly acid to mildly alkaline in the surface layer and subsoil.

This soil is used for hay and pasture, for woodland, and for community development.

The hazard of erosion makes this soil generally unsuitable for cultivated crops. The soil is suited to pasture, however. Using equipment and allowing livestock to graze when the soil is wet causes compaction of the surface layer, thus increasing runoff and erosion. Overgrazing is a major pasture management concern. The use of proper stocking rates to maintain key plant species, pasture rotation, and periodic application of nutrients are major pasture management practices.

The soil is suitable for trees, and the potential for woodland is moderately high. Machine planting is practical in larger areas. Erosion and a high rate of seedling mortality are major hazards. Livestock graze many areas of woodland on this soil, further hindering the establishment and growth of young trees (fig. 5). The hazard of erosion and the slope limit the use of equipment on this soil. Constructing roads on the contour helps to control erosion during timber harvesting.

The permeability, the slope, the clayey texture, and the depth to bedrock limit this soil for community development, especially for onsite sewage disposal. The low strength of the soil is a hazard for roads and buildings.

The capability subclass is VIe; the woodland ordination symbol is 3c.

CaB—Culleoka silt loam, 3 to 8 percent slopes.
CaC—Culleoka silt loam, 8 to 15 percent slopes.
CaD—Culleoka silt loam, 15 to 25 percent slopes.

These soils are moderately deep and well drained. The areas are on uplands and range from about 2 to 50 acres. Slopes range from 100 to 600 feet in length.

Typically, the surface layer of these soils is dark brown silt loam about 11 inches thick. The subsoil is yellowish brown and is about 14 inches thick. The upper 10 inches is light silty clay loam, and the lower 4 inches is shaly heavy silt loam. The substratum is yellowish brown very shaly silt loam about 3 inches thick. Shale bedrock is at a depth of 28 inches.

Included with these soils in mapping are a few small areas of Dormont, Guernsey, Brooke, Dekalb, and Weikert soils. Also included are small areas of a soil that is similar to these Culleoka soils but that is more than 40 inches deep to bedrock. Included soils make up about 25 percent of each unit.

The permeability of these Culleoka soils is moderately rapid, and the available water capacity is moderate. Runoff is medium on units CaB and CaC and rapid on unit CaD. Reaction in unlimed areas is medium acid or strongly acid in the surface layer and subsoil. The hazard of erosion is moderate on unit CaB, severe on unit CaC, and very severe on unit CaD.

Areas of these soils are used for cultivated crops, for hay and pasture, for woodland, and for community development. Most areas of units CaB and CaC are used for cultivated crops or hay. Most of unit CaD is used for hay and pasture.

All areas of these soils are generally suitable for cultivated crops, but those of units CaB and CaC are better suited. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Growing cover crops, returning crop residue to the soil, and using grasses and legumes in the cropping system help maintain the organic matter content and tilth of the soils.

The soils are well suited to pasture. The prevention of overgrazing is a major pasture management concern. Proper stocking rates to maintain key plant species, rotating of pastures, and periodically applying nutrients are major pasture management practices.

The soils are suitable for trees, and the potential for woodland is high. Machine planting is practical in larger areas. Livestock graze many areas of woodland on these soils, hindering the establishment and growth of young trees. The hazard of erosion and the slope in unit CaD limit the use of equipment on these soils. Constructing roads on the contour of these more sloping areas helps to control erosion during timber harvesting.

The depth to bedrock limits the use of these soils for community development, especially for onsite waste disposal. Slope in the areas of units CaC and CaD is an additional limitation for community development.

The capability subclass is IIe for unit CaB, IIIe for unit CaC, and IVe for unit CaD; the woodland ordination symbol is 2o for units CaB and CaC, and 2r for unit CaD.

CkB—Culleoka-Upshur complex, 3 to 8 percent slopes.
CkC—Culleoka-Upshur complex, 8 to 15 percent slopes.

CkD—Culleoka-Upshur complex, 15 to 25 percent slopes.

This complex consists of moderately deep and deep, well drained soils on uplands. Slopes range from 100 to 400 feet in length, and areas of the soils range from about 2 to 25 acres. Each unit is about 40 to 55 percent Culleoka soils, 30 to 40 percent Upshur soils, and 15 to 20 percent other soils. The Culleoka and Upshur soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Culleoka soils is dark brown silt loam about 11 inches thick. The subsoil is yellowish brown and is about 14 inches thick. The upper 10 inches is light silty clay loam, and the lower 4 inches is shaly heavy silt loam. The substratum is yellowish brown very shaly silt loam about 3 inches thick. Shale bedrock is at a depth of 28 inches.

Typically, the surface layer of the Upshur soils is dark brown silty clay loam about 5 inches thick. The subsoil is 23 inches thick. The upper 19 inches is reddish brown silty clay, and the lower 4 inches is variegated reddish brown and dusky red clay. The substratum is variegated dark reddish brown and dusky red shaly and very shaly silty clay loam 26 inches thick. Shaly limestone bedrock is at a depth of 54 inches.

Included with these soils in mapping are a few small areas of Brooke, Weikert, Dormont, Guernsey, and Library soils. Also included are small areas of a soil that is similar to the Culleoka soil but that is more than 40 inches deep to bedrock and areas of a soil that is similar to the Upshur soil but that is more poorly drained.

These Culleoka and Upshur soils have moderate available water capacity. The Culleoka soils have moderately rapid permeability, and the Upshur soils slow permeability. Runoff is medium on units CkB and CkC and rapid on unit CkD. Reaction in unlimed areas of the Culleoka soils is medium acid or strongly acid in the surface layer and subsoil. In the Upshur soils it is very strongly acid to slightly acid in the surface layer and upper part of the subsoil and strongly acid to neutral in the lower part of the subsoil. The hazard of erosion is moderate on unit CkB, severe on unit CkC, and very severe on unit CkD.

Most areas of these soils are used for hay, pasture, woodland, or brushland. A few areas are used for cultivated crops.

These soils are suited to cultivated crops, but the areas of units CkB and CkC have better suitability for crops. Contour stripcropping and using minimum tillage, grassed waterways, cover crops, and hay in the crop rotation help to reduce runoff and control erosion. Growing cover crops, returning crop residue to the soil, and using grasses and legumes in the cropping system help to maintain the organic matter content and tilth of the soils.

These soils are suitable for pasture. The prevention of overgrazing is a major pasture management concern. Grazing and using equipment when the Upshur soils are wet cause compaction of the surface layer, which in turn increases runoff and erosion. The use of proper stocking rates to maintain key plant species, pasture rotation, and periodic applications of nutrients are the major pasture management practices.

The soils are suitable for trees. The potential for woodland is high on the Culleoka soils and moderately high on the Upshur soils. Machine planting is practical on larger areas, but the use of equipment is limited on all areas of Upshur soils and on the Culleoka soils in unit CkD. Constructing roads on the contour of the Upshur soils and on the more sloping areas of Culleoka soils helps to control erosion during timber harvesting. Livestock graze many areas of woodland on these soils, hindering the establishment and growth of young trees.

The depth to bedrock and the slow permeability in the Upshur soils are the major limitations of these complexes for community development, especially for onsite waste disposal. Low strength and instability in the Upshur soils are a hazard for the construction of roads and buildings. Slope is an additional limitation for community development in units CkC and CkD.

The capability subclass is IIe for unit CkB, IIIe for unit CkC, and IVe for unit CkD. The woodland ordination symbol is 2o for the Culleoka part of units CkB and CkC, 2r for the Culleoka part of unit CkD, and 3c for the Upshur part of all three units.

DaB—Dekalb channery loam, 3 to 8 percent slopes.

DaC—Dekalb channery loam, 8 to 15 percent slopes.

DaD—Dekalb channery loam, 15 to 25 percent slopes.

These soils are moderately deep and well drained. The areas are on uplands and range from about 2 to 20 acres. Slopes are 100 to 400 feet long.

Typically, the surface layer of these soils is very dark grayish brown channery loam about 3 inches thick. The subsurface layer is light yellowish brown channery loam 4 inches thick. The subsoil is yellowish brown and is 14 inches thick. It is channery fine sandy loam in the upper 6 inches and channery sandy loam in the lower 8 inches. The substratum is yellowish brown very channery loamy sand 4 inches thick.

Included with these soils in mapping are small areas of Culleoka, Weikert, Dormont, and Guernsey soils. Also included are small areas of soils that are less than 20 inches deep to bedrock. Included soils make up about 15 to 25 percent of each unit.

The permeability of these Dekalb soils is moderately rapid or rapid, and the available water capacity is low. Runoff is medium on unit DaB and rapid on units DaC and DaD. Reaction in unlimed areas is very strongly acid or strongly acid to a depth of about 21 inches. The hazard of erosion is moderate on unit DaB, severe on DaC, and very severe on DaD.

Most areas of these soils are used for woodland or brushland. Some areas are used for pasture or hay, and

a few areas of units DaB and DaC are used for cultivated crops and housing sites.

The areas of unit DaB are suitable for cultivated crops, but slope makes units DaC and DaD poorly suited to crops. Contour stripcropping and using grassed waterways, minimum tillage, and cover crops help to control erosion. Growing cover crops, returning crop residue to the soil, and using grasses and legumes in the cropping system help to maintain the organic matter content and tilth of the soils.

These soils are suited to pasture. The prevention of overgrazing is a major pasture management concern. Some suitable pasture management practices are the use of proper stocking rates to maintain key plant species, pasture rotation, and periodic applications of nutrients.

The soils are suitable for trees, and the potential for woodland is moderately high. A high rate of seedling mortality is the major hazard. Machine planting is practical in larger areas, but the slope of some areas, especially unit DaD, limits the use of equipment. Constructing roads on the contour of such areas helps to control erosion during timber harvesting. Livestock graze many areas of woodland on these soils, hindering the establishment and growth of young trees.

The moderately rapid permeability and the depth of bedrock limit these soils for community development, especially for onsite waste disposal. Slope is an additional limitation on unit DaD.

The capability subclass is IIe for unit DaB, IIIe for unit DaC, and IVe for unit DaD; the woodland ordination symbol is 3f for all three units.

DaF—Dekalb channery loam, 25 to 80 percent slopes. This soil is steep and very steep, moderately deep, and well drained. It is on uplands. Areas range from about 5 to 20 acres. Slopes are 250 to 500 feet long.

Typically, the surface layer is very dark grayish brown channery loam about 3 inches thick. The subsurface layer is brown channery loam about 4 inches thick. The subsoil is yellowish brown and is 14 inches thick. It is channery fine sandy loam in the upper 6 inches and channery sandy loam in the lower 8 inches. The substratum is yellowish brown very channery loamy sand 4 inches thick. Sandstone bedrock is at a depth of 25 inches.

Included with this soil in mapping are a few small areas of Culleoka and Weikert soils. Also included are small areas of soils that are less than 20 inches deep to bedrock. Included soils make up about 25 percent of this unit.

The permeability of this Dekalb soil is moderately rapid or rapid, and the available water capacity is low. Runoff is very rapid. Reaction in unlimed areas is very strongly acid or strongly acid in the upper 21 inches. The hazard of erosion is very severe.

Most areas of this soil are in woodland. Some areas are used for pasture or are in brushland.

Slope and the hazard of erosion make this soil unsuitable for cultivated crops and poorly suited to pasture. The prevention of overgrazing is a major pasture management concern. The slope limits the use of equipment for pasture maintenance and applying nutrients. Some suitable pasture management practices are the use of proper stocking rates to maintain key plant species and pasture rotation.

This soil is suited to trees, and the potential for woodland is moderately high. A high rate of seedling mortality and the equipment limitation caused by slope are the main management concerns. Livestock graze many areas of woodland on this soil, further hindering the establishment and growth of young trees. Constructing roads on the contour helps to control erosion during timber harvesting.

Slope and the depth to bedrock limit this soil for community development and especially for onsite waste disposal.

The capability subclass is VIIe; the woodland ordination symbol is 3f.

DbD—Dekalb very stony loam, 8 to 25 percent slopes. This soil is sloping and moderately steep, moderately deep, and well drained. Slopes are 300 to 800 feet long. The areas are on uplands and range from about 5 to 75 acres. Large stones cover 3 to 15 percent of the surface.

Typically, the surface layer is very dark grayish brown channery loam about 3 inches thick. The subsurface layer is light yellowish brown channery loam 4 inches thick. The subsoil is yellowish brown and is 14 inches thick. It is channery fine sandy loam in the upper 6 inches and channery sandy loam in the lower 8 inches. The substratum is yellowish brown very channery loamy sand 4 inches thick. Sandstone bedrock is at a depth of 25 inches.

Included with this soil in mapping are a few small areas of Culleoka, Weikert, Dormont, and Guernsey soils. Also included are small areas of soils that are less than 20 inches deep to bedrock. Included soils make up about 25 percent of this unit.

The permeability of this Dekalb soil is moderately rapid or rapid, and the available water capacity is low. Runoff is medium to rapid. Reaction in unlimed areas is very strongly acid or strongly acid to a depth of 21 inches. The hazard of erosion is very severe.

Most areas of this soil are in woodland or brushland. Some areas are used for pasture.

The stones on the surface make the soil generally unsuitable for cultivated crops and limit intensive management practices in the areas used for pasture. Suitable management practices include the use of proper stocking rates to maintain key plant species and pasture rotation. In these areas weed and brush control and fertilization must be performed with handtools or small machinery.

This soil is suited to woodland, and the potential for trees is moderately high. A high rate of seedling mortality

and equipment limitations caused by the stones on the surface are the main management concerns. Livestock graze many areas of woodland on this soil, thus hindering the establishment and growth of young trees. Constructing logging roads on the contour helps to control erosion on this soil.

Slope, the depth to bedrock, and the stones on the surface limit this soil for community development. Slope and the depth to bedrock especially limit the soil for onsite waste disposal.

The capability subclass is VIs; the woodland ordination symbol is 3f.

DoB—Dormont silt loam, 3 to 8 percent slopes.
DoC—Dormont silt loam, 8 to 15 percent slopes.
DoD—Dormont silt loam, 15 to 25 percent slopes.

These soils are deep and moderately well drained. Slopes are 100 to 500 feet long. The areas are on uplands and range from about 2 to 150 acres.

Typically, the surface and subsurface layers of these soils are dark brown silt loam and have a combined thickness of 12 inches. The subsoil is 42 inches thick. The upper 15 inches is yellowish brown silt loam and silty clay loam. The lower 27 inches is mottled, yellowish brown silty clay loam and channery silty clay loam. The substratum is mottled, brown silty clay to a depth of 78 inches.

Included with these soils in mapping are small areas of Culleoka, Guernsey, Library, and Weikert soils. Also included are soils that are similar to these Dormont soils but that are more poorly drained or shallower to bedrock. Included soils make up about 20 to 25 percent of each unit.

The permeability of these Dormont soils is slow to moderately slow, and the available water capacity is high. Runoff ranges from medium on unit DoB to rapid on units DoC and DoD. Reaction in unlimed areas is very strongly acid to medium acid to a depth of about 25 inches and is strongly acid to medium acid at a depth of more than 25 inches. A seasonal high water table is at a depth of 18 to 36 inches. The hazard of erosion is moderate on unit DoB and severe on units DoC and DoD.

These soils are used for cultivated crops, for hay and pasture, for woodland, and for community development. Many of the areas of unit DoB are used for crops; most of the acreage of units DoC and DoD is used for pasture or woodland.

Most areas of these soils are suited to cultivated crops, but the areas of unit DoB are better suited. Contour stripcropping and using minimum tillage, grassed waterways, cover crops and hay in the crop rotation help to reduce runoff and control erosion. Subsurface drains are needed in some areas to drain wet spots. Growing cover crops, returning crop residue to the soil, and using grasses and legumes in the cropping system help to maintain the organic matter content and tilth of the soils.

These soils are well suited to pasture. The prevention of overgrazing is a major pasture management concern. The use of proper stocking rates to maintain key plant species, pasture rotation, and periodic applications of nutrients are the main management practices. Restricted grazing and keeping equipment off the soils during the wet seasons help prevent compaction of the surface layer.

The soils are suitable for trees, and the potential for woodland is high. Machine planting is practical in larger areas, but slope limits the use of equipment on unit DoD. Constructing roads on the contour of such areas helps to control erosion during timber harvesting. Livestock graze many areas of woodland on these soils, hindering the establishment of young trees.

The seasonal high water table and slow to moderately slow permeability limit these soils for community development, especially for onsite waste disposal. Slope is an additional limitation on unit DoD, and low strength is a hazard for roads and foundations.

The capability subclass is IIe for unit DoB, IIIe for unit DoC, and IVe for unit DoD; the woodland ordination symbol is 2o for units DoB and DoC, and 2r for unit DoD.

DtD—Dormont-Culleoka silt loams, 15 to 25 percent slopes. This complex consists of moderately steep, deep and moderately deep, moderately well drained and well drained soils on uplands. Slopes are 100 to 600 feet long. The areas range from 5 to 400 acres. Dormont soils make up about 55 percent of this unit, Culleoka soils about 40 percent, other soils about 5 percent. The soils are so intermingled that it was not practical to map them separately.

Typically, the surface and subsurface layers of the Dormont soils are dark brown silt loam and have a combined thickness of about 12 inches. The subsoil is 42 inches thick. The upper 15 inches is yellowish brown silt loam and silty clay loam. The lower 27 inches is mottled, yellowish brown silty clay loam and channery silty clay loam. The substratum is mottled, brown silty clay to a depth of 78 inches.

Typically, the surface layer of the Culleoka soils is dark brown silt loam about 11 inches thick. The subsoil is yellowish and is about 14 inches thick. The upper 10 inches is light silty clay loam, and the lower 4 inches is shaly heavy silt loam. The substratum is yellowish brown very shaly silt loam about 3 inches thick. Shale bedrock is at a depth of 28 inches.

Included with these soils in mapping are small areas of Brooke, Weikert, Guernsey, and Library soils. Also included are soils similar to these Dormont soils but that are more poorly drained or shallower to bedrock.

These Dormont soils have moderately slow permeability and high available water capacity. Runoff is rapid, and the hazard of erosion is very severe. Reaction in unlimed areas of the Dormont soils is very strongly acid to medium acid to a depth of about 25 inches and strongly acid or medium acid at a depth of more than 25 inches. A seasonal high water table is at a depth of 18 to 36 inches.

The Culleoka soils have moderately rapid permeability and moderate available water capacity. Runoff is rapid, and the hazard of erosion is very severe. Reaction in unlimed areas of the Culleoka soils is medium acid or strongly acid to a depth of about 25 inches.

Most areas of this unit are used for hay and pasture or are in woodland and brushland. A few areas are used for cultivated crops.

These soils are suited to cultivated crops. Contour stripcropping and using minimum tillage, grassed waterways, cover crops, and hay in the crop rotation help to reduce runoff and control erosion. Subsurface drains are needed in some areas of the Dormont soils to drain wet spots. Growing cover crops, returning crop residue to the soil, and using grasses and legumes in the cropping system help to maintain the organic matter content and tilth of the soils.

These soils are suited to pasture. The prevention of overgrazing is a pasture management concern. The main management practices are using proper stocking rates to maintain key plant species, pasture rotation, and using periodic applications of nutrients. Restricted grazing and keeping equipment off the soils during the wet season help to prevent compaction of the surface layer.

The soils are suitable for trees, and the potential for woodland is high. Machine planting is practical in larger areas. The hazard of erosion and the slope limit the use of equipment on these soils. Constructing roads on the contour helps to control erosion during timber harvesting. Livestock graze many areas of woodland on these soils, hindering the establishment and growth of young trees.

Slope, the seasonal high water table in the Dormont soils, and the depth to bedrock in the Culleoka soils are the main limitations for community development, especially for onsite waste disposal. Low strength in the Dormont soils is a hazard for roads and foundations.

The capability subclass is IVe; the woodland ordination sumbol is 2r.

DtF—Dormont-Culleoka silt loams, 25 to 50 percent slopes. This unit consists of steep and very steep, deep and moderately deep, well drained and moderately well drained soils on uplands. Slopes are 100 to 800 feet long. Dormont soils make up about 55 percent of this unit, Culleoka soils about 40 percent, and other soils about 5 percent. The areas range from about 5 to 800 acres. The soils are so intermingled that it was not practical to map them separately.

Typically, the surface and subsurface layers of the Dormont soils are dark brown silt loam and have a combined thickness of about 12 inches. The subsoil is 42 inches thick. The upper 15 inches is yellowish brown silt loam and silty clay loam. The lower 27 inches is mottled, yellowish brown silty clay loam and channery silty clay loam. The substratum is mottled, brown silty clay to a depth of 78 inches.

Typically, the surface layer of the Culleoka soils is dark brown silt loam about 11 inches thick. The subsoil is yellowish brown and is about 14 inches thick. The upper 10 inches is light silty clay loam, and the lower 4 inches is shaly heavy silt loam. The substratum is yellowish brown very shaly silt loam about 3 inches thick. Shale bedrock is at a depth of 28 inches.

Included with this soil in mapping are small areas of Guernsey, Weikert, and Upshur soils. Also included are areas of soils similar to these Dormont soils but that are more poorly drained and areas of soils that are similar to these Culleoka soils but that are deeper to bedrock. Some areas of the Dormont and Culleoka soils have slopes of more than 50 percent.

These Dormont soils have moderately slow permeability and high available water capacity. Runoff is rapid, and the hazard of erosion is very severe. Reaction in unlimed areas of the Dormont soils is very strongly acid to medium acid to a depth of about 25 inches and strongly acid or medium acid at a depth of more than 25 inches. A seasonal high water table is a depth of 18 to 36 inches.

The Culleoka soils have moderately rapid permeability and moderate available water capacity. Runoff is rapid, and the hazard of erosion is very severe. Reaction in unlimed areas of the Culleoka soils is medium acid or strongly acid to a depth of about 25 inches.

Most areas of these soils are used for pasture or are in woodland and brushland.

Slope and the hazard of erosion make these soils unsuitable for cultivated crops and poorly suited to pasture. The prevention of overgrazing is a major pasture management concern.

These soils are well suited to trees, and the potential for woodland is high. Slope limits the use of equipment, however, and makes machine planting impractical. Constructing roads on the contour helps to control erosion during timber harvesting. Livestock graze many areas of woodland on these soils, hindering the establishment and growth of young trees.

Slope, the seasonal high water table in the Dormont soils, and the depth to bedrock in the Culleoka soils are the main limitations for community development, especially for onsite waste disposal. Low strength in the Dormont soils is a hazard for roads and foundations.

The capability subclass is VIIe; the woodland ordination symbol is 2r.

Du—Dumps, mine. This unit consists of piles of low grade coal, carbonaceous shale, and ash from deep mining operations. The material is extremely acid, generally has no vegetation, and contains large amounts of iron and sulphur.

These areas are difficult to revegetate because few plants can survive the extreme acidity of the material. Some of the material is suitable for fill, but it is not suitable for most other uses.

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

Fa—Fluvaquents, loamy. This unit consists of nearly level, moderately deep or deep, somewhat poorly drained or poorly drained soils on flood plains. Slopes are 50 to 250 feet long. Areas range from about 2 to 50 acres and are frequently flooded.

Typically, these soils have a surface layer of black to dark brown silt loam or loam. The subsoil is mottled loam to silty clay. The substratum is silt loam to sand.

Included with these soils in mapping are small areas of Huntington and Newark soils. Included soils make up about 25 percent of this unit.

The permeability of Fluvaquents is moderate, and available water capacity is moderate to high. Runoff is very slow. Reaction ranges from medium acid to mildly alkaline. A high water table is between the surface and a depth of 10 inches. The hazard of erosion is slight.

Most areas of these soils are in pasture and brushland. Some areas are used for hay, and a few are used for cultivated crops.

Frequent flooding and the high water table make these soils poorly suited to cultivated crops. Subsurface drainage and protection from flooding are the chief management needs.

The soils are suitable for pasture. The prevention of overgrazing is a major pasture management concern. Restricted grazing and keeping equipment off the soils during wet periods help to prevent compaction of the surface layer. The main pasture management practices are using proper stocking rates to maintain key plant species, rotating pastures, and periodically applying nutrients.

The soils are suitable for trees and have moderately high potential for woodland. A high rate of seedling mortality is the main management concern. The use of equipment is limited, but machine planting is practical in the larger areas.

Frequent flooding and the high water table limit these soils for community development, especially for onsite sewage disposal.

This unit is not assigned to a capability subclass or woodland ordination symbol.

GdA—Glenford silt loam, 0 to 3 percent slopes.
GdB—Glenford silt loam, 3 to 8 percent slopes.
GdC—Glenford silt loam, 8 to 15 percent slopes.

These soils are deep and moderately well drained. Slopes range from 200 to 600 feet long. The areas are on terraces and range from about 2 to 70 acres.

Typically, the surface layer is brown silt loam about 9 inches thick. The subsoil is yellowish brown silt loam and light silty clay loam and is 38 inches thick. The substratum is yellowish brown gravelly silt loam to a depth of 60 inches.

Included with these soils in mapping are small areas of Allegheny, Dormont, Library, Newark, and Purdy soils. Also included are areas of a soil that is similar to these Glenford soils but that is better drained. Included soils make up about 20 to 30 percent of each unit.

The permeability of these Glenford soils is moderately slow, and the available water capacity is high. Runoff is slow on unit GdA, medium on unit GdB, and medium to rapid on unit GdC. Reaction in unlimed areas is very strongly acid or strongly acid to a depth of about 25 inches and medium acid or slightly acid at a depth of more than 25 inches. A seasonal high water table is at a depth of 24 to 36 inches. The hazard of erosion is slight on unit GdA, moderate on unit GdB, and severe on unit GdC.

Most areas of these soils are cultivated or used for hay or pasture. A few small areas are in woodland, and some acreage is used for housing.

These soils are suitable for cultivated crops, but the areas of units GdB and GdC are not so well suited as those of unit GdA. Contour stripcropping and using minimum tillage, grassed waterways, diversions, and cover crops help to control runoff and erosion on the more sloping areas. Subsurface drains are needed to drain wet spots in some areas of these soils. Growing cover crops, returning crop residue to the soil, and using grasses and legumes in the cropping system help to maintain the tilth and organic matter content of the soils.

The soils are well suited to pasture. The prevention of overgrazing is a major pasture management concern. The main management practices are using proper stocking rates to maintain key plant species, rotating pastures, and periodically applying nutrients.

The soils are well suited to trees, and the potential for woodland is very high. Machine planting is practical on larger areas.

The seasonal high water table and moderately slow permeability of the soils are the main limitations for community development, especially for onsite sewage disposal. Slope is an additional limitation on unit GdC.

The capability subclass is IIw for units GdA and GdB, and IIIe for unit GdC; the woodland ordination symbol for all three units is 1o.

GeB—Guernsey silt loam, 3 to 8 percent slopes.
GeC—Guernsey silt loam, 8 to 15 percent slopes.
GeD—Guernsey silt loam, 15 to 25 percent slopes.

These soils are deep and moderately well drained. Slopes are 100 to 500 feet long. The areas range from about 2 to 100 acres.

Typically, the surface layer is yellowish brown silt loam about 10 inches thick. The subsoil is 32 inches thick. The upper 8 inches of the subsoil is yellowish brown silty clay loam and silty clay. The lower 24 inches is mottled, yellowish brown and light brownish gray clay and silty clay. The substratum is strong brown and yellowish brown silty clay and cobbly clay to a depth of 60 inches.

Included with these soils in mapping are areas of Culleoka, Dormont, Brooke, and Library soils. Also included are areas of a soil that is similar to these Guernsey soils but that is shallower to bedrock. A few areas of more sloping soils near Atlasburg and Donora have no vegetation and are severely eroded. Included areas make up about 25 percent of each unit.

The permeability of these Guernsey soils is slow or moderately slow, and the available water capacity is high. Runoff is medium on unit GeB and rapid on units GeC and GeD. Reaction in unlimed areas is very strongly acid or strongly acid to a depth of about 20 inches and medium acid to mildly alkaline at a depth of more than 20 inches. A seasonal high water table is at a depth of 18 to 36 inches. The hazard of erosion is moderate on unit GeB, severe on GeC, and very severe on GeD.

These soils are used for cultivated crops, for hay and pasture, for woodland, and for community development. Most of the areas of units GeB and GeC are cultivated or used for hay and pasture; the areas of unit GeD are mostly used for hay, pasture, and woodland.

These soils are suitable for cultivated crops, but the slope and erosion hazard on unit GeD make it necessary to use hay as the dominant crop in the crop rotation on such areas. Contour stripcropping and using minimum tillage, grassed waterways, cover crops, and hay in the crop rotation help to reduce runoff and control erosion on all areas. Subsurface drains are needed in some areas to drain wet spots. Growing cover crops, returning crop residue to the soil, and using grasses and legumes in the cropping system help to maintain the organic matter content and tilth of the soil.

The soils are well suited to pasture. The prevention of overgrazing is a major pasture management concern. The main management practices are using proper stocking rates to maintain key plant species, rotating pastures, and periodically applying nutrients.

The soils are well suited to trees, and the potential for woodland is high. Machine planting is practical on larger areas, but slope limits the use of equipment on the areas of unit GeD. Constructing roads on the contour of such areas helps to control erosion during timber harvesting. Livestock graze many areas of these soils, hindering the establishment and growth of young trees.

The high water table and slow permeabilty of the soils are the main limitations for community development, especially for onsite waste disposal. Slope is an additional limitation of unit GeD. The low strength of the soils is a hazard for roads and foundations, and slips and slides are common in disturbed areas.

The capability subclass is IIe for unit GeB, IIIe for unit GeC, and IVe for unit GeD; the woodland ordination symbol is 2o for units GeB and GeC, and 2r for unit GeD.

Hu—Huntington silt loam. This soil is nearly level, deep, and well drained. It is on flood plains. Slopes are about 200 to 800 feet long. The areas range from about 4 to 40 acres.

Typically, the surface and subsurface layers are very dark grayish brown silt loam and have a combined thickness of about 14 inches thick. The subsoil is very dark grayish brown, dark yellowish brown, and dark brown silt loam 32 inches thick. The substratum is dark yellowish brown loam to a depth of 60 inches.

Included with this soil in mapping are small areas of Newark soils and Fluvaquents. Included soils make up about 15 percent of this unit.

The permeability of this Huntington soil is moderate, and the available water capacity is high. Runoff is medium. Reaction in unlimed areas is slightly acid or neutral to a depth of about 45 inches. The hazard of erosion is slight.

Most areas of this unit are used for cultivated crops, hay, and pasture. Some areas are in woodland or brushland, and a few are used for community development.

This soil is well suited to cultivated crops (fig. 6). Growing cover crops, returning crop residue to the soil, and using grasses and legumes in the cropping system help to maintain the organic matter content and tilth of the soil.

The soil is well suited to pasture. The prevention of overgrazing is a major pasture management concern. The main management practices are using proper stocking rates to maintain key plant species, rotating pastures, and periodically applying nutrients. Livestock need protection from occasional flooding in some areas of the soil.

This soil is well suited to trees, and the potential for woodland is very high. Machine planting is practical on larger areas.

The hazard of flooding is the main limitation of this soil for community development.

The capability class is I; the woodland ordination symbol is 1o.

LbA—Library silty clay loam, 0 to 3 percent slopes.
LbB—Library silty clay loam, 3 to 8 percent slopes.
LbC—Library silty clay loam, 8 to 15 percent slopes.

These soils are deep and somewhat poorly drained. They are on uplands and terraces. Slopes are 100 to 500 feet long. The areas range from about 2 to 50 acres.

Typically, the surface layer is dark grayish brown silty clay loam about 7 inches thick. The subsoil is 30 inches thick. The upper 9 inches is brown silty clay. The middle 14 inches is mottled, grayish brown and light gray clay. The lower 7 inches is mottled, dark gray shaly clay. The substratum is dark grayish brown and yellowish brown very shaly silty clay and shaly silty clay to a depth of 60 inches.

Included with these soils in mapping are small areas of Culleoka, Brooke, Weikert, Glenford, Purdy, Dormont, Upshur, and Guernsey soils. Included soils make up about 25 percent of each unit.

The permeability of these Library soils is slow, and the available water capacity is moderate or high. Runoff is slow on unit LbA, medium on unit LbB, and rapid on unit LbC. Reaction in unlimed areas ranges from strongly acid to neutral in the surface layer and subsoil and from medium acid to mildly alkaline in the substratum. A seasonal high water table is at a depth of 6 to 18 inches.

Figure 6.—A stand of corn on Huntington silt loam.

The hazard of erosion is slight on unit LbA, moderate on LbB, and severe on LbC.

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

These soils are suitable for cultivated crops. Contour stripcropping and using minimum tillage, grassed waterways, cover crops, and hay in the crop rotation help to control erosion on units LbB and LbC.

Subsurface drains are needed to drain some wet spots in these soils. Growing cover crops, returning crop residue to the soil, and growing moisture-tolerant grasses and legumes help to maintain the organic matter content and tilth of the soils.

The soils are well suited to pasture. Using equipment and allowing livestock to graze when the soils are wet causes compaction of the surface layer and reduction of the desirable pasture grasses. The suitable management

practices include using proper stocking rates to maintain key plant species, rotating pastures, and periodically applying nutrients.

The soils are well suited to trees, and the potential for woodland is high. The main management concerns are the high water table, which restricts the use of equipment, and a high rate of seedling mortality. Slope is an additional limitation to the use of equipment in the areas of units LbB and LbC. Constructing roads on the contour of such areas helps to control erosion during timber harvesting. Machine planting is practical on the larger areas of these soils.

The slow permeability and seasonal high water table of the soils are the main limitations for community development, especially for onsite waste disposal. Low strength in the soils is a hazard for roads and foundations.

The capability subclass is IIIw for units LbA and LbB, and IIIe for unit LbC; the woodland ordination symbol is 2w for all three units.

Nw—Newark silt loam. This soil is nearly level, deep, and somewhat poorly drained. Slopes are 50 to 300 feet long. The areas range from about 5 to 70 acres.

Typically, the surface layer is dark yellowish brown silt loam about 10 inches thick. The subsoil is yellowish brown and mottled, light brownish gray silty clay loam 29 inches thick. The substratum is mottled, light brownish gray and brown loam to a depth of 60 inches.

Included with this soil in mapping are areas of Huntington soils and Fluvaquents. Included soils make up about 25 percent of this unit.

The permeability of this Newark soil is moderate, and the available water capacity is high. Runoff is very slow. Reaction in unlimed areas is medium acid or slightly acid in the surface layer and subsoil. A seasonal high water table is at a depth of 6 to 18 inches. The hazard of erosion is slight.

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

This soil is suited to cultivated crops. Subsurface drains are needed in some areas to drain wet spots. Growing cover crops, returning crop residue to the soil, and using grasses and legumes in the cropping system help to maintain the organic matter content and tilth of the soil.

The soil is well suited to pasture. The prevention of overgrazing is a major pasture management concern. The suitable management practices include using proper stocking rates to maintain key plant species, rotating pastures, and periodically applying nutrients. Livestock need protection from occasional flooding of some areas of this soil.

The soil is well suited to trees, and the potential for woodland is very high. Machine planting is practical on larger areas, but the seasonal high water table limits the use of equipment.

The hazard of flooding and the seasonal high water table are the main limitations of the soil for community development.

The capability subclass is IIw; the woodland ordination symbol is 1w.

Py—Purdy silt loam. This soil is nearly level, deep, and poorly drained to very poorly drained. It is on terraces. Slopes are 100 to 500 feet long. The areas range from about 2 to 100 acres.

Typically, the surface layer is grayish brown silt loam about 8 inches thick. The subsoil is grayish brown and is 34 inches thick. It is silty clay loam in the upper 25 inches and silty clay in the lower 9 inches. The substratum is gray silty clay to a depth of 60 inches.

Included with this soil in mapping are small areas of Allegheny, Glenford, and Library soils. Also included are small areas of Newark soils and Fluvaquents. Included soils make up about 25 percent of this unit.

The permeability of this Purdy soil is slow or very slow, and the available water capacity is high. Runoff is slow. Reaction in unlimed areas is strongly acid or medium acid to a depth of about 20 inches and medium acid to slightly acid at a depth of more than 20 inches. A seasonal high water table is between the surface and a depth of 6 inches. The hazard of erosion is slight.

The high water table makes this soil poorly suited to cultivated crops. Subsurface drainage is needed to make this soil suitable for most crops.

This soil is suitable for pasture. Allowing livestock to graze and using equipment when the soil is wet causes compaction of the surface layer and reduction of the desirable pasture grasses. The suitable management practices include using proper stocking rates to maintain key plant species, rotating pastures, and periodically applying nutrients.

The soil is well suited to water-tolerant trees, and the potential for woodland is very high. The main management concerns are the seasonal high water table, which restricts the use of equipment, and a high rate of seedling mortality. Machine planting is practical on the larger areas of this soil.

The high water table and slow permeability of the soil are the main limitations for community development, especially for onsite waste disposal. The low strength of the soil is a hazard for roads and foundations.

The capability subclass is IVw; the woodland ordination symbol is 1w.

UdB—Udorthents, smoothed, gently sloping.
UdD—Udorthents, smoothed, moderately steep.
UdF—Udorthents, smoothed, steep.

These units consist of very shallow to deep, well drained to somewhat poorly drained soils on uplands and flood plains. Areas of these soils have been altered for housing and industrial development, roads, and railroads. The areas are 5 to 50 acres. Most are near larger cities and towns, but isolated areas are throughout the survey area. Slopes are 100 to 500 feet long.

Typically, these Udorthents have a surface layer of brown to yellowish brown silt loam and loam. The substratum ranges mainly from mottled sandy loam through clay.

Included with these soils in mapping are areas of soils that have not been significantly altered by cutting or filling and small urbanized areas. Inclusions make up about 10 to 15 percent of each unit.

The permeability of these Udorthents is slow to rapid, and the available water capacity is low to high. Runoff is slow to medium on unit UdB, rapid on UdD, and very rapid on UdE. Reaction is mildly alkaline to extremely acid throughout the soils. A seasonal high water table is at a depth of about 6 to 36 inches. The hazard of erosion is moderate on the gently sloping areas and very severe on the moderately steep and steep areas.

Most areas of these soils are adjacent to housing developments, industrial sites, roads, and railroads. The soils are generally not suited to farming. They have a wide range of suitability to landscaping and lawns, depending on the thickness of the soil material.

The suitability of soils for nonfarm uses depends on the extent to which the soils have been altered and the type of use. Onsite investigation is necessary, however, to determine the potential and limitations for any use.

These units are not assigned a capability subclass or woodland ordination symbol.

UkB—Udorthents, strip mine, gently sloping.
UkD—Udorthents, strip mine, moderately steep.
UkF—Udorthents, strip mine, steep.

These units consist of deep, well drained to somewhat poorly drained soils on uplands. The soils have been altered by strip mining activities. The areas of these soils are in the northwestern part of Washington County and, to a lesser extent, are adjacent to the Monongahela River and its tributaries in both counties. Slopes are 100 to 500 feet long. Areas range from about 5 to 250 acres.

Typically, these Udorthents have a surface layer of brown to yellowish brown silt loam and loam. The substratum ranges mainly from mottled sandy loam through clay.

Included with these soils in mapping are soils that have not been significantly altered by mining operations. Included soils make up about 20 percent of each unit.

The permeability of these Udorthents is slow to rapid, and the available water capacity is low to high. Runoff is slow to very rapid. Reaction is mildly alkaline to extremely acid throughout the soils. A seasonal high water table is at a depth of about 6 to 36 inches. The hazard of erosion is moderate to very severe.

Most areas of these soils are idle or are in pasture or woodland. A few areas of unit UkB are used for cultivated crops and community development. The suitability of the soils for most uses depends on the degree of reclamation, but the areas of unit UkF are poorly suited for most uses.

These units are not assigned a capability subclass or woodland ordination symbol.

Us—Urban land. This unit consists of areas where more than 85 percent of the surface is covered by asphalt, concrete, buildings, and other impervious surfaces. Examples are parking lots, shopping centers, and industrial parks. These areas are mainly along the Monongahela River and near larger cities and towns. The areas range from 2 to 400 acres.

Examination and identification of soils or materials in this unit are impractical. Onsite investigation is needed to determine the suitabilities and potentials for any use.

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

WeB—Weikert-Culleoka complex, 3 to 8 percent slopes.
WeC—Weikert-Culleoka complex, 8 to 15 percent slopes.

These units consist of shallow and moderately deep, well drained soils on uplands. Slopes are 100 to 500 feet long. Areas range from about 4 to 30 acres. Weikert soils make up about 50 to 60 percent of each unit, Culleoka soils about 30 to 40 percent, and other soils about 5 to 10 percent. These Weikert and Culleoka soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Weikert soils is brown channery silt loam about 7 inches thick. The subsoil is yellowish brown very shaly loam 4 inches thick. The substratum is light yellowish brown very shaly silt loam 8 inches thick. Shale bedrock is at a depth of 19 inches.

Typically, the surface layer of the Culleoka soils is dark brown silt loam about 11 inches thick. The subsoil is yellowish brown and is about 14 inches thick. The upper 10 inches is light silty clay loam, and the lower 4 inches is shaly heavy silt loam. The substratum is yellowish brown very shaly silt loam about 3 inches thick. Shale bedrock is at a depth of 28 inches thick.

Included with these soils in mapping are small areas of Brooke, Upshur, Dormont, Dekalb, Guernsey, and Library soils.

These Weikert and Culleoka soils have moderately rapid permeability. Available water capacity is very slow in the Weikert soils and moderate in the Culleoka soils. Runoff is medium on unit WeB and rapid on unit WeC. Reaction in unlimed areas of both soils is medium acid or very strongly acid in the surface layer and subsoil. The hazard of erosion is moderate on unit WeB and severe on unit WeC.

Most areas of these soils are in hay, pasture, or woodland. A few areas are used for cultivated crops.

The Culleoka soils in these units are suitable for cultivated crops. The Weikert soils, however, are limited for crops by the shallow depth to bedrock, the low available water capacity, and the channery and shaly texture of the soil. Contour stripcropping and using minimum tillage, grassed waterways, cover crops, and hay in the crop rotation help to control runoff and

erosion. Growing cover crops, returning crop residue to the soil, and using grasses and legumes in the cropping system help to maintain the tilth and organic matter content of the soils.

These soils are suitable for pasture. The prevention of overgrazing is a major pasture management concern. Some suitable management practices include using proper stocking rates to maintain key plant species, rotating pastures, and periodically applying nutrients.

The soils are suitable for trees, and the potential for woodland ranges from moderate to high. Machine planting is practical on the larger areas. Seedlings on the Weikert soils have a high mortality rate, and trees are susceptible to uprooting during windy periods. Livestock graze many areas of woodland on these soils, further hindering the establishment and growth of young trees.

The depth to bedrock in these soils is the main limitation for community development, especially for onsite sewage disposal. Slope is an additional limitation in unit WeC.

The capability subclass is IIIe for unit WeB and IVe for unit WeC. The woodland ordination symbol is 4D for the Weikert part of both units and 2o for the Culleoka part of both.

WeD—Weikert-Culleoka complex, 15 to 25 percent slopes. This unit consists of shallow and moderately deep, well drained soils on uplands. Slopes are 100 to 500 feet long. Areas range from about 4 to 30 acres. Weikert soils make up about 50 to 60 percent of the unit, Culleoka soils about 30 to 40 percent, and other soils about 5 to 10 percent. These Weikert and Culleoka soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Weikert soils is brown channery silt loam about 7 inches thick. The subsoil is yellowish brown very shaly loam 4 inches thick. The substratum is light yellowish brown very shaly silt loam 8 inches thick. Shale bedrock is at a depth of 19 inches.

Typically, the surface layer of the Culleoka soils is dark brown silt loam about 11 inches thick. The subsoil is yellowish brown and is about 14 inches thick. The upper 10 inches is light silty clay loam, and the lower 4 inches is shaly heavy silt loam. The substratum is yellowish brown very shaly silt loam about 3 inches thick. Shale bedrock is at a depth of 28 inches thick.

Included with these soils in mapping are small areas of Brooke, Upshur, Dormont, Dekalb, Guernsey, and Library soils.

These Weikert and Culleoka soils have moderately rapid permeability. Available water capacity is very slow in the Weikert soils and moderate in the Culleoka soils. Runoff is rapid. Reaction in unlimed areas is medium acid or very strongly acid in the surface layer and subsoil. The hazard of erosion is very severe.

Most areas of these soils are in hay, pasture, or woodland. A few areas are used for cultivated crops.

These soils are unsuitable for crops because of slopes, the depth to bedrock, the low to moderate available water capacity, and the channery and shaly texture of the soil. The soils are suitable for pasture. The prevention of overgrazing is a major pasture management concern. Some suitable management practices include using proper stocking rates to maintain key plant species, rotating pastures, and periodically applying nutrients.

The soils are suitable for trees, and the potential for woodland ranges from moderate to high. Slope limits the use of most types of equipment. Constructing roads on the contour of such areas helps to control erosion during timber harvesting. Seedlings on the Weikert soils have a high mortality rate, and trees are susceptible to uprooting during windy periods. Livestock graze many areas of woodland on these soils, further hindering the establishment and growth of young trees.

The depth to bedrock and slope are the main limitations of the soil for community development, especially for onsite sewage disposal.

The capability subclass is VIe. The woodland ordination symbol is 4D for the Weikert part and 2r for the Culleoka part.

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

John C. Spitzer, conservation agronomist, Soil Conservation Service, assisted with 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.

The 1975 update of the Conservation Needs Inventory reports a total of 347,185 acres of crops and pasture in the survey area—89,287 acres in Greene County and 257,898 acres in Washington County. Of this total, 184,349 acres was used for permanent pasture; 16,198 acres for row crops, mainly corn for grain; and 1,000 acres for orchards. The remaining acreage was in other farming uses.

Erosion is the major soil management concern on the cropland and pasture in Greene and Washington Counties. Allegheny and Glenford soils, for example, are potentially productive soils for crops and pasture, but the areas that have slopes of more than 3 percent have a moderate to severe erosion hazard.

Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging to soils with a restricting layer or bedrock in or below the subsoil that limits the depth of the root zone. Culleoka and Dekalb soils, for instance, have a moderate depth to bedrock that limits rooting depth. Erosion also reduces productivity on soils that tend to be droughty, such as Weikert soils. Second, soil erosion from farmland pollutes streams and reservoirs through sediment deposition. Control of erosion minimizes the pollution of streams, which in turn helps to maintain water quality for municipal use, for recreation, and for fish and wildlife.

Preparing a good seedbed and tilling are difficult on many sloping, channery soils because the original surface layer has been eroded, leaving a large number of stone fragments on the surface. Such areas are common in the Weikert-Culleoka complex. Erosion control practices provide a protective surface cover, reduce surface water runoff, and increase infiltration. A cropping system that keeps plant cover on the soil for extended periods will keep soil erosion losses to a minimum.

On livestock farms, which require pasture and hay, the legume and grass forage crops in the cropping system

help to reduce erosion on sloping land, provide nutrients to the soil, and improve soil tilth.

Contour farming and stripcropping are common erosion control practices in the survey area. These practices are suited to soils with smooth, uniform slopes, including most areas of the sloping Allegheny, Brooke, Culleoka, Dormont, Glenford, and Guernsey soils. However, some areas of these soils have irregular slopes, making contour tillage or terracing impractical. On these soils, cropping systems that provide substantial plant cover are needed to control erosion, and minimum tillage provides additional protection for the soils.

Minimizing tillage, cover cropping, and leaving crop residue on the surface help to increase infiltration and reduce erosion hazard. These practices can be used on most soils in the survey area. No-till farming for corn is effective in reducing erosion on sloping land and can be used on most soils in the survey except the poorly drained and very poorly drained soils.

Diversions reduce the length of slope, resulting in the reduction of erosion. They are practical on deep, well drained soils that have regular slopes. Allegheny and Glenford soils, for example, are suitable for diversions. Other soils are less suitable for diversions because of irregular slopes, excessive wetness in the diversion channels, or bedrock at a depth of less than 40 inches.

Soil drainage is the major management need on about 55,000 acres of land used for crops and pasture in the survey area. Some soils, such as poorly drained and very poorly drained Fluvaquents and Purdy soils, are naturally so wet that production of crops or pasture plants common to the area is generally not feasible without artificial drainage.

The design of surface and subsurface drainage systems varies with the kind of soil. A combination of surface drainage and tile drainage is needed in most areas of poorly drained soils used for intensive cropping. Drains must be more closely spaced in soils with slow permeability than in the more permeable soils. Finding adequate outlets for drainage systems is often difficult in areas of Purdy soils.

Fertility is low in some soils in the survey area. Available phosphorus and magnesium levels are naturally low in most soils. Many soils on uplands are naturally strongly acid, and they require application of ground limestone to supply calcium and to raise the pH sufficiently for good growth of alfalfa and other crops.

Soil tilth is an important factor in the germination of seeds and in the infiltration of water into the soil. Soils with good tilth are granular and porous.

Many soils used for crops in the survey area have a surface layer that is relatively low in organic matter content. Generally, the structure of such soil is weak, and intense rainfall causes crusting of the exposed surface. The crust is hard when it is dry and is nearly impervious to water. Once the crust forms, it reduces infiltration and increases runoff. Regular additions of crop residues, manure, and other organic material help to improve soil structure and to reduce crust formation.

Fall plowing on soils that have a surface layer of silt loam that is low in organic matter content causes the formation of a crust during winter and spring. Many of the soils are nearly as dense and hard at planting time after fall plowing as they were before they were plowed. Also, most of the cropland consists of sloping soils that are subject to damaging erosion if they are plowed in the fall.

Field crops suited to the soils and climate of the survey area include many that are not commonly grown. Corn is the major row crop grown, although the soils are suitable for grain sorghum, potatoes, and similar crops. Wheat and oats are the common close-grown crops.

The common special crops grown commercially in the survey area are apples, vegetables, and nursery plants. Deep soils that have good natural drainage and that warm up early in the spring are suitable for these crops. Good air drainage is needed to reduce frost damage.

In this survey area the Dormont and Culleoka soils have the best combination of soil properties and air drainage for fruit and vegetables. Huntington soils are also suitable for vegetables but are subject to flooding. In areas used for low residue-producing vegetable crops, using cover crops or a rotation with heavy residue-producing crops helps to reduce erosion and maintain the organic matter content.

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; 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. 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.

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

Paxton G. Wolfe, woodland conservationist, Soil Conservation Service, assisted with this section.

Greene and Washington Counties have about 406,100 acres of woodland, most of which is privately owned (*3*). Most of the woodland consists of stands of second- and third-growth trees. The main forest cover types and the extent of each are as follows: oak-hickory, 26 percent; aspen-birch, 25 percent; elm-ash-red maple, 21 percent; maple-beech-birch, 21 percent; white pine, 4 percent; and chestnut oak, 3 percent (*5*).

The main species in the oak-hickory type are white oak, red oak, and hickories, although black oak and chestnut oak are dominant in some areas. The principal associates are yellow-poplar, shagbark hickory, white ash, red maple, and beech.

Quaking aspen, bigtooth aspen, and gray birch dominate the mixture of the aspen-birch cover type. Principal associates are pin oak, black cherry, red maple, yellow birch, white pine, ash, and sugar maple.

The elm-ash-red maple cover type mainly has white ash, American elm, and red maple. The associates in this type are slippery elm, yellow birch, sycamore, and hemlock.

The maple-beech-birch cover type is mainly sugar maple, beech, and yellow birch. Associated species are varying mixtures of basswood, red maple, hemlock, red oak, white ash, white pine, black birch, black cherry, yellow-poplar, and cucumbertree.

White pine is pure or predominant. Principal associates are Virginia pine and pitch pine, ash, sugar maple and red maple, hemlock, red and white oak, quaking and bigtooth aspen, paper birch, yellow birch, and black birch.

The chestnut oak grows in pure stands or is dominant. Common associates are red oak, white oak, black oak, scarlet oak, pitch pine, blackgum, and red maple.

The commercial woodland in the survey area is about 43 percent sawtimber, 30 percent seedlings and saplings, 20 percent poletimber, and 7 percent nonstocked woodland.

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 *w* indicates excessive water in or on the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *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: w, d, c, 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 *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that a few trees may be blown down by normal winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in 50 years. The site index applies to fully stocked, even-aged, unmanaged stands. The commonly grown trees include the trees that woodland managers generally favor for wood crop production and those that commonly occur on the soil.

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

recreation

The survey area has nearly 35,000 acres used for outdoor recreation. Most of this land is in parks, State game lands, camps, and golf courses. Many small public and private lands provide areas for picnicking, camping, hiking, swimming, horseback riding, hunting, fishing, and boating.

Two State parks are in the survey area. Ryerson Station State Park, in the western part of Greene County, is 1,164 acres and has a 61-acre lake. Hillman State Park consists of about 3,800 acres of wooded hills in the northern part of Washington County.

The largest county-maintained parks in the survey area are Cross Creek, Mingo Creek, and Ten Mile Creek Parks in Washington County and Warrior and Catawba Trails in Greene County. Many townships and smaller municipalities throughout the survey area operate parks with picnic areas, playgrounds, and athletic fields.

The Pennsylvania Game Commission manages the more than 19,300 acres of game lands, and the Pennsylvania Fish Commission manages Cannonsburg Lake and Dutch Fork Lake in Washington County for public fishing.

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

The principal species of game in the survey area are white-tailed deer, gray squirrel, fox squirrel, cottontail rabbit, ruffed grouse, ringnecked pheasant, woodcock, turkey, and various species of waterfowl. The major furbearers are beaver, muskrat, raccoon, fox, mink, and opossum. The area also has a large variety of nongame wildlife, including songbirds, reptiles, amphibians, and small mammals.

White-tailed deer, which inhabit areas throughout the two counties, are considered forest species, but they neither prefer nor do well in large, mature forests. They instead prefer a combination of brush or young trees, lesser amounts of mature trees, and small open areas.

Ruffed grouse prefer young, brushy stands of trees, especially aspen, and open areas much like those that white-tailed deer frequent. Squirrels are especially common in areas with mature, nut-producing woodlands. Cottontail rabbits live mostly in areas of present or past agricultural activities, such as abandoned farms.

The wild turkey is primarily a bird of the forest. The Pennsylvania Game Commission has stocked most of the turkeys in the area; however, a few flocks are native to the survey area. Mourning doves thrive in areas where corn and small grains are grown, and although some nest in pine plantations, most prefer to nest and roost in trees adjacent to open land.

Muskrat, mink, and beaver live along rivers, lakes, and ponds. Beavers generally inhabit the more remote areas.

Ringnecked pheasants inhabit the eastern part of Greene County and the west-central part of Washington County. Woodcock live along stream bottoms and areas with grassy or weedy openings and shrubs or small tree thickets.

Many species of waterfowl are found in Greene and Washington Counties. The most common species (mallards, Canada geese, wood ducks, and black ducks) frequently inhabit ponds, lakes, streams, and beaver dams of the county.

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, beggarweed, wheatgrass, and grama.

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, 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.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas.

engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

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

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt

fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

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

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

building site development

Table 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. 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

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

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

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

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

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

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

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

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. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

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

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

engineering index properties

Table 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.

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

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

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

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

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

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

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

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

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

In table 15, the estimated content of organic matter of the plow layer is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity,

infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

soil and water features

Table 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 is more likely to 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.

Not shown in the table is subsidence caused by an imposed surface load or by the withdrawal of ground water throughout an extensive area as a result of lowering the water table.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density,

permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*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."

Allegheny series

The Allegheny series consists of deep, well drained, moderately permeable soils on terraces. The soils formed in old alluvium derived from sandstone, siltstone, and shale. Slopes range from 3 to 15 percent.

Allegheny soils are associated on the landscape with moderately well drained Glenford soils, somewhat poorly drained Library soils, and poorly drained and very poorly drained Purdy soils.

Typical pedon of Allegheny silt loam, 3 to 8 percent slopes, in Washington County, Morris Township, 1/4 mile northwest of the intersection of Pa. Route 221 and Township Route 337, 500 feet north of Route 221, in a pasture:

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; slightly sticky, slightly plastic; medium acid; clear smooth boundary.
B1—8 to 12 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; strongly acid; clear wavy boundary.
B21t—12 to 22 inches; yellowish brown (10YR 5/6) loam; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; many thin discontinuous clay films on ped faces; strongly acid; clear irregular boundary.
B22t—22 to 33 inches; yellowish brown (10YR 5/8) loam; weak medium subangular blocky structure; firm; slightly sticky, slightly plastic; many thin discontinuous clay films on ped faces; many coarse black concretions; strongly acid; gradual wavy boundary.
B3—33 to 43 inches; yellowish brown (10YR 5/8) loam; few medium distinct yellowish red (5YR 5/8) mottles; weak coarse angular blocky structure; firm; slightly sticky, slightly plastic; few medium black concretions; strongly acid; gradual wavy boundary.
C—43 to 72 inches; yellowish brown (10YR 5/6) loam; 35 percent light gray (10YR 7/2) skeletans; massive; firm; slightly sticky, slightly plastic; few fine black concretions; strongly acid.

The solum is 30 to 50 inches thick. The depth to bedrock is more than 48 inches. Coarse fragments make up 0 to 15 percent of the A, B1, and B2t horizons and 0 to 35 percent of the B3 and C horizons. Reaction is strongly acid to extremely acid throughout unless the soil is limed.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 through 4. Some pedons have a thin A1 horizon with hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 or 2. The fine earth texture dominantly is silt loam, but it is loam in some pedons.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 8. The fine earth texture of the B1 horizon is silt loam or loam. The fine earth texture is silt loam, loam, silty clay loam, clay loam, or sandy clay loam in the B2 horizon and ranges from fine sandy loam through clay loam in the B3 horizon. Some pedons have low-chroma mottles 24 inches below the top of the argillic horizon.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 8. It is mottled in most pedons. The fine earth texture ranges from sandy loam through clay loam.

Brooke series

The Brooke series consists of moderately deep, well drained, slowly permeable soils on uplands. The soils formed in residuum of weathered limestone. Slopes range from 3 to 25 percent.

Brooke soils are associated on the landscape with well drained moderately deep Culleoka soils, shallow Weikert soils, deep Upshur soils, moderately well drained Dormont and Guernsey soils, and somewhat poorly drained Library soils. Brooke soils are more clayey throughout than the Culleoka soils.

Typical pedon of Brooke silty clay loam, 3 to 8 percent slopes, in Washington County, South Strabane Township, 1-1/2 miles northeast of the city of Washington, on the eastern side of Township Route 620, 33 feet north of electric power pole number H2-744:

Ap—0 to 10 inches; dark brown (7.5YR 3/2) silty clay loam; moderate medium granular structure; firm; slightly sticky, slightly plastic; 10 percent coarse fragments; neutral; abrupt smooth boundary.
B21t—10 to 16 inches; dark brown (7.5YR 4/4) silty clay; moderate coarse prismatic structure parting to strong fine angular blocky; firm; sticky, plastic; thick discontinuous clay films on ped faces; 10 percent coarse fragments; neutral; clear wavy boundary.
B22t—16 to 23 inches; dark brown (7.5YR 4/4) gravelly silty clay; moderate coarse prismatic structure parting to strong fine angular blocky; very firm; very sticky, very plastic; thick discontinuous clay films on ped faces; 20 percent coarse fragments; neutral; clear wavy boundary.
C—23 to 30 inches; brown (7.5YR 5/2) cobbly clay; weak coarse prismatic structure parting to weak medium angular blocky; very firm; very sticky, very plastic; 40 percent coarse fragments; moderately alkaline; abrupt wavy boundary.
R—30 inches; limestone bedrock.

The solum is 18 to 30 inches thick. The depth to bedrock ranges from 20 to 40 inches. Coarse fragments make up 5 to 20 percent of the solum and 10 to 40 percent of the C horizon. Reaction in the solum ranges from slightly acid to mildly alkaline where the soils are unlimed, and the C horizon is neutral to moderately alkaline.

The Ap horizon has hue of 7.5YR or 10YR and value and chroma of 3 or less. The fine earth texture is dominantly silty clay loam, but in some pedons it is silty clay.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 6. The fine earth texture is silty clay or clay.

The C horizon has hue of 5YR through 5Y, value of 4 or 5, and chroma of 2 to 3. The fine earth texture is dominantly clay.

Culleoka series

The Culleoka series consists of moderately deep, well drained, moderately rapidly permeable soils on uplands. The soils formed in residuum of weathered limestone, sandstone, siltstone, and shale. Slopes range from 3 to 50 percent.

Culleoka soils are associated on the landscape with the well drained, moderately deep Brooke and Dekalb soils, deep Upshur soils, shallow Weikert soils, moderately well drained Dormont and Guernsey soils, and somewhat poorly drained Library soils. Culleoka soils are less clayey throughout than the Brooke soils and more clayey in the B horizon than the Dekalb soils.

Typical pedon of Culleoka silt loam, 3 to 8 percent slopes, in Washington County, Hopewell Township, 3 miles northwest of Wolfdale, 1/2 mile west of the intersection of Pa. Routes 844 and 331, 350 feet north-northwest of utility pole 757:

Ap—0 to 11 inches; dark brown (10YR 3/3) moist, pale brown (10YR 6/3) dry, silt loam; moderate fine and medium granular structure; friable; slightly sticky, slightly plastic; neutral; abrupt smooth boundary.

B2t—11 to 21 inches; yellowish brown (10YR 5/4) light silty clay loam; moderate fine and medium angular blocky structure; firm; slightly sticky, slightly plastic; thin nearly continuous clay films on ped faces; 10 percent coarse fragments; medium acid; clear wavy boundary.

B3—21 to 25 inches; yellowish brown (10YR 5/4) shaly heavy silt loam; moderate fine and medium angular and subangular blocky structure; firm; slightly sticky, slightly plastic; thin patchy clay films on ped faces; 30 percent coarse fragments; strongly acid; clear wavy boundary.

C—25 to 28 inches; yellowish brown (10YR 5/4) very shaly silt loam; massive; firm in place; nonsticky, nonplastic; many black (10YR 2/1) oxide coatings on shale; 70 percent coarse fragments; strongly acid; gradual wavy boundary.

R—28 inches; shale bedrock.

The solum is 20 to 37 inches thick. The depth to bedrock is 20 to 40 inches. Coarse fragments make up 0 to 15 percent of the A horizon, 20 to 35 percent of the B horizon, and 25 to 80 percent of the C horizon. Reaction is medium acid or strongly acid in the solum and slightly acid to strongly acid in the C horizon where the soil is unlimed.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 2 through 4. The fine earth texture is dominantly silt loam, but it is loam in some pedons.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 through 6. The fine earth texture is loam, silt loam, or silty clay loam.

The C horizon has hue of 7.5 YR or 10YR, value of 4 or 5, and chroma of 4 through 6. Some pedons have grayish mottles. The fine earth texture ranges from loam through silty clay loam.

Dekalb series

The Dekalb sries consists of moderately deep, well drained, moderately rapidly permeable and rapidly permeable soils on uplands. The soils formed in residuum of weathered sandstone and shale. Slopes range from 3 to 80 percent.

Dekalb soils are associated on the landscape with well drained Culleoka and Weikert soils, moderately well drained Dormont and Guernsey soils, and somewhat poorly drained Library soils. Dekalb soils contain less clay throughout than the Culleoka soils and are deeper than the Weikert soils.

Typical pedon of Dekalb channery loam, 3 to 8 percent slopes, in Greene County, Cumberland Township, 1/3 mile northeast of Carmichaels and 1/2 mile southwest of the intersection of Township Route 684 and Legislative Route 30097, 1,300 feet southeast of Legislative Route 30097:

A1—0 to 3 inches; very dark grayish brown (10YR 3/2) channery loam; weak fine granular structure; very friable; nonsticky, nonplastic; 25 percent coarse fragments; strongly acid; clear wavy boundary.

A2—3 to 7 inches; light yellowish brown (10YR 6/4) channery loam; weak fine granular structure; very friable; slightly sticky, slightly plastic; 25 percent coarse fragments; strongly acid; clear wavy boundary.

B21—7 to 13 inches; yellowish brown (10YR 5/6) channery fine sandy loam; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; 35 percent coarse fragments; very strongly acid; clear wavy boundary.

B22—13 to 21 inches; yellowish brown (10YR 5/6) channery sandy loam; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; 35 percent coarse fragments; very strongly acid; clear wavy boundary.

C—21 to 25 inches; yellowish brown (10YR 5/6) very channery loamy sand; single grain; friable; nonsticky, nonplastic; 80 percent coarse fragments; very strongly acid; gradual wavy boundary.

R—25 inches; sandstone bedrock.

The solum thickness and depth to bedrock range from 20 to 40 inches. Coarse fragments make up 10 to 60 percent of individual horizons of the solum and 50 to 80 percent of the C horizon. The weighted average of coarse fragments is 35 to 60 percent in the particle-size control section. Reaction is very strongly acid or strongly acid throughout where the soil is unlimed.

The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 1 through 4. Some pedons have an Ap horizon with hue of 10YR, value of 4, and chroma of 2 through 4. The fine earth texture of the A horizon is dominantly loam but is sandy loam in some pedons.

The B horizon has hue of 7.5YR or 10YR, value of 5 through 7, and chroma of 4 through 8. The fine earth texture is loam or sandy loam.

The C horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 4 through 6. The fine earth texture is sandy loam or loamy sand.

Dormont series

The Dormont series consists of deep, moderately well drained, slowly permeable or moderately slowly permeable soils on uplands and colluvial areas. The soils formed in residuum of weathered shale, siltstone, and limestone and in adjacent colluvium. Slope ranges from 3 to 50 percent.

Dormont soils are associated on the landscape with well drained, moderately deep Culleoka, Brooke, and Dekalb soils; deep Upshur soils and shallow Weikert soils; moderately well drained Guernsey soils; and somewhat poorly drained Library soils. The Dormont soils are less clayey throughout than the Guernsey soils and more clayey than the Dekalb soils.

Typical pedon of Dormont silt loam, 3 to 8 percent slopes, in Washington County, Canton Township, 1,700 feet southeast of the intersection of Legislative Route 62096 and Township Route 532, at a roadcut on the north side of Route 532, near a culvert:

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam; moderate fine granular structure; very friable; slightly sticky, slightly plastic; strongly acid; clear smooth boundary.

A12—8 to 12 inches; dark brown (10YR 4/3) silt loam; moderate medium granular structure; friable; slightly sticky, slightly plastic; 5 percent coarse fragments; strongly acid; abrupt wavy boundary.

B1—12 to 16 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; 5 percent coarse fragments; strongly acid; gradual wavy boundary.

B21t—16 to 20 inches; yellowish brown (10YR 5/6) heavy silt loam; weak and moderate fine angular and subangular blocky structure; firm; slightly sticky, slightly plastic; thin patchy clay films on ped faces; 5 percent coarse fragments; strongly acid; gradual wavy boundary.

B22t—20 to 27 inches; yellowish brown (10YR 5/4) light silty clay loam; moderate medium subangular blocky structure; firm; slightly sticky, slightly plastic; thin discontinuous clay films on ped faces; 5 percent coarse fragments; strongly acid; gradual wavy boundary.

B23t—27 to 34 inches; yellowish brown (10YR 5/4) light silty clay loam; few fine and medium distinct light brownish gray (2.5Y 6/2) mottles; weak medium and coarse subangular blocky structure; very firm; slightly sticky, slightly plastic; thin discontinuous clay films on ped faces; few fine black (10YR 2/1) concretions; 10 percent coarse fragments; medium acid; gradual wavy boundary.

B24t—34 to 41 inches; yellowish brown (10YR 5/4) channery silty clay loam; common fine and medium distinct grayish brown (2.5Y 5/2) mottles; moderate medium and coarse angular and subangular blocky structure; firm; slightly sticky, slightly plastic; few patches of clay films on ped faces; few fine black (10YR 2/1) concretions; 15 percent coarse fragments; medium acid; gradual wavy boundary.

B3—41 to 54 inches; light yellowish brown (10YR 6/4) channery silty clay loam; many medium distinct light brownish gray (2.5Y 6/2) mottles; weak coarse subangular blocky structure; firm; slightly sticky, slightly plastic; few patches of clay films on ped faces; few black (10YR 2/1) coatings on coarse fragments; 25 percent coarse fragments; medium acid; abrupt wavy boundary.

IIC—54 to 78 inches; brown (10YR 5/3) silty clay; many medium and coarse prominent strong brown (7.5YR 5/8) and light gray (5Y 7/1) mottles; massive; firm; sticky, plastic; 5 percent coarse fragments; medium acid.

The solum is 36 to 60 inches thick. The depth to bedrock is 48 inches or more. Coarse fragments make up 0 to 15 percent of the A horizon, 2 to 15 percent of the upper part of the B horizon, and 5 to 30 percent of the lower part of the B horizon. In unlimed areas reaction ranges from very strongly acid to medium acid in the upper part of the solum and is strongly acid or medium acid in the lower part of the solum and in the C horizon.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 2 through 4. The dry value is 6 or more. Undisturbed pedons have a thin A1 horizon with hue of 10YR, value of 3, and chroma of 1 or 2. It is silt loam.

The upper part of the B horizon has hue of 7.5YR or 10YR and value and chroma of 4 through 6. The fine earth texture is silt loam or silty clay loam. The lower part of the horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 2 through 4. The fine earth texture is silty clay loam, silty clay, or clay.

The C horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 2 through 4. The fine earth texture ranges from silt loam through clay.

Fluvaquents

Fluvaquents are moderately deep or deep, somewhat poorly drained and poorly drained, moderately permeable soils on flood plains. The soils formed in alluvium derived from limestone, sandstone, siltstone, and shale. Slopes range from 0 to 3 percent.

Fluvaquents are associated on the landscape with well drained Huntington soils and somewhat poorly drained Newark soils.

Because of the variability of Fluvaquents a typical pedon is not given.

The solum is as much as 30 inches thick. The depth to bedrock is 24 to 60 inches. Coarse fragments are

generally absent in the upper part of the soil but make up as much as 30 percent of the lower part. Reaction is medium acid to mildly alkaline throughout.

The A horizon has hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 0 to 3. It is dominantly silt loam but is loam in some pedons.

The B horizon has hue of 7.5YR to 5Y, value of 3 through 5, and chroma of 0 through 2 and is mottled. The fine earth texture ranges from loam to silty clay.

The C horizon has hue of 7.5YR to 5Y, value of 3 through 5, and chroma of 0 through 2 and is mottled. The fine earth texture is silt loam through sand.

Glenford series

The Glenford series consists of deep, moderately well drained, moderately slowly permeable soils on terraces. The soils formed in slackwater alluvium derived from calcareous shale and sandstone. Slopes range from 0 to 15 percent.

Glenford soils are associated on the landscape with well drained Allegheny soils, somewhat poorly drained Library soils, and poorly drained and very poorly drained Purdy soils.

Typical pedon of Glenford silt loam, 3 to 8 percent slopes, in Greene County, Jefferson Township, 1/2 mile west of Jefferson on Pa. Route 188, 450 feet south of Route 188, in a field:

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; weak medium granular structure; friable; slightly plastic; medium acid; clear wavy boundary.

B1—9 to 15 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; strongly acid; gradual wavy boundary.

B21t—15 to 24 inches; yellowish brown (10YR 5/6) light silty clay loam; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; many thin patches of clay films on ped faces; strongly acid; gradual wavy boundary.

B22t—24 to 35 inches; yellowish brown (10YR 5/6) light silty clay loam; common medium distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; slightly sticky, plastic; many thin patches of clay films on ped faces; medium acid; gradual wavy boundary.

B23t—35 to 40 inches; yellowish brown (10YR 5/4) light silty clay loam; few fine distinct light gray (10YR 7/1) mottles; moderate medium platy structure parting to weak very fine subangular blocky; firm, slightly brittle; slightly sticky, plastic; continuous clay films on ped faces; 10 percent coarse fragments; medium acid; gradual wavy boundary.

B3—40 to 47 inches; yellowish brown (10YR 5/4) light silty clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; moderate medium platy structure parting to weak very fine subangular blocky; firm; slightly sticky, slightly plastic; 10 percent coarse fragments; medium acid; gradual wavy boundary.

C—47 to 60 inches; yellowish brown (10YR 5/4) gravelly silt loam; weak medium subangular blocky structure; firm; slightly sticky, slightly plastic; 15 percent coarse fragments; medium acid.

The solum is 30 to 60 inches thick. The depth to bedrock is greater than 48 inches. Coarse fragments are usually absent in the upper part of the solum but make up as much as 15 percent of the lower part of the solum and of the entire C horizon. Reaction in unlimed areas is very strongly acid or strongly acid in the upper part of the solum and medium acid or slightly acid in the lower part. The C horizon is medium acid to mildly alkaline.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is silt loam.

The B1 horizon has hue of 10YR, value of 4 or 5, and chroma of 3 through 6. It is silt loam.

The B2 and B3 horizons have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 through 6. The fine earth texture is silt loam or silty clay laom. Low chroma mottles are within 10 inches of the top of the argillic horizon. A thin, slightly brittle layer is in the middle or lower part of the B2 horizon.

The C horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 2 through 8. The dominant fine earth texture is silt loam and silty clay loam but includes thin strata of loam, fine sandy loam, and silty clay.

Guernsey series

The Guernsey series consists of deep, moderately well drained, slowly permeable and moderately slowly permeable soils on uplands. The soils formed in residuum of weathered clay shale, siltstone, and limestone. Slopes range from 3 to 25 percent.

Guernsey soils are associated on the landscape with well drained, moderately deep Brooke and Culleoka soils, deep Upshur soils and shallow Weikert soils, moderately well drained Dormont soils, and somewhat poorly drained Library soils. Guernsey soils are more clayey throughout than Dormont soils.

Typical pedon of Guernsey silt loam, 3 to 8 percent slopes, in Washington County, Chartiers Township, 1-1/2 miles northwest of Wolfdale, on Township Route 626, and 230 feet north of utility pole number 294.4:

Ap—0 to 10 inches; yellowish brown (10YR 5/4) silt loam; weak fine and medium granular structure; friable; slightly sticky, slightly plastic; 5 percent coarse fragments; very strongly acid; abrupt smooth boundary.

B21t—10 to 14 inches; yellowish brown (10YR 5/6) silty clay loam; strong fine and medium angular and subangular blocky structure; firm; slightly sticky, slightly plastic; thin patchy clay films on ped faces; 5

percent coarse fragments; very strongly acid; clear smooth boundary.

B22t—14 to 18 inches; yellowish brown (10YR 5/6) silty clay; moderate medium prismatic structure parting to medium and coarse angular and subangular blocky; firm; sticky, plastic; thin continuous clay films on ped faces; 5 percent coarse fragments; strongly acid; clear wavy boundary.

B23t—18 to 23 inches; yellowish brown (10YR 5/4) clay; few fine faint light brownish gray (2.5Y 6/2) and strong brown (7.5YR 5/6) mottles; moderate medium and coarse angular and subangular blocky structure; very firm; sticky, plastic; thin continuous clay films on ped faces; common fine black (10YR 2/1) concretions; 5 percent coarse fragments; strongly acid; clear wavy boundary.

B24tg—23 to 28 inches; light brownish gray (2.5Y 6/2) clay; common fine prominent strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure; very firm; sticky, plastic; thin and thick continuous clay films on ped faces; few fine black (10YR 2/1) concretions; 5 percent coarse fragments; strongly acid; clear wavy boundary.

B3t—28 to 42 inches; yellowish brown (10YR 5/6) silty clay; few medium distinct pale brown (10YR 6/3) mottles; weak coarse prismatic structure; firm; sticky, plastic; thin patchy clay films on ped faces; common medium black (10YR 2/1) concretions; 5 percent coarse fragments; medium acid; gradual irregular boundary.

C1—42 to 51 inches; strong brown (7.5YR 5/6) silty clay; few fine faint grayish brown (2.5Y 5/2) mottles; massive; sticky, plastic; 5 percent coarse fragments; slightly acid; clear wavy boundary.

IIC2—51 to 60 inches; yellowish brown (10YR 5/4) cobbly clay; common fine and medium distinct olive gray (5Y 5/2) and strong brown (7.5YR 5/6) mottles; massive; sticky, plastic; 35 percent coarse fragments; mildly alkaline.

The solum is 40 to 60 inches thick. The depth to bedrock is 60 to 120 inches. Coarse fragments make up 0 to 20 percent of the upper 20 inches of the profile and 0 to 35 percent at a depth of more than 20 inches. Reaction in unlimed areas is very strongly acid or strongly acid in the A horizon and upper part of the B horizon. The lower part of the B horizon is medium acid to mildly alkaline. The C horizon is medium acid to moderately alkaline.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. Undisturbed pedons have an A1 horizon with hue of 10YR, value of 3, and chroma of 2 or 3. Some pedons have a thin A2 horizon. The fine earth texture of the A horizon is silt loam.

The B1 and B21t horizons have hue of 10YR through 5Y, value of 4 or 5, and chroma of 4 through 6. The fine earth texture is silt loam or silty clay loam. Mottles with chroma of 2 or less are within 10 inches of the top of the Bt horizon. The lower part of the solum has hue of 5Y through 10YR, value of 5 or 6, and chroma of 2 through 6. The fine earth texture is heavy silty clay loam, silty clay, or clay.

The C horizon has hue of 5Y through 7.5YR, value of 5 or 6, and chroma of 2 through 6. The fine earth texture is heavy silty clay loam, silty clay, or clay.

Huntington series

The Huntington series consists of deep, well drained, moderately permeable soils on flood plains. The soils formed in alluvium derived from limestone, sandstone, siltstone, and shale. Slopes range from 0 to 3 percent.

Huntington soils are associated on the landscape with somewhat poorly drained Newark soils and somewhat poorly drained and poorly drained Fluvaquents.

Typical pedon of Huntington silt loam, in Washington County, Chartiers Township, 1/2 mile northeast of Arden and 1,000 feet east of Washington County Home:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2), brown (10YR 5/3) dry, silt loam; moderate fine and medium granular structure; friable; slightly sticky, slightly plastic; neutral; abrupt smooth boundary.

A12—7 to 14 inches; very dark grayish brown (10YR 3/2), brown (10YR 5/3) dry, silt loam; moderate medium subangular blocky structure parting to weak medium granular; friable; slightly sticky, slightly plastic; neutral; gradual wavy boundary.

B1—14 to 24 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium prismatic structure parting to weak medium and coarse subangular blocky; firm; slightly sticky, slightly plastic; neutral; gradual wavy boundary.

B21—24 to 30 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium prismatic structure parting to moderate medium angular and subangular blocky; firm; slightly sticky, slightly plastic; neutral; clear wavy boundary.

B22—30 to 40 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium prismatic structure parting to moderate medium angular and subangular blocky; firm; slightly sticky, slightly plastic; neutral; gradual wavy boundary.

B3—40 to 46 inches; dark brown (10YR 4/3) silt loam; moderate medium prismatic structure; firm; slightly sticky, slightly plastic; slightly acid; gradual wavy boundary.

C—46 to 60 inches; dark yellowish brown (10YR 4/4) loam; massive; friable; slightly sticky, slightly plastic; neutral.

The solum is more than 40 inches thick. The depth to bedrock is 60 inches or more. The mollic epipedon is 10 to 15 inches thick. Coarse fragments make up 0 to 5 percent of the solum. Reaction is slightly acid or neutral throughout where the soil is unlimed.

The Ap horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 2 or 3. It is dominantly silt loam, but it is loam in some pedons.

The B1 horizon has hue of 7.5YR or 10YR, value of 2 through 5, and chroma of 2 or 3. It is silt loam or loam.

The B2 and B3 horizons have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam or light silty clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. The fine earth texture is loam or sandy loam and is stratified.

Library series

The Library series consists of deep, somewhat poorly drained, slowly permeable soils on uplands. The soils formed in residuum of weathered clay shale, siltstone, and limestone; in Greene County they also formed in slackwater alluvium derived from siltstone, calcareous shale, and limestone. Slope ranges from 0 to 15 percent.

Library soils are associated on the landscape with well drained, moderately deep Brooke and Culleoka soils; deep Upshur soils; shallow Weikert soils; moderately well drained Dormont, Guernsey, and Glenford soils; and poorly drained and very poorly drained Purdy soils.

Typical pedon of Library silty clay loam, 3 to 8 percent slopes, in Washington County, South Strabane Township, 1/2 mile northeast of Washington County Courthouse, about 2,200 feet north-northwest of the intersection of U.S. 19 and I-70, 530 feet northwest of Township Route 620:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silty clay loam; weak fine subangular blocky structure; friable; slightly sticky, slightly plastic; neutral; abrupt smooth boundary.

B1—7 to 10 inches; brown (10YR 4/3) silty clay; weak coarse prismatic structure parting to weak medium angular blocky; firm; slightly sticky, plastic; medium acid; clear wavy boundary.

B21tg—10 to 16 inches; brown (7.5YR 5/4) silty clay; gray (10YR 5/1) prism faces; grayish brown (10YR 5/2) and brown (10YR 5/3) ped faces; many fine distinct gray (10YR 6/1) and red (2.5YR 4/6) mottles; moderate coarse prismatic structure parting to moderate medium angular blocky; firm; sticky, plastic; medium acid; clear wavy boundary.

B22tg—16 to 23 inches; grayish brown (10YR 5/2) clay; many fine distinct gray (10YR 6/1), strong brown (7.5YR 5/6), and red (2.5YR 4/6) mottles; moderate coarse prismatic structure parting to weak medium angular blocky; very firm; sticky, very plastic; thin continuous clay films on prism and ped faces; strongly acid; gradual wavy boundary.

B23tg—23 to 30 inches; light gray (10YR 6/1) clay; many medium distinct brownish yellow (10YR 6/6) mottles; moderate coarse prismatic structure parting to weak medium angular blocky; very firm; sticky, very plastic; thin continuous clay films on prism and ped faces; strongly acid; clear wavy boundary.

IIB3g—30 to 37 inches; dark gray (10YR 4/1) shaly clay; common fine distinct brownish yellow (10YR 6/6) mottles; weak coarse angular blocky structure with some weakly expressed shale bedding; firm; sticky, plastic; many thin clay films on ped faces; 20 percent coarse fragments; slightly acid; gradual wavy boundary.

IIC1—37 to 45 inches; dark grayish brown (10YR 4/2) very shaly silty clay; massive; very firm; slightly sticky, slightly plastic; 60 percent coarse fragments; neutral; abrupt smooth boundary.

IIIC2—45 to 48 inches; light yellowish brown (10YR 6/4) shaly silty clay; massive; firm; sticky, plastic; 20 percent coarse fragments; neutral; abrupt smooth boundary.

IIIC3—48 to 60 inches; yellowish brown (10YR 5/4) very shaly silty clay; massive; 50 percent soft crushable coarse fragments; neutral; abrupt smooth boundary.

The solum is 20 to 40 inches thick. The depth to bedrock is 40 to 72 inches. Coarse fragments make up 0 to 20 percent of the solum and 5 to 65 percent of the C horizon. Reaction in unlimed areas is strongly acid or medium acid in the upper part of the solum, strongly acid through neutral in the lower part of the solum, and medium acid to mildly alkaline in the C horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 2 or 3. The fine earth texture is dominantly silty clay loam but is silt loam in some pedons.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 1 through 4. A thin layer below the Ap horizon is mottle free or has high chroma mottles. Ped faces have chroma of 2 or less below a depth of 10 inches. The fine earth texture is silty clay or clay.

The C horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 2 through 4. The fine earth texture is loam to silty clay.

Newark series

The Newark series consists of deep, somewhat poorly drained, moderately permeable soils on flood plains. The soils formed in alluvium derived from limestone, sandstone, siltstone, and shale. Slopes range from 0 to 3 percent.

Newark soils are associated on the landscape with well drained Huntington soils and somewhat poorly drained and poorly drained Fluvaquents.

Typical pedon of Newark silt loam, in Greene County, Cumberland Township, 3/4 mile west of Carmichaels and east of Legislative Route 30061, 105 feet northeast of power pole 12738B, 70 feet northeast of the northeast corner of a bridge:

Ap—0 to 10 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium granular structure; friable; slightly sticky, slightly plastic; medium acid; abrupt wavy boundary.

B21—10 to 21 inches; yellowish brown (10YR 5/4) light silty clay loam; common fine distinct light gray (2.5Y 7/2) mottles; moderate medium subangular blocky structure; friable; slightly sticky, slightly plastic; medium acid; clear wavy boundary.

B22g—21 to 30 inches; light brownish gray (10YR 6/2) silty clay loam; common fine distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; medium acid; clear wavy boundary.

B3g—30 to 39 inches; light brownish gray (10YR 6/2) light silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable; slightly sticky, slightly plastic; few brown (7.5YR 5/4) concretions; medium acid; abrupt wavy boundary.

C1g—39 to 45 inches; light brownish gray (10YR 6/2) loam; many medium and coarse strong brown (7.5YR 5/8) mottles; massive; friable; slightly sticky, slightly plastic; common dark reddish brown (5YR 3/2) concretions; 5 percent coarse fragments; medium acid; clear wavy boundary.

IIC2—45 to 60 inches; brown (7.5YR 5/2) loam; many fine distinct yellowish red (5YR 5/8) and light brownish gray (10YR 6/2) mottles; massive; friable; slightly sticky, slightly plastic; many dark reddish brown (5YR 3/2) concretions; 5 percent coarse fragments; slightly acid.

The solum is 22 to 44 inches thick. The depth to bedrock is 60 inches or more. Coarse fragments make up 0 to 5 percent of the profile to a depth of 30 inches, 0 to 15 percent between depths of 30 to 40 inches, and 0 to 40 percent below a depth of 40 inches. Reaction is medium acid or slightly acid throughout where the soil is unlimed.

The Ap horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 2 through 4. It is dominantly silt loam, but in some pedons it is silty clay loam.

The B21 horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 2 through 4 and has brown and gray mottles. It is silt loam or silty clay loam.

The B22g and B3g horizons have hue of 7.5YR through 2.5Y, value of 4 through 7, and chroma of 0 through 2 and are mottled. They are silt loam or silty clay loam. Some pedons do not have a B3 horizon.

The C horizon has hue of 7.5YR through 2.5Y, value of 4 through 7, and chroma of 0 through 2. It is loam, silt loam, fine sandy loam, or silty clay loam.

Purdy series

The Purdy series consists of deep, poorly drained and very poorly drained, slowly permeable and very slowly permeable soils on terraces. The soils formed in slackwater alluvium derived from siltstone, shale, and limestone. Slopes range from 0 to 3 percent. The Purdy soils in this survey area are a taxadjunct because they have higher base saturation in the control section than is defined in the range for the series. This difference does not have a major effect on use and management. The Purdy soils in this survey area are classified as fine, mixed, mesic Typic Ochraqualfs.

Purdy soils are associated on the landscape with well drained Allegheny soils, moderately well drained Glenford soils, and somewhat poorly drained Library soils on terraces; and with somewhat poorly drained Newark soils and somewhat poorly drained and poorly drained Fluvaquents on flood plains.

Typical pedon of Purdy silt loam in Washington County, Amwell Township, 1 mile south-southwest of Amity, 1,300 feet southeast of the intersection of Legislative Route 62082 and Township Route 686 and about 650 feet southeast of the Baily covered bridge:

Ap—0 to 8 inches; grayish brown (10YR 5/2) silt loam; common fine faint dark yellowish brown (10YR 4/4) mottles; weak coarse granular structure; friable; slightly sticky, slightly plastic; strongly acid; abrupt wavy boundary.

B1g—8 to 12 inches; grayish brown (10YR 5/2) silty clay loam; many fine and medium distinct reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; medium acid; clear wavy boundary.

B21tg—12 to 23 inches; grayish brown (10YR 5/2) silty clay loam; common fine distinct strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate coarse angular blocky; friable; slightly sticky, slightly plastic; thin discontinuous clay films on ped faces; medium acid; clear wavy boundary.

B22tg—23 to 33 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; moderate coarse prismatic structure parting to moderate coarse angular blocky; firm; slightly sticky, slightly plastic; thin continuous clay films on ped faces; few black oxide concretions; medium acid; clear wavy boundary.

B3g—33 to 42 inches; grayish brown (10YR 5/2) silty clay; many medium and coarse distinct strong brown (7.5YR 5/6) mottles; weak coarse angular blocky structure; firm; slightly sticky, plastic; few oxide concretions; medium acid; gradual wavy boundary.

Cg—42 to 60 inches; gray (10YR 6/1) silty clay; many medium and coarse distinct reddish yellow (7.5YR 6/8) and brownish yellow (10YR 6/6) mottles; massive; firm; slightly sticky, plastic; few oxide concretions; slightly acid.

The solum is 30 to 50 inches thick. The depth to bedrock is 48 inches or more. Reaction in unlimed areas

is strongly acid or medium acid in the upper part of the solum and medium acid or slightly acid in the lower part of the solum and in the substratum.

The Ap horizon has hue of 10YR, 2.5Y, or is neutral; value of 4 or 5; and chroma of 0 through 2. It is dominantly silt loam but is silty clay loam in some pedons.

The B horizon has hue of 10YR, 2.5Y, or is neutral; value of 4 or 5; and chroma of 0 through 2. It is heavy silty clay loam through clay. Mottles have hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 4 through 8.

The C horizon has hue of 10YR, 2.5Y, or is neutral; value of 4 through 6; and chroma of 0 through 2. It is silty clay, clay loam, or clay.

Udorthents

Udorthents are very shallow to deep, well drained to somewhat poorly drained, slowly permeable to rapidly permeable soils on uplands and flood plains. The soils are in areas that have been altered for developments or used for strip mining. Slopes range from 0 to 50 percent.

Udorthents are associated on the landscape with all other soils in the survey area but are more commonly on the landscape with moderately well drained Dormont soils.

Because of the variability of Udorthents, a typical pedon is not given. The solum is as much as 20 inches thick. The depth to bedrock is more than 60 inches in some areas. Coarse fragments make up 0 to 60 percent of the soil. Reaction is mildly alkaline to extremely acid throughout.

The A horizon has hue of 5YR to 2.5Y and value and chroma of 0 through 8. It ranges from sandy loam to clay.

The C horizon has hue of 7.5YR to 5Y, value of 2 through 6, and chroma of 3 through 8. It ranges from sandy loam to clay.

Upshur series

The Upshur series consists of deep, well drained, slowly permeable soils on uplands. The soils formed in residuum of weathered limestone, siltstone, and shale. Slopes range from 3 to 25 percent.

Upshur soils are associated on the landscape with well drained, moderately deep Brooke and Culleoka soils, shallow Weikert soils, moderately well drained Dormont and Guernsey soils, and somewhat poorly drained Library soils.

Typical pedon of Upshur silty clay loam, in an area of Culleoka-Upshur complex, 15 to 25 percent slopes, in Washington County, Hanover Township, 1.1 miles northwest of the village of Florence, 0.4 mile south-southwest of the northwestern corner of Washington County, and 1,300 feet south of Township Route 869:

Ap—0 to 5 inches; dark brown (7.5YR 4/2) silty clay loam; moderate medium granular structure; friable; slightly sticky, slightly plastic; very strongly acid; abrupt smooth boundary.

B21t—5 to 10 inches; reddish brown (10YR 4/3) silty clay; moderate medium angular blocky structure; firm; slightly sticky, plastic; thin patchy clay films on ped faces; 5 percent coarse fragments; very strongly acid; abrupt irregular boundary.

B22t—10 to 24 inches; reddish brown (2.5YR 4/4) silty clay; moderate coarse prismatic structure parting to moderate medium angular blocky; firm; sticky, plastic; thin continuous clay films on ped faces; strongly acid; clear wavy boundary.

B3t—24 to 28 inches; variegated reddish brown (2.5YR 4/4) and dusky red (10R 3/3) clay; weak coarse subangular blocky structure; firm; sticky, plastic; thin discontinuous clay films on ped faces; 5 percent coarse fragments; neutral; clear wavy boundary.

C1—28 to 36 inches; variegated dark reddish brown (2.5YR 3/4) and dusky red (10R 3/3) shaly silty clay loam; massive; firm; slightly sticky, plastic; 25 percent coarse fragments; mildly alkaline; clear wavy boundary.

C2—36 to 44 inches; variegated dark reddish brown (2.5YR 3/4) and dusky red (10R 3/3) shaly silty clay loam; massive; firm; slightly sticky, plastic; 35 percent coarse fragments; mildly alkaline; gradual wavy boundary.

C3—44 to 54 inches; variegated dark reddish brown (2.5YR 3/4) and dusky red (10R 3/3) very shaly silty clay loam; massive; friable; slightly sticky, slightly plastic; 50 percent coarse fragments; mildly alkaline; abrupt wavy boundary.

R—54 inches; shaly limestone bedrock.

The solum is 26 to 40 inches thick. The depth to bedrock ranges from 42 to 60 inches. Coarse fragments make up 0 to 10 percent of the upper part of the solum, 0 to 25 percent of the lower part of the solum, and 20 to 60 percent of the C horizon. Reaction in unlimed areas ranges from very strongly acid to slightly acid in the upper part of the solum, strongly acid to neutral in the lower part of the solum, and neutral to moderately alkaline in the C horizon.

The Ap horizon has hue of 2.5YR through 7.5YR and value and chroma of 2 through 4. The fine earth texture is dominantly silty clay loam, but in some pedons is silt loam or silty clay.

The B horizon has hue of 10R through 5YR and value and chroma of 3 or 4. The fine earth texture is silty clay or clay.

The C horizon mainly has hue of 10R through 5YR and value and chroma of 3 or 4, but some pedons are variegated olive, olive brown, or yellow. The fine earth texture is silty clay loam through clay.

Weikert series

The Weikert series consists of shallow, well drained, moderately rapidly permeable soils on uplands. The soils formed in residuum of weathered shale, siltstone, and sandstone. Slopes range from 3 to 25 percent.

Weikert soils are associated on the landscape with well drained, moderately deep Culleoka, Dekalb, and Brooke soils; deep Upshur soils; moderately well drained Dormont and Guernsey soils; and somewhat poorly drained Library soils.

Typical pedon of Weikert channery silt loam, in an area of Weikert-Culleoka complex, 8 to 15 percent slopes, in Washington County, West Finley Township, 1 mile north of the intersection of Legislative Route 62007 and Township Route 360, 200 feet east of Legislative Route 62007:

Ap—0 to 7 inches; brown (10YR 4/3) channery silt loam; moderate medium granular structure; friable; slightly sticky, slightly plastic; 20 percent coarse fragments; medium acid; abrupt smooth boundary.

B2—7 to 11 inches; yellowish brown (10YR 5/6) very shaly loam; weak fine subangular blocky structure; friable; slightly sticky, slightly plastic; 65 percent coarse fragments; strongly acid; clear wavy boundary.

C—11 to 19 inches; light yellowish brown (10YR 6/4) very shaly silt loam; moderate medium platy structure; friable; slightly sticky, slightly plastic; 80 percent coarse fragments; medium acid; clear wavy boundary.

R—19 inches; fractured shale bedrock.

The solum thickness and depth to bedrock are 10 to 20 inches. Coarse fragments make up 20 to 50 percent of the Ap horizon, 30 to 65 percent of the B horizon, and 60 to 85 percent of the C horizon. Reaction is medium acid or strongly acid throughout where the soil is unlimed.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 through 4. Some undisturbed pedons have an A1 and A2 horizon. The fine earth texture of the A horizon is dominantly silt loam, but it is loam in some pedons.

The B horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 3 through 6. The fine earth texture is silt loam or loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 3 through 6. The fine earth texture is silt loam or loam.

formation of the soils

The characteristics of a soil at any given site depend on five major factors: (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material has accumulated and remained; (3) the plant and animal life on and in the soil; (4) the relief, or lay of the land; (5) and the length of time the forces of soil formation have acted on the soil material.

Climate and plant and animal life are the active forces that change the parent material into a soil that has genetically related horizons. The effects of climate and plant and animal life are influenced by relief and the nature of the parent material. In some cases, the parent material dominates the other factors of soil formation. Finally, time is needed to change the parent material into a soil profile.

The factors of soil formation are so closely related in their effects on the soil that few generalizations can be made about the effects of any one factor unless conditions are specified for the other four. In addition, many processes of soil development are unknown.

factors of soil formation

This section gives the five factors of soil formation and describes their effect on the soils in Greene and Washington Counties.

parent material

Parent material is the unconsolidated mass from which a soil forms. It is composed of varying amounts of sand, silt, and clay and has various kinds and amounts of chemicals. All other soil forming factors affect parent material, but the parent material determines the chemical and mineralogical composition of the soil.

In Greene and Washington Counties most soils on uplands formed in material weathered from a parent material of interbedded shale, siltstone, sandstone, and limestone. The reddish, clayey Upshur soil shows the dominance of red clay shale. The shaly subsoil of the Weikert and Culleoka soils shows the dominance of brownish and grayish shale in their parent material. The channery and sandy subsoil of the Dekalb soils shows the dominance of a sandstone parent material. The subsoil of soils on flood plains, such as Fluvaquents and Huntington and Newark soils, reflects the stratified nature of alluvium.

climate

A combination of ample precipitation and soils with a dense or clayey substratum has caused a high water table in many areas in Greene and Washington Counties. The water table accounts for the grayish color of the wetter soils, such as Purdy and Library soils. Climate has also affected the soils through its influence on the growth and extent of vegetation.

plant and animal life

The climate of Greene and Washington Counties favors the growth of hardwood trees, and many of the soils have formed under forests. Leaves, twigs, roots, and entire plants accumulate on the surface of soils in forests. Organic matter is added to the soil as plant remains decompose through the action of micro-organisms, earthworms, and other forms of life. The uprooting of trees also influences soil formation by mixing the soil and loosening the underlying material.

Man has influenced the direction and rate of soil formation. Among the activities that have altered the soils are drainage, changing the vegetation, tilling, and changing the amount of organic matter.

relief

Relief affects runoff and internal drainage. Runoff in turn influences the degree of erosion and affects soil depth. Internal drainage affects the weathering of the soil material and the bedrock. Steep soils commonly have a restricted depth because of runoff and erosion. The Culleoka part of the steep and very steep Dormont-Culleoka soils, for example, loses soil material almost as fast as it forms. Dormont soils, however, are farther down slope, where the constant downslope movement of soil material increases the depth of the soil.

time

The effects of climate, relief, and living organisms in changing parent material into soil are governed by the time these factors have been in action. The degree of soil development generally indicates the age of a soil. The Fluvaquents and Huntington and Newark soils, which are on flood plains, are younger than most other soils in the county. Organic matter has accumulated on the surface of these soils, but the soil layers are less distinct than those in most soils on uplands.

geology

Joseph N. Van, geologist, Soil Conservation Service, helped prepare this section.

The two-county area is part of the Kanawha section of the Appalachian Plateaus Province. To the east is a mature upland plateau with strong relief, which constitutes the Allegheny Mountain section of the Appalachian Plateaus. The Kanawha section consists in most places of rounded hills and ridges, products of the submature dissection of a once featured plain whose character is suggested by the few flat summit areas. North of Washington, Pennsylvania, the interstream crests, or upland remnants, reach an elevation between 1,200 and 1,250 feet above sea level and mark a slightly undulating surface. South and west of Washington, to the corner of the state, the ridges become sharp and locally uneven in elevation, although they increase progressively in elevation and attain a maximum of about 1,600 feet in Greene County. This area is also more deeply dissected and less maturely rounded, a relief of 500 to 650 feet being common even in headwater localities.

The entire Washington-Greene County drainage area is tributary to the Mississippi River system, the Ohio River being the immediate master stream. Along the extreme western portion of the two counties, the major streams draining into the Ohio River include Harmon Creek, Cross Creek, and Enslow Fork and Dunkard Fork of Wheeling Creek and Fish Creek. Most of the drainage to the east flows into the Monongahela River. The major streams are Dunkard Creek, Whiteley Creek, Muddy Run, Tenmile Run, Pike Run, and Pigeon Creek. Draining to the northeast into the Ohio River are Chartiers Creek, Robinson Run, and Raccoon Creek.

The sedimentary rocks which crop out in the area range in age from middle Conemaugh, Pennsylvanian, on the north to the youngest Permian beds in the Greene Formation in southwestern Greene County. Recent alluvium is in and adjacent to streambeds consisting of unconsolidated clay, silt, sand, gravel, and cobbles. Landslide deposits consisting of unconsolidated, slumped hummocky masses of soil and rock are scattered throughout the two counties. Unconsolidated material of the Carmichael Formation is on the terraces and valleys of the Monongahela Valley and in southern Greene County. These glacial deposits consist of silts, sands, some varved clay, quartz pebbles, and hard rounded sandstone boulders which are Pleistocene in age and are in the Kansan or Illinoian glacial stage.

In northern Washington County, the rocks in the middle Conemaugh group of middle Pennsylvanian age consist of shales, Ames limestone, Morgantown and Connellsville sandstones and siltstones, and several thin local coal seams. The Pittsburgh coal separates the Conemaugh and Monongahela groups. It is the thickest coalbed and is the only zone that is continuous over the entire area.

The Pittsburgh Formation in the Monongahela group consists of the massive Pittsburgh sandstone overlain by limestone, claystone, and siltstone and of the Redstone, Fishpot, and the Sewichley coalbeds. The Uniontown Formation of the upper Monongahela and Upper Pennsylvanian has the Uniontown coalbed at the base overlain by shale and thick sandstone and by limestone and siltstone.

The Waynesburg coalbed separates the Pennsylvanian system and the transitional Pennsylvanian and Permian systems. The thick Waynesburg sandstone overlies the coal along with shale and siltstone which underlie the Waynesburg "A" coalbed. The middle member of the Waynesburg Formation, composed of siltstone, some locally calcareous shale, and limestone, is overlain by the Waynesburg "B" coalbed. The Little Washington coalbed is at the base of the Upper Waynesburg member. It is underlain and overlain by shale and sandstone.

The Washington coalbed is at the base of the lower Permian and the Washington Formation of the Dunkard group. Limestone, sandstone with some local cross-bedded sandstone, shale, and siltstone overlie the Washington coal. The Upper Washington "A" coalbed is overlain by shale, siltstone, and sandstone and the Jellytown coal seam. The Greene Formation of the Dunkard group is the youngest exposed formation and consists of shales, sandy shales and siltstone, calcareous and carbonaceous shale, some cross-bedded fine grained sandstone, claystone, mudstone, and an occasional thin limestone bed. Several thin local coal seams and blossoms are throughout this section.

The layered rock sequence in the survey area has a slight general slope to the southwest. In addition to the southwest slope, the rock beds of this area have been buckled into a series of long, narrow northeast-southwest trending folds. When contoured on the base of the Pittsburgh coal, a consistent marker of low ridges (anticlines) and troughs (synclines) is formed. Some of the major folds, from west to east, are the West Middletown syncline, Claysville anticline, Finney syncline, Washington anticline, Nineveh syncline, Amity anticline, Waynesburg syncline, Bellinevnon anticline, and Whiteley syncline. The east-west trending Cross Creek syncline is in the northern part of Washington County. North of this syncline are two small domes, the Aunt Clara and Candor domes. South of the Cross Creek syncline is the Gillespie dome and the Westland dome.

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glossary

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.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 2.4
Low	2.4 to 3.2
Moderate	3.2 to 5.2
High	More than 5.2

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

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

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.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

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.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured soil. Sandy clay, silty clay, and clay.

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.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

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.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

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.

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.

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.

Light textured soil. Sand and loamy sand.

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

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

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size

measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

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.

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

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

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

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts 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.

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. Sedimentary rock formed by the hardening of a clay deposit.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slip. A landform in which soil has been displaced downslope. It generally has the appearance of a bench.

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.

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).

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

Substratum. The part of the soil below the solum.

Subsurface layer. 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.

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.

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

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data were recorded in the period 1951-70 at Claysville, Pennsylvania]

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
January----	38.6	17.0	27.8	66	-17	0	2.80	1.62	3.76	8	8.5
February---	41.8	19.3	30.6	66	-12	0	2.49	1.28	3.47	8	9.1
March------	50.2	26.0	38.2	79	4	15	3.53	1.99	4.78	9	5.3
April------	63.8	36.4	50.1	85	14	88	3.85	2.53	5.03	10	.4
May--------	74.0	44.5	59.3	89	24	307	3.88	2.30	5.29	9	.0
June-------	81.7	53.2	67.5	95	33	525	3.24	1.71	4.48	7	.0
July-------	84.7	57.1	70.9	96	39	648	4.19	2.30	5.73	8	.0
August-----	83.3	55.5	69.4	95	36	601	3.35	1.67	4.71	6	.0
September--	78.0	48.2	63.1	94	26	393	2.73	1.25	3.93	6	.0
October----	66.4	36.9	49.0	85	15	375	2.49	.97	3.72	6	.1
November---	52.9	29.2	41.0	77	6	0	2.61	1.69	3.43	7	1.9
December---	42.0	21.0	31.6	72	-10	14	2.45	1.10	3.54	8	6.0
Year-----	63.1	37.0	49.9	97	-20	2,966	37.61	32.20	42.97	92	31.3

[1]A growing degree day is a unit of heat available for plant growth It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data were recorded in the period 1951-70 at Claysville, Pennsylvania]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	May 10	May 20	May 31
2 years in 10 later than--	May 5	May 15	May 27
5 years in 10 later than--	April 25	May 5	May 18
First freezing temperature in fall:			
1 year in 10 earlier than--	September 24	September 16	September 14
2 years in 10 earlier than--	October 1	September 21	September 18
5 years in 10 earlier than--	October 15	October 1	September 25

TABLE 3.--GROWING SEASON

[Data were recorded in the period 1951-70 at Claysville, Pennsylvania]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	152	127	109
8 years in 10	159	135	116
5 years in 10	172	148	129
2 years in 10	186	162	142
1 year in 10	193	169	149

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Greene County	Washington County	Total-- Area	Total-- Extent
		Acres	Acres	Acres	Pct
AgB	Allegheny silt loam, 3 to 8 percent slopes	693	415	1,108	0.1
AgC	Allegheny silt loam, 8 to 15 percent slopes	303	50	353	*
BoB	Brooke silty clay loam, 3 to 8 percent slopes	192	3,430	3,622	0.4
BoC	Brooke silty clay loam, 8 to 15 percent slopes	147	3,030	3,177	0.3
BoD	Brooke silty clay loam, 15 to 25 percent slopes	5	2,965	2,970	0.3
CaB	Culleoka silt loam, 3 to 8 percent slopes	5,793	12,790	18,583	2.0
CaC	Culleoka silt loam, 8 to 15 percent slopes	5,390	21,285	26,675	2.9
CaD	Culleoka silt loam, 15 to 25 percent slopes	3,832	41,200	45,032	4.9
CkB	Culleoka-Upshur complex, 3 to 8 percent slopes	500	250	750	0.1
CkC	Culleoka-Upshur complex, 8 to 15 percent slopes	1,315	505	1,820	0.2
CkD	Culleoka-Upshur complex, 15 to 25 percent slopes	1,979	460	2,439	0.3
DaB	Dekalb channery loam, 3 to 8 percent slopes	1,063	0	1,063	0.1
DaC	Dekalb channery loam, 8 to 15 percent slopes	647	0	647	0.1
DaD	Dekalb channery loam, 15 to 25 percent slopes	794	0	794	0.1
DaF	Dekalb channery loam, 25 to 80 percent slopes	825	0	825	0.1
DbD	Dekalb very stony loam, 8 to 25 percent slopes	86	925	1,011	0.1
DoB	Dormont silt loam, 3 to 8 percent slopes	5,267	12,655	17,922	1.9
DoC	Dormont silt loam, 8 to 15 percent slopes	17,672	64,565	82,237	8.9
DoD	Dormont silt loam, 15 to 25 percent slopes	28,110	18,710	46,820	5.1
DtD	Dormont-Culleoka silt loams, 15 to 25 percent slopes	55,584	77,560	133,144	14.5
DtF	Dormont-Culleoka silt loams, 25 to 50 percent slopes	180,417	117,218	297,635	32.4
Du	Dumps, mine	1,012	2,425	3,437	0.4
Fa	Fluvaquents, loamy	11,233	10,074	21,307	2.3
GdA	Glenford silt loam, 0 to 3 percent slopes	844	955	1,799	0.2
GdB	Glenford silt loam, 3 to 8 percent slopes	7,770	9,080	16,850	1.8
GdC	Glenford silt loam, 8 to 15 percent slopes	3,522	3,040	6,562	0.7
GeB	Guernsey silt loam, 3 to 8 percent slopes	2,142	9,325	11,467	1.2
GeC	Guernsey silt loam, 8 to 15 percent slopes	2,734	22,300	25,034	2.7
GeD	Guernsey silt loam, 15 to 25 percent slopes	517	13,825	14,342	1.6
Hu	Huntington silt loam	3,261	3,362	6,623	0.7
LbA	Library silty clay loam, 0 to 3 percent slopes	1,034	50	1,084	0.1
LbB	Library silty clay loam, 3 to 8 percent slopes	1,566	1,075	2,641	0.3
LbC	Library silty clay loam, 8 to 15 percent slopes	134	345	479	0.1
Nw	Newark silt loam	7,591	18,359	25,950	2.8
Py	Purdy silt loam	817	325	1,142	0.1
UdB	Udorthents, smoothed, gently sloping	1,199	3,863	5,062	0.5
UdD	Udorthents, smoothed, moderately steep	239	922	1,161	0.1
UdF	Udorthents, smoothed, steep	316	807	1,123	0.1
UkB	Udorthents, strip mine, gently sloping	350	4,475	4,825	0.5
UkD	Udorthents, strip mine, moderately steep	1,792	6,050	7,842	0.9
UkF	Udorthents, strip mine, steep	941	11,885	12,826	1.4
Us	Urban land	0	5,198	5,198	0.6
WeB	Weikert-Culleoka complex, 3 to 8 percent slopes	4,404	11,880	16,284	1.8
WeC	Weikert-Culleoka complex, 8 to 15 percent slopes	3,126	9,330	12,456	1.4
WeD	Weikert-Culleoka complex, 15 to 25 percent slopes	2,570	21,325	23,895	2.6
W	Water	944	2,000	2,944	0.3
	Total	371,000	549,960	920,960	100.0

* Less than 0.1 percent.

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	Corn silage	Oats	Wheat	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
AgB---- Allegheny	115	23	80	45	5.0	3.5	9.0
AgC---- Allegheny	105	21	75	40	4.5	3.5	9.0
BoB---- Brooke	95	19	65	40	4.0	3.0	7.0
BoC---- Brooke	90	18	60	35	4.0	3.0	7.0
BoD---- Brooke	---	---	---	---	---	---	---
CaB---- Culleoka	110	22	70	45	4.5	4.0	8.0
CaC---- Culleoka	100	20	65	40	4.5	3.5	7.0
CaD---- Culleoka	95	19	60	35	4.0	2.5	5.0
CkB---- Culleoka-Upshur	110	22	70	45	4.5	4.0	8.0
CkC---- Culleoka-Upshur	100	20	65	40	4.5	3.5	7.0
CkD---- Culleoka-Upshur	95	19	60	35	4.0	2.5	5.0
DaB---- Dekalb	80	16	60	35	3.5	3.0	6.5
DaC---- Dekalb	75	15	55	35	3.0	2.5	5.5
DaD---- Dekalb	70	14	50	30	2.5	2.5	5.0
DaF, DbD---- Dekalb	---	---	---	---	---	---	---
DoB---- Dormont	100	20	65	40	3.5	3.0	7.0
DoC---- Dormont	90	18	60	35	3.5	3.0	7.0
DoD---- Dormont	80	16	55	35	3.0	2.5	6.5
DtD---- Dormont-Culleoka	80	16	55	35	3.0	2.5	6.5
DtF---- Dormont-Culleoka	---	---	---	---	---	---	---
Du**. Dumps							

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
Fa**. Fluvaquents							
GdA---------- Glenford	115	23	80	45	5.0	4.5	9.0
GdB---------- Glenford	110	22	75	45	5.0	4.5	9.0
GdC---------- Glenford	95	19	70	35	4.0	4.0	8.0
GeB---------- Guernsey	100	20	65	40	4.5	4.0	8.0
GeC---------- Guernsey	90	18	60	30	3.5	4.0	7.0
GeD---------- Guernsey	80	16	50	25	3.0	3.0	6.5
Hu---------- Huntington	135	27	80	50	5.0	3.5	9.5
LbA, LbB---------- Library	95	19	60	35	---	3	6.0
LbC---------- Library	85	17	55	30	---	3	6.0
Nw---------- Newark	100	20	60	45	---	4.5	8.5
Py---------- Purdy	80	16	55	---	---	2.5	7.5
UdB**, UdD**, UdF**, UkB**, UkD**, UkF**. Udorthents							
Us**. Urban land							
WeB---------- Weikert-Culleoka	75	15	45	30	---	2.7	5.3
WeC---------- Weikert-Culleoka	70	14	40	25	---	2.6	5.3
WeD---------- Weikert-Culleoka	---	---	---	---	---	---	---

* 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:				
Greene County	3,261	---	---	---
Washington County	3,362	---	---	---
II:				
Greene County	31,663	15,458	16,205	---
Washington County	63,829	35,435	28,394	---
III:				
Greene County	38,913	36,313	2,600	---
Washington County	128,525	127,400	1,125	---
IV:				
Greene County	94,906	94,089	817	---
Washington County	164,440	164,115	325	---
V:				
Greene County	---	---	---	---
Washington County	---	---	---	---
VI:				
Greene County	2,661	2,575	---	86
Washington County	25,215	24,290	---	925
VII:				
Greene County	181,242	181,242	---	---
Washington County	117,218	117,218	---	---
VIII:				
Greene County	---	---	---	---
Washington 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]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
AgB, AgC---------- Allegheny	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Eastern white pine, Austrian pine, yellow-poplar, black walnut, Japanese larch, red pine, Norway spruce.
						Yellow-poplar-------	90	
						Virginia pine-------	75	
						Eastern white pine--	90	
BoB, BoC---------- Brooke	3c	Moderate	Moderate	Moderate	Slight	Northern red oak----	70	Eastern white pine, Virginia pine, black walnut.
						Yellow-poplar-------	80	
						Black walnut--------	70	
						White ash-----------	70	
						Sugar maple---------	70	
						White oak-----------	70	
BoD---------- Brooke	3c	Severe	Severe	Moderate	Slight	Northern red oak----	70	Eastern white pine, Virginia pine, black walnut.
						Yellow-poplar-------	80	
						Black walnut--------	70	
						White ash-----------	70	
						Sugar maple---------	70	
						White oak-----------	70	
CaB, CaC---------- Culleoka	2o	Slight	Slight	Slight	Slight	Yellow-poplar-------	95	Eastern white pine, black walnut, yellow-poplar, Virginia pine.
						Northern red oak----	80	
CaD---------- Culleoka	2r	Moderate	Moderate	Slight	Slight	Yellow-poplar-------	95	Eastern white pine, black walnut, yellow-poplar, Virginia pine.
						Northern red oak----	80	
CkB*: Culleoka----------	2o	Slight	Slight	Slight	Slight	Yellow-poplar-------	95	Eastern white pine, black walnut, yellow-poplar, Virginia pine.
						Northern red oak----	80	
Upshur----------	3c	Moderate	Severe	Slight	Slight	Northern red oak----	70	Eastern white pine, Virginia pine, yellow-poplar.
						Yellow-poplar-------	82	
						Eastern white pine--	82	
						Virginia pine-------	66	
CkC*: Culleoka----------	2o	Slight	Slight	Slight	Slight	Yellow-poplar-------	95	Eastern white pine, black walnut, yellow-poplar, Virginia pine.
						Northern red oak----	80	
Upshur----------	3c	Severe	Severe	Slight	Slight	Northern red oak----	70	Eastern white pine, Virginia pine, yellow-poplar.
						Yellow-poplar-------	82	
						Eastern white pine--	82	
						Virginia pine-------	66	

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	Windthrow hazard	Common trees	Site index	
CkD*:								
Culleoka	2r	Moderate	Moderate	Slight	Slight	Yellow-poplar Northern red oak	95 80	Eastern white pine, black walnut, yellow-poplar, Virginia pine.
Upshur	3c	Severe	Severe	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine Virginia pine	70 89 89 71	Eastern white pine, Virginia pine, yellow-poplar.
DaB, DaC Dekalb	3f	Slight	Slight	Moderate	Slight	Northern red oak Black cherry White ash	70 88 80	Norway spruce, yellow-poplar, black cherry.
DaD Dekalb	3f	Slight	Moderate	Moderate	Slight	Northern red oak Black cherry Yellow-poplar	70 88 80	Norway spruce, yellow-poplar, black cherry.
DaF Dekalb	3f	Moderate	Severe	Moderate	Slight	Northern red oak Black cherry Yellow-poplar	70 88 80	Norway spruce, yellow-poplar, black cherry.
DbD Dekalb	3f	Slight	Moderate	Moderate	Slight	Northern red oak Black cherry Yellow-poplar	76 95 93	Norway spruce, yellow-poplar, black cherry.
DoB, DoC Dormont	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar White ash Sugar maple	80 80 80 80	Eastern white pine, Norway spruce, yellow-poplar, Japanese larch, white spruce.
DoD Dormont	2r	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar White ash Sugar maple	80 80 80 80	Eastern white pine, Norway spruce, yellow-poplar, Japanese larch, white spruce.
DtD*:								
Dormont	2r	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar White ash Sugar maple	80 80 80 80	Eastern white pine, Norway spruce, yellow-poplar, Japanese larch, white spruce.
Culleoka	2r	Moderate	Moderate	Slight	Slight	Yellow-poplar Northern red oak	95 80	Eastern white pine, black walnut, yellow-poplar, Virginia pine.
DtF*:								
Dormont	2r	Severe	Severe	Slight	Slight	Northern red oak Yellow-poplar White ash Sugar maple	80 80 80 80	Eastern white pine, Norway spruce, yellow-poplar, Japanese larch, white spruce.
Culleoka	2r	Severe	Severe	Slight	Slight	Yellow-poplar Northern red oak	95 80	Eastern white pine, black walnut, yellow-poplar, Virginia pine.
GdA, GdB, GdC Glenford	1o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar	86 96	Eastern white pine, black walnut.

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	Windthrow hazard	Common trees	Site index	
GeB, GeC---------- Guernsey	2o	Slight	Slight	Slight	Slight	Northern red oak----	78	Eastern white pine, yellow-poplar, black walnut.
						Yellow-poplar-------	95	
						Sugar maple---------	70	
						Black walnut--------	70	
GeD---------- Guernsey	2r	Moderate	Moderate	Slight	Slight	Northern red oak----	78	Eastern white pine, yellow-poplar, black walnut.
						Yellow-poplar-------	95	
						Sugar maple---------	70	
						Black walnut--------	70	
Hu---------- Huntington	1o	Slight	Slight	Slight	Slight	Yellow-poplar-------	95	Yellow-poplar, black walnut, eastern white pine.
						Northern red oak----	90	
LbA, LbB---------- Library	2w	Slight	Moderate	Moderate	Moderate	Northern red oak----	80	Yellow-poplar, Japanese larch, eastern white pine, Norway spruce, white spruce.
						White ash-----------	80	
						Sugar maple---------	80	
						Red maple-----------	80	
						Yellow-poplar-------	90	
LbC---------- Library	2w	Moderate	Moderate	Moderate	Moderate	Northern red oak----	80	Yellow-poplar, Japanese larch, eastern white pine, Norway spruce, white spruce.
						White ash-----------	80	
						Sugar maple---------	80	
						Red maple-----------	80	
						Yellow-poplar-------	90	
Nw----------	1w	Slight	Moderate	Slight	Moderate	Pin oak-------------	99	Red maple, American sycamore, eastern white pine, yellow-poplar.
						Northern red oak----	90	
						Yellow-poplar-------	95	
Py---------- Purdy	1w	Slight	Severe	Severe	Severe	Pin oak-------------	90	Virginia pine, eastern white pine.
						Virginia pine-------	75	
						Yellow-poplar-------	90	
WeB*, WeC*: Weikert----------	4d	Slight	Slight	Severe	Moderate	Northern red oak----	59	Virginia pine, red pine, eastern white pine.
						Virginia pine-------	56	
Culleoka----------	2o	Slight	Slight	Slight	Slight	Yellow-poplar-------	95	Eastern white pine, black walnut, yellow-poplar, Virginia pine.
						Northern red oak----	80	
WeD*: Weikert----------	4d	Slight	Moderate	Severe	Moderate	Northern red oak----	59	Virginia pine, shortleaf pine, red pine, eastern white pine.
						Virginia pine-------	56	
Culleoka----------	2r	Moderate	Moderate	Slight	Slight	Yellow-poplar-------	95	Eastern white pine, black walnut, yellow-poplar, Virginia pine.
						Northern red oak----	80	

* 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
AgB Allegheny	Slight	Slight	Moderate: slope.	Slight	Slight.
AgC Allegheny	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
BoB Brooke	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey, depth to rock.	Moderate: too clayey.	Moderate: depth to rock, too clayey.
BoC Brooke	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.	Moderate: slope, depth to rock, too clayey.
BoD Brooke	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.	Severe: slope.
CaB Culleoka	Slight	Slight	Moderate: slope, small stones, depth to rock.	Slight	Moderate: large stones, depth to rock.
CaC Culleoka	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope, depth to rock.
CaD Culleoka	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
CkB*: Culleoka	Slight	Slight	Moderate: slope, small stones, depth to rock.	Slight	Moderate: large stones, depth to rock.
Upshur	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.	Moderate: too clayey.
CkC*: Culleoka	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope, depth to rock.
Upshur	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.	Moderate: slope, too clayey.
CkD*: Culleoka	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Upshur	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.	Severe: slope.
DaB Dekalb	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Severe: 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
DaC---- Dekalb	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Severe: small stones.
DaD---- Dekalb	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.
DaF---- Dekalb	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope, small stones.
DbD---- Dekalb	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope, large stones.
DoB---- Dormont	Moderate: percs slowly, wetness.	Slight----	Moderate: slope, percs slowly, wetness.	Slight----	Slight.
DoC---- Dormont	Moderate: slope, percs slowly, wetness.	Moderate: slope.	Severe: slope.	Slight----	Moderate: slope.
DoD---- Dormont	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
DtD*: Dormont----	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Culleoka----	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
DtF*: Dormont----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Culleoka----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Du*. Dumps					
Fa*. Fluvaquents					
GdA---- Glenford	Moderate: wetness, percs slowly.	Moderate: percs slowly.	Moderate: wetness, percs slowly.	Slight----	Slight.
GdB---- Glenford	Moderate: wetness, percs slowly.	Moderate: percs slowly.	Moderate: slope, wetness, percs slowly.	Slight----	Slight.
GdC---- Glenford	Moderate: slope, wetness, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----	Moderate: slope.
GeB---- Guernsey	Moderate: wetness, percs slowly.	Slight----	Moderate: slope, wetness.	Slight----	Slight.

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
GeC---------- Guernsey	Moderate: wetness, slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
GeD---------- Guernsey	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Hu---------- Huntington	Moderate: floods.	Slight----------	Moderate: floods.	Slight----------	Slight.
LbA, LbB---------- Library	Moderate: wetness, percs slowly, too clayey.	Moderate: wetness, too clayey.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
LbC---------- Library	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, too clayey.	Severe: slope, wetness.	Moderate: wetness.	Moderate: wetness, slope.
Nw---------- Newark	Moderate: floods, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Py---------- Purdy	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
UdB*, UdD*, UdF*, UkB*, UkD*, UkF*. Udorthents					
Us*. Urban land					
WeB*: Weikert----------	Moderate: small stones.	Moderate: small stones.	Severe: depth to rock, small stones.	Moderate: small stones.	Moderate: small stones, droughty.
Culleoka----------	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Moderate: large stones, depth to rock.
WeC*: Weikert----------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, depth to rock, small stones.	Moderate: small stones.	Moderate: slope, small stones, droughty.
Culleoka----------	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: large stones, slope, depth to rock.
WeD*: Weikert----------	Severe: slope.	Severe: slope.	Severe: slope, depth to rock, small stones.	Moderate: slope, small stones.	Severe: slope.
Culleoka----------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT POTENTIALS

[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
AgB---- Allegheny	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AgC---- Allegheny	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BoB---- Brooke	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BoC---- Brooke	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BoD---- Brooke	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CaB---- Culleoka	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
CaC---- Culleoka	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
CaD---- Culleoka	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CkB*:										
Culleoka----	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
Upshur----	Fair	Good	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
CkC*:										
Culleoka----	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Upshur----	Fair	Good	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CkD*:										
Culleoka----	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Upshur----	Poor	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
DaB---- Dekalb	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
DaC---- Dekalb	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
DaD---- Dekalb	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
DaF, DbD---- Dekalb	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
DoB---- Dormont	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DoC---- Dormont	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT POTENTIALS--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
DoD---- Dormont	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
DtD*:										
Dormont----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Culleoka----	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
DtF*:										
Dormont----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Culleoka----	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Du*. Dumps										
Fa*. Fluvaquents										
GdA---- Glenford	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
GdB---- Glenford	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GdC---- Glenford	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GeB---- Guernsey	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GeC---- Guernsey	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GeD---- Guernsey	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Hu---- Huntington	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LbA---- Library	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
LbB---- Library	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LbC---- Library	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Nw---- Newark	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Py---- Purdy	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
UdB*, UdD*, UdF*, UkB*, UkD*, UkF*. Udorthents										
Us*. Urban land										

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT POTENTIALS--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
WeB*:										
Weikert	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Culleoka	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
WeC*:										
Weikert	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Culleoka	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
WeD*:										
Weikert	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Culleoka	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	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
AgB---- Allegheny	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
AgC---- Allegheny	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
BoB---- Brooke	Severe: cutbanks cave, depth to rock, slippage.	Severe: shrink-swell, slippage.	Severe: depth to rock, shrink-swell, slippage.	Severe: shrink-swell, slippage.	Severe: low strength, shrink-swell, slippage.	Moderate: thin layer.
BoC---- Brooke	Severe: cutbanks cave, depth to rock, slippage.	Severe: shrink-swell, slippage.	Severe: depth to rock, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: low strength, shrink-swell, slippage.	Moderate: slope, thin layer.
BoD---- Brooke	Severe: slope, slippage, depth to rock.	Severe: slope, shrink-swell, slippage.	Severe: slope, depth to rock, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, low strength, slippage.	Severe: slope.
CaB---- Culleoka	Moderate: depth to rock, large stones.	Moderate: large stones.	Moderate: depth to rock, large stones.	Moderate: slope, large stones.	Moderate: low strength, large stones.	Moderate: large stones, thin layer.
CaC---- Culleoka	Moderate: depth to rock, large stones, slope.	Moderate: slope, large stones.	Moderate: depth to rock, slope, large stones.	Severe: slope.	Moderate: low strength, slope, large stones.	Moderate: large stones, slope, thin layer.
CaD---- Culleoka	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CkB*: Culleoka----	Moderate: depth to rock, large stones.	Moderate: large stones.	Moderate: depth to rock, large stones.	Moderate: slope, large stones.	Moderate: low strength, large stones.	Moderate: large stones, thin layer.
Upshur----	Severe: cutbanks cave, slippage.	Severe: shrink-swell, slippage.	Severe: shrink-swell, slippage.	Severe: shrink-swell, slippage.	Severe: shrink-swell, low strength, slippage.	Slight: too clayey.
CkC*: Culleoka----	Moderate: depth to rock, large stones, slope.	Moderate: slope, large stones.	Moderate: depth to rock, slope, large stones.	Severe: slope.	Moderate: low strength, slope, large stones.	Moderate: large stones, slope, thin layer.
Upshur----	Severe: cutbanks cave, slippage.	Severe: shrink-swell, slippage.	Severe: shrink-swell, slippage.	Severe: shrink-swell, slope, slippage.	Severe: shrink-swell, low strength, slippage.	Moderate: slope.
CkD*: Culleoka----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Upshur----	Severe: slope, cutbanks cave, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, low strength, slippage.	Severe: slope.
DaB---- Dekalb	Severe: depth to rock.	Moderate: depth to rock, large stones.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, large stones.	Severe: small stones.

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
DaC---------- 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.	Severe: small stones.
DaD, DaF---------- Dekalb	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
DbD---------- Dekalb	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, large stones.
DoB---------- Dormont	Severe: wetness, slippage.	Severe: slippage.	Severe: wetness, slippage.	Severe: slippage.	Severe: slippage.	Slight.
DoC---------- Dormont	Severe: wetness, slippage.	Severe: slippage.	Severe: wetness, slippage.	Severe: slope, slippage.	Severe: slippage.	Moderate: slope.
DoD---------- Dormont	Severe: slope, wetness, slippage.	Severe: slope, slippage.	Severe: slope, wetness, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope.
DtD*, DtF*: Dormont----------	Severe: slope, wetness, slippage.	Severe: slope, slippage.	Severe: slope, wetness, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope.
Culleoka---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Du*. Dumps						
Fa*. Fluvaquents						
GdA---------- Glenford	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Slight.
GdB---------- Glenford	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Slight.
GdC---------- Glenford	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
GeB---------- Guernsey	Severe: wetness, slippage.	Severe: slippage.	Severe: wetness, slippage.	Severe: slippage.	Severe: low strength, slippage.	Slight.
GeC---------- Guernsey	Severe: wetness, slippage.	Severe: slippage.	Severe: wetness, slippage.	Severe: slope, slippage.	Severe: low strength, slippage.	Moderate: slope.
GeD---------- Guernsey	Severe: wetness, slope, slippage.	Severe: slope, slippage.	Severe: wetness, slope, slippage.	Severe: slope, slippage.	Severe: low strength, slope, slippage.	Severe: slope.
Hu---------- Huntington	Moderate: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: frost action, floods.	Moderate: floods.

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
LbA, LbB---------- Library	Severe: wetness, cutbanks cave, slippage.	Severe: wetness, slippage.	Severe: wetness, slippage.	Severe: wetness, slippage.	Severe: low strength, wetness, slippage.	Moderate: wetness.
LbC---------- Library	Severe: wetness, cutbanks cave, slippage.	Severe: wetness, shrink-swell, slippage.	Severe: wetness, slippage.	Severe: slope, wetness, slippage.	Severe: low strength, wetness, slippage.	Moderate: wetness, slope.
Nw---------- Newark	Severe: wetness.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: low strength, wetness, floods.	Severe: wetness.
Py---------- Purdy	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness.
UdB*, UdD*, UdF*, UkB*, UkD*, UkF*. Udorthents						
Us*. Urban land						
WeB*: Weikert----------	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Mode. depth to rock, frost action.	Severe: thin layer.
Culleoka----------	Moderate: depth to rock, large stones.	Moderate: large stones.	Moderate: depth to rock, large stones.	Moderate: slope, large stones.	Moderate: low strength, large stones.	Moderate: large stones, thin layer.
WeC*: Weikert----------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Severe: thin layer.
Culleoka----------	Moderate: depth to rock, large stones, slope.	Moderate: slope, large stones.	Moderate: depth to rock, slope, large stones.	Severe: slope.	Moderate: low strength, slope, large stones.	Moderate: large stones, slope, thin layer.
WeD*: Weikert----------	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, thin layer.
Culleoka----------	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
AgB Allegheny	Moderate: percs slowly.	Moderate: slope, seepage.	Slight	Slight	Fair: too clayey.
AgC Allegheny	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: too clayey, slope.
BoB Brooke	Severe: percs slowly, depth to rock, slippage.	Severe: depth to rock.	Severe: depth to rock, too clayey, slippage.	Severe: depth to rock.	Poor: thin layer.
BoC Brooke	Severe: percs slowly, depth to rock, slippage.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey, slippage.	Severe: depth to rock.	Poor: thin layer.
BoD Brooke	Severe: slope, slippage, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slippage, slope.	Severe: slope, depth to rock.	Poor: slope, thin layer.
CaB Culleoka	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.
CaC Culleoka	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.
CaD 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.
CkB*: Culleoka	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.
Upshur	Severe: percs slowly, slippage.	Moderate: slope, depth to rock.	Severe: too clayey, depth to rock, slippage.	Moderate: depth to rock.	Poor: too clayey.
CkC*: Culleoka	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.
Upshur	Severe: percs slowly, slippage.	Severe: slope.	Severe: too clayey, depth to rock, slippage.	Moderate: slope, depth to rock.	Poor: too clayey.
CkD*: 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.

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*:					
Upshur	Severe: slope, percs slowly, slippage.	Severe: slope.	Severe: too clayey, depth to rock, slippage.	Severe: slope.	Poor: slope, too clayey.
DaB Dekalb	Severe: depth to rock, poor filter.	Severe: depth to rock, small stones, seepage.	Severe: seepage, depth to rock.	Severe: seepage, depth to rock.	Poor: small stones.
DaC 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.
DaD Dekalb	Severe: slope, depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: seepage, depth to rock, slope.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones.
DaF 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.
DbD Dekalb	Severe: slope, depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage, slope.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones.
DoB Dormont	Severe: percs slowly, wetness, slippage.	Moderate: slope.	Severe: slippage.	Moderate: wetness.	Fair: too clayey.
DoC Dormont	Severe: percs slowly, wetness, slippage.	Severe: slope.	Severe: slippage.	Moderate: slope, wetness.	Fair: slope, too clayey.
DoD Dormont	Severe: slope, slippage, wetness.	Severe: slope.	Severe: slope, slippage.	Severe: slope.	Poor: slope.
DtD*:					
Dormont	Severe: slope, slippage, wetness.	Severe: slope.	Severe: slope, slippage.	Severe: slope.	Poor: slope.
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.
DtF*:					
Dormont	Severe: slope, slippage, wetness.	Severe: slope.	Severe: slope, slippage.	Severe: slope.	Poor: slope.
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.
Du*. Dumps					

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
Fa*. Fluvaquents					
GdA, GdB---------- Glenford	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
GdC---------- Glenford	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope, too clayey.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
GeB---------- Guernsey	Severe: wetness, percs slowly, slippage.	Moderate: slope.	Severe: too clayey, slippage.	Moderate: wetness.	Poor: too clayey, hard to pack.
GeC---------- Guernsey	Severe: wetness, percs slowly, slippage.	Severe: slope.	Severe: too clayey, slippage.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
GeD---------- Guernsey	Severe: wetness, slope, slippage.	Severe: slope.	Severe: slope, too clayey, slippage.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Hu---------- Huntington	Severe: wetness.	Severe: floods.	Severe: wetness, floods.	Severe: floods.	Good.
LbA---------- Library	Severe: percs slowly, wetness, slippage.	Moderate: depth to rock.	Severe: wetness, too clayey, slippage.	Severe: wetness.	Severe: too clayey, wetness.
LbB---------- Library	Severe: percs slowly, wetness, slippage.	Moderate: slope, depth to rock.	Severe: wetness, too clayey, slippage.	Severe: wetness.	Severe: too clayey, wetness.
LbC---------- Library	Severe: percs slowly, wetness, slippage.	Severe: slope.	Severe: wetness, too clayey, slippage.	Severe: wetness.	Severe: too clayey, wetness.
Nw---------- Newark	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
Py---------- Purdy	Severe: wetness, percs slowly.	Slight----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey.
UdB*, UdD*, UdF*, UkB*, UkD*, UkF*. Udorthents					
Us*. Urban land					
WeB*: Weikert----------	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: thin layer.
Culleoka----------	Severe: depth to rock.	Severe: seepage, depth to rock.	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
WeC*:					
Weikert	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: thin layer.
Culleoka	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.
WeD*:					
Weikert	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, thin layer.
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.

* 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," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AgB Allegheny	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
AgC Allegheny	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim, slope.
BoB Brooke	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
BoC Brooke	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
BoD Brooke	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
CaB, CaC Culleoka	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
CaD Culleoka	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
CkB*, CkC*: Culleoka	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
Upshur	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CkD*: Culleoka	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Upshur	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
DaB, DaC Dekalb	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
DaD Dekalb	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
DaF Dekalb	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
DbD Dekalb	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones, area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
DoB---------- Dormont	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
DoC---------- Dormont	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey.
DoD---------- Dormont	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
DtD*: Dormont----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Culleoka----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stone slope.
DtF*: Dormont----------	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Culleoka----------	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Du*. Dumps				
Fa*. Fluvaquents				
GdA, GdB---------- Glenford	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
GdC---------- Glenford	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
GeB, GeC---------- Guernsey	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey.
GeD---------- Guernsey	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope, too clayey.
Hu---------- Huntington	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
LbA, LbB---------- Library	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
LbC---------- Library	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Nw---------- Newark	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Py---------- Purdy	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
UdB*, UdD*, UdF*, UkB*, UkD*, UkF*. Udorthents				
Us*. Urban land				
WeB*, WeC*: Weikert----------	Poor: area reclaim.	Improbable: small stones.	Improbable: thin layer.	Poor: small stones, thin layer.
Culleoka----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
WeD*: Weikert----------	Poor: area reclaim.	Improbable: small stones.	Improbable: thin layer.	Poor: slope, small stones, thin layer.
Culleoka----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, 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	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
AgB---- Allegheny	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Favorable----	Favorable.
AgC---- Allegheny	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----	Slope.
BoB---- Brooke	Severe: slippage.	Severe: hard to pack.	Severe: no water.	Deep to water	Erodes easily, depth to rock, slippage.	Erodes easily, depth to rock.
BoC, BoD---- Brooke	Severe: slope, slippage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slippage, depth to rock, slope.	Erodes easily, slope, depth to rock.
CaB---- Culleoka	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Large stones, depth to rock.	Large stones, depth to rock.
CaC, CaD---- Culleoka	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
CkB*:						
Culleoka----	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Large stones, depth to rock.	Large stones, depth to rock.
Upshur----	Severe: slippage.	Severe: hard to pack.	Severe: no water.	Deep to water	Erodes easily, percs slowly, slippage.	Erodes easily, percs slowly.
CkC*:						
Culleoka----	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Upshur----	Severe: slope, slippage.	Severe: hard to pack.	Severe: no water.	Depth to water	Erodes easily, slope, slippage.	Erodes easily, slope.
CkD*:						
Culleoka----	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Upshur----	Severe: slope, slippage.	Severe: hard to pack.	Severe: no water.	Deep to water	Erodes easily, slope, slippage.	Erodes easily, slope.
DaB---- Dekalb	Severe: seepage.	Severe: piping, large stones.	Severe: no water.	Not needed----	Large stones, depth to rock.	Slope, droughty, large stones.
DaC, DaD, DaF---- Dekalb	Severe: seepage, slope.	Severe: piping, large stones.	Severe: no water.	Not needed----	Slope, depth to rock, large stones.	Slope, droughty, large stones.
DbD---- Dekalb	Severe: seepage, slope.	Severe: piping, large stones.	Severe: no water.	Not needed----	Slope, depth to rock, large stones.	Slope, droughty, large stones.
DoB---- Dormont	Moderate: slippage.	Severe: hard to pack.	Severe: no water.	Slope, percs slowly.	Percs slowly, erodes easily, slippage.	Erodes easily, percs slowly.

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	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
DoC, DoD---------- Dormont	Severe: slope, slippage.	Severe: hard to pack.	Severe: no water.	Slope, percs slowly.	Slope, percs slowly, erodes easily, slippage.	Slope, erodes easily, percs slowly.
DtD*, DtF*: Dormont----------	Severe: slope, slippage.	Severe: hard to pack.	Severe: no water.	Slope, percs slowly.	Slope, percs slowly, erodes easily, slippage.	Slope, erodes easily, percs slowly.
Culleoka---------	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Du*. Dumps						
Fa*. Fluvaquents						
GdA---------- Glenford	Moderate: seepage.	Severe: piping.	Severe: no water.	Frost action---	Erodes easily, wetness.	Erodes easily.
GdB---------- Glenford	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Frost action, slope.	Erodes easily, wetness.	Erodes easily.
GdC---------- Glenford	Severe: slope.	Severe: piping.	Severe: no water.	Frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily.
GeB---------- Guernsey	Severe: slippage.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Erodes easily, wetness, slippage.	Erodes easily, percs slowly.
GeC, GeD---------- Guernsey	Severe: slope, slippage.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Slope, erodes easily, wetness, slippage.	Slope, erodes easily, percs slowly.
Hu---------- Huntington	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Favorable------	Favorable.
LbA---------- Library	Severe: slippage.	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, frost action, slope.	Wetness, percs slowly, slippage.	Wetness, percs slowly.
LbB---------- Library	Severe: slippage.	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, frost action, slope.	Wetness, percs slowly, slippage.	Wetness, percs slowly.
LbC---------- Library	Severe: slope, slippage.	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, frost action, slope.	Wetness, slope, percs slowly, slippage.	Wetness. slope, percs slowly.
Nw---------- Newark	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Floods, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
Py---------- Purdy	Slight---------	Severe: piping, hard to pack, wetness.	Severe: slow refill.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.
UdB*, UdD*, UdF*, UkB*, UkD*, UkF*. Udorthents						
Us*. Urban land						

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	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
WeB*:						
Weikert	Severe: depth to rock.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock.	Depth to rock, droughty.
Culleoka	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Large stones, depth to rock.	Large stones, depth to rock.
WeC*, WeD*:						
Weikert	Severe: depth to rock, slope.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, slope.	Depth to rock, slope, droughty.
Culleoka	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.

* 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	
AgB, AgC--------- Allegheny	0-8	Silt loam---------	ML, CL, CL-ML	A-4	0	90-100	80-100	65-100	55-95	<35	NP-10
	8-43	Clay loam, loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0-10	90-100	70-100	65-95	35-80	<35	NP-15
	43-72	Clay loam, sandy loam, gravelly sandy loam.	SM, SC, ML, CL	A-4, A-6, A-2, A-1	0-5	65-100	55-100	35-95	20-75	<35	NP-15
BoB, BoC, BoD---- Brooke	0-10	Silty clay loam	CL, CH	A-6, A-7	0-5	75-100	65-100	65-100	60-95	30-60	11-35
	10-23	Clay, silty clay	CH, CL	A-6, A-7	0-5	75-100	65-100	60-100	50-95	35-75	11-45
	23-30	Clay, silty clay	CH, CL, GC, SC	A-6, A-7	5-20	55-100	50-95	45-95	35-90	35-75	11-45
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CaB, CaC, CaD---- Culleoka	0-11	Silt loam---------	ML, CL, CL-ML	A-4	0-10	90-100	85-100	70-100	55-95	<35	NP-10
	11-25	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
	25-28	Very flaggy silty clay loam, flaggy loam.	ML, CL, GC, SM	A-6, A-4, A-2	10-60	50-95	40-90	35-90	30-85	20-40	2-20
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CkB*, CkC*, CkD*: Culleoka---------	0-11	Silt loam---------	ML, CL, CL-ML	A-4	0-10	90-100	85-100	70-100	55-95	<35	NP-10
	11-25	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
	25-28	Very flaggy silty clay loam, flaggy loam.	ML, CL, GC, SM	A-6, A-4, A-2	10-60	50-95	40-90	35-90	30-85	20-40	2-20
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Upshur----------	0-10	Silty clay loam	CL, ML	A-6, A-7	0	95-100	95-100	90-100	80-95	35-50	11-25
	10-28	Silty clay, clay	MH, CH, CL, ML	A-7	0	95-100	95-100	90-100	85-100	45-70	18-40
	28-54	Silty clay loam, silty clay, clay.	CL, ML, MH, GC	A-6, A-7	0-20	70-90	55-80	50-80	50-75	35-55	11-25
	54	Unweathered bedrock.									
DaB, DaC, DaD, DaF---------- Dekalb	0-7	Channery loam----	SM, GM, ML, CL-ML	A-2, A-4	0-30	50-90	45-80	40-75	20-55	15-32	NP-7
	7-21	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML, GM-GC	A-2, A-4	5-40	50-85	40-80	40-75	20-55	15-32	NP-7
	21-25	Channery sandy loam, flaggy sandy loam, very flaggy loamy sand.	SM, GM, SC, GC	A-2, A-4	10-50	45-85	35-75	25-65	15-40	15-32	NP-9
	25	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	
DbD---------- Dekalb	0-7	Very stony loam	SM, GM, ML, CL-ML	A-2, A-4	10-30	50-90	45-80	40-75	20-55	15-32	NP-7
	7-21	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML	A-2, A-4	5-40	50-85	40-80	40-75	20-55	15-32	NP-7
	21-25	Channery sandy loam, flaggy sandy loam, very flaggy loamy sand.	SM, GM, SC, GC	A-2, A-4	10-50	45-85	35-75	25-65	15-40	15-32	NP-9
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
DoB, DoC, DoD---- Dormont	0-8	Silt loam--------	ML, CL	A-4, A-6	0	80-100	75-100	75-95	70-85	<35	NP-10
	8-20	Silt loam, silty clay loam, clay.	ML, CL	A-4, A-6	0	80-100	75-95	75-90	70-85	30-39	9-15
	20-54	Silt loam, shaly silty clay loam, clay.	ML, CL, MH, CH	A-6, A-7	0	70-100	60-90	55-85	55-80	35-55	12-25
	54-78	Silt loam, shaly silty clay loam, clay.	ML, CL, MH, GM	A-2, A-4, A-6, A-7	0-5	60-100	35-90	35-80	30-80	30-55	9-25
DtD*, DtF*: Dormont----------	0-8	Silt loam-- -----	ML, CL	A-4, A-6	0	80-100	75-100	75-95	70-85	<35	NP-10
	8-20	Silt loam, silty clay loam, clay.	ML, CL	A-4, A-6	0	80-100	75-95	75-90	70-85	30-39	9-15
	20-54	Silt loam, shaly silty clay loam, clay.	ML, CL, MH, CH	A-6, A-7	0	70-100	60-90	55-85	55-80	35-55	12-25
	54-78	Silt loam, shaly silty clay loam, clay.	ML, CL, MH, GM	A-2, A-4, A-6, A-7	0-5	60-100	35-90	35-80	30-80	30-55	9-25
Culleoka--------	0-11	Silt loam--------	ML, CL, CL-ML	A-4	0-10	90-100	85-100	70-100	55-95	<35	NP-10
	11-25	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
	25-28	Very flaggy silty clay loam, flaggy loam.	ML, CL, GC, SM	A-6, A-4, A-2	10-60	50-95	40-90	35-90	30-85	20-40	2-20
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Du*. Dumps											
Fa*. Fluvaquents											
GdA, GdB, GdC---- Glenford	0-9	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0	100	100	95-100	80-100	25-38	4-14
	9-40	Silty clay loam, silt loam.	CL, CL-ML, ML	A-6, A-7, A-4	0	100	100	95-100	80-100	25-45	5-18
	40-47	Silt loam, silty clay loam.	CL, ML, CL-ML	A-6, A-4	0	100	95-100	90-100	75-100	20-40	3-18
	47-60	Stratified silty clay loam to fine sandy loam.	ML, CL, CL-ML	A-4, A-6	0-10	95-100	90-100	85-100	70-100	20-40	3-15

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	
GeB, GeC, GeD---- Guernsey	0-10	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0-2	90-100	80-100	75-95	70-90	25-40	4-14
	10-14	Silt loam, silty clay loam.	CL, CH, ML, MH	A-6, A-7	0-2	80-100	70-100	65-100	60-95	35-54	11-26
	14-51	Silty clay, clay, silty clay loam.	CH, CL, ML, MH	A-7	0-10	75-100	65-100	60-100	55-95	45-65	18-35
	51-60	Clay, silty clay, shaly clay.	CH, MH, ML, CL	A-7	2-20	70-100	60-90	55-85	55-80	40-70	15-35
Hu---------- Huntington	0-14	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	95-100	95-100	85-100	60-95	25-35	2-15
	14-46	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	95-100	85-100	60-95	25-35	2-15
	46-60	Stratified sandy clay loam to loam.	SM, SC, ML, CL	A-2, A-4	0	85-100	60-100	50-90	30-75	<30	NP-10
LbA, LbB, LbC---- Library	0-7	Silty clay loam	ML, CL	A-6, A-7	0-5	90-100	85-100	80-100	75-100	30-60	11-35
	7-37	Silty clay, clay	MH, CH, CL, ML	A-7	0-15	90-100	80-100	75-100	70-100	40-65	15-30
	37-60	Shaly silty clay loam, shaly loam, silty clay.	CL, ML, SC, CH	A-7	0-25	75-100	50-100	45-90	40-90	40-55	15-30
Nw---------- Newark	0-10	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	90-100	80-100	55-95	<32	NP-10
	10-39	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	70-95	22-42	4-20
	39-60	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-15	75-100	70-100	65-100	55-95	22-42	4-20
Py---------- Purdy	0-8	Silt loam--------	ML, CL	A-4, A-6, A-7	0	95-100	90-100	90-100	90-100	25-50	2-25
	8-42	Silty clay, clay, clay loam.	ML, CL, CH	A-4, A-6, A-7	0	95-100	90-100	85-100	75-95	25-75	2-45
	42-60	Silty clay, clay loam, clay.	ML, CL, CH	A-4, A-6, A-7	0	95-100	90-100	85-100	70-95	25-75	2-45
UdB*, UdD*, UdF*, UkB*, UkD*, UkF*. Udorthents											
Us*. Urban land											
WeB*, WeC*, WeD*: Weikert---------	0-7	Channery silt loam	GM, ML	A-1, A-2, A-4	0-10	35-70	35-70	25-65	20-55	30-40	4-10
	7-19	Shaly loam, very shaly silt loam, channery loam.	GM, GP	A-1, A-2	0-20	15-60	10-45	5-35	5-35	28-36	3-9
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Culleoka--------	0-11	Silt loam--------	ML, CL, CL-ML	A-4	0-10	90-100	85-100	70-100	55-95	<35	NP-10
	11-25	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
	25-28	Very flaggy silty clay loam, flaggy loam.	ML, CL, GC, SM	A-6, A-4, A-2	10-60	50-95	40-90	35-90	30-85	20-40	2-20
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
AgB, AgC----------	0-8	15-27	1.20-1.40	0.6-2.0	0.12-0.22	3.6-5.5	Low----------	0.32	4	1-4
Allegheny	8-43	18-35	1.20-1.50	0.6-2.0	0.13-0.18	3.6-5.5	Low----------	0.28		
	43-72	10-35	1.20-1.40	0.6-2.0	0.08-0.17	3.6-5.5	Low----------	0.28		
BoB, BoC, BoD----	0-10	27-40	1.00-1.30	0.2-2.0	0.18-0.24	6.3-7.8	Moderate-----	0.43	3	3-6
Brooke	10-23	40-60	1.40-1.70	0.06-0.2	0.12-0.18	6.2-7.8	High----------	0.28		
	23-30	40-60	1.40-1.70	0.06-0.2	0.12-0.18	6.6-8.4	High----------	0.28		
	30	---	---	---	---	---	----------	----		
CaB, CaC, CaD----	0-11	15-27	1.20-1.40	2.0-6.0	0.14-0.20	5.1-6.0	Low----------	0.32	3	1-4
Culleoka	11-25	18-35	1.20-1.50	2.0-6.0	0.12-0.20	5.1-6.0	Low----------	0.28		
	25-28	18-35	1.20-1.50	2.0-6.0	0.05-0.14	5.1-6.5	Low----------	0.17		
	28	---	---	---	---	---	----------	----		
CkB*, CkC*, CkD*:										
Culleoka--------	0-11	15-27	1.20-1.40	2.0-6.0	0.14-0.20	5.1-6.0	Low----------	0.32	3	1-4
	11-25	18-35	1.20-1.50	2.0-6.0	0.12-0.20	5.1-6.0	Low----------	0.28		
	25-28	18-35	1.20-1.50	2.0-6.0	0.05-0.14	5.1-6.5	Low----------	0.17		
	28	---	---	---	---	---	----------	----		
Upshur----------	0-10	27-35	1.20-1.50	0.2-0.6	0.12-0.16	4.5-6.5	Moderate-----	0.43	3	.5-4
	10-28	40-55	1.30-1.60	0.06-0.2	0.10-0.14	4.5-7.3	High----------	0.28		
	28-54	27-45	1.30-1.60	0.06-0.2	0.08-0.12	6.6-8.4	Moderate-----	0.28		
	54	---	---	---	---	---	----------	----		
DaB, DaC, DaD,										
DaF, DbD--------	0-7	10-20	1.20-1.40	2.0-20	0.08-0.12	4.5-6.5	Low----------	0.24	3	.5-2.5
Dekalb	7-21	5-15	1.20-1.40	2.0-20	0.06-0.12	4.5-5.5	Low----------	0.17		
	21-25	2-15	1.20-1.60	>6.0	0.05-0.10	4.5-5.5	Low----------	0.17		
	25	---	---	---	---	---	----------	----		
DoB, DoC, DoD----	0-8	15-27	1.20-1.40	0.6-2.0	0.16-0.20	4.5-6.0	Low----------	0.43	3	1-4
Dormont	8-20	18-45	1.20-1.60	0.2-2.0	0.14-0.18	4.5-6.0	Moderate-----	0.43		
	20-54	18-45	1.20-1.60	0.06-0.6	0.12-0.18	5.1-6.0	Moderate-----	0.32		
	54-78	18-45	1.20-1.60	0.06-2.0	0.08-0.12	5.1-6.0	Moderate-----	0.17		
DtD*, DtF*:										
Dormont---------	0-8	15-27	1.20-1.40	0.6-2.0	0.16-0.20	4.5-6.0	Low----------	0.43	3	1-4
	8-20	18-45	1.20-1.60	0.2-2.0	0.14-0.18	4.5-6.0	Moderate-----	0.43		
	20-54	18-45	1.20-1.60	0.06-0.6	0.12-0.18	5.1-6.0	Moderate-----	0.32		
	54-78	18-45	1.20-1.60	0.06-2.0	0.08-0.12	5.1-6.0	Moderate-----	0.17		
Culleoka--------	0-11	15-27	1.20-1.40	2.0-6.0	0.14-0.20	5.1-6.0	Low----------	0.32	3	1-4
	11-25	18-35	1.20-1.50	2.0-6.0	0.12-0.20	5.1-6.0	Low----------	0.28		
	25-28	18-35	1.20-1.50	2.0-6.0	0.05-0.14	5.1-6.5	Low----------	0.17		
	28	---	---	---	---	---	----------	----		
Du*.										
Dumps										
Fa*.										
Fluvaquents										
GdA, GdB, GdC----	0-9	16-27	1.30-1.45	0.6-2.0	0.16-0.20	4.5-7.3	Low----------	0.37	5-4	1-3
Glenford	9-40	18-35	1.45-1.68	0.2-2.0	0.14-0.18	4.5-6.0	Moderate-----	0.37		
	40-47	18-35	1.45-1.68	0.2-0.6	0.13-0.17	5.6-7.3	Low----------	0.37		
	47-60	16-30	1.40-1.60	0.2-2.0	0.12-0.17	5.6-7.8	Low----------	0.37		
GeB, GeC, GeD----	0-10	13-26	1.30-1.50	0.6-2.0	0.19-0.24	4.5-5.5	Low----------	0.37	3	1-3
Guernsey	10-14	22-38	1.35-1.55	0.2-2.0	0.15-0.21	4.5-6.0	Low----------	0.43		
	14-51	35-60	1.45-1.70	0.06-0.6	0.10-0.15	5.1-7.8	Moderate-----	0.32		
	51-60	40-60	1.50-1.70	0.06-0.6	0.06-0.10	5.1-7.8	Moderate-----	0.32		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
Hu----------	0-14	15-27	1.20-1.40	0.6-2.0	0.18-0.24	5.6-7.3	Low----------	0.43	5	2-4
Huntington	14-46	15-35	1.20-1.50	0.6-2.0	0.10-0.21	5.6-7.3	Low----------	0.43		
	46-60	15-30	1.20-1.50	0.6-2.0	0.10-0.21	5.6-7.3	Low----------	0.43		
LbA, LbB, LbC----	0-7	27-35	1.20-1.50	0.06-2.0	0.14-0.18	4.5-6.0	Moderate-----	0.43	3-2	1-4
Library	7-37	40-60	1.30-1.65	0.06-0.2	0.10-0.14	4.5-7.3	High----------	0.24		
	37-60	20-50	1.30-1.60	0.06-0.6	0.08-0.12	5.6-7.8	Moderate-----	0.10		
Nw----------	0-10	15-27	1.20-1.40	0.6-2.0	0.15-0.23	5.6-7.3	Low----------	0.43	5	2-4
Newark	10-39	15-35	1.20-1.50	0.6-2.0	0.18-0.23	5.6-7.3	Low----------	0.43		
	39-60	15-35	1.20-1.50	0.6-2.0	0.15-0.22	5.6-7.3	Low----------	0.43		
Py----------	0-8	18-35	1.30-1.50	0.2-0.6	0.18-0.24	3.6-5.5	Moderate-----	0.43	3	2-4
Purdy	8-42	25-90	1.30-1.60	<0.2	0.12-0.18	3.6-5.5	Moderate-----	0.28		
	42-60	35-60	1.30-1.60	<0.2	0.10-0.16	5.6-6.5	Moderate-----	0.28		
UdB*, UdD*, UdF*, UkB*, UkD*, UkF*. Udorthents										
Us*. Urban land										
WeB*, WeC*, WeD*:										
Weikert---------	0-7	15-27	1.20-1.40	2.0-6.0	0.08-0.14	4.5-6.0	Low----------	0.28	2	1-3
	7-19	15-27	1.20-1.40	2.0-6.0	0.04-0.08	4.5-6.0	Low----------	0.28		
	19	---	---	---	---	---	----------	----		
Culleoka--------	0-11	15-27	1.20-1.40	2.0-6.0	0.14-0.20	5.1-6.0	Low----------	0.32	3	1-4
	11-25	18-35	1.20-1.50	2.0-6.0	0.12-0.20	5.1-6.0	Low----------	0.28		
	25-28	18-35	1.20-1.50	2.0-6.0	0.05-0.14	5.1-6.5	Low----------	0.17		
	28	---	---	---	---	---	----------	----		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the text explain terms such as "rare," "brief," "apparent," and "perched." The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
AgB, AgC---------- Allegheny	B	None---------	---	---	>6.0	---	---	>48	Hard	Moderate	Low-------	High.
BoB, BoC, BoD----- Brooke	C	None---------	---	---	>6.0	---	---	20-40	Hard	Moderate	High------	Low.
CaB, CaC, CaD----- Culleoka	B	None---------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low-------	Moderate.
CkB*, CkC*, CkD*: Culleoka---------	B	None---------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low-------	Moderate.
Upshur------------	C	None---------	---	---	>6.0	---	---	42-60	Soft	Moderate	High------	Moderate.
DaB, DaC, DaD, DaF, DbD--------- Dekalb	C	None---------	---	---	>6.0	---	---	20-40	Hard	Low-------	Low-------	High.
DoB, DoC, DoD----- Dormont	C	None---------	---	---	1.5-3.0	Perched	Feb-Mar	>48	Soft	Moderate	High------	Moderate.
DtD*, DtF*: Dormont----------	C	None---------	---	---	1.5-3.0	Perched	Feb-Mar	>48	Soft	Moderate	High------	Moderate.
Culleoka---------	B	None---------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low-------	Moderate.
Du*. Dumps												
Fa*. Fluvaquents												
GdA, GdB, GdC----- Glenford	C	None---------	---	---	2.0-3.5	Perched	Nov-May	>48	Hard	High------	Moderate	Moderate.
GeB, GeC, GeD----- Guernsey	C	None---------	---	---	1.5-3.5	Perched	Jan-Apr	>60	---	Moderate	High------	Moderate.
Hu---------------- Huntington	B	Occasional	Brief------	Jan-Apr	3.0-6.0	Apparent	Dec-Apr	>60	---	High------	Low-------	Moderate.
LbA, LbB, LbC----- Library	D	None---------	---	---	0.5-1.5	Apparent	Oct-May	40-72	Soft	High------	High------	Moderate.
Nw---------------- Newark	C	Occasional	Brief------	Jan-Apr	0.5-1.5	Apparent	Dec-May	>60	---	High------	High------	Low.
Py---------------- Purdy	D	None---------	---	---	0-0.5	Apparent	Nov-Jun	>48	Soft	High------	High------	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		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
UdB*, UdD*, UdF*, UkB*, UkD*, UkF*. Udorthents												
Us*. Urban land												
WeB*, WeC*, WeD*: Weikert----------	C/D	None--------	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate	Moderate.
Culleoka----------	B	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low------	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that 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]

Soil name	Family or higher taxonomic class
Allegheny	Fine-loamy, mixed, mesic Typic Hapludults
Brooke	Fine, mixed, mesic Mollic Hapludalfs
Culleoka	Fine-loamy, mixed, mesic Ultic Hapludalfs
Dekalb	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Dormont	Fine-loamy, mixed, mesic Ultic Hapludalfs
Glenford	Fine-silty, mixed, mesic Aquic Hapludalfs
Guernsey	Fine, mixed, mesic Aquic Hapludalfs
Huntington	Fine-silty, mixed, mesic Fluventic Hapludolls
Library	Fine, mixed, mesic Aeric Ochraqualfs
Newark	Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents
*Purdy	Clayey, mixed, mesic Typic Ochraquults
Upshur	Fine, mixed, mesic Typic Hapludalfs
Weikert	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts

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