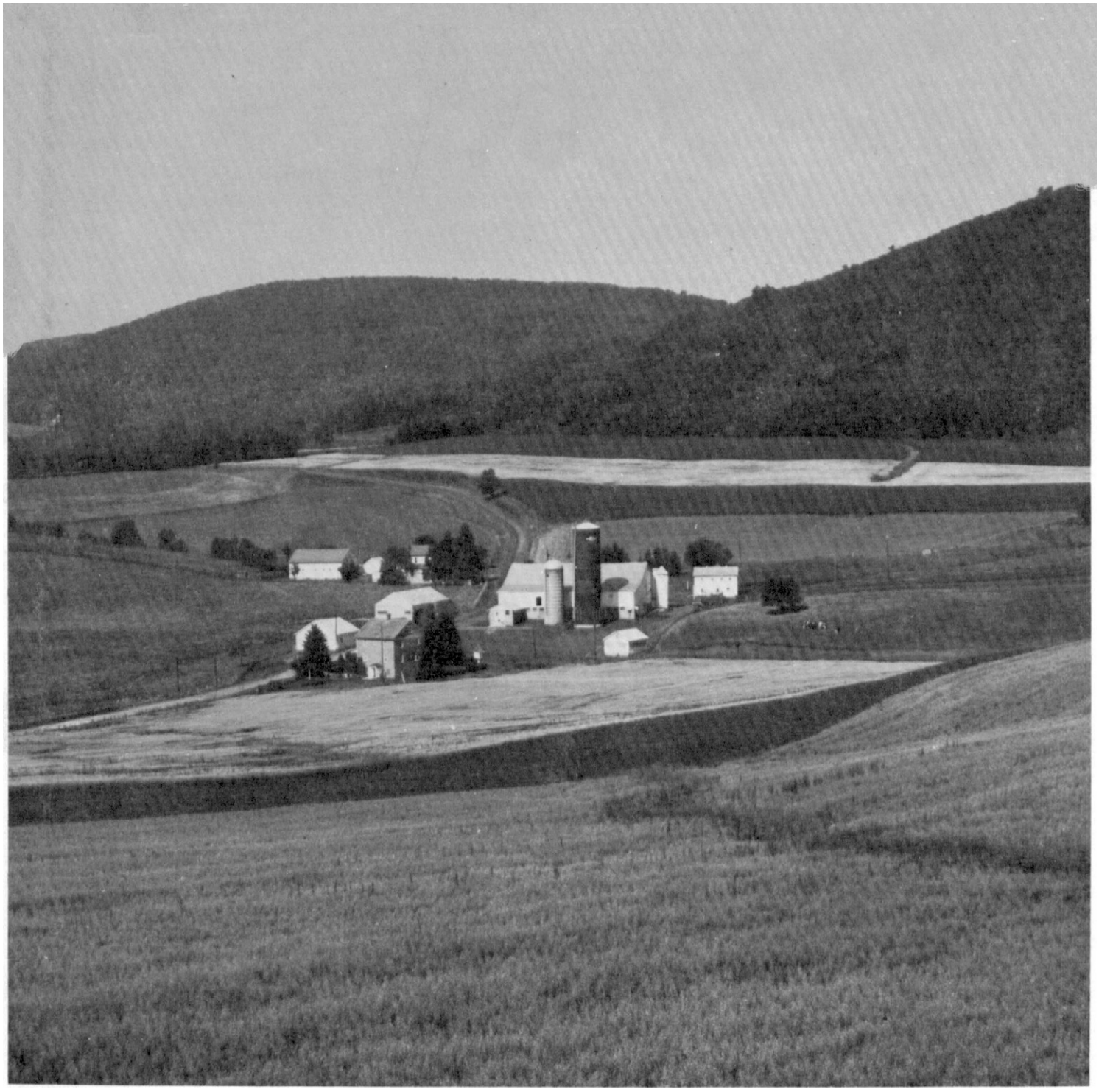
United States Department of Agriculture

Soil Conservation Service

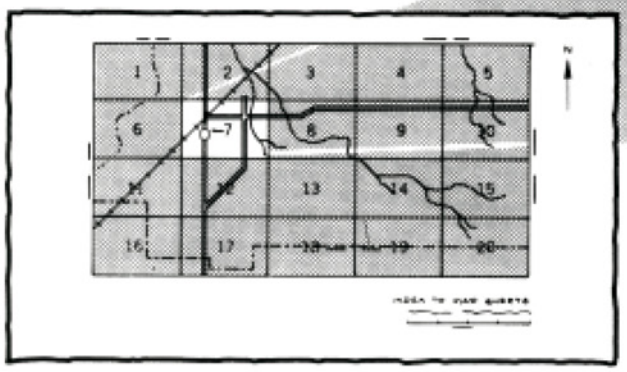
In Cooperation with The Pennsylvania State University, College of Agriculture and Pennsylvania Department of Environmental Resources, State Conservation Commission

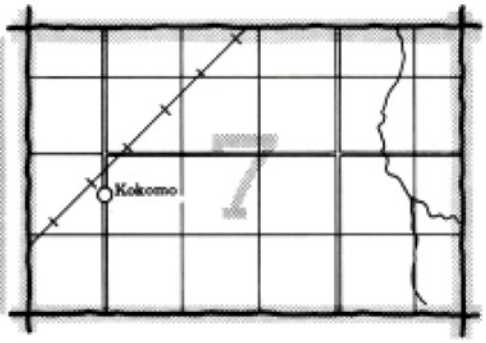
Soil Survey of Somerset County Pennsylvania



HOW TO USE

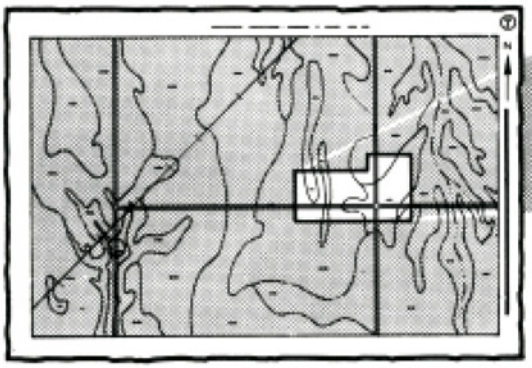
1. Locate your area of interest on the "Index to Map Sheets"

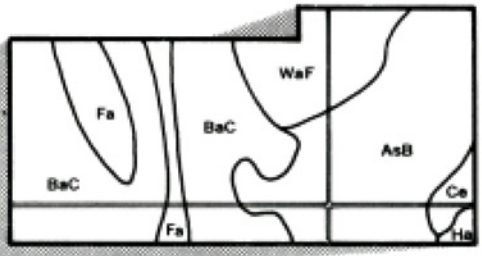




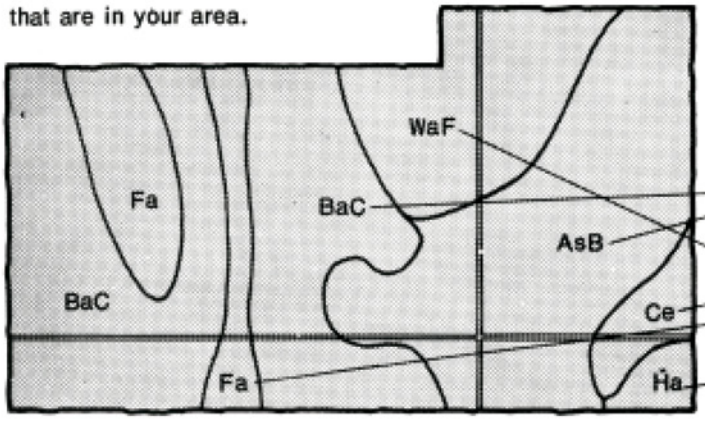
2. Note the number of the map sheet and turn to that sheet.

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





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



Symbols

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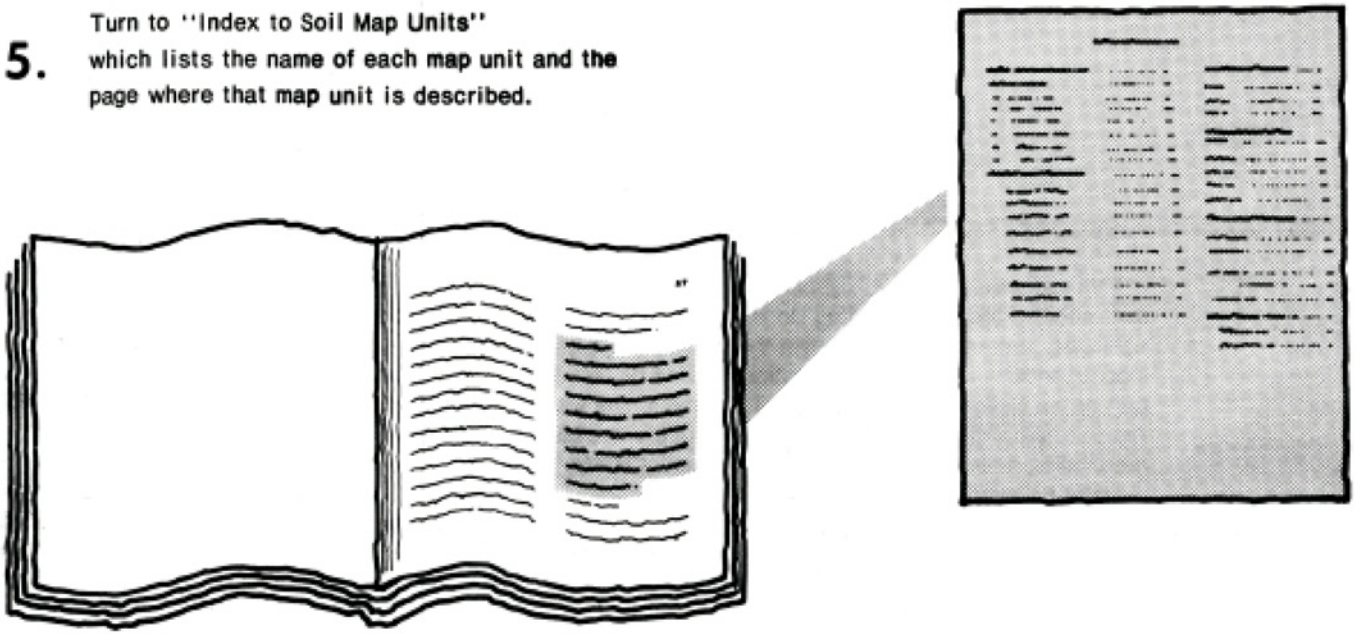
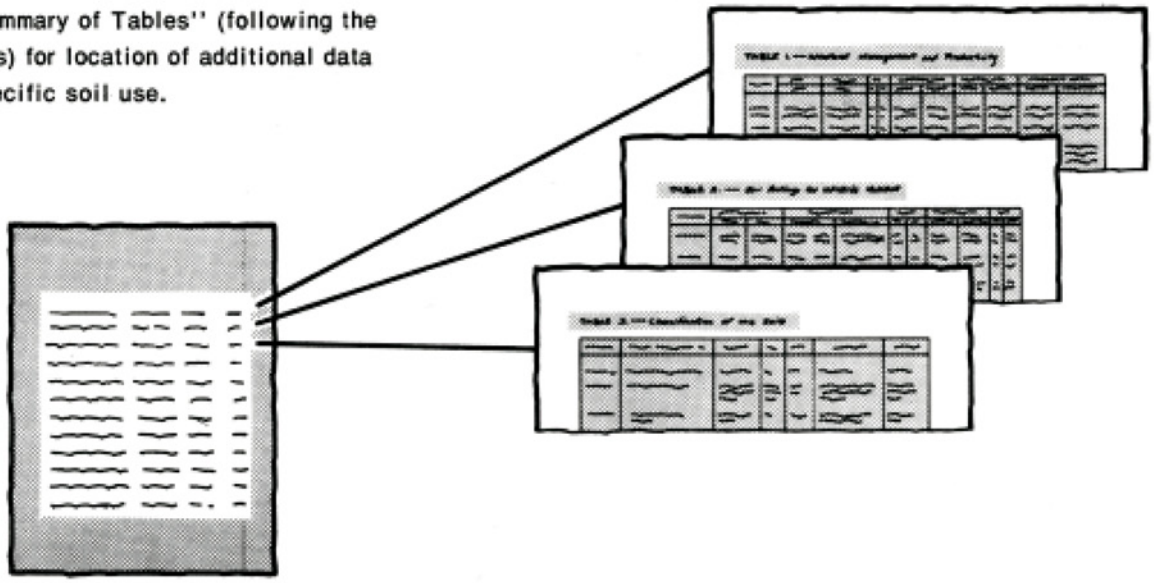
THIS SOIL SURVEY

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 1968-76. Soil names and descriptions were approved in 1977. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1977. This survey was made cooperatively by the Soil Conservation Service and the Pennsylvania State University, College of Agriculture, and Pennsylvania Department of Environmental Resources, State Conservation Commission. It is part of the technical assistance furnished to the Somerset County Conservation District. Financial assistance was provided by the Somerset County Board of Commissioners and by the Department of Housing Act of 1954, as amended.

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: A farm in area of Rayne-Gilpin-Wharton-Cavode soils. Rayne and Gilpin soils are in foreground and on ridges in background. Wharton and Cavode soils are in middle distance.

Contents

Issued December 1983

Index to soil map units

Index to soil map units—Continued

Summary of tables

Summary of tables—Continued

Foreword

We would like to introduce the Soil Survey of Somerset County. You will find within the report basic information useful for many different land uses. Also included are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land use will have on the environment.

This 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 homebuyers 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 the soil survey to help them understand, protect, and enhance the environment.

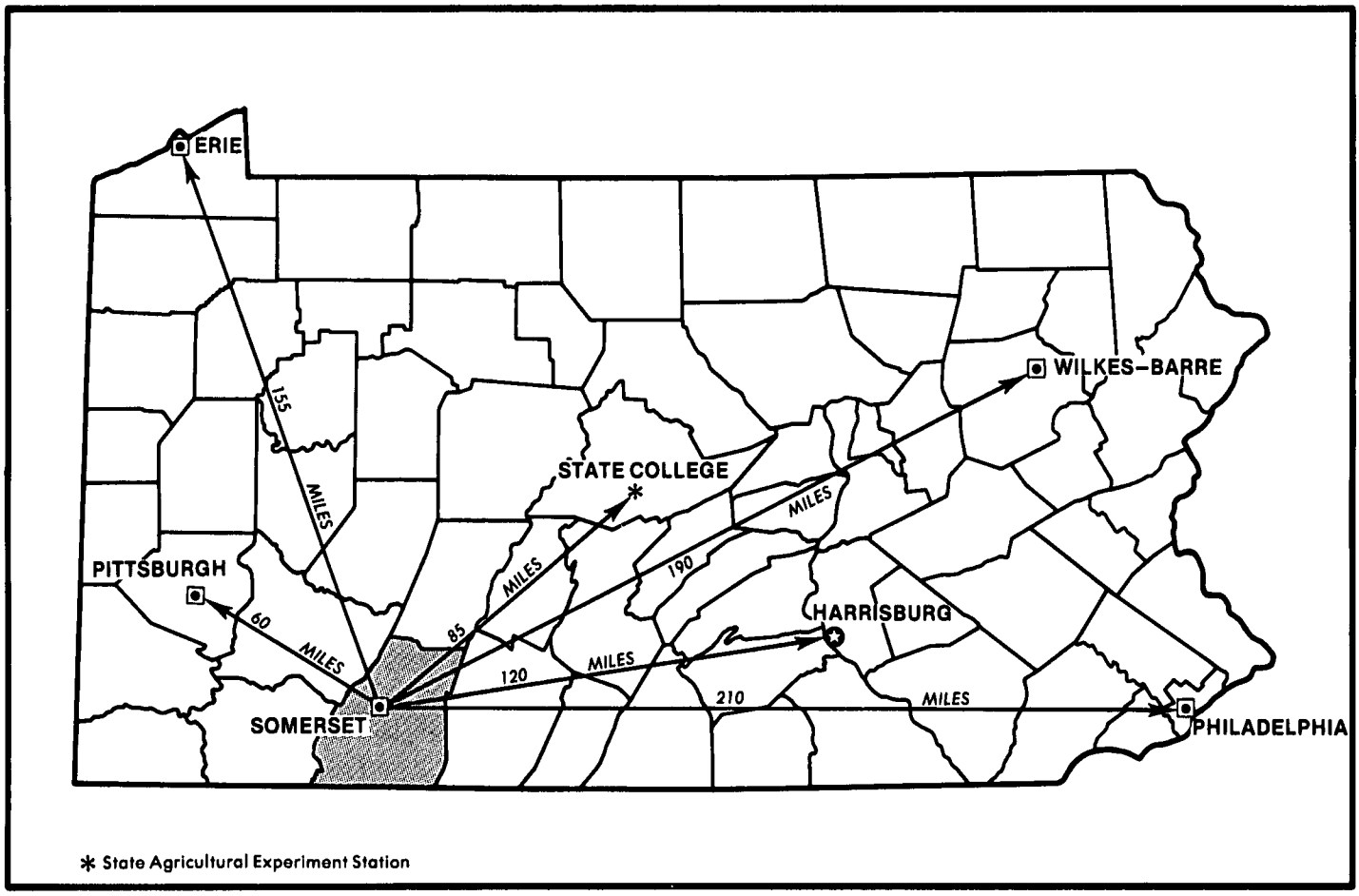
The soil survey is a very useful document. If properly used, costly mistakes can be avoided. Many people, when they purchase land, assume that all soils are alike. They are unaware that great differences in soil properties occur within short distances.

Soils may be shallow to bedrock. They may be seasonally wet or subject to flooding. Soils that have high clay content and soils that are wet are poorly suited to onsite waste disposal. Some soils are too unstable to be used as a foundation for buildings or roads.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

We believe that use of the information in this soil survey will help maintain the quality of the environment for satisfying places in which to live, work, and play.

Graham T. Munkittrick
State Conservationist
Soil Conservation Service



Location of Somerset County in Pennsylvania.

SOIL SURVEY OF SOMERSET COUNTY, PENNSYLVANIA

By Michael Yaworski, Soil Conservation Service

Fieldwork by Michael Yaworski, Earl Reber, George D. Martin, Daniel R. Seibert, David J. Belz, Dr. William H. Farley, and Reginald Speir, Soil Conservation Service

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

SOMERSET COUNTY is in the southwestern part of Pennsylvania in the Allegheny Mountains (see map on facing page). Most of the county is a high plateau, or tableland, between the crests of the Allegheny Mountains and Laurel Hill. Somerset County is bordered on the north by Cambria County, on the west by Fayette and Westmoreland Counties, on the east by Bedford County, and on the south by the State of Maryland. It contains approximately 1,085 square miles or 694,400 acres.

Somerset is the county seat. Windber, Meyersdale, Central City, Berlin, Confluence, Stoystown, Rockwood, and Boswell are other main towns. Approximately 80,000 people live in the county. The people are employed in agriculture, mining, and manufacturing and in wholesale and retail businesses (*5*). The county has a network of good highways and railroads.

Drainage in the county is into three major river basins. The largest area is west of the Allegheny Mountains and drains into the Ohio River Basin. An area east of the Allegheny Mountains and north of Dividing Ridge drains into the Susquehanna River Basin. The area east of the Allegheny Mountains and south of Dividing Ridge drains into the Potomac River Basin.

Dairying is the main source of farm income in Somerset County. Field crops, poultry products, vegetables, and livestock products are also important. Lumber, maple syrup, and Christmas trees are sources of income from woodland areas.

The soils of Somerset County are complex and form an intricate pattern. They formed in material weathered from shale, siltstone, and sandstone. Many of the soils are suited to cultivated crops, hay crops, and fruit trees. Soils that are sloping or steeper are subject to severe erosion if unprotected. Many of the soils have limitations for urban development. Slope, wetness, surface stones, and depth to bedrock are the main limitations. The limitation for many uses of these soils can be minimized by advanced planning and design.

General nature of the county

Bruce A. Benton, geologist, Soil Conservation Service, helped prepare the sections on "Geology," "Mineral resources," and "Water."

This section provides general information about Somerset County. It discusses history and population, geology, mineral resources, water, climate, and transportation.

History and population

The first step in settlement and development of Somerset County was in 1755, when General Braddock and George Washington crossed the southwestern corner of the county in an expedition against Fort Duquesne. This expedition opened the Braddock Road, or Trail, that is now known as U.S. Route 40.

In the Treaty of Fort Stanwix in November, 1768, the Indians relinquished their rights to the land that is now Somerset County. Berlin, one of the first settlements in the county, dates to that time. In 1771, Harmon Husband settled in Coxes Creek Glades and became the first permanent settler in the Somerset area. Several families from New Jersey had already settled at Jersey Church in the Turkeyfoot area.

In 1795, Somerset County was organized and included the area surrounding Brothersvalley. Manufacturing of lumber for commercial trade began at Southhampton Mills in 1848. The first coal lands were optioned in the county in 1853 by Philip Roman and Norman Bruce.

In 1970, according to the U.S. Bureau of Census, the population of Somerset County was 76,037, ranking 34th in the State. The population declined from 77,450 in 1960. The total number of farms, according to the 1974 census, was 1,124. Land area in farms was 224,780 acres.

Geology

Somerset County lies entirely in the Allegheny Mountain section of the Appalachian Plateaus physiographic province. Topographically, the setting is typical of the mountain section. It has a series of parallel, rounded ridges oriented northeast and highly elevated, stream-dissected valleys. The more prominent ridges, from west to east, are Laurel Hill and the Allegheny Mountains. The highest point in the county and the State is Mount Davis, elevation 3,213 feet, on Negro Mountain (*4*). The lowest elevation is 1,040 feet where Gladdens Run leaves the county in Southampton Township.

Sedimentary rock of Pennsylvanian, Mississippian, and Devonian ages are in Somerset County (*3*). Pennsylvanian rocks, youngest of the group, cover most of the county. Mississippian rocks outcrop along Laurel Hill and Negro Mountain and on the narrow ridges represented by Allegheny, Little Savage, and Big Savage Mountains. Devonian rocks outcrop between Allegheny and Little Savage Mountains in the southeast corner of the county.

The Monongahela, Conemaugh, Allegheny, and Pottsville Groups represent the Pennsylvanian rocks. The Conemaugh Group is made up of the Glenshaw and Casselman Formations, and the Allegheny Group is made up of the Clarion, Kittanning, and Freeport Formations. The lithology is a cyclical sequence of sandstone, shale, coal, limestone, and some siltstone. The average thickness of Pennsylvanian beds is 1,500 feet.

The Mississippian rocks are the Mauch Chunk and Loyalhanna Formations and the Pocono Group. The lithology of the Mauch Chunk Formation is sandstone, shale, and some limestone. The Loyalhanna Formation is made up of sandy limestone, and the Pocono Group is made up of sandstone that has interbeds of shale and siltstone. Total thickness ranges from 600 to 1,600 feet.

The Catskill and Jennings Formations represent the Devonian rocks. The nonmarine Catskill Formation is an interbedded sequence of sandstone and shale and has a thickness of 1,600 feet. The Jennings Formation is a sequence of interbedded shale, siltstone, sandstone, and conglomerate as much as 5,500 feet thick.

Regional uplift and compression during the Permian Period caused intense folding of beds in the southeastern part of the county and less intense folding toward the northwestern part. The resulting anticline and syncline features have been reduced by erosion to the present day northeast-oriented ridges and valleys. This same orientation is the common bedrock strike throughout the county. Major near-surface faulting is not evident to any extent in the county; however, there is extensive faulting at greater depths. Some minor surface faulting has occurred at Negro Mountain.

Unconsolidated recent alluvial deposits are in stream and river valleys in the county. The larger deposits are common to the larger streams and river valleys. Other older alluvial terrace deposits at higher elevation than present stream levels are found near the confluence of the Casselman River, the Youghiogheny River, and Laurel Hill Creek.

Mineral resources

Coal is the most valuable mineral resource in Somerset County, and coal mined in the county ranks high in the state. This low to medium volatile bituminous coal is used for domestic heat, kiln firing, steam, and metallurgy. Recovery is accomplished by both surface mining and deep mining.

Coal resources are only in the rocks of Pennsylvanian age. Seams from the Monongahela Group, namely the Pittsburg, Blue Lick, and Redstone, were the major resources but are rapidly being mined out. Coal from the Allegheny Group (upper and lower Freeport, upper and lower Kittanning, and Brookville) are the major reservoirs of good-quality coal. Other coal mined to a smaller extent are the upper and lower Bakerstown and Wellersburg coal of the Conemaugh Group. Many other coal seams throughout the Pennsylvanian System are too thin or impure to mine.

Natural gas production is along the western border and central part of the county. The producing fields along the Laurel Hill anticline are the Ohiopyle Field north of Confluence, Seven Springs Field, and Kooser Pool west of Somerset, and Williams Pool north of Boswell. The Boswell Field lies east of Laurel Hill at Boswell. Production from these fields comes from the cherty Onondaga Formation and the Ridgeley sandstone of the Oriskany Formation, Middle and Lower Devonian age, respectively.

Limestone is not a large resource, but it is mined in the central and southern parts of the county from rocks of Pennsylvanian and Mississippian ages. Presently, limestone is mined for use as concrete aggregate, agricultural purposes, and road metal from the Ames limestone of the Conemaugh Group and the Wymps Gap limestone of the Mauch Chunk Formation. Further mining for agricultural lime and cement has potential in the Fishpot and Restone limestone of the Monongahela Group.

Clay is an important mineral resource in the county. Most of the good-quality flint refractory clays are underclays associated with coal seams, mainly from the Allegheny Group. Other low-quality semirefractory clays are in the Conemaugh Group. Small quantities of surficial clay from alluvium and lacustrine deposits are mined to produce brick and tile.

Shale is not a valuable resource in the county, but some shale is mined and used for road surfaces and fills. The most extensive outcrop for mining is shales of the Conemaugh Group. Most of the shales in the county have some potential for producing Portland cement and ceramics.

Sandstone is throughout the stratigraphic sequence represented in the county. Most of the sandstone comes from rocks of Pennsylvanian age. Currently, Kittanning and Freeport sandstones from the Allegheny Group are quarried for building stone and aggregates. Other sandstone from the Pottsville and Conemaugh Groups have been mined for aggregates and building stone. The Pocono sandstone of Mississippian age and the Catskill Formation of Devonian age are quarried for building stone.

Water

Somerset County has mean annual precipitation of about 42 inches and mean annual runoff of 25 inches.

The county lies almost entirely in the Ohio River drainage, with the Conemaugh River draining the northern part and the Youghiogheny River draining the southern part. A small southeastern part is drained by the Raystown Branch of the Juniata River and tributaries of the Potomac River. The area east of the Allegheny Mountains and north of Dividing Ridge drains into the Susquehanna River basin.

Sources of water supply in the county are drilled wells, dug wells, springs, and storage reservoirs. Rural residents use wells and springs. Municipal water supplies are derived from storage reservoirs and are supplemented by wells. Further development of dug wells and springs has been replaced by the advent of drilled wells.

Ground water yields are most productive from sandstone formations. The Pottsville sandstone is the most productive aquifer. High hydrogen sulfide and high hardness content are common in the sandstone aquifers. One exception is sandstone from the Conemaugh Group, where the quality of water is generally good. Shale is throughout the entire stratigraphic sequence represented in the county. Ground water yield from shale formations is generally not high, except in units where joints and bedding planes are prevalent. Limestone formations are not important producers of ground water, but yields are high in a few wells and springs.

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 Confluence in the period 1951 to 1975. 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 29 degrees F, and the average daily minimum temperature is 19 degrees. The lowest temperature on record, which occurred at Confluence on January 30, 1963, is -22 degrees. In summer the average temperature is 68 degrees, and the average daily maximum temperature is 81 degrees. The highest recorded temperature, which occurred on September 3, 1953, is 99 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.

Of the total annual precipitation, 23 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 20 inches. The heaviest 1-day rainfall during the period of record was 4.93 inches at Confluence on October 16, 1954. Thunderstorms occur on about 35 days each year, and most occur in summer.

Average seasonal snowfall is 66 inches. The greatest snow depth at any one time during the period of record was 24 inches. On an average of 34 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 southwest. Average windspeed is highest, 11 miles per hour, in winter.

Transportation

Several major federal and state highways serve Somerset County. Among these are the Pennsylvania Turnpike; U.S. Routes 219, 30, and 40; and State Highways 31, 160, 281, 653, 403, 601, 669, 523, and 56. Paved roads in the county total 1,775 miles.

Three major railroads serve main towns and cities in the county. The coal industry is the main user of the railroads; however, lumbering and other industries also use the railroads.

Commercial airports are at Somerset and Central City. Other private airports are throughout the county.

Trucking facilities are available within the county for intrastate and interstate freight. The Pennsylvania Turnpike, which passes through the Borough of Somerset, is one of the main arteries serving large cities from east to west. U.S. Highway 219 connects large cities from north to south.

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 ot soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map for broad land use planning" and "Soil maps for detailed planning."

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

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

General soil map for broad land use planning

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

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

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

1. Rayne-Gilpin-Wharton-Cavode

Nearly level to very steep, deep and moderately deep, well drained to somewhat poorly drained soils; on hills and ridges

This map unit makes up about 52 percent of the county (fig. 1). It occupies nearly level to very steep tops and side slopes of hills and ridges (fig. 2). The areas are dominantly on broad uplands on hills and ridges that are dissected by streams.

Rayne soils make up about 26 percent of this map unit. They are deep and well drained. Gilpin soils make up about 14 percent. They are moderately deep and well drained. Wharton soils make up about 13 percent. They are deep and moderately well drained. Cavode soils make up about 9 percent. They are deep and somewhat poorly drained. Minor soils make up 38 percent. They include Armagh, Brinkerton, and Ernest soils and Udorthents on uplands; Allegheny, Chavies, Purdy, Tyler, and Monongahela soils on terraces; and Atkins, Pope, and Philo soils and Fluvaquents on flood plains.

Most areas of this map unit are cleared and used for crops, hay, and pasture. Some areas are wooded, especially areas of steep and stony soils. A few areas are used for urban and industrial developments and for surface mining of coal. The soils in this unit are the most extensive in the county and are some of the best soils for farming. The moderate depth to bedrock, the slope, and the seasonal high water table are major limitations for most uses.

2. Hazleton-Cookport

Nearly level to very steep, deep, well drained and moderately well drained soils; on foot slopes of hills and on mountains

This map unit makes up about 28 percent of the county (fig. 3). It occupies the nearly level to the very steep tops and side slopes of hills and mountains. The areas are dominantly on broad mountains and hilly valleys between the mountains.

Hazleton soils make up about 60 percent of this map unit. They are deep and well drained. Cookport soils make up about 16 percent. They are deep and moderately well drained. Minor soils make up 24 percent. They include Nolo, Ernest, Dekalb, Rayne, Gilpin, Brinkerton, Berks, Weikert, and Leck Kill soils on uplands.

Most areas of this map unit are wooded, except the areas that are cleared for crops, hay, and pasture. A few areas are used for homesites and recreation. The soils are mostly too stony for farming. In addition to stoniness, slope and a seasonal high water table are major limitations.

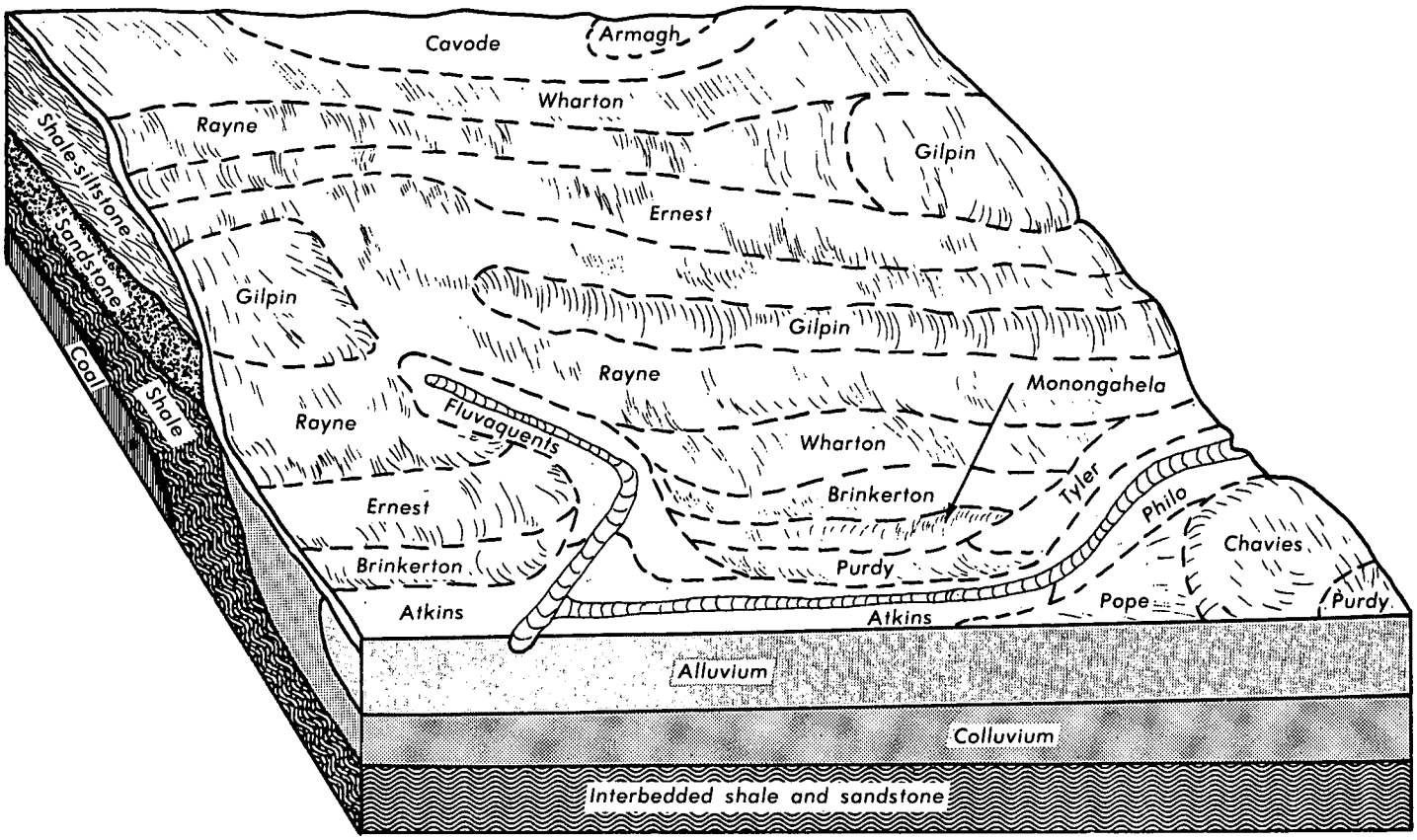


Figure 1.—Typical pattern of soils and underlying materials in area of Rayne-Gilpin-Wharton-Cavode soils.

Figure 2.—Typical landscape of Rayne-Gilpin-Wharton-Cavode soils. Rayne and Gilpin soils are mostly on tops and upper side slopes of hills and ridges. Wharton and Cavode soils are on lower slopes.

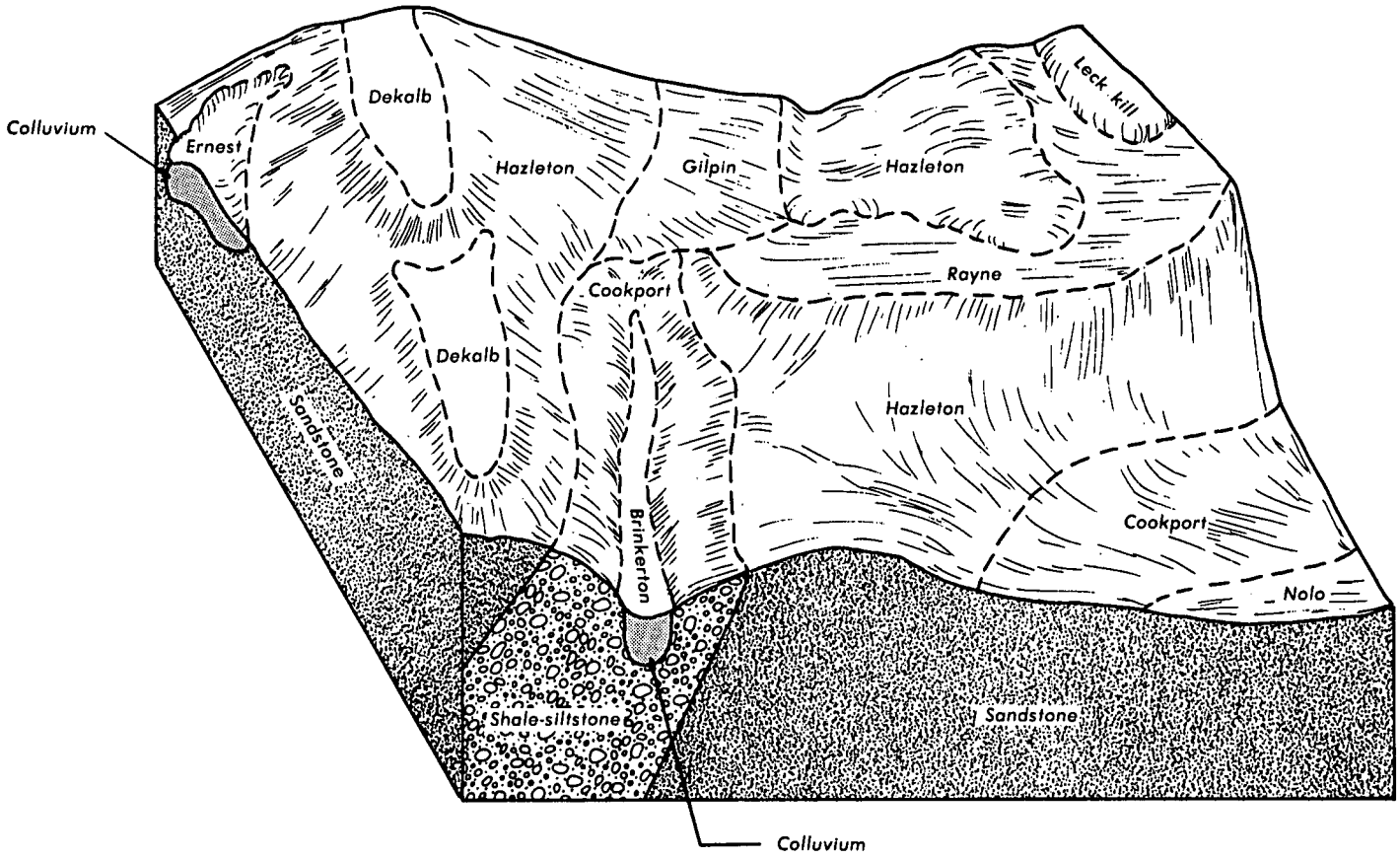


Figure 3.—Typical pattern of soils and underlying materials in area of Hazleton-Cookport soils.

3. Berks-Weikert

Gently sloping to very steep, shallow and moderately deep, well drained soils; on hills and ridges

This map unit makes up about 10 percent of the county (fig. 4). It occupies the gently sloping to very steep tops and side slopes of hills and ridges. The areas are dominantly on broad uplands that are highly dissected by streams and drainageways.

Berks soils make up about 48 percent of this map unit. They are moderately deep and well drained. Weikert soils make up 16 percent. They are shallow and well drained. Minor soils make up 36 percent. They include Blairton, Ernest, Hazleton, Rayne, Gilpin, Leck Kill, and Brinkerton soils on uplands, and Atkins soils on flood plains.

Most areas of this map unit are used for cultivated crops. The soils on steep areas are wooded. Some areas are in pasture. A few areas are used for surface mining of coal and for homesites and recreation. The slope and the shallow and moderate depth to bedrock are major limitations.

4. Leck Kill-Albrights

Gently sloping to very steep, deep, well drained to somewhat poorly drained soils; on hills and ridges

This map unit makes up about 8 percent of the county (fig. 5). It occupies the gently sloping to very steep tops and side slopes of hills and ridges. The areas are dominantly on broad uplands that are dissected by streams and drainageways.

Leck Kill soils make up about 60 percent of this map unit. They are deep and well drained. Albrights soils make up about 10 percent. They are deep and moderately well drained and somewhat poorly drained. Minor

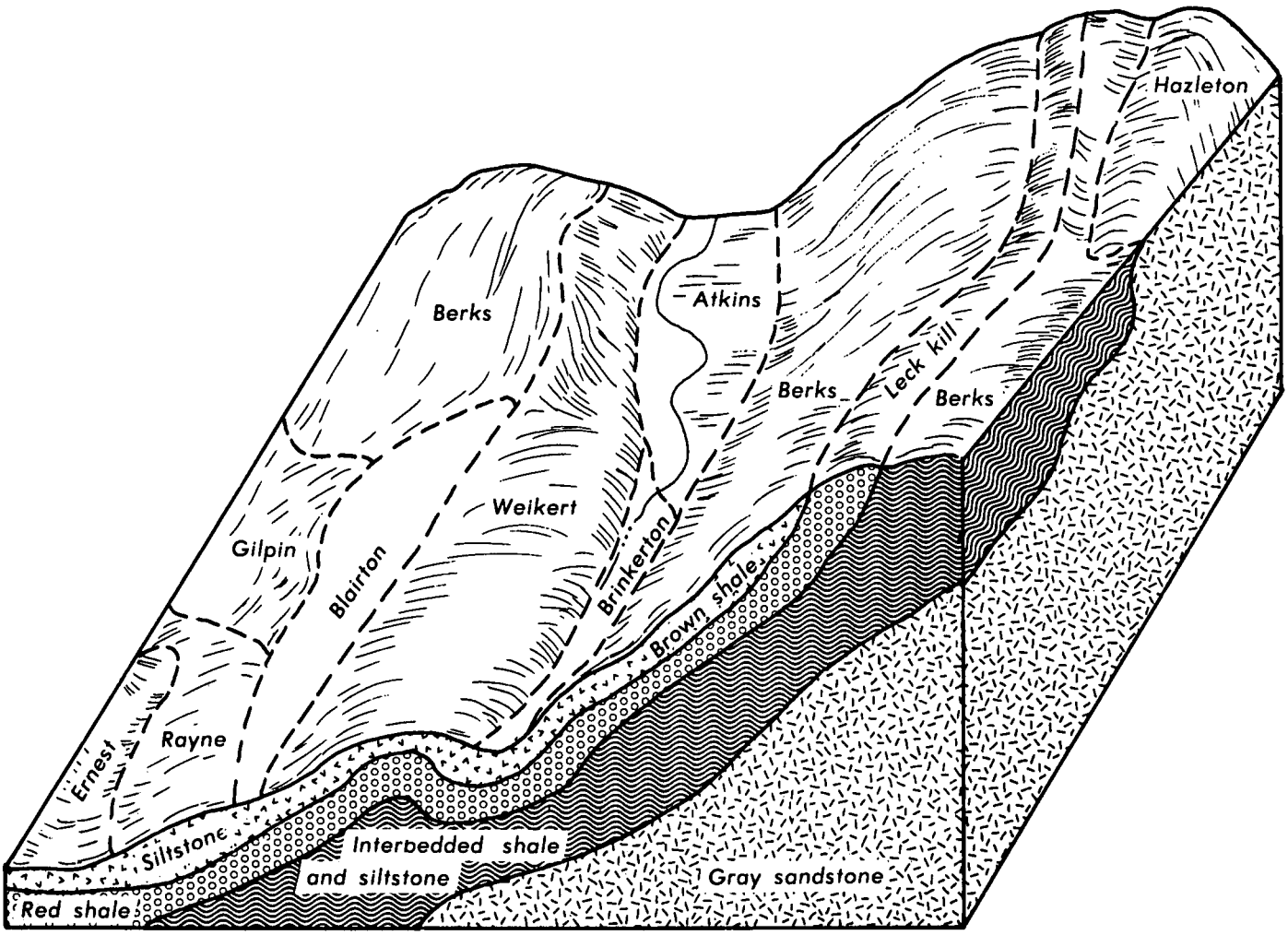


Figure 4.—Typical pattern of soils and underlying materials in area of Berks-Weikert soils.

soils make up 30 percent. They include Rayne, Gilpin, Ernest, Weikert, Berks, Dekalb, Hazleton, and Brinkerton soils on uplands and Atkins soils on flood plains.

Approximately half of the areas of this map unit have been cleared for cropland, hay, and pasture. The rest of the areas are mostly wooded. Small areas are used for homesites and recreation. The soils are mostly suited to farming. Slope and a seasonal high water table are major limitations.

5. Ernest-Rayne-Gilpin

Gently sloping to moderately steep, moderately deep and deep, moderately well drained and well drained soils; on ridges

This map unit makes up about 2 percent of the county (fig. 6). It occupies the gently sloping to moderately steep tops and side slopes of ridges. The areas are mostly gently sloping to moderately steep but include some steep and very steep areas on side slopes. The areas are dominantly on narrow to broad uplands dissected by drainageways.

Ernest soils make up about 60 percent of this map unit. They are deep and moderately well drained. Rayne soils make up about 15 percent. They are deep and well drained. Gilpin soils make up about 5 percent. They are moderately deep and well drained. Minor soils make up 20 percent. They include Brinkerton, Wharton, Cavode, and Cookport soils and Udorthents on uplands and Atkins soils on flood plains.

Most areas of this map unit are cleared and used for crops, hay, and pasture. The soils in the steeper areas are wooded. Few areas of this map unit are used for surface mining. The soils are mostly suited to farming. A seasonal high water table and moderate depth to bedrock are major limitations.

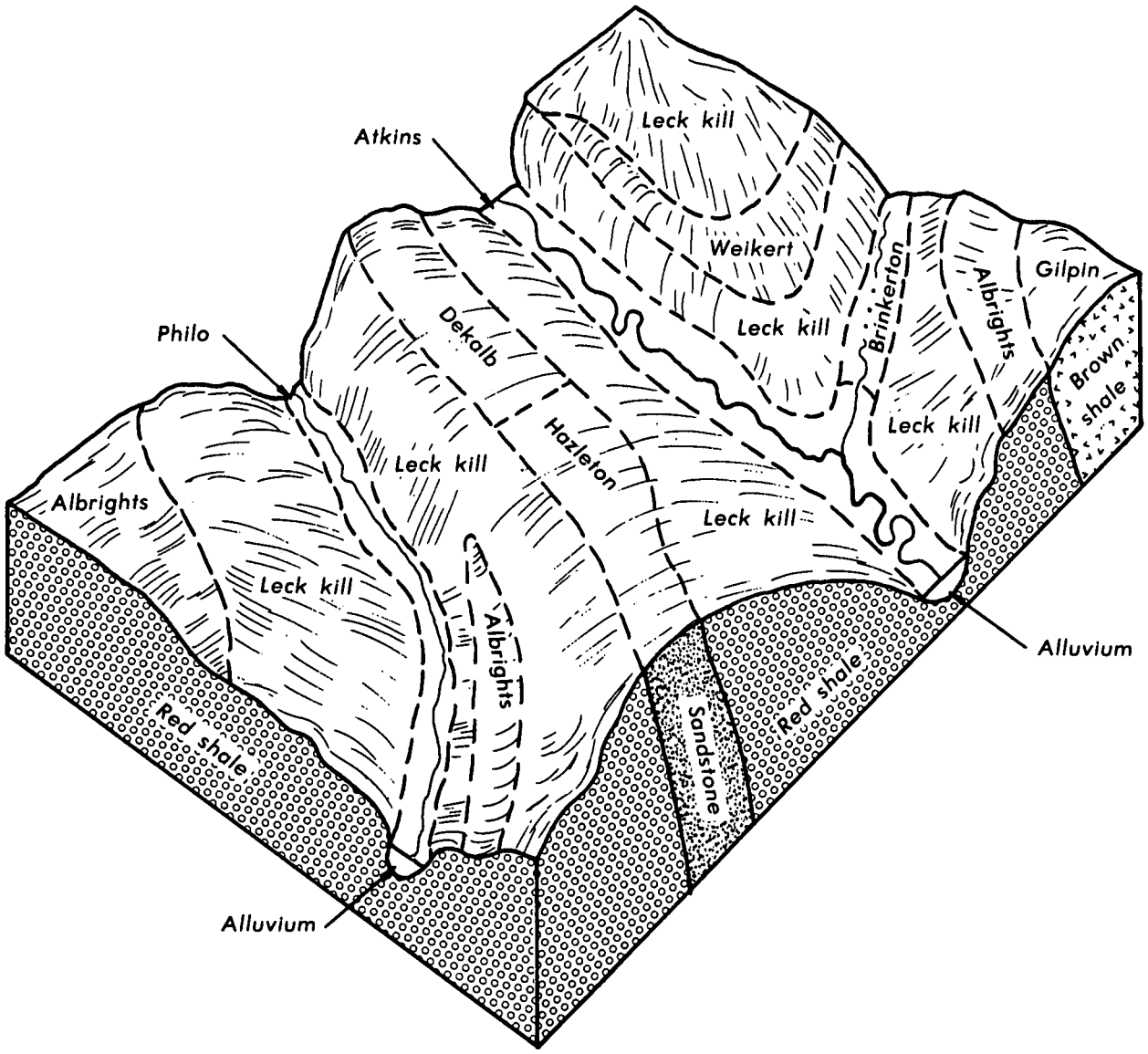


Figure 5.—Typical pattern of soils and underlying materials in area of Leck Kill-Albrights soils.

Soil maps for detailed planning

The map units shown on the detailed soil maps at the back of this publication represent the kinds of soil in the survey area. They are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each map unit, or soil, is given in the section "Use and management of the soils."

This survey has both narrowly defined and broadly defined map units. Broadly defined units generally have larger delineations and the composition is apt to be more variable than that of other units in the survey area.

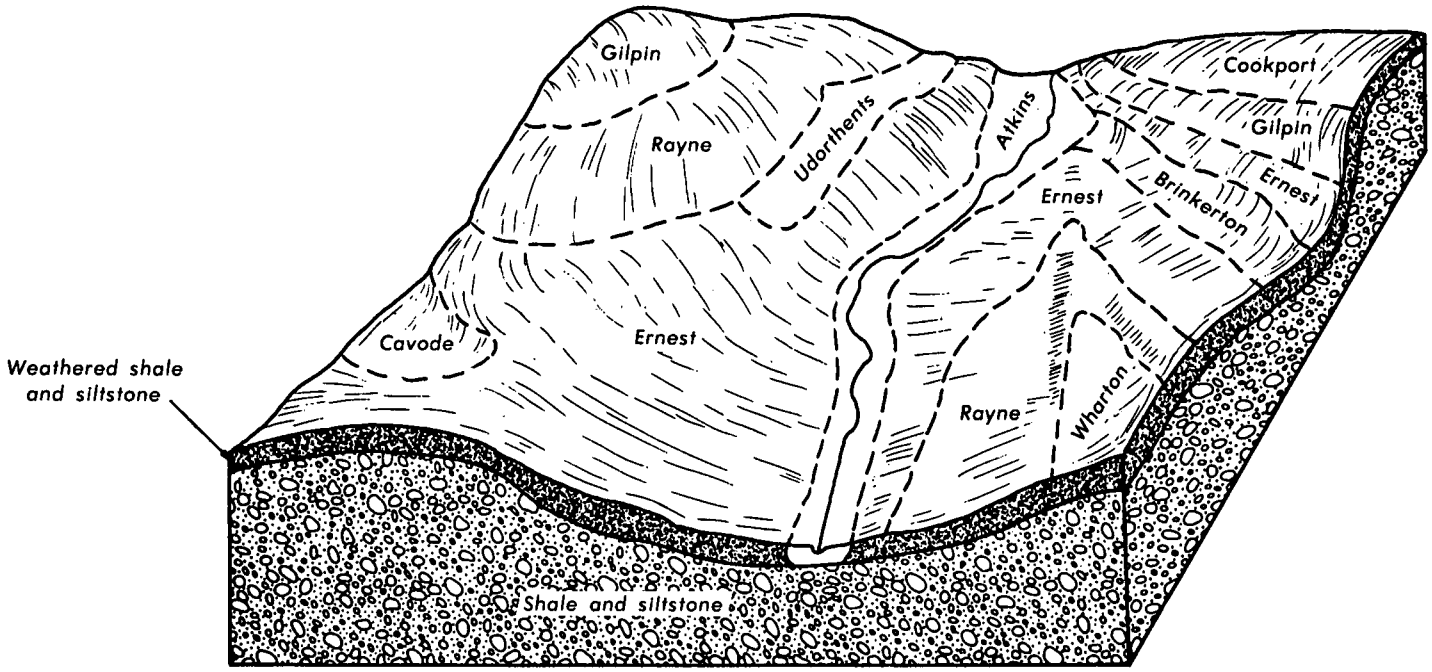


Figure 6.—Typical pattern of soils and underlying materials in area of Ernest-Rayne-Gilpin soils.

Broadly defined units are indicated by symbols in which all of the letters are capitals.

Preceding the name of each map unit is the symbol that identifies the soil on the detailed soil maps. Each soil description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated, and the management concerns and practices needed are discussed.

The map units on the detailed soil maps represent an area on the landscape made up mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map are phases of soil series.

Soils that have a profile that is almost alike make up a *soil series*. Except for allowable differences in texture of the surface layer or of the underlying substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped. The Cookport series, for example, was named for the town of Cookport in Indiana County, Pennsylvania.

Soils of one series can differ in texture of the surface layer or in the underlying substratum and in slope, erosion, stoniness, salinity, wetness, or other characteristics that affect their use. On the basis of such differences, a soil series is divided into phases. The name of a *soil phase* commonly indicates a feature that affects use or management. For example, Cookport loam, 3 to 8 percent slopes, is one of several phases within the Cookport series.

Some map units are made up of two or more dominant kinds of soil. Such map units are called soil complexes and undifferentiated groups.

A *soil complex* consists of areas of two or more soils that are so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area includes some of each of the two or more dominant soils, and the pattern and proportion are somewhat similar in all areas. Berks-Weikert channery silt loams, 3 to 8 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because there is little value in separating them. The pattern and proportion of the soils are not uniform. An area shown on the map has at least one of the dominant (named) soils or may have all of them. Berks and Weikert soils, 25 to 70 percent slopes, is an undifferentiated group in this survey area.

Most map units include small, scattered areas of soils other than those that appear in the name of the map unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of

the map unit. These soils are described in the description of each map unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

Most mapped areas include places that have little or no soil material and support little or no vegetation. Such places are called *miscellaneous areas*; they are delineated on the soil map and given descriptive names. Quarries is an example. Some of these areas are too small to be delineated and are identified by a special symbol on the soil map.

The acreage and proportionate extent of each map unit are given in table 4, and additional information on properties, limitations, capabilities, and potentials for many soil uses is given for each kind of soil in other tables in this survey. (See "Summary of tables.") Many of the terms used in describing soils are defined in the Glossary.

AbB—Albrights silt loam, 3 to 8 percent slopes. This gently sloping, deep, moderately well drained and somewhat poorly drained soil is in upland depressions and on side slopes of hills. Slopes are slightly concave and are 150 to 300 feet in length. Areas are irregular in shape and range from about 2 to 5 acres in size.

Typically, the surface layer is dark reddish brown silt loam about 7 inches thick. The subsoil, to a depth of 18 inches, is red and reddish brown channery silt loam and clay loam; to 38 inches, it is very firm and brittle, mottled, reddish brown channery silty clay loam; and to 54 inches, it is firm and brittle, mottled, yellowish red shaly clay loam. The substratum to a depth of 65 inches is yellowish red shaly silty clay loam.

Included with this soil in mapping are small areas of Leck Kill, Wharton, Cookport, and Ernest soils and a few areas of nearly level Albrights soils. Included soils make up about 10 to 15 percent of this map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is medium, and the hazard of erosion is moderate. A seasonal high water table is within a depth of 12 to 24 inches during wet periods. The root zone is restricted by the fragipan. In unlimed areas, reaction is strongly acid and very strongly acid in the surface layer and subsoil.

Most areas of this soil are used for pasture (fig. 7). Some areas are used for woodland. This soil has good potential for cultivated crops and pasture. It is suited to trees. Potential for nonfarm uses is limited because of the moderately slowly permeable subsoil and the seasonal high water table.

This soil is suited to cultivated crops. Surface and subsurface drains help remove excess water, allow for timely tillage, and increase production. Stripcropping, use of cover crops, minimum tillage, diversions, and sod waterways help reduce runoff and control erosion. Returning crop residue to the surface layer helps maintain good tilth.

Where this soil is used for pasture, overgrazing and grazing when the soil is too wet are the main concerns in management. The surface layer compacts easily when wet. Restricted grazing during wet periods and rotation of pasture are good management practices. Optimum production requires periodic application of nutrients.

This soil is suited to trees, but only a small acreage is wooded. Productivity is moderately high. The use of equipment is restricted for short periods during wet seasons. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses, because it is moderately slowly permeable and has a seasonal high water table. The moderately slow permeability and the seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IIe. The woodland ordination symbol is 3w.

AbC—Albrights silt loam, 8 to 15 percent slopes. This sloping, deep, moderately well drained and somewhat poorly drained soil is on side slopes of hills and on lower slopes of valleys. Areas are generally elongated in shape or in long narrow bands and range from 3 to 10 acres in size.

Typically, the surface layer is dark reddish brown silt loam about 7 inches thick. The subsoil, to a depth of 18 inches, is red and reddish brown channery silt loam and clay loam; to 38 inches, it is very firm and brittle, mottled, reddish brown channery silty clay loam; and to 54 inches, it is firm and brittle, mottled, yellowish red shaly clay loam. The substratum to a depth of 65 inches is yellowish red shaly silty clay loam.

Included with this soil in mapping are small areas of Leck Kill, Wharton, Ernest, and Cookport soils and a few areas of gently sloping Albrights soils. Also included are a few areas of soils that are similar to this Albrights soil but have a sandier texture. Included soils make up 10 to 20 percent of this map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is rapid, and the hazard of erosion is severe. A seasonal high water table is within a depth of 12 to 24 inches during wet periods. The root zone is restricted by the fragipan. In unlimed areas, reaction is strongly acid and very strongly acid in the surface layer and subsoil.

Most areas of this soil are used for pasture. Some areas are used for woodland. This soil has good potential for cultivated crops and pasture. It is suited to trees. Potential for many nonfarm uses is limited because of the moderately slowly permeable subsoil and the seasonal high water table.

This soil is suited to cultivated crops. Stripcropping, cover crops, minimum tillage, diversions, and sod waterways help reduce runoff and control erosion. Surface and subsurface drains help remove excess water. Returning crop residue to the surface layer helps maintain tilth.

Where this soil is used for pasture, overgrazing and

Figure 7.—Albrights silt loam, 3 to 8 percent slopes, in pasture in foreground. Leck Kill soils on slopes in background.

grazing when the soil is wet are the major concerns in management. The surface layer compacts easily when it is wet. When the surface layer is compacted, runoff is increased and soil losses through erosion are excessive. Rotation of pasture, deferment of grazing, and restricted grazing during wet periods are the chief management needs.

This soil is suited to trees. Productivity is moderately high. The use of equipment is restricted for short periods during wet seasons. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses, because it is moderately slowly permeable and has a seasonal high water table. The seasonal high water table is a problem for homesites and onsite waste disposal.

This soil is in capability subclass IIIe. The woodland ordination symbol is 3w.

AgB—Albrights very stony silt loam, 3 to 8 percent slopes. This gently sloping, deep, moderately well drained and somewhat poorly drained soil is on mountains and along the base of hills and ridges. Large stones cover about 5 to 15 percent of the surface area. Slopes are mostly concave and range from 150 to 300

feet in length. Areas are irregular in shape and range from about 5 to 10 acres in size.

Typically, the surface layer is dark reddish brown silt loam about 7 inches thick. The subsoil, to a depth of 18 inches, is red and reddish brown channery silt loam and clay loam; to 38 inches, it is very firm and brittle, mottled, reddish brown channery silty clay loam; and to 54 inches, it is firm and brittle, mottled, yellowish red shaly clay loam. The substratum to a depth of 66 inches is yellowish red shaly silty clay loam.

Included with this soil in mapping are small areas of Wharton, Ernest, Cavode, Rayne, and Gilpin soils and a few areas of nearly level Albrights soils. Also included are a few areas of soils that are similar to this Albrights soil but have a sandier texture. Included soils make up about 15 to 25 percent of this map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is medium, and the hazard of erosion is slight. A seasonal high water table is within a depth of 12 to 24 inches during wet periods. The root zone is restricted by the fragipan. In unlimed areas, reaction is strongly acid or very strongly acid in the surface layer and subsoil.

Most areas of this soil are used for woodland. Small areas are used for pasture. This soil has poor potential for cropland and pasture because of the surface stones. Surface stones, moderately slow permeability, and a seasonal high water table are limitations for nonfarm uses.

This soil is not suited to cultivated crops and pasture because of the surface stones. Removing the stones and trees is not feasible.

This soil is suited to trees. Productivity is moderately high. The use of equipment is restricted during wet periods because of the seasonal high water table. Removal of undesirable trees helps production. Large stones interfere with harvesting.

This soil has limitations for most nonfarm uses because of the surface stones, the moderately slow permeability, and the seasonal high water table. The moderately slow permeability and the seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass VIs. The woodland ordination symbol is 3w.

AgD—Albrights very stony silt loam, 8 to 25 percent slopes. This sloping and moderately steep, deep, moderately well drained and somewhat poorly drained soil is at the base of mountains, hills, and ridges. Large stones cover 5 to 15 percent of the surface. Slopes are mostly concave and range from 150 to 300 feet in length. Areas are in long, narrow bands or are irregular in shape and range from 5 to 10 acres in size.

Typically, the surface layer is dark reddish brown silt loam about 7 inches thick. The subsoil, to a depth of 18 inches, is red and reddish brown channery silt loam and clay loam; to 38 inches, it is very firm and brittle, mottled, reddish brown channery silty clay loam; and to 54 inches, it is firm and brittle, mottled, yellowish red shaly clay loam. The substratum to a depth of 65 inches is yellowish red shaly silty clay loam.

Included with this soil in mapping are small areas of Wharton, Ernest, Cavode, Rayne, and Gilpin soils and a few areas of gently sloping Albrights soils. Also included are small areas of soils that have a sandy texture. Included soils make up 15 to 20 percent of this map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is moderately rapid to rapid, and the hazard or erosion is moderate. A seasonal high water table is within a depth of 12 to 24 inches during wet periods. The root zone is restricted by the fragipan. In unlimed areas, reaction is strongly acid and very strongly acid in the surface layer and subsoil.

Most areas of this soil are used for woodland. Some areas are used for pasture. This soil has poor potential for cropland and pasture because of the surface stones. It has limited potential for nonfarm uses, because it is very stony, is moderately slowly permeable, and has a seasonal high water table.

This soil is not suited to cultivated crops and pasture because of the surface stones. Removal of the stones and trees is not feasible.

This soil is suited to trees. Productivity is moderately high. The use of equipment is restricted during wet periods because of the seasonal high water table. Removal of undesirable trees helps production. Large stones interfere with harvesting.

This soil has limitations for most nonfarm uses, because it is very stony, is moderately slowly permeable, and has a seasonal high water table. The moderately slow permeability and the seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass VIs. The woodland ordination symbol is 3r.

AhB—Allegheny silt loam, gravelly substratum, 3 to 8 percent slopes. This gently sloping, deep, well drained soil is on stream terraces. Slopes are smooth or convex. Areas are elongated or fan-shaped and range from 5 to 10 acres in size.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil, to a depth to 40 inches, is strong brown gravelly loam and gravelly silty clay loam. The substratum to a depth of 60 inches is brown gravelly sand.

Included with this soil in mapping are small areas of Chavies, Pope, Monongahela, and Philo soils. Also included are small areas of nearly level Allegheny soils. Included soils make up about 10 to 15 percent of this map unit.

Permeability is moderate, and available water capacity is high. Surface runoff is medium, and the hazard of erosion is moderate. The root zone extends below a

depth of 40 inches. Reaction in the surface layer and subsoil ranges from strongly acid to extremely acid, where unlimed.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture. This soil has excellent potential for cropland and pasture. It is suited to trees and has few limitations for many nonfarm uses.

This soil is well suited to cultivated crops. Stripcropping, minimum tillage, contour tillage, cover crops, and sod waterways help prevent erosion. Incorporating crop residue into the surface layer and including grasses and legumes in the cropping system help maintain soil tilth and fertility.

Where this soil is used for pasture, overgrazing is a major concern in management. Rotation of pasture and proper stocking rates help prevent overgrazing. Optimum production requires maintenance of fertility through periodic application of nutrients.

This soil is suited to trees, but only a small acreage is wooded. Productivity is high. Concerns in management are few. Machine planting is feasible in large areas.

This soil has few limitations for most nonfarm uses; however, a few low lying areas are rarely flooded. The gravelly substratum is conducive to ground water contamination if it is used for onsite waste disposal.

This soil is in capability subclass IIe. The woodland ordination symbol is 2o.

AhC—Allegheny silt loam, gravelly substratum, 8 to 15 percent slopes. This sloping, deep, well drained soil is on stream terraces. Slopes are convex and are less than 200 feet in length. Areas are in narrow bands and range from about 2 to 6 acres in size.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil, to a depth of 40 inches, is strong brown gravelly loam and gravelly silty clay loam. The substratum to a depth of 60 inches is brown gravelly sand.

Included with this soil in mapping are a few small areas of Rayne, Gilpin, and Wharton soils. Also included are small areas of Allegheny soils that have a sandy loam surface layer. Included soils make up 10 percent of this map unit.

Permeability is moderate, and available water capacity is high. Runoff is medium, and the hazard of erosion is moderate. The root zone extends below a depth of 40 inches. In unlimed areas, reaction in the surface layer and subsoil ranges from strongly acid to extremely acid.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture. This soil has excellent potential for cropland and pasture. It is well suited to trees. It has some limitations for nonfarm uses because of slope.

This soil is well suited to cultivated crops. Control of erosion is a major concern in management. Minimum tillage, diversions, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion. Also, stripcropping helps where the topography is suitable. Incorporating crop residue and manure into the surface helps maintain organic matter content.

The soil has excellent potential for pasture. When this soil is used for pasture, proper stocking rates to maintain desired plant species and rotation of pasture are the chief management needs. Optimum production requires maintenance of fertility through periodic application of nutrients.

A small acreage of this soil is wooded. Productivity is high. Removal of undesirable trees helps production.

This soil has limitations for many nonfarm uses because of slope. Slope is a major limitation for homesites and onsite waste disposal.

This soil is in capability subclass IIIe. The woodland ordination symbol is 2o.

Ar—Armagh silt loam. This nearly level, deep, poorly drained soil is on flat areas and in depressions on uplands. Slopes are smooth and concave and generally range from about 150 to 200 feet in length. Areas are commonly elongated or fan-shaped and range from 3 to 5 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 6 inches thick. The subsoil, to a depth of 50 inches, is light gray silty clay loam and silty clay. The substratum is light gray shaly silty clay loam. Bedrock is at a depth of 60 inches. It is weathered gray and brown shale that has some interbedded siltstone.

Included with this soil in mapping are small areas of Brinkerton, Cavode, Nolo, Wharton, and Ernest soils. Also included are small areas of Armagh soils that have a stony surface. Included soils make up 5 to 15 percent of this map unit.

Permeability is slow, and available water capacity is high. Runoff is slow, and the hazard of erosion is slight. A high water table is within a depth of 0 to 6 inches during wet periods. The root zone is restricted by the high water table. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for pasture. Some areas are used for woodland. This soil has fair potential for cultivated crops and pasture. It is suited to trees. Potential for nonfarm uses is limited because of the slowly permeable subsoil and the high water table.

This soil is fairly well suited to cultivated crops. The high water table causes the soil to warm slowly in the spring. Excess surface water can be drained away by keeping natural drainageways open. Surface and subsurface drains help improve drainage where outlets are available.

Where this soil is used for pasture, overgrazing and grazing when the soil is wet are the main concerns in management. Proper stocking rates, rotation of pasture,

deferment of grazing, and restricted grazing during wet periods are the chief management needs.

This soil is suited to trees. Productivity is moderately high. The use of equipment is restricted for long periods because of wetness. Machine planting is feasible in larger areas, when the soil is dry enough to support machinery.

This soil has limitations for nonfarm uses, because it is slowly permeable and has a high water table. The slow permeability and the high water table are serious limitations for onsite waste disposal and homesites.

This soil is in capability subclass IVw. The woodland ordination symbol is 3w.

AsB—Armagh very stony silt loam, 0 to 8 percent slopes. This nearly level and gently sloping, deep, poorly drained soil is on flats and in depressions. About 3 to 15 percent of the surface area is covered with large stones. Slopes are smooth or concave and range from about 100 to 200 feet in length. Areas are generally elongated or fan-shaped and range from 3 to 5 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 6 inches thick. The subsoil, to a depth of 50 inches, is light gray silty clay loam and silty clay. The substratum is light gray shaly silty clay loam. Bedrock is at a depth of 60 inches. It is weathered gray and brown shale that has some interbedded siltstone.

Included with this soil in mapping are small areas of stony Brinkerton, Nolo, Cavode, Wharton, and Ernest soils. Also included are small nonstony areas of Armagh soils. Included soils make up 5 to 15 percent of this map unit.

Permeability is slow, and available water capacity is high. Runoff is slow, and the hazard of erosion is slight. A high water table is within a depth of 0 to 6 inches during wet periods. The root zone is restricted by the high water table. In unlimed areas, reaction in the surface layer and subsoil is very strongly acid and strongly acid.

Most areas of this soil are used for woodland. Some areas are used for pasture. This soil has poor potential for cultivated crops and pasture because of surface stones and the high water table. It is better suited to trees than to most other uses. Potential for nonfarm uses is limited because of the surface stones, slowly permeable subsoil, and high water table.

This soil is not suited to cultivated crops and pasture. Removing the surface stones and trees and draining the soil for these uses is not feasible.

This soil is suited to trees. Productivity is moderately high. The root zone is restricted by the high water table. The use of equipment is restricted for long periods because of wetness. Removal of undesirable trees helps production.

This soil has limitations for nonfarm uses, because it is slowly permeable, has a high water table, and is very stony. The slow permeability and the high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass VIs. The woodland ordination symbol is 3w.

At—Atkins silt loam. This nearly level, deep, poorly drained soil is on flood plains along major streams throughout the county. Areas are long and narrow in shape and generally range from 20 to 100 acres in size.

Typically, the surface layer is dark gray silt loam about 4 inches thick. The subsurface layer, to a depth of 9 inches, is gray silt loam. The subsoil, to a depth of 46 inches, is mottled, gray clay loam. The substratum to a depth of 60 inches is light brownish gray loam.

Included with this soil in mapping are small areas of Tyler, Purdy, Pope, Philo, and Monongahela soils and Fluvaquents. Included soils make up 15 to 20 percent of this map unit.

Permeability is slow to moderate, and available water capacity is high. Runoff is slow, and the hazard of erosion is slight. A high water table is within a depth of 6 inches during wet seasons. The rooting depth is restricted by the high water table. In unlimed areas, reaction is strongly acid and very strongly acid in the surface layer and subsoil.

Most areas of this soil are used for pasture. Where properly drained, this soil is suited to row crops. It is suited to trees. The high water table, flooding, and slow to moderate permeability limit potential for nonfarm uses.

This soil is fairly well suited to cultivated crops. Flooding and surface ponding damage crops after intensive rainfall. Keeping natural drainageways open helps drain excess surface water. Surface and subsurface drains, where outlets are available, help improve drainage. Incorporating crop residue and manure into the surface layer helps maintain tilth and organic matter.

This soil is suited to pasture. Grazing when the soil is wet and overgrazing are the major concerns in management. The surface layer compacts easily if grazed when wet. Rotation of pasture, restricted grazing during wet seasons, and deferment of grazing are good management practices. Optimum production requires periodic application of nutrients.

This soil is suited to trees, but only a small acreage is wooded. Productivity is very high. The use of equipment is restricted for long periods during wet seasons. Mechanical planting is feasible in large areas.

This soil has limitations for most nonfarm uses because of the high water table, slow to moderate permeability, and flooding. It has serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IIIw. The woodland ordination symbol is 1w.

BeB—Berks channery silt loam, 3 to 8 percent slopes. This gently sloping, moderately deep, well drained soil is on hilltops and ridges of uplands. Slopes

are convex and range from 300 to 500 feet in length. Areas are semi-rounded and elongated in shape and mainly range from 3 to 10 acres in size.

Typically, the surface layer is dark brown channery silt loam about 9 inches thick. The subsoil, to a depth of 29 inches, is yellowish brown and strong brown channery silt loam. The substratum is strong brown very channery loam. Gray and brown shale and siltstone bedrock is at a depth of 38 inches.

Included with this soil in mapping are a few small areas of Rayne, Gilpin, Dekalb, Hazleton, Weikert, Blairton, and Ernest soils. Also included are small, stony areas of these included soils. Included soils make up 15 to 20 percent of the map unit.

Permeability is moderate to moderately rapid, and the available water capacity is very low. Runoff is medium, and the hazard of erosion is moderate. This soil has more than 20 percent coarse fragments in the surface layer. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cropland. Small areas are used for pasture or are idle. This soil has fair potential for cultivated crops and is suited to pasture and trees. It has limitations for nonfarm uses because of coarse fragments and the moderate depth to bedrock.

This soil is suited to cultivated crops. Stripcropping, minimum tillage, diversions, and sod waterways help reduce runoff and control erosion. Growing cover crops, utilizing crop residue, and including hay in the cropping system help maintain organic matter content and good tilth.

Where this soil is used for pasture, proper stocking rates to maintain desired plant species and rotation of pasture are the chief management needs. Optimum production requires periodic application of nutrients.

This soil is suited to trees, but only a small acreage is wooded. Productivity is moderately high. A concern in management is the loss of seedlings because of very low available water. Removal of undesirable trees helps production. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses because of the moderate depth to bedrock, the moderate to moderately rapid permeability, and the coarse fragments. The moderate depth to bedrock is a serious limitation for onsite waste disposal.

This soil is in capability subclass IIe. The woodland ordination symbol is 3f.

BeC—Berks channery silt loam, 8 to 15 percent slopes. This sloping, moderately deep, well drained soil is on side slopes of hills and ridges on uplands. Slopes are convex and range from 200 to 300 feet in length. Areas are generally long and narrow in shape and range from 5 to 15 acres in size.

Typically, the surface layer is dark brown channery silt loam about 9 inches thick. The subsoil, to a depth of 29 inches, is yellowish brown and strong brown channery silt loam. The substratum is strong brown very channery loam. Gray and brown shale and siltstone bedrock is at a depth of 38 inches.

Included with this soil in mapping are small areas of Rayne, Gilpin, Hazleton, Berks, Weikert, Blairton, Leck Kill, and Ernest soils. Some areas of these included soils are stony. Included soils make up 10 to 15 percent of the map unit.

Permeability is moderate to moderately rapid, and available water capacity is very low. Runoff is moderate, and the hazard of erosion is severe. This soil has more than 20 percent coarse fragments in the surface layer. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cropland. Some areas are used for pasture. This soil has fair potential for cultivated crops and very good potential for pasture. It is suited to trees. The slopes, moderate depth to bedrock, and coarse fragments are limitations for many nonfarm uses.

This soil is suited to cultivated crops. Further erosion results in a more shallow rooting depth and a lower available water capacity for plants. Minimum tillage, diversions, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion. Also, stripcropping helps where topography is suitable. In places, depth to bedrock is a limitation for construction of diversions. Incorporating crop residue and manure into the surface layer helps maintain organic matter content and tilth.

Where this soil is used for pasture, proper stocking rates to maintain desired plant species and rotation of pasture are the chief management needs. Optimum production requires periodic application of nutrients.

This soil is suited to trees. Productivity is moderately high. The root zone is restricted in places because of moderate depth to bedrock. Roads that are planned on the contour help reduce erosion during harvesting. A concern in management is loss of seedlings because of very low available water. Machine planting is generally feasible in large areas.

This soil has limitations for most nonfarm uses because of the slope and the depth to bedrock. The moderate depth to the underlying rock is a serious limitation for homesites and onsite waste disposal.

This soil is in capability subclass IIIe. The woodland ordination symbol is 3f.

BeD—Berks channery silt loam, 15 to 25 percent slopes. This moderately steep, moderately deep, well drained soil is on side slopes of hills and ridges on uplands. Slopes are convex and range from 300 to 500 feet in length. Areas are irregular in shape or in long bands and commonly range from 5 to 10 acres in size.

Typically, the surface layer is dark brown channery silt loam about 9 inches thick. The subsoil, to a depth of 29 inches, is yellowish brown and strong brown channery

silt loam. The substratum is strong brown very channery loam. Gray and brown shale and siltstone bedrock is at a depth of 38 inches.

Included with this soil in mapping are small areas of Rayne, Gilpin, Hazleton, Weikert, and Leck Kill soils. Also included are small areas of steeper Rayne, Gilpin, Berks, and Weikert soils. Some areas of the included soils are stony. Included soils make up 10 to 15 percent of this map unit.

Permeability is moderate to moderately rapid, and available water capacity is very low. Runoff is rapid, and the hazard of erosion is very severe. The rooting depth is restricted in places by the depth to bedrock. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for woodland and pasture. This soil has poor to fair potential for cultivated crops and fair potential for pasture. It is suited to trees. For many nonfarm uses, the moderately steep slopes, moderate depth to bedrock, and coarse fragments are limitations.

This soil can occasionally be used for row crops. The hazard of erosion is very severe. Further erosion results in a more shallow rooting depth and a lower available water capacity. Minimum tillage, diversions, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion. Stripcropping can be used where the topography is suitable. Incorporating crop residue and manure into the surface layer helps maintain organic matter content and tilth.

Where this soil is used for pasture, proper seeding to maintain desired plant species and rotation of pasture are the chief management needs. Optimum production requires periodic application of nutrients.

This soil is suited to trees. Productivity is moderately high. The rooting depth is restricted in places by the depth to bedrock. A main concern in management is the loss of seedlings because of very low available water.

This soil has limitations for most nonfarm uses because of the moderately steep slope, the moderate depth to bedrock, and the coarse fragments. Slope and the depth to bedrock are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IVe. The woodland ordination symbol is 3f.

BkB—Berks-Weikert channery silt loams, 3 to 8 percent slopes. These gently sloping, moderately deep and shallow, well drained soils are on knobs and ridgetops on uplands. These soils were not mapped separately because the areas of each soil were so small and the soils were so intermingled that separating them was not practical. About 50 percent of this map unit is Berks soils, about 35 percent is Weikert soils, and 15 percent is included soils. Slopes are convex and are several hundred feet in length. Areas are oval or elongated in shape and range from 5 to 50 acres in size.

Typically, the Berks soils have a surface layer of dark brown channery silt loam about 9 inches thick. The subsoil, to a depth of 29 inches, is yellowish brown and strong brown channery silt loam. The substratum is strong brown very channery loam. Gray and brown shale and siltstone bedrock is at a depth of 38 inches.

Typically, the Weikert soils have a surface layer of very dark grayish brown channery silt loam about 3 inches thick. The subsurface layer, to a depth of 7 inches, is yellowish brown channery silt loam. The subsoil is dark brown very channery silt loam. Gray and brown shale and siltstone bedrock is at a depth of 14 inches.

Included with these soils in mapping are small areas of Hazleton, Leck Kill, Blairton, Rayne, Gilpin, Ernest, and Dekalb soils. In some places, the included soils have a stony surface layer. Small areas of nearly level and sloping Berks and Weikert soils are also included.

Permeability is moderate to moderately rapid, and available water capacity is very low. Runoff is medium, and the hazard of erosion is moderate. The rooting depth is restricted by the depth to bedrock. Reaction in the surface layer and subsoil of these soils is strongly acid and very strongly acid, where unlimed.

Most areas of these soils are used for cropland. Some small areas are used for pasture. These soils have fair potential for cultivated crops and are fairly well suited to pasture and trees. They have limited potential for nonfarm uses because of the moderate and shallow depth to bedrock.

These soils are fairly well suited to cultivated crops; however, yields are seriously reduced during dry years because of very low available water. Stripcropping, use of cover crops, minimum tillage, diversions, and sod waterways help reduce runoff and control erosion. Returning crop residue to the surface layer helps maintain tilth.

Where these soils are used for pasture, proper stocking rates to maintain desired plant species and rotation of pasture are the chief management needs. Optimum production requires maintenance of fertility through periodic application of nutrients.

These soils are fairly well suited to trees, but only a small acreage is wooded. Productivity is moderate to moderately high. Loss of seedlings because of very low available water is a concern in management. Removal of undesirable trees improves the value of the woodland. Machine planting is feasible in large areas.

These soils have limitations for most nonfarm uses because of the moderate and shallow depth to bedrock, the coarse fragments, and the moderate to moderately rapid permeability. Depth to bedrock and rapid permeability are serious limitations for homesites and onsite waste disposal.

These soils are in capability subclass IIIe. The woodland ordination symbol is 3f for the Berks soils and 4d for the Weikert soils.

BkC—Berks-Weikert channery silt loams, 8 to 15 percent slopes. These sloping, moderately deep and shallow, well drained soils are on hills and knobs on uplands. These soils were mapped together because they were in such an intricate pattern and because areas of each soil were so small that separating them was not practical. About 60 percent of this map unit is Berks soils, 25 percent is Weikert soils, and about 15 percent is included soils. Areas are typically long and narrow in shape and range from 3 to 5 acres in size.

Typically, the Berks soils have a surface layer of dark brown channery silt loam about 9 inches thick. The subsoil, to a depth of 29 inches, is yellowish brown and strong brown channery silt loam. The substratum is strong brown very channery loam. Gray and brown shale and siltstone bedrock is at a depth of 38 inches.

Typically, the Weikert soils have a surface layer of very dark grayish brown channery silt loam about 3 inches thick. The subsurface layer, to a depth of 7 inches, is yellowish brown channery silt loam. The subsoil is dark brown very channery silt loam. Gray and brown shale and siltstone bedrock is at a depth of 14 inches.

Included with these soils in mapping are small areas of Rayne, Gilpin, Blairton, Ernest, Dekalb, and Hazleton soils. Also included are some areas of Berks and Weikert soils that have a loam or stony loam surface layer and areas of steeper Berks and Weikert soils.

Permeability is moderate to moderately rapid, and available water capacity is very low. Runoff is moderately rapid, and the hazard of erosion is severe. The rooting depth is restricted by the depth to bedrock. Reaction in the surface layer and subsoil of these soils is strongly acid and very strongly acid, where unlimed.

Most areas of these soils are used for cropland. Some areas are used for pasture. These soils have fair potential for cultivated crops if management is adequate. Potential for pasture and woodland is fair. Shallow to moderate depth to bedrock, slope, and coarse fragments are limitations for nonfarm uses.

These soils are fairly well suited to cultivated crops, however, yields are seriously reduced during dry years because of very low available water. Minimum tillage, diversions, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion. Also, stripcropping can be used where topography is suitable. In places, bedrock can hinder the construction of diversions. Incorporating crop residue and manure into the surface layer helps maintain organic matter content and reduces clodding and crusting of these soils.

Where these soils are used for pasture, proper stocking rates to maintain desired plant species and rotation of pasture are the chief management needs. Optimum production requires maintenance of fertility through periodic application of nutrients.

A few areas of these soils are wooded. Productivity is moderate to moderately high, but rooting depth is restricted in places by the moderate and shallow depth to bedrock. A major concern in management is the moderate loss of seedlings because of very low available water. Machine planting of large areas is feasible.

These soils have limitations for most nonfarm uses because of the moderate and shallow depth to bedrock, the slope, and the coarse fragments. The depth to bedrock is a serious limitation for homesites and onsite waste disposal.

These soils are in capability subclass IVe. The woodland ordination symbol is 3f for the Berks soils and 4d for the Weikert soils.

BkD—Berks-Weikert channery silt loams, 15 to 25 percent slopes. These moderately steep, moderately deep and shallow, well drained soils are on knobs and ridgetops on uplands. These soils were mapped together because they were in such an intricate pattern and because areas of each soil were so small that separating them was not practical. About 50 percent of this map unit is Berks soils, 40 percent is Weikert soils, and 10 percent is included soils. Slopes are convex and are several hundred feet in length. Areas are elongated in shape or banded and range from 5 to 40 acres in size.

Typically, the Berks soils have a surface layer of dark brown channery silt loam about 9 inches thick. The subsoil, to a depth of 29 inches, is yellowish brown and strong brown channery silt loam. The substratum is strong brown very channery loam. Gray and brown shale and siltstone are at a depth of 38 inches.

Typically, the Weikert soils have a surface layer of very dark grayish brown channery silt loam about 3 inches thick. The subsurface layer, to a depth of 7 inches, is yellowish brown channery silt loam. The subsoil is dark brown very channery silt loam. Gray and brown shale and siltstone bedrock is at a depth of 14 inches.

Included with these soils in mapping are small areas of Hazleton, Leck Kill, Rayne, Gilpin, and Dekalb soils. Small areas of gently sloping and steep Berks and Weikert soils are included. Also included are some areas of Berks and Weikert soils that have a stony loam surface layer.

Permeability is moderate to moderately rapid, and available water capacity is very low. Runoff is rapid, and the hazard of erosion is very severe. The root zone is restricted by the depth to bedrock. In unlimed areas, reaction of these soils is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of these soils are used for woodland. Some areas are used for pasture. Potential for cultivated crops is poor because of the depth to bedrock, hazard of

erosion, and low available water capacity. Potential is fair to poor for pasture and fair for woodland. Moderate to shallow depth to bedrock, moderately steep slopes, and coarse fragments are limitations for nonfarm uses.

These soils are not suited to cultivated crops because of the steep slopes, high risk of erosion, and low available water capacity. Further erosion results in a more shallow rooting depth and lower available water.

Where these soils are used for pasture, proper stocking rates to maintain desired plant species, rotation of pasture, and deferment of grazing during dry periods are the chief management needs. Optimum production requires maintenance of fertility through periodic application of nutrients.

These soils are suited to woodland. Productivity is moderate to moderately high. Rooting depth is restricted in places by moderate and shallow depth to bedrock. Loss of seedlings because of very low available water capacity is a concern in management.

These soils have limitations for nonfarm uses because of the moderate and shallow depth to bedrock, moderately steep slope, and coarse fragments. The slope and depth to bedrock are serious limitations for homesites and onsite waste disposal.

These soils are in capability subclass VIe. The woodland ordination symbol is 3f for the Berks soils and 4d for the Weikert soils.

BkF—Berks and Weikert soils, 25 to 70 percent slopes. This undifferentiated unit is made up of steep and very steep Berks channery silt loam and Weikert very channery silt loam. These soils are on side slopes of ridges and mountains. These soils were mapped together because they were so similar in use and management and in slope. About 60 percent of the map unit is Berks channery silt loam, 30 percent is Weikert soils, and 10 percent is included soils. Areas are long and narrow in shape and range from 10 to 100 acres in size.

Typically, the Berks soils have a surface layer of dark brown channery silt loam about 9 inches thick. The subsoil, to a depth of 29 inches, is yellowish brown and strong brown channery silt loam. The substratum is strong brown very channery loam. Gray and brown shale and siltstone bedrock is at a depth of 38 inches.

Typically, the Weikert soils have a surface layer of very dark grayish brown channery silt loam about 3 inches thick. The subsurface layer, to a depth of 7 inches, is yellowish brown very channery silt loam. The subsoil is dark brown very channery silt loam. Gray and brown shale and siltstone bedrock is at a depth of 14 inches.

Included with these soils in mapping are small areas of Rayne, Gilpin, Dekalb, Hazleton, and Leck Kill soils. In some places the included soils have a stony surface.

Permeability is moderate to moderately rapid, and available water capacity is very low. Runoff is very rapid, and the hazard of erosion is very severe. The rooting depth is restricted by the depth to bedrock. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of these soils are used for woodland. Some areas are used for pasture. These soils have very poor potential for cultivated crops and pasture and are better suited to trees. They have limited potential for nonfarm uses because of the steep slopes and moderate and shallow depth to bedrock.

These soils are fairly well suited to trees. Productivity is moderate to moderately high. Removal of undesirable trees helps production. Steep and very steep slopes are severe limitations in selection of equipment. A concern in management is the loss of seedlings because of very low available water. Roads need to be constructed on the contour to prevent erosion during harvesting.

The soils have limitations for most nonfarm uses because of the steep and very steep slopes, the moderate and shallow depths to bedrock, and the coarse fragments. The slope and depth to bedrock are serious limitations for homesites and onsite waste disposal.

These soils are in capability subclass VIIe. The woodland ordination symbol is 3f for the Berks soils and 4d for the Weikert soils.

BnB—Blairton channery silt loam, 3 to 8 percent slopes. This gently sloping, moderately deep, moderately well drained and somewhat poorly drained soil is on upper slopes of hills on uplands. Slopes are generally concave and range from 200 to 400 feet in length. Areas are irregular in shape and range from 5 to 15 acres in size.

Typically, the surface layer is dark grayish brown channery silt loam about 9 inches thick. The subsoil is strong brown and grayish brown channery silty clay loam and shaly silty clay loam. Grayish brown shale bedrock is at a depth of 39 inches.

Included with this soil in mapping are small areas of Berks, Gilpin, Cookport, Wharton, and steeper areas of Blairton soils. Included soils make up 10 to 15 percent of this map unit.

Permeability is moderately slow, and available water capacity is high. Runoff is medium, and the hazard of erosion is moderate. A seasonal high water table is within a depth of 12 to 24 inches during wet periods. In unlimed areas, reaction ranges from extremely acid to strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture. This soil has good potential for pasture and woodland. It has limited potential for nonfarm uses because of the moderately slowly permeable subsoil and a seasonal high water table.

This soil is suited to cultivated crops. Surface and subsurface drains help remove excess water, allow for timely tillage, and increase production. Stripcropping, use of cover crops, minimum tillage, diversions, and sod wa-

terways reduce runoff and control erosion. Returning crop residue to the surface layer helps maintain tilth.

Where this soil is used for pasture, overgrazing and grazing when the soil wet are the major concerns in management. The surface layer compacts easily when wet. Restricted grazing during wet periods and rotation of pasture are good management practices. Optimum production requires periodic application of nutrients.

This soil is suited to trees, but only a small acreage is wooded. Productivity is moderately high. The use of equipment is restricted during wet seasons. Removal of undesirable trees helps woodland production. Machine planting is feasible in large areas.

This soil has limitations for most nonfarm uses, because it is moderately slowly permeable and has a seasonal high water table. The moderately slow permeability and the seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IIIw. The woodland ordination symbol is 3w.

BnC—Blairton channery silt loam, 8 to 15 percent slopes. This sloping, moderately deep, moderately well drained and somewhat poorly drained soil is on upper side slopes of hills and ridges on uplands. Slopes are concave and range from 200 to 500 feet in length. Areas are irregular in shape and range from 3 to 10 acres in size.

Typically, the surface layer is dark grayish brown channery silt loam about 9 inches thick. The subsoil is strong brown and grayish brown channery silty clay loam and shaly silty clay loam. Grayish brown shale bedrock is at a depth of 39 inches.

Included with this soil in mapping are small areas of Berks, Rayne, Gilpin, Hazleton, Cookport, and Ernest soils. Included soils make up 10 to 15 percent of this map unit.

Permeability is moderately slow, and available water capacity is high. Runoff is rapid, and the hazard of erosion is very severe. A high water table is within a depth of 12 to 24 inches during wet periods. In unlimed areas, reaction ranges from extremely acid to strongly acid in the surface layer and subsoil.

Most areas of this soil are used for pasture. Some areas are used for cultivated crops. This soil has fair potential for cropland and good potential for pasture and woodland. It has limited potential for many nonfarm uses because of slopes, the moderately slowly permeable subsoil, and a seasonal high water table.

This soil is suited to cultivated crops. Minimum tillage, use of cover crops, crop residue management, contour stripcropping, diversions, tile drainage, and including grasses and legumes in the cropping system help reduce runoff and control erosion. Tilling within the proper range of water content reduces compaction and clodding of the soil.

This soil is suited to pasture. Overgrazing and grazing this soil when wet are major concerns in management. If this soil is grazed when wet, the surface layer is compacted. This increases the rates of runoff and erosion. Proper stocking rates, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are the chief management needs.

This soil is suited to trees, but only a small acreage is wooded. Productivity is moderately high. The use of equipment is restricted for short periods during wet seasons. Removal of undesirable trees helps woodland production. Machine planting is feasible in large areas.

This soil has limitations for most nonfarm uses because of the slow permeability, the slope, and the seasonal high water table. The moderately slow permeability and the seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IVe. The woodland ordination symbol is 3w.

BrA—Brinkerton silt loam, 0 to 3 percent slopes. This nearly level, deep, poorly drained soil is on lower slopes of hills and mountains and in narrow valleys along streams. Slopes are concave and range from 300 to 500 feet in length. Areas are long and narrow in shape and range from about 5 to 40 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 4 inches thick. The subsurface layer, to a depth of 10 inches, is dark gray silt loam. The subsoil, to a depth of 24 inches, is mottled, gray silty clay loam; and to 46 inches, it is very firm and brittle, mottled, gray silty clay loam. The substratum to a depth of 60 inches is brown silt loam.

Included with this soil in mapping are small areas of Armagh, Purdy, Tyler, and Atkins soils. Also inlcuded are small areas of stony Brinkerton soils. Included soils make up 10 to 15 percent of this map unit.

Permeability is slow, and available water capacity is moderate. Runoff is slow, and the hazard of erosion is slight. A high water table is within a depth of 6 inches during wet periods. The fragipan is at a depth of about 18 inches. The rooting depth is restricted by the high water table and fragipan. Reaction of the surface layer and subsoil is very strongly acid and strongly acid where unlimed.

Most areas of this soil are used for pasture. Small areas are used for woodland. This soil has fair potential for cultivated crops and pasture (fig. 8). It is suited to water-tolerant trees. Potential for many nonfarm uses is limited because of the slow permeability and high water table.

This soil is used for cultivated crops where drainage is adequate. Surface and subsurface drains help remove excess water where outlets are available. The high water table causes the soil to warm slowly in the spring. Returning crop residue to the surface layer helps maintain good tilth.

Where this soil is used for pasture, overgrazing and grazing when the soil is wet are the major concerns in

Figure 8.—Pasture of fair quality in an area of Brinkerton silt loam, 0 to 3 percent slopes.

management. Proper stocking rates, deferment of grazing, restricted grazing during wet periods, and rotation of pasture are important in management.

This soil is suited to water-tolerant trees. Productivity is high. The use of equipment is restricted for long periods during wet seasons. Removal of undesirable trees helps woodland production. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses because of the slow permeability and the high water table. The slow permeability and the high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IVw. The woodland ordination symbol is 2w.

BrB—Brinkerton silt loam, 3 to 8 percent slopes. This gently sloping, deep, poorly drained soil is on lower slopes of hills, mountains, and ridges. Slopes are concave and range from 300 to 800 feet in length. Areas are elongated in shape and range from about 5 to 50 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 4 inches thick. The subsurface layer is about

6 inches of dark gray silt loam. The subsoil, to a depth of 24 inches, is mottled, gray silty clay loam; and to 46 inches, it is very firm and brittle, mottled, gray silty clay loam. The substratum to a depth of 60 inches is brown silt loam.

Included with this soil in mapping are small areas of Ernest, Nolo, Tyler, Purdy, and Atkins soils. Also included are small areas of stony Brinkerton soils. Included soils make up 10 to 15 percent of this map unit.

Permeability is slow, and available water capacity is high. Runoff is medium, and the hazard of erosion is moderate. A high water table is at a depth of 6 inches during wet periods. The rooting depth is restricted by the high water table and the fragipan. Reaction in the surface layer and subsoil is very strongly acid and strongly acid, where unlimed.

Most areas of this soil are used for pasture. Small areas are used for woodland. This soil has fair potential for cultivated crops where adequate drainage is provided. It has fair potential for pasture and woodland. Potential for many nonfarm uses is limited because of the slowly permeable subsoil and the high water table.

This soil is fairly well suited to cultivated crops that have adequate drainage. Surface and subsurface drains help remove excess water and allow for timely tillage and good production. The high water table causes the soil to warm slowly in spring. Returning crop residue to the surface layer helps maintain good tilth.

Where this soil is used for pasture, overgrazing and grazing when the soil is wet are the main concerns in management. The surface layer compacts easily when wet. Restricted grazing during wet periods and rotation of pasture are good management practices.

This soil is suited to water-tolerant trees. Productivity is high. The use of equipment is restricted for long periods during wet seasons. Machine planting is feasible in large areas.

This soil has limitations for most nonfarm uses, because it is slowly permeable and has a high water table. The slow permeability and the high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IVw. The woodland ordination symbol is 2w.

BtB—Brinkerton very stony silt loam, 0 to 8 percent slopes. This nearly level and gently sloping, deep, poorly drained soil is at the base of hills and mountains and in valleys. About 3 to 15 percent of the surface is covered with large stones. Slopes are concave and range from 400 to 1,200 feet in length. Areas are elongated and irregular in shape and range from about 10 to 200 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 4 inches thick. The subsurface layer is about 6 inches of dark gray silt loam. The subsoil, to a depth of 24 inches, is mottled, gray silty clay loam; and to 46 inches, it is very firm and brittle, mottled, gray silty clay loam. The substratum to a depth of 60 inches is brown silt loam.

Included with this soil in mapping are small areas of Armagh, Cavode, and Ernest soils that have a stony surface and small areas of Nolo and Brinkerton soils that have no surface stones. Included soils make up 10 percent of the map unit.

Permeability is slow, and available water capacity is high. Runoff is slow, and the hazard of erosion is moderate. A high water table is within a depth of 6 inches during wet periods. The rooting depth is restricted by the high water table and fragipan. In unlimed areas, reaction is strongly acid and very strongly acid in the surface layer and subsoil.

Most areas of this soil are used for woodland. Small areas are used for pasture. This soil has poor potential for cultivated crops and pasture. It is suited to water-tolerant trees. Potential for nonfarm uses is limited because of surface stones, slow permeability, and a high water table.

This soil is not suited to cultivated crops and pasture. Draining the soil, removing the surface stones, and clearing the trees for these uses are not feasible.

The soil is suited to water-tolerant trees. Productivity is high. The rooting depth is restricted by the fragipan and high water table. Removal of undesirable trees helps increase production. The use of equipment is restricted for long periods because of the high water table.

This soil has limitations for most nonfarm uses, because it is very stony, is slowly permeable, and has a high water table. The slow permeability and the high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass VIIs. The woodland ordination symbol is 2w.

CaA—Cavode silt loam, 0 to 3 percent slopes. This nearly level, deep, somewhat poorly drained soil is on upland flats and in depressions. Slopes are slightly concave or smooth and range from 200 to 1,000 feet in length. Areas are irregular and rounded in shape and range from about 4 to 50 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil, to a depth of 12 inches, is yellowish brown silty clay loam; from 12 to 42 inches, it is mottled, gray silty clay; and to 54 inches, it is mottled, light brownish gray silty clay loam. The substratum to a depth of 66 inches is dark yellowish brown silty clay loam.

Included in mapping are small areas of Wharton, Armagh, Ernest, and Brinkerton soils. Also included are small areas of stony Cavode soils. Included soils make up about 10 to 15 percent of this map unit.

Permeability is slow, and available water capacity is moderate. Runoff is very slow, and the hazard of erosion is slight. A seasonal high water table is within a depth of 12 to 18 inches during wet periods. The root zone is

restricted by the seasonal high water table. In unlimed areas, reaction is strongly acid and very strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cropland. Some areas are used for pasture and woodland. This soil has good potential for cultivated crops and pasture. It is suited to woodland. Potential for nonfarm uses is limited because of slow permeability and the seasonal high water table.

This soil is suited to cultivated crops. Surface and subsurface drains help remove excess water and allow for timely tillage and better production. Incorporating crop residue and manure into the surface layer helps maintain organic matter content and reduces clodding and crusting of the soil.

Where this soil is used for pasture, overgrazing and grazing when the soil is wet are major concerns in management. The surface layer compacts easily when wet. Proper stocking rates to maintain desired plant species, rotation of pasture, and restricted grazing during wet periods are the chief management needs.

This soil is suited to trees, but only a small acreage is wooded. Productivity is high. The rooting depth is restricted by the seasonal high water table. The use of equipment is restricted for short periods during wet seasons because of the seasonal high water table. Machine planting is feasible in large areas.

This soil has limitations for most nonfarm uses, because it is slowly permeable and has a seasonal high water table. The slow permeability and the seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IIIw. The woodland ordination symbol is 2w.

CaB—Cavode silt loam, 3 to 8 percent slopes. This gently sloping, deep, somewhat poorly drained soil is on sides of hills on uplands. Slopes are concave and range from 200 to 1,200 feet in length. Areas are irregular and fan-shaped and range from 5 to 20 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil, to a depth of 12 inches, is yellowish brown silty clay loam; from 12 to 42 inches, it is mottled, gray silty clay; and to 54 inches, it is mottled, light brownish gray silty clay loam. The substratum to a depth of 66 inches is dark yellowish brown silty clay loam.

Included with this soil in mapping are small areas of Wharton, Ernest, and Brinkerton soils. Included soils make up about 5 to 15 percent of this map unit.

Permeability is slow, and available water capacity is moderate. Runoff is medium, and the hazard of erosion is moderate. A seasonal high water table is within a depth of 12 to 18 inches during wet periods. The rooting depth is restricted by the seasonal high water table. In unlimed areas, reaction is strongly acid and very strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cropland. Some areas are used for pasture and woodland. This soil has good potential for cultivated crops and pasture (fig. 9). It is suited to woodland. Potential for nonfarm uses is limited because of the slow permeability and the seasonal high water table.

This soil is suited to cultivated crops. Surface and subsurface drains help remove excess water and allow for timely tillage and good production. Stripcropping, use of cover crops, minimum tillage, diversions, and sod waterways help reduce runoff and control erosion. Returning crop residue to the surface layer helps maintain good tilth.

Where this soil is used for pasture, overgrazing and grazing when the soil is wet are the main concerns in management. The surface layer compacts easily when wet. Proper stocking rates to maintain key plant species, rotation of pasture, and restricted grazing during wet periods are the chief management needs.

This soil is suited to trees, but only a small acreage is wooded. Productivity is high. The rooting depth is restricted by the seasonal high water table. The use of equipment is restricted during wet seasons because of the seasonal high water table. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses, because it is slowly permeable and has a seasonal high water table. The slow permeability and the seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IIIw. The woodland ordination symbol is 2w.

CaC—Cavode silt loam, 8 to 15 percent slopes. This sloping, deep, somewhat poorly drained soil is on lower side slopes of hills and valleys. Slopes are concave and range from 150 to 500 feet in length. Areas are irrregular to long and narrow in shape and range from 3 to 10 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil, to a depth of 12 inches, is yellowish brown silty clay loam; from 12 to 42 inches, it is mottled, gray silty clay; and to 54 inches, it is mottled, light brownish gray silty clay loam. The substratum to a depth of 66 inches is dark yellowish brown silty clay loam.

Included with this soil in mapping are small areas of Wharton, Ernest, Rayne, and Gilpin soils. Included soils make up about 5 to 15 percent of this map unit.

Permeability is slow, and available water capacity is moderate. Runoff is rapid, and the hazard of erosion is severe. A seasonal high water table is within a depth of 12 to 18 inches during wet periods. The root zone is restricted by the seasonal high water table. In unlimed areas, reaction ranges from strongly acid to very strongly acid in the surface layer and subsoil.

Figure 9.—Corn on Cavode silt loam, 3 to 8 percent slopes. Wharton soils are in middle distance. Rayne and Gilpin soils are in background.

Most areas of this soil are used for cropland. Some areas are used for pasture and woodland. This soil has good potential for cultivated crops and pasture. It is suited to woodland. Potential for nonfarm uses is limited because of the slow permeability and seasonal high water table.

This soil is suited to cultivated crops. Stripcropping, use of cover crops, minimum tillage, diversions, and sod waterways help reduce runoff and control erosion. Returning crop residue to the surface layer helps maintain good tilth. Subsurface drains help remove excess water, allow for timely tillage, and help production.

When this soil is used for pasture, overgrazing and grazing when the soil is wet are the main concerns in management. The surface layer compacts easily when wet. Proper stocking rates to maintain key plant species, rotation of pasture, and restricted grazing during wet periods are the chief management needs.

This soil is suited to trees, but only a small acreage is wooded. Productivity is high. The rooting depth is restricted by the seasonal high water table. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses, because it is slowly permeable and has a seasonal high water table. The slow permeability and the seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IIIe. The woodland ordination symbol is 2w.

CbB—Cavode very stony silt loam, 0 to 8 percent slopes. This nearly level and gently sloping, deep, somewhat poorly drained soil is on flats and in depressions on uplands and on lower slopes of hills and valleys. Large stones cover 3 to 15 percent of the surface. Slopes are concave and range from 300 to 500 feet in length. Areas are broad and elongated or irregular in shape and range from 10 to 200 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil, to a depth of 12 inches, is yellowish brown silty clay loam; from 12 to 42 inches, it is mottled, gray silty clay; and to 54 inches, it is

mottled, light brownish gray silty clay loam. The substratum to a depth of 66 inches is dark yellowish brown silty clay loam.

Included with this soil in mapping are stony and nonstony areas of Wharton, Ernest, Armagh, and Brinkerton soils. Included soils make up about 5 to 15 percent of this map unit.

Permeability is slow, and available water capacity is moderate. Runoff is very slow and slow, and the hazard of erosion is slight. A seasonal high water table is within a depth of 12 to 18 inches during wet periods. The root zone is restricted by the high water table. In unlimed areas, reaction is strongly acid and very strongly acid in the surface layer and subsoil.

Most areas of this soil are used for woodland. Some cleared areas are used for pasture. This soil has good potential for woodland. It has limited potential for nonfarm uses because of surface stones, slow permeability, and the seasonal high water table.

This soil is too stony for cultivated crops and pasture. Removing the large stones and trees is not feasible for these uses.

This soil is suited to woodland. Productivity is high. Removing undesirable trees helps increase production. Surface stones interfere with harvesting. Use of equipment is restricted during wet periods because of the seasonal high water table.

This soil has limitations for nonfarm uses, because it is very stony, has slow permeability, and has a seasonal high water table. The slow permeability and the seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass VIs. The woodland ordination symbol is 2w.

ChA—Chavies silt loam, 0 to 3 percent slopes. This nearly level, deep, well drained soil is on stream terraces in major valleys. Slopes are smooth and range from 200 to 400 feet in length. Areas are elongated in shape and range from 5 to 20 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 10 inches thick. The subsoil, to a depth of 42 inches, is brown and strong brown silt loam. The substratum, to a depth of 65 inches, is yellowish brown gravelly sandy loam.

Included with this soil in mapping are small areas of Allegheny, Monongahela, Tyler, Purdy, Pope, and Philo soils and Chavies silt loam, 3 to 8 percent slopes. Included soils make up about 5 to 15 percent of this map unit.

Permeability is moderately rapid, and available water capacity is high. Runoff is very slow, and the hazard of erosion is slight. In unlimed areas, reaction ranges from very strongly acid to medium acid in the surface layer and subsoil.

Most areas of this soil are used for cropland. A few areas are used for pasture. This soil has excellent potential for cultivated crops and pasture. It is well suited to trees. It has limitations for a few nonfarm uses, because it is rarely flooded.

This soil is well suited to cultivated crops. Crops respond well to fertility and good management. Growing cover crops, utilizing crop residue, and including hay in the cropping system help maintain organic matter content and good tilth.

Where this soil is used for pasture, proper stocking rates to maintain desired plant species and pasture rotation are the chief management needs. Maximum production requires periodic application of nutrients.

This soil is suited to trees, but only a few acres are wooded. Productivity is high. Concerns in management are slight. Machine planting is feasible in large areas.

This soil has limitations for a few nonfarm uses, because of rare floods. Rare flooding is a potential hazard for homesites and onsite waste disposal. This soil is suited to most other nonfarm uses.

This soil is in capability unit I. The woodland ordination symbol is 2o.

ChB—Chavies silt loam, 3 to 8 percent slopes. This gently sloping, deep, well drained soil is on stream terraces in major valleys. Slopes are slightly convex and range from 200 to 400 feet in length. Areas are generally elongated in shape and range from 5 to 20 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 10 inches thick. The subsoil, to a depth of 42 inches, is brown and strong brown silt loam. The substratum to a depth of 65 inches is yellowish brown gravelly sandy loam.

Included with this soil in mapping are a few areas of Allegheny, Monongahela, and Tyler soils. Included soils make up about 5 to 10 percent of this map unit.

Permeability is moderately rapid, and available water capacity is high. Runoff is medium, and the hazard of erosion is moderate. In unlimed areas, reaction ranges from very strongly acid to medium acid in the surface layer and subsoil.

Most areas of this soil are used for cropland. Small areas are used for pasture and woodland. This soil has excellent potential for cultivated crops and is well suited to pasture and woodland. It is suited to most nonfarm uses.

Where this soil is used for cropland, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Where the topography is suitable, stripcropping can be used.

Where this soil is used for pasture, overgrazing and grazing when the soil is wet are major concerns in management. Proper stocking rates to maintain desired plant species, deferment of grazing, and rotation of pasture are the chief management needs.

This soil is suited to trees, but only a small acreage is wooded. Productivity is high. Management problems are slight. Machine planting is feasible in large areas.

The soil has few limitations for most nonfarm uses. In places, management is needed to help control erosion during construction.

This soil is in capability subclass IIe. The woodland ordination symbol is 2o.

CoB—Cookport loam, 3 to 8 percent slopes. This gently sloping, deep, moderately well drained soil is in broad areas on uplands and on side slopes of hills. Slopes are concave and smooth and range from 200 to 500 feet in length. Areas are irregular in shape and range from 4 to 20 acres in size.

Typically, the surface layer is very dark brown loam about 4 inches thick. The subsurface layer is about 8 inches of yellowish brown sandy loam. The subsoil, from a depth of 12 to 22 inches, is yellowish brown sandy clay loam; from 22 to 40 inches, it is firm and brittle, mottled, yellowish brown and strong brown gravelly sandy clay loam. The substratum to a depth of 62 inches is grayish brown and dark brown gravelly sandy loam.

Included with this soil in mapping are small areas of Ernest, Nolo, Wharton, Cavode, Hazleton, Rayne, and Gilpin soils and Cookport loam, 8 to 15 percent slopes. Included soils make up 10 to 15 percent of this map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is medium, and the hazard of erosion is moderate. A seasonal high water table is within a depth of 18 to 30 inches during wet periods. The root zone is restricted by the fragipan. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture and woodland. This soil has good potential for cultivated crops and pasture. It is suited to trees. Potential for nonfarm uses is limited because of the moderately slowly permeable subsoil and seasonal high water table.

This soil is suited to cultivated crops. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion. Surface and subsurface drains help remove excess water and allow for timely tillage. Incorporating crop residue into the plow layer increases soil fertility.

Where this soil is used for pasture, overgrazing and grazing when the soil is wet are major concerns in management. The surface layer compacts easily when wet. Proper seeding rates to maintain desired plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are the chief management needs.

The soil is suited to trees. Most areas of this soil are wooded. Productivity is high. Removing undesirable trees helps production. Equipment limitation because of the seasonal high water table is a concern in management. Roads need to be planned on the contour to reduce erosion during harvesting. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses, because it is moderately slowly permeable and has a seasonal high water table. The moderately slow permeability and the seasonal high water table are serious limitations for onsite waste disposal and homesites.

This soil is in capability subclass IIe. The woodland ordination symbol is 2w.

CoC—Cookport loam, 8 to 15 percent slopes. This sloping, deep, moderately well drained soil is on ridges and hillsides on uplands. Slopes are concave or smooth and range from 200 to 500 feet in length. Areas are irregular and range from 3 to 10 acres in size.

Typically, the surface layer is very dark brown loam about 4 inches thick. The subsurface layer is about 8 inches of yellowish brown sandy loam. The subsoil, from a depth of 12 to 22 inches, is yellowish brown sandy clay loam; from 22 to 40 inches, it is firm and brittle, mottled, yellowish brown and strong brown gravelly sandy clay loam. The substratum to a depth of 62 inches is grayish brown and dark brown gravelly sandy loam.

Included with this soil in mapping are small areas of Ernest, Wharton, Albrights, Hazleton, and Blairton soils and Cookport loam, 3 to 8 percent slopes. Included soils make up to 10 to 15 percent of this map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is rapid, and the hazard of erosion is severe. A seasonal high water table is within a depth of 18 to 30 inches during wet periods. The root zone is restricted by the fragipan. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture and woodland. This soil has good potential for cultivated crops and pasture. It is suited to trees. Potential for many nonfarm uses is limited because of slope, the moderately slowly permeable subsoil, and the seasonal high water table.

When this soil is used for cultivated crops, minimum tillage, use of cover crops, stripcropping, sod waterways, and including grasses and legumes in the cropping system help reduce runoff and control erosion. Diversions and subsurface drains help remove excess water and allow for timely tillage.

The soil has good potential for pasture. Where this soil is used for pasture, overgrazing and grazing when the soil is wet are major concerns in management. The surface layer compacts easily if grazed when wet. Proper stocking rates to maintain desired plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are the chief management needs.

This soil is suited to trees. A small acreage is wooded, and potential for productivity is high. Removal of undesirable trees helps production. The use of equipment is restricted during wet seasons because of the seasonal high water table. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses because of the slope, the moderately slow permeability, and the seasonal high water table. The moderately slow permeability and the seasonal high water table are serious limitations for homesites and onsite disposal of waste.

This soil is in capability unit IIIe. The woodland ordination symbol is 2w.

CpB—Cookport very stony loam, 3 to 8 percent slopes. This gently sloping, deep, moderately well drained soil is in broad areas on uplands and on lower slopes of hillsides. About 3 to 15 percent of the surface is covered with large stones. Slopes are concave or smooth and range from 300 to 1,200 feet in length. Areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is very dark brown loam about 4 inches thick. The subsurface layer is about 8 inches of yellowish brown sandy loam. The subsoil, from a depth of 12 to 22 inches, is yellowish brown sandy clay loam; from 22 to 40 inches, it is firm and brittle, mottled, yellowish brown and strong brown gravelly sandy clay loam. The substratum to a depth of 62 inches is grayish brown and dark brown gravelly sandy loam.

Included with this soil in mapping are small areas of stony Ernest, Wharton, Nolo, Cavode, Hazleton, Rayne, and Gilpin soils and Cookport very stony loam, 8 to 25 percent slopes. Included soils make up 10 to 15 percent of this map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is medium, and the hazard of erosion is slight. A high water table is within a depth of 18 to 30 inches during wet periods. The root zone is restricted by the fragipan. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for woodland. Some areas are used for pasture. The soil is not suited to cultivated crops and pasture. It has excellent potential for trees. Potential for nonfarm uses is limited because of the surface stones, the moderately slow permeability, and the seasonal high water table.

This soil is too stony for cultivated crops and pasture. Removal of the large surface stones for these uses is not feasible.

This soil is suited to woodland. Productivity is high. Removal of undesirable trees helps production. In some places large surface stones interfere with harvesting. Use of equipment is restricted during wet periods because of the seasonal high water table.

This soil has limitations for nonfarm uses because of the surface stones, the moderately slow permeability, and the seasonal high water table. The moderately slow permeability and seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass VIs. The woodland ordination symbol is 2w.

CpD—Cookport very stony loam, 8 to 25 percent slopes. This sloping and moderately steep, deep, moderately well drained soil is on side slopes of valleys and ridges. About 3 to 15 percent of the surface is covered with large stones. Slopes are concave or smooth and range from 200 to 800 feet in length. The areas are elongated and irregular in shape and range from 5 to several hundred acres in size.

Typically, the surface layer is very dark brown loam about 4 inches thick. The subsurface layer is about 8 inches of yellowish brown sandy loam. The subsoil, from a depth of 12 to 22 inches, is yellowish brown sandy clay loam; from 22 to 40 inches, it is firm and brittle, mottled, yellowish brown and strong brown gravelly sandy clay loam. The substratum to a depth of 62 inches is grayish brown and dark brown gravelly sandy loam.

Included with this soil in mapping are small areas of stony Ernest, Wharton, Hazleton, Rayne, and Gilpin soils and Cookport very stony loam, 3 to 8 percent slopes. Included soils make up 15 to 25 percent of this map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is rapid, and the hazard of erosion is slight to moderate. A seasonal high water table is within a depth of 18 to 30 inches during wet periods. The root zone is restricted by the fragipan. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for woodland. Some areas are used for pasture. This soil has poor potential for cultivated crops and pasture because of the surface stones. It has excellent potential for trees. Potential for nonfarm uses is limited because of surface stones, moderately slow permeability, and the seasonal high water table.

This soil is not suited to cultivated crops or pasture because of the surface stones. Removing the surface stones and trees for these uses is not feasible.

This soil is suited to trees. Removal of undesirable trees helps increase production. Use of equipment is restricted during wet seasons because of the seasonal high water table. Many large surface stones interfere in places with harvesting.

This soil has limitations for nonfarm uses because of the surface stones, the slope, the moderately slow permeability, and the seasonal high water table. The moderately slow permeability and seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass VIs. The woodland ordination symbol is 2w.

DhB—Dekalb-Hazleton channery sandy loams, 3 to 8 percent slopes. These gently sloping, moderately deep and deep, well drained soils are on ridges and hilltops. The soils of this complex were mapped together because they were in an intricate pattern and because areas of each soil were so small that separating them

was not practical. About 60 percent of this complex is Dekalb soils, 30 percent is Hazleton soils, and 10 percent is included soils. Areas are typically long and narrow in shape and range from 3 to 10 acres in size.

Typically, the Dekalb soils have a surface layer of black channery sandy loam about 4 inches thick. The subsurface layer is about 8 inches of yellowish brown channery sandy loam. The subsoil, to a depth of 24 inches, is strong brown channery sandy loam. The substratum is brown very channery sandy loam. Gray sandstone bedrock is at a depth of 35 inches.

Typically, the Hazleton soils have a surface layer of dark grayish brown channery sandy loam about 7 inches thick. The subsoil, to a depth of 36 inches, is yellowish brown channery sandy loam, and the substratum to a depth of 70 inches is yellowish brown channery loamy sand.

Included with these soils in mapping are a few small areas of Cookport, Leck Kill, Berks, Weikert, Gilpin, Rayne, and Nolo soils. Included soils make up 10 percent of the map unit.

Permeability is moderately rapid to rapid, and available water capacity is very low and low. Runoff is medium, and the hazard of erosion is moderate. In unlimed areas, reaction ranges from extremely acid to strongly acid in the surface layer and subsoil of the Hazleton soils and is extremely acid and very strongly acid in the Dekalb soils.

Most areas of these soils are used for cropland. Some areas are used for pasture. These soils have fair potential for cultivated crops and pasture. They have limited potential for nonfarm uses because of the moderate depth to bedrock and the moderately rapid to rapid permeability.

These soils are suited to cultivated crops; however, they become droughty during dry periods. Minimum tillage, use of cover crops, and use of grass and legumes in the cropping systems help control erosion. Stripcropping and diversion terraces can be used where slopes are suitable. Incorporating crop residue into the surface layer helps maintain organic matter content.

Where these soils are used for pasture, proper stocking rates to maintain desired plant species and rotation of pasture are the chief management needs. Optimum production requires maintenance of fertility through periodic application of nutrients.

These soils are suited to trees, and productivity is moderately high. Rooting depth is restricted by the bedrock in the Dekalb soils. A management problem is the moderate to heavy loss of seedlings because of the very low to low available water capacity. Machine planting is generally feasible in large areas.

These soils have limitations for nonfarm uses because of the coarse fragments and the moderate depth to bedrock in the Dekalb soils. The moderate depth to bedrock is a serious limitation for homesites and onsite waste disposal.

These soils are in capability unit IIe. The woodland ordination symbol is 3f for the Dekalb soil and 3o for the Hazleton soil.

DkB—Dekalb-Hazleton very stony sandy loams, 3 to 8 percent slopes. These gently sloping, deep and moderately deep, well drained soils are on ridges and mountaintops. Large stones cover 3 to 15 percent of the surface. The soils of this complex were mapped together because they were in an intricate pattern and because areas of each soil were so small that separating them was not practical. About 60 percent of this complex is Dekalb soils, 30 percent is Hazleton soils, and 10 percent is included soils. Areas are typically long and narrow in shape and range from 10 to 50 acres in size.

Typically, the Dekalb soils have a black channery sandy loam surface layer about 4 inches thick. The subsurface layer is about 8 inches of yellowish brown channery sandy loam. The subsoil, to a depth of 24 inches, is strong brown channery sandy loam. The substratum is brown very channery sandy loam. Gray sandstone bedrock is at a depth of 35 inches.

Typically, the Hazleton soils have a dark grayish brown channery sandy loam surface layer about 7 inches thick. The subsoil, to a depth of 36 inches, is yellowish brown channery sandy loam. The substratum to a depth of 70 inches is yellowish brown channery loamy sand.

Included with these soils in mapping are a few small areas of Leck Kill, Berks, Weikert, Rayne, Gilpin, and Cookport soils. Included soils make up 10 percent of this map unit.

Permeability is moderately rapid to rapid, and available water capacity is low. Runoff is low, and the hazard of erosion is slight. In unlimed areas, reaction ranges from extremely acid to strongly acid in the surface layer and subsoil of the Hazleton soils and is extremely acid and very strongly acid in the Dekalb soils.

Most areas of these soils are used for woodland. These soils have poor potential for cropland and pasture. They are suited to trees. The moderate depth to bedrock, the coarse fragments, and the moderately rapid to rapid permeability are limitations for nonfarm uses.

These soils are not suited to cultivated crops and pasture because of the surface stones. Removal of surface stones and trees for these uses is not economically feasible.

These soils are suited to trees. Productivity is moderate to moderately high. The rooting depth is restricted by bedrock. Removal of undesirable trees helps production. Large surface stones interfere with harvesting. A concern in management is the moderate to heavy loss of seedlings because of very low to low available water capacity.

These soils have limitations for nonfarm uses because of the surface stones, the coarse fragments, and the moderate depth to bedrock. The moderate depth to bed-

rock is a serious limitation for homesites and onsite waste disposal.

This soil is in capability subclass VIs. The woodland ordination symbol is 3f for the Dekalb soils and 3o for the Hazleton soils.

ErB—Ernest silt loam, 3 to 8 percent slopes. This gently sloping, deep, moderately well drained soil is on lower slopes of hills and ridges. Slopes are concave and range from 200 to 800 feet in length. Areas are elongated or fan-shaped and range from 5 to 50 acres in size.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil, to a depth of 28 inches, is yellowish brown and light yellowish brown silty clay loam and channery silty clay loam; to 48 inches, it is very firm and brittle, mottled, brown channery silty clay loam. The substratum to a depth of 60 inches is brownish yellow silty clay.

Included with this soil in mapping are small areas of Brinkerton, Nolo, Cavode, Albrights, Blairton, Cookport, Wharton, Armagh, Rayne, and Gilpin soils and small areas of Ernest very stony soils. Included soils make up 15 to 20 percent of this map unit.

Permeability is moderately slow to slow, and available water capacity is moderate. Runoff is medium, and the hazard of erosion is moderate. A seasonal high water table is within a depth of 18 to 30 inches during wet periods. The root zone is restricted by the fragipan. In unlimed areas, the reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture. This soil has good potential for cultivated crops and pasture (fig. 10). It is suited to trees. Potential for nonfarm uses is limited because of the moderately slow to slow permeability and the seasonal high water table.

The soil is suited to cultivated crops. Surface and subsurface drains help remove excess water, allow for timely tillage, and increase production. Stripcropping, use of cover crops, minimum tillage, diversions, and sod waterways help reduce runoff and control erosion. Return-

Figure 10.—Pasture on Ernest silt loam, 3 to 8 percent slopes, in foreground. Berks and Weikert soils are on steeper slopes in background.

ing crop residue to the surface layer helps maintain good tilth.

Where this soil is used for pasture, overgrazing and grazing when the soil is wet are the main concerns in management. The surface layer compacts easily when wet. Restricted grazing during wet periods and rotation of pasture are good management practices. Optimum production requires periodic application of nutrients.

This soil is suited to trees. Productivity is high. Removal of undesirable trees helps production. The use of equipment is restricted for short periods during wet seasons. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses, because it has moderately slow to slow permeability and a seasonal high water table. These are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IIe. The woodland ordination symbol is 2w.

ErC—Ernest silt loam, 8 to 15 percent slopes. This sloping, deep, moderately well drained soil is on side slopes of hills and ridges. Slopes are concave and range from 200 to 500 feet in length. Areas are elongated and range from 10 to 100 acres in size.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil, to a depth of 28 inches, is yellowish brown and light yellowish brown silty clay loam and channery silty clay loam; to 48 inches, it is very firm and brittle, mottled, brown channery silty clay loam. The substratum to a depth of 60 inches is brownish yellow silty clay.

Included with this soil in mapping are some small areas of Cavode, Albrights, Blairton, Wharton, Rayne, and Gilpin soils and small areas of Ernest very stony soils. Included soils make up to 10 to 20 percent of this map unit.

Permeability is moderately slow to slow, and available water capacity is moderate. Runoff is medium, and the hazard of erosion is severe. A seasonal high water table is within a depth of 18 to 30 inches during wet periods. The root zone is restricted by the fragipan. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture. This soil has good potential for cultivated crops and pasture. It is suited to trees. Potential for many nonfarm uses is limited because of the moderately slow to slow permeability and the seasonal high water table.

This soil is suited to cultivated crops. Stripcropping, use of cover crops, minimum tillage, diversions, and sod waterways help reduce runoff and control erosion. Returning crop residue to the surface layer helps maintain good tilth. Subsurface drains help remove excess water, allow for timely tillage, and increase production.

Where this soil is used for pasture, overgrazing and grazing when the soil is wet are the main concerns in management. The surface layer compacts easily when wet. Restricted grazing during wet periods and rotation of pasture are good management practices.

This soil is suited to trees. Productivity is high. Removal of undesirable trees helps production. The use of equipment is restricted for short periods during wet seasons. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses, because it has moderately slow to slow permeability and a seasonal high water table. These are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IIIe. The woodland ordination symbol is 2w.

EsB—Ernest very stony silt loam, 3 to 8 percent slopes. This gently sloping, deep, moderately well drained soil is on lower slopes of hills and mountains. Large stones cover about 15 percent of the surface. Slopes are concave and range from 300 to 1,200 feet in length. Areas are elongated and fan-shaped and range from 10 to 200 acres in size.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil, to a depth of 28 inches, is yellowish brown and light yellowish brown silty clay loam and channery silty clay loam; to 48 inches, it is very firm and brittle, mottled, brown channery silty clay loam. The substratum to a depth of 60 inches is brownish yellow silty clay.

Included with this soil in mapping are small stony areas of Brinkerton, Nolo, Cavode, Albrights, Blairton, Wharton, and Armagh soils. Included soils make up 15 to 20 percent of this map unit.

Permeability is moderately slow to slow, and available water capacity is moderate. Runoff is medium, and the hazard of erosion is slight. A seasonal high water table is within a depth of 18 to 30 inches during wet periods. The root zone is restricted by the fragipan. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for woodland. This soil is not suited to cropland and pasture. It has excellent potential for trees. Potential for nonfarm uses is limited because of the surface stones, the moderately slow and slow permeability, and the seasonal high water table.

This soil is not suited to cultivated crops or pasture. It is not feasible to drain the soil, remove surface stones, or remove tree cover.

This soil is suited to trees. Removal of undesirable trees helps production. The use of equipment is restricted during wet seasons because of the seasonal high water table. Many large surface stones interfere with harvesting.

This soil has limitations for most nonfarm uses because of stoniness, the moderately slow to slow permeability, and the seasonal high water table. The slow to moderately slow permeability and the seasonal high

water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass VIs. The woodland ordination symbol is 2w.

EsD—Ernest very stony silt loam, 8 to 25 percent slopes. This sloping and moderately steep, deep, moderately well drained, stony soil is on side slopes of hills and ridges. Large stones cover about 3 to 15 percent of the surface. Slopes are concave and range from 300 to 800 feet in length. Areas are elongated and irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil, to a depth of 28 inches, is yellowish brown and light yellowish brown silty clay loam and channery silty clay loam; to 48 inches, it is very firm and brittle, mottled, brown channery silty clay loam. The substratum to a depth of 60 inches is brownish yellow silty clay.

Included with this soil in mapping are small areas of stony Wharton, Blairton, Cookport, Albrights, Rayne, and Gilpin soils and small areas of nonstony Ernest soils. Included soils make up 15 to 20 percent of this map unit.

Permeability is moderately slow to slow, and available water capacity is moderate. Runoff is medium. A seasonal high water table is within a depth of 18 to 30 inches during wet periods. The root zone is restricted by the fragipan. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for woodland. Small areas are used for pasture. This soil has poor potential for cropland and pasture. It has high potential for trees. Potential for nonfarm uses is limited because of the surface stones, the moderately slow and slow permeability, and the seasonal high water table.

This soil is not suited to cultivated crops or pasture. It is not feasible to drain the soil, remove surface stones, or remove trees.

This soil is suited to trees. Removal of undesirable trees helps production. The use of equipment is restricted during wet seasons because of the seasonal high water table. Many large surface stones interfere in places with harvesting. Roads and skid trails need to be constructed on the contour to prevent erosion during harvesting.

This soil has limitations for nonfarm uses because of the stoniness, the slow permeability, and the seasonal high water table. The moderately slow to slow permeability and the seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass VIs. The woodland ordination symbol is 2w.

FV—Fluvaquents. This nearly level, deep, poorly drained to moderately well drained soil is on flood plains and in drainageways. Slopes are smooth and range from 400 to 2,500 feet in length. Areas are long and narrow in shape and range from 10 to 100 acres in size.

Typically, the surface layer ranges from sandy loam to silty clay loam and, in places, can have many large stones. The subsoil ranges from sandy loam to clay. In many places, the substratum is stratified sand and gravel but ranges to clay.

Included with this soil in mapping are small areas of Pope, Monongahela, Ernest, Philo, Tyler, Brinkerton, and Atkins soils. Included areas make up 15 percent of this map unit.

Permeability is moderately slow to slow, and available water capacity and runoff are variable. This unit has a seasonal high water table at a depth of 6 to 24 inches during wet periods. In unlimed areas, reaction is very strongly acid and strongly acid.

Most areas of this soil are used for woodland. This soil has good to poor potential for trees. It has poor potential for most nonfarm uses because of the moderately slow to slow permeability, the seasonal high water table, and flooding.

This soil is not suited to cultivated crops or pasture because of the hazard of flooding, the large stones, and the seasonal high water table.

This soil is poorly suited to fairly well suited to trees. Removal of undesirable trees helps production. Use of equipment is restricted during wet seasons because of the seasonal high water table and flooding. In some places, large surface stones interfere with harvesting.

This soil has serious limitations for most nonfarm uses because of the flooding, the moderately slow to slow permeability, and the seasonal high water table. These are serious limitations of homesites and onsite waste disposal.

A capability subclass and woodland ordination symbol are not assigned to this soil.

HaB—Hazleton channery sandy loam, 3 to 8 percent slopes. This gently sloping, deep, well drained soil is mostly on mountaintops and ridges. Slopes are convex and range from 200 to 700 feet in length. The areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is dark grayish brown channery sandy loam about 7 inches thick. The subsoil, to a depth of 36 inches, is yellowish brown channery sandy loam. The substratum to 70 inches is yellowish brown channery loamy sand.

Included with this soil in mapping are a few small areas of Cookport, Nolo, Wharton, Blairton, Rayne, Gilpin, and Leck Kill soils and Hazleton channery sandy loam, 8 to 15 percent slopes. Also included are small areas of soils that have a stony surface. Included soils make up 15 to 25 percent of this map unit.

Permeability is moderately rapid to rapid, and available water capacity is very low to low. Runoff is medium, and the hazard of erosion is moderate. This soil tends to become droughty during dry periods. In unlimed areas,

reaction is extremely acid to strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture and woodland. This soil has good potential for cultivated crops and pasture. It is suited to trees. Potential for nonfarm uses is limited because of the moderately rapid to rapid permeability.

This soil is suited to cultivated crops. Stripcropping, use of cover crops, minimum tillage, diversions, and sod waterways help reduce runoff and control erosion. Returning crop residue to the surface layer helps maintain good tilth.

Where this soil is used for pasture, overgrazing is the main concern in management. Proper stocking rates to maintain desired plant species, rotation of pasture, and deferment of grazing are the chief management needs. Optimum production requires maintenance of fertility through periodic application of nutrients.

This soil is suited to trees, but only a small acreage is used for woodland. Productivity is moderately high. Removal of undesirable trees helps production. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses because of the moderately rapid to rapid permeability and the coarse fragments.

This soil is in capability subclass IIe. The woodland ordination symbol is 3o.

HaC—Hazleton channery sandy loam, 8 to 15 percent slopes. This sloping, deep, well drained soil is on upper side slopes of hills and ridges of the uplands. Slopes are convex and range from 200 to 800 feet in length. Areas are elongated and range from about 5 to 15 acres in size.

Typically, the surface layer is dark grayish brown channery sandy loam about 7 inches thick. The subsoil, to a depth of 36 inches, is yellowish brown channery sandy loam. The substratum to 70 inches is yellowish brown channery loamy sand.

Included with this soil in mapping are a few small areas of Rayne, Gilpin, Cookport, Wharton, and Leck Kill soils and Hazleton channery sandy loam, 3 to 8 percent slopes. Also included are small areas of soils that have a stony surface. Included soils make up 15 to 25 percent of this map unit.

Permeability is moderately rapid to rapid, and available water capacity is low to very low. Runoff is medium, and the hazard of erosion is severe. This soil tends to become droughty during dry periods. In unlimed areas, reaction ranges from extremely acid to strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture and woodland. This soil has good potential for cultivated crops and pasture. It is suited to trees. Potential for nonfarm uses is limited because of the coarse fragments, the slope, and the moderately rapid to rapid permeability.

This soil is suited to cultivated crops. Stripcropping, use of cover crops, minimum tillage, diversions, and sod waterways help reduce runoff and control erosion. Returning crop residue to the surface layer helps maintain good tilth.

This soil is suited to pasture. Overgrazing is the main concern in management. Proper stocking rates to maintain desired plant species, rotation of pasture, and deferment of grazing are the chief management needs. Optimum production requires maintenance of fertility through periodic application of nutrients.

This soil is suited to trees, but only a small acreage is wooded. Productivity is moderately high. Removal of undesirable trees helps production. Machine planting is feasible in large areas.

This soil has limitations for many nonfarm uses because of the slope, the coarse fragments, and the moderately rapid to rapid permeability.

This soil is in capability subclass IIIe. The woodland ordination symbol is 3o.

HaD—Hazleton channery sandy loam, 15 to 25 percent slopes. This moderately steep, deep, well drained soil is on side slopes of hills and ridges on uplands. Slopes are convex and range from 200 to 1,200 feet in length. Areas are elongated and range from 3 to 10 acres in size.

Typically, the surface layer is dark grayish brown channery sandy loam about 7 inches thick. The subsoil, to a depth of 36 inches, is yellowish brown channery sandy loam. The substratum to 70 inches is yellowish brown channery loamy sand.

Included with this soil in mapping are small areas of Rayne, Gilpin, Leck Kill, Berks, and Weikert soils. Included soils make up 10 to 15 percent of this map unit.

Permeability is moderately rapid to rapid, and available water capacity is low to very low. Runoff is rapid, and the hazard of erosion is very severe. This soil tends to become droughty during dry periods. In unlimed areas, reaction ranges from extremely acid to strongly acid in the surface layer and subsoil.

Most areas of this soil are used for pasture. Some areas are used for woodland. This soil has fair potential for cultivated crops because of slope and droughtness. It is suited to trees. The slope, coarse fragments, and moderately rapid to rapid permeability are limitations for many nonfarm uses.

This soil can occasionally be used for crops if management is adequate. The hazard of erosion is very severe. Further erosion results in a more shallow rooting depth and a lower available water capacity. Minimum tillage, diversions, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion. Stripcropping can be used where the topography is suitable. Incorporating crop residue and manure into the surface layer helps maintain organic matter content and tilth.

Where this soil is used for pasture, overgrazing is the main concern in management. Proper stocking rates to maintain desired plant species, rotation of pasture, deferment of grazing, and restricted grazing during dry periods are the chief management needs. Optimum production requires maintenance of fertility through periodic application of nutrients.

This soil is suited to trees, but only a small acreage is wooded. Productivity is moderately high. Removal of undesirable trees helps production.

This soil has limitations for nonfarm uses because of the slope, the coarse fragments, and the moderately rapid to rapid permeability. The slope is a serious limitation for homesites and onsite waste disposal.

This soil is in capability subclass IVe. The woodland ordination symbol is 3r.

HbB—Hazleton very stony sandy loam, 3 to 8 percent slopes. This gently sloping, deep, well drained, stony soil is on mountaintops and ridges. Large stones cover about 3 to 15 percent of the surface. Slopes are smooth and convex and range from 200 to 500 feet in length. The areas are irregular or long and narrow in shape and range from about 10 to 100 acres in size.

Typically, the surface layer is dark grayish brown channery sandy loam about 7 inches thick. The subsoil, to a depth of 36 inches, is yellowish brown channery sandy loam. The substratum to 70 inches is yellowish brown channery loamy sand.

Included with this soil in mapping are a few small areas of stony Cookport, Ernest, Wharton, Rayne, Gilpin, and Leck Kill soils. Included soils make up 10 to 15 percent of this map unit.

Permeability is moderately rapid to rapid, and available water capacity is low to very low. Runoff is medium, and the hazard of erosion is slight. This soil tends to become droughty during dry periods. In unlimed areas, reaction ranges from extremely acid to strongly acid in the surface layer and subsoil.

Most areas of this soil are used for woodland. Some areas are used for pasture. Potential for cropland and pasture is poor because of the surface stones. This soil has good potential for trees. It has limited potential for nonfarm uses because of the surface stones and the rapid to moderately rapid permeability.

This soil is not suited to cultivated crops and pasture. Removal of the stones and trees is not feasible.

This soil is suited to trees. Productivity is moderately high. Removal of undesirable trees helps increase production. Large surface stones interfere with harvesting.

This soil has limitations for nonfarm uses because of the surface stones and the moderately rapid to rapid permeability. The surface stones and moderately rapid to rapid permeability are problems for onsite waste disposal.

This soil is in capability subclass VIs. The woodland ordination symbol is 3o.

HbD—Hazleton very stony sandy loam, 8 to 25 percent slopes. This sloping and moderately steep, deep, well drained, stony soil is on upper side slopes of mountains and ridges. Large stones cover about 3 to 15 percent of the surface. Slopes are convex and range from 200 to 1,200 feet in length. Areas are commonly in long bands parallel to the mountains. Areas range from 10 to hundreds of acres in size.

Typically, the surface layer is dark grayish brown channery sandy loam about 7 inches thick. The subsoil; to a depth of 36 inches, is yellowish brown channery sandy loam. The substratum to 70 inches is yellowish brown channery loamy sand.

Included with this soil in mapping are small areas of stony Rayne, Gilpin, Leck Kill, Cookport, Ernest, Nolo, and Wharton soils and Hazleton very bouldery sandy loam. Included soils make up 10 to 15 percent of the map unit.

Permeability is moderately rapid to rapid, and available water capacity is low to very low. Runoff is rapid, and the hazard of erosion is slight. This soil tends to become droughty during dry periods. In unlimed areas, reaction is extremely acid to strongly acid in the surface layer and subsoil.

Most areas of this soil are used for woodland. Some areas are used for pasture. This soil has poor potential for cropland and pasture because of surface stones. It has good potential for trees. Potential for nonfarm uses is limited because of the slope, the surface stones, and the rapid to moderately rapid permeability.

This soil is not suited to cultivated crops and pasture. Removal of stones and trees is not feasible.

This soil is suited to trees. Productivity is moderately high. Removal of undesirable trees helps increase production. Large surface stones interfere with harvesting.

This soil has limitations for nonfarm uses because of the slope, the surface stones, and the moderately rapid to rapid permeability. Slope is a serious limitation for homesites and onsite waste disposal.

This soil is in capability subclass VIs. The woodland ordination symbol is 3r.

HbF—Hazleton very stony sandy loam, 25 to 65 percent slopes. This steep and very steep, deep, well drained soil is on side slopes of mountains and ridges. Large stones cover about 3 to 15 percent of the surface. Slopes are convex and range from 200 to 800 feet in length. Areas are in long, broad bands and range from 25 to hundreds of acres in size.

Typically, the surface layer is dark grayish brown channery sandy loam about 7 inches thick. The subsoil, to a depth of 36 inches, is yellowish brown channery sandy loam. The substratum to 70 inches is yellowish brown channery loamy sand.

Included with this soil in mapping are a few small areas of stony Rayne, Gilpin, Berks, Weikert, and Leck

Kill soils. Included soils make up 15 to 25 percent of this map unit.

Permeability is moderately rapid to rapid, and available water capacity is low to very low. Runoff is medium, and the hazard of erosion is slight. This soil tends to become droughty during dry periods. In unlimed areas, reaction ranges from extremely acid to strongly acid in the surface layer and subsoil.

Most areas of this soil are used for woodland. Some areas are used for pasture. This soil has poor potential for cropland and pasture because of the surface stones and the steep and very steep slopes. This soil has good potential for trees and wildlife habitat. It has limited potential for nonfarm uses because of the surface stones and the steep and very steep slopes.

This soil is not suited to cropland or pasture. The slopes are too steep, and removal of the stones and trees is not feasible.

This soil is suited to woodland. Productivity is moderately high. Removal of undesirable trees helps production. Slope is a concern in harvesting.

This soil has limitations for nonfarm uses because of the slope and surface stones. The slope is a serious limitation for homesites and onsite waste disposal.

This soil is in capability subclass VIIs. The woodland ordination symbol is 3r.

HzB—Hazleton very bouldery sandy loam, 0 to 8 percent slopes. This nearly level and gently sloping, deep, well drained soil is on mountaintops (fig. 11) and lower side slopes. Boulders and stones cover about 60 to 90 percent of the surface. Areas are elongated or long and narrow in shape and range from 5 to 300 acres in size.

Typically, the surface layer is dark grayish brown channery sandy loam about 7 inches thick. The subsoil, to a depth of 36 inches, is yellowish brown channery sandy loam. The substratum to 70 inches is yellowish brown channery loamy sand.

Included with this soil in mapping are small areas of intermingled Hazleton very stony sandy loam, Dekalb very stony loam, Nolo stony loam, Rayne very stony silt loam, and Gilpin very stony silt loam. Included soils make up 15 percent of this map unit.

Permeability is moderately rapid to rapid, and available water capacity is low to very low. Runoff is slow and medium, and the hazard of erosion is slight. Reaction in unlimed areas ranges from extremely acid to strongly acid in the surface layer and subsoil. The soil tends to become droughty during dry periods.

All areas of this soil are used for woodland. This soil is suited to woodland. It has poor potential for cropland, pasture, and most nonfarm uses because of the many boulders and stones on the surface. It has some potential for use as natural areas and as habitat for many kinds of wildlife.

This soil is in capability subclass VIIs. The woodland ordination symbol is 3o.

Figure 11.—Hazleton very bouldery sandy loam, 0 to 8 percent slopes, on Mount Davis.

HzD—Hazleton very bouldery sandy loam, 8 to 25 percent slopes. This sloping and moderately steep, deep, well drained soil is on upper side slopes of mountains and ridges. Boulders and stones cover about 60 to 90 percent of the surface. Slopes are convex and range from 200 to 400 feet in length. Areas are long and narrow in shape and range from 5 to 150 acres in size.

Typically, the surface layer is dark grayish brown channery sandy loam about 7 inches thick. The subsoil, to a depth of 36 inches, is yellowish brown channery sandy loam. The substratum to 70 inches is yellowish brown channery loamy sand.

Included with this soil in mapping are small stony areas of Hazleton, Rayne, and Gilpin soils. Included soils make up about 20 percent of this map unit.

Permeability is moderately rapid to rapid, and available water capacity is low to very low. Runoff is medium, and the hazard of erosion is slight. In unlimed areas, reaction ranges from extremely acid to strongly acid in the surface layer and subsoil. This soil tends to be droughty.

This soil has poor potential for most uses because of the many boulders and stones on the surface. It is suited to woodland. It has some potential for use as natural areas and as habitat for many kinds of wildlife (fig. 12).

This soil is in capability subclass VIIs. The woodland ordination symbol is 3r.

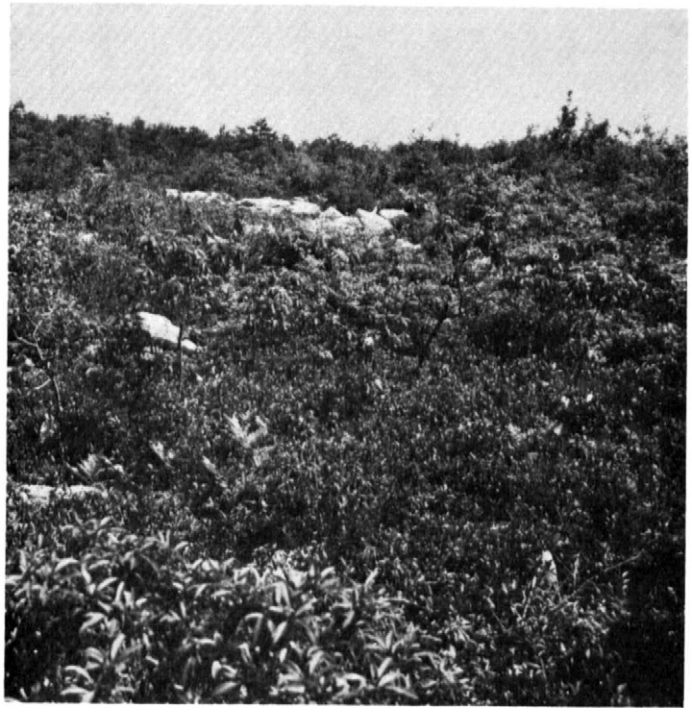


Figure 12.—Shrubs on Hazleton very bouldery sandy loam, 8 to 25 percent slopes. Shrubs provide food and cover for wildlife.

HzF—Hazleton very bouldery sandy loam, 25 to 60 percent slopes. This steep and very steep, deep, well drained soil is on side slopes of mountains and ridges. Boulders and stones cover about 60 to 90 percent of the surface. Slopes are convex and range from 200 to 500 feet in length. Areas are long and narrow in shape and range from 5 to 200 acres in size.

Typically, the surface layer is dark grayish brown channery sandy loam about 7 inches thick. The subsoil, to a depth of 36 inches, is yellowish brown channery sandy loam. The substratum to 70 inches is yellowish brown channery loamy sand.

Included with this soil in mapping are small areas of intermingled Hazleton very stony sandy loam and Rayne and Gilpin very stony silt loams. Also included are small areas that have more than 90 percent of the surface covered with stones. Included soils make up about 10 percent of this map unit.

Permeability is moderately rapid to rapid, and available water capacity is low to very low. Runoff is rapid, and the hazard of erosion is slight. In unlimed areas, reaction ranges from extremely acid to strongly acid in the surface layer and subsoil. This soil tends to be droughty.

This soil has poor potential for most uses, but the productivity of trees is moderately high. It has potential for use as natural areas or as habitat for some kinds of wildlife.

This soil is in capability subclass VIIs. The woodland ordination symbol is 3r.

LeB—Leck Kill channery silt loam, 3 to 8 percent slopes. This gently sloping, deep, well drained soil is on upper slopes of hills and ridges. Slopes are smooth or slightly convex and range from 300 to 600 feet in length. Areas are irregular in shape and range from 3 to 50 acres in size.

Typically, the surface layer is dark reddish brown channery silt loam about 6 inches thick. The subsoil, to a depth of 14 inches, is reddish brown channery silt loam; to 45 inches, it is dark red channery clay loam. The substratum is dark red very channery loam. Dark red shale and siltstone bedrock is at a depth of 58 inches.

Included with this soil in mapping are small areas of Albrights, Wharton, Ernest, Rayne, Gilpin, and Hazleton soils. Also included are small areas of soils that are similar to the Leck Kill soil but have sandy loam texture. Included soils make up 10 to 15 percent of this map unit.

Permeability is moderate to moderately rapid, and available water capacity is high. Runoff is medium, and the hazard of erosion is moderate. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cropland. Some areas are used for pasture. This soil has good potential for cultivated crops and pasture. It is suited to trees. Coarse fragments and bedrock at a depth of 3 1/2 to 6 feet are limitations for some nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, cover crops, minimum tillage, diversions, and sod waterways help control erosion. Incorporating crop residue into the surface layer helps maintain good tilth. The channery surface layer interferes with seeding of small grain and mechanical harvesting of some crops.

Where this soil is used for pasture, proper stocking rates to maintain key plant species and rotation of pasture are the chief management needs. Optimum production requires maintenance of fertility through periodic application of nutrients.

This soil is suited to trees, but only a small acreage is wooded. Productivity is moderately high. Removal of undesirable trees helps production. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses because of coarse fragments and bedrock at a depth of 3 1/2 to 6 feet. The depth to bedrock can be a problem for deep excavations and onsite waste disposal.

This soil is in capability subclass IIe. The woodland ordination symbol is 3o.

LeC—Leck Kill channery silt loam, 8 to 15 percent slopes. This sloping, deep, well drained soil is on upper side slopes of hills, mountains, and ridges. Slopes are smooth or convex and range from 200 to 400 feet in

length. Areas are long and narrow in shape and range from 3 to 10 acres in size.

Typically, the surface layer is dark reddish brown channery silt loam about 6 inches thick. The subsoil, to a depth of 14 inches, is reddish brown channery silt loam; to 45 inches, it is dark red channery clay loam. The substratum is dark red very channery loam. Bedrock, at a depth of 58 inches, is dark red shale and siltstone.

Included in mapping are small areas of Albrights, Wharton, Blairton, Rayne, Gilpin, Hazleton soils, and small areas of a reddish soil that is similar to the Leck Kill soil but has a sandy loam texture. Included soils make up 10 to 25 percent of this map unit.

Permeability is moderate to moderately rapid, and available water capacity is high. Runoff is medium, and the hazard of erosion is severe. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture. This soil has good potential for cultivated crops and pasture. It is suited to trees. Slope, coarse fragments, and bedrock at a depth of 3 1/2 to 6 feet are limitations for nonfarm uses.

This soil is suited to cultivated crops. Stripcropping (fig. 13), use of cover crops, minimum tillage, diversions, and sod waterways help reduce runoff and control erosion. Returning crop residue to the surface layer helps maintain good tilth. The channery surface interferes in places with seeding of small grain and mechanical harvesting of some crops.

Figure 13.—Stripcropping on Leck Kill channery silt loam, 8 to 15 percent slopes.

This soil is suited to pasture. Proper stocking rates to maintain desired plant species and rotation of pasture are the chief management needs. Optimum production requires periodic application of nutrients.

This soil is suited to trees, and productivity is moderately high. Removal of undesirable trees helps production. Roads need to be planned on the contour to reduce erosion during harvesting. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses because of slope, coarse fragments, and bedrock at a depth of 3 1/2 to 6 feet. The depth to bedrock is a problem in places for deep excavations and onsite waste disposal.

This soil is in capability subclass IIIe. The woodland ordination symbol is 3o.

LeD—Leck Kill channery silt loam, 15 to 25 percent slopes. This moderately steep, deep, well drained soil is on side slopes of mountains and ridges. Slopes are convex and range from 200 to 400 feet in length. Areas are long and narrow in shape and range from 3 to 10 acres or more in size.

Typically, the surface layer is dark reddish brown channery silt loam about 6 inches thick. The subsoil, to a depth of 14 inches, is reddish brown channery silt loam; to 45 inches, it is dark red channery clay loam. The substratum is dark red very channery loam. Bedrock, at a depth of 58 inches, is dark red shale and siltstone.

Included with this soil in mapping are small areas of Rayne, Gilpin, Hazleton, Berks, and Weikert soils. Also included are small areas of soils that are similar to the Leck Kill soil but have a sandy loam texture. Included soils make up about 10 to 20 percent of this map unit.

Permeability is moderate to moderately rapid, and available water capacity is high. Surface runoff is rapid, and the hazard of erosion is very severe. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for pasture. Some areas are used for cropland and woodland. This soil has fair potential for cultivated crops and good potential for pasture. It is suited to trees. Potential for many nonfarm uses is limited because of the slope, the coarse fragments, and the bedrock at a depth of 3 1/2 to 6 feet.

This soil is used for crops where management is adequate. The hazard of erosion is very severe. Further erosion results in a more shallow rooting depth and lower available water for plants. Minimum tillage, diversions, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion. Stripcropping can be used where the topography is suitable. Incorporating crop residue and manure into the surface layer helps maintain organic matter content and soil tilth.

This soil is suited to pasture. Overgrazing of pasture is the main concern in management. Proper stocking rates to maintain desired plant species and rotation of pasture are the chief management needs.

This soil is suited to trees. Productivity is moderately high. A concern in management is the moderate equipment limitation because of slope. Removal of undesirable trees helps production.

This soil has limitations for nonfarm uses because of the slope, the coarse fragments, and the bedrock at a depth of 3 1/2 to 6 feet. Slope is a serious limitation for homesites and onsite waste disposal.

This soil is in capability subclass IVe. The woodland ordination symbol is 3r.

LkB—Leck Kill very stony silt loam, 3 to 8 percent slopes. This gently sloping, deep, well drained soil is on the tops of hills and ridges. Stones cover about 3 to 15 percent of the surface. Slopes are smooth or convex and range from 200 to 400 feet in length. Areas are irregular or long and narrow in shape and range from 3 to 30 acres in size.

Typically, the surface layer is dark reddish brown channery silt loam about 6 inches thick. The subsoil, to a depth of 14 inches, is reddish brown channery silt loam; to 45 inches, it is dark red channery clay loam. The substratum is dark red very channery loam. Bedrock, at a depth of 58 inches, is dark red shale and siltstone.

Included with this soil in mapping are small areas of stony Rayne, Gilpin, Hazleton, Berks, and Weikert soils and small areas of nonstony Leck Kill soils. Included soils make up 5 to 25 percent of this map unit.

Permeability is moderate to moderately rapid, and available water capacity is high. Runoff is slow. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for woodland. Some areas are used for pasture. This soil has poor potential for cultivated crops and pasture because of the surface stones. It has excellent potential for woodland. Potential for nonfarm uses is limited because of the surface stones and the bedrock at a depth of 3 1/2 to 6 feet.

This soil is not suited to cropland and pasture because of the surface stones. It is not feasible to remove the stones and trees.

This soil is suited to woodland. Productivity is moderately high. Removal of undesirable trees helps production. In places, large surface stones interfere with harvesting.

This soil has limitations for nonfarm uses because of the surface stones and the bedrock at a depth of 3 1/2 to 6 feet. In places, the large surface stones and the

depth to bedrock are problems for homesites and onsite waste disposal.

This soil is in capability subclass VIs. The woodland ordination symbol is 3o.

LkD—Leck Kill very stony silt loam, 8 to 25 percent slopes. This sloping and moderately steep, deep, well drained soil is on upper side slopes of mountains and ridges. Large stones cover about 3 to 15 percent of the surface. Slopes are convex and range from 200 to 700 feet in length. Areas are elongated or irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is dark reddish brown channery silt loam about 6 inches thick. The subsoil, to a depth of 14 inches, is reddish brown channery silt loam; to 45 inches, it is dark red channery clay loam. The substratum is dark red very channery loam. Bedrock, at a depth of 58 inches, is dark red shale and siltstone.

Included with this soil in mapping are small areas of stony Rayne, Gilpin, Hazleton, Berks, and Weikert soils and small areas of Leck Kill soils that have a nonstony surface. Included soils make up 10 to 15 percent of this map unit.

Permeability is moderate to moderately rapid, and available water capacity is high. Runoff is medium to rapid, and the hazard of erosion is moderate. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for woodland. Some areas are used for pasture. This soil has poor potential for cropland and pasture. It has excellent potential for woodland. Surface stones, slope, and bedrock at a depth of 3 1/2 to 6 feet are limitations for many nonfarm uses.

This soil is not suited to cultivated crops and pasture, because it is too stony. Removal of the stones and trees for these uses is not feasible.

This soil is suited to woodland. Productivity is moderately high. Removal of undesirable trees helps production. Slope is a concern in selection of equipment.

This soil has limitations for nonfarm uses because of the slope, the surface stones, and the bedrock at a depth of 3-1/2 to 6 feet. Slope is a serious limitation for homesites and onsite waste disposal.

This soil is in capability subclass VIs. The woodland ordination symbol is 3r.

LmF—Leck Kill soils, 25 to 70 percent slopes. This undifferentiated unit is made up of steep and very steep Leck Kill channery silt loam and Leck Kill very stony silt loam. These soils are on side slopes of mountains and ridges. They were mapped together because slope is the major influence on their use and management. About 60 percent of this map unit is Leck Kill channery silt loam, 30 percent is Leck Kill very stony silt loam, and 10 percent is included soils. Areas are long and narrow in shape and range from 5 to 20 acres in size.

Typically, the surface layer is dark reddish brown channery silt loam about 6 inches thick. The subsoil, to a depth of 14 inches, is reddish brown channery silt loam; to 45 inches, it is dark red channery clay loam. The substratum is dark red channery loam. Dark red shale and siltstone bedrock is at a depth of 58 inches.

Included with these soils in mapping are small areas of Rayne, Gilpin, Berks, and Weikert soils, very stony Hazleton soils, and small areas of soils that are similar to the Leck Kill soils but have sandy loam texture. Also included are small areas of shallow and moderately deep soils.

Permeability is moderate to moderately rapid, and available water capacity is high. Runoff is very rapid, and the hazard of erosion is severe. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most of the soils are suited to and used for woodland. They have poor potential for cropland and pasture because of the steep and very steep slopes and, in places, surface stones. The steep and very steep slopes, the bedrock at a depth of 3 1/2 to 6 feet, and, in places, the surface stones are limitations for nonfarm uses.

These soils are suited to trees. Woodland production is moderately high. Removal of undesirable trees helps production. Steep and very steep slopes are serious limitations in selection of equipment. Roads need to be constructed on the contour to prevent erosion.

The steep and very steep slopes, the bedrock at a depth of 3 1/2 to 6 feet, and, in places, the surface stones are limitations for nonfarm uses. Steep and very steep slopes are serious limitations for homesites and onsite waste disposal.

This map unit is in capability subclass VIIe. The woodland ordination symbol is 3r.

MoA—Monongahela silt loam, 0 to 3 percent slopes. This nearly level, deep, moderately well drained soil is on terraces along major streams. Slopes are smooth and range from 200 to 500 feet in length. Areas are elongated or irregular in shape and range from 5 to 25 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsoil, to a depth of 22 inches, is dark brown and yellowish brown silty clay loam; to 55 inches, it is firm and brittle, brown and yellowish brown silty clay loam, clay loam, and gravelly clay loam. The substratum to a depth of 63 inches is brown gravelly clay loam.

Included with this soil in mapping are small areas of Allegheny, Chavies, Pope, Philo, and Tyler soils. Included soils make up 10 to 15 percent of this map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is slow, and the hazard of erosion is slight. A seasonal high water table is at a depth of 18 to 30 inches during wet seasons. The root zone is restricted by the fragipan. In unlimed areas, reac-

tion is very strongly acid or strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture. This soil has good potential for cultivated crops and pasture. It has very good potential for trees. Potential for nonfarm uses is limited because of the moderately slow permeability and the seasonal high water table.

This soil is suited to cultivated crops. Minimum tillage, use of cover crops, and including grasses and legumes in the cropping system are the chief management needs. Subsurface drains help improve drainage and allow for timely tillage. Incorporating crop residue into the surface layer helps maintain tilth.

Where this soil is used for pasture, overgrazing and grazing when the soil is wet are the main concerns in management. The surface layer compacts easily when wet. Optimum production requires periodic application of nutrients. Proper stocking rates to maintain desired plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are the chief management needs.

This soil is suited to trees, but only a small acreage is wooded. Productivity is moderately high. The use of equipment is restricted for short periods during wet periods by the seasonal high water table. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses, because it is moderately slowly permeable and has a seasonal high water table. The moderately slow permeability and the seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IIw. The woodland ordination symbol is 3w.

MoB—Monongahela silt loam, 3 to 8 percent slopes. This gently sloping, deep, moderately well drained soil is on terraces along major streams. Slopes are convex and range from 200 to 400 feet in length. Areas are long and narrow in shape and range from 2 to 5 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsoil, to a depth of 22 inches, is dark brown and yellowish brown silty clay loam; to 55 inches, it is firm and brittle, brown and yellowish brown silty clay loam, clay loam, and gravelly clay loam. The substratum to a depth of 63 inches is brown gravelly clay loam.

Included with this soil in mapping are small areas of Allegheny and Chavies soils and small areas of Monongahela silt loam, 0 to 3 percent slopes. Included soils make up 10 to 15 percent of this map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is medium, and the hazard of erosion is moderate. A seasonal high water table is at a depth of 18 to 30 inches during wet seasons. The root zone is restricted by the fragipan. In unlimed areas, reaction is very strongly acid or strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture. This soil has good potential for cultivated crops and pasture. It has very good potential for trees. Potential for nonfarm uses is limited because of the moderately slow permeability and seasonal high water table.

This soil is suited to cultivated crops. Stripcropping, use of cover crops, minimum tillage, diversions, and sod waterways help reduce runoff and control erosion. Returning crop residue to the surface layer helps maintain good tilth. Subsurface drains help remove excess water, allow for timely tillage, and increase production.

Where this soil is used for pasture, overgrazing and grazing when the soil is wet are the main concerns in management. The surface layer compacts easily when wet. Optimum production requires periodic application of nutrients. Proper seeding rates to maintain desired plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are the chief management needs.

This soil is suited to trees, but only a small acreage is wooded. Productivity is moderately high. Removal of undesirable trees helps production. The use of equipment is restricted for short periods during wet seasons by the seasonal high water table. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses because it is moderately slowly permeable and has a seasonal high water table. The moderately slow permeability and the seasonal high water are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IIe. The woodland ordination symbol is 3w.

NoA—Nolo loam, 0 to 3 percent slopes. This nearly level, deep, poorly drained soil is in depressions and drainageways and on broad flats on uplands. Slopes are smooth or slightly concave and range from 100 to 300 feet in length. Areas are oval and irregular in shape and range from 5 to 40 acres in size.

Typically, this soil has a black organic layer on the surface. The surface layer is mottled, very dark brown loam about 5 inches thick. The subsurface layer is about 6 inches of mottled, grayish brown loam. The subsoil, to a depth of 29 inches, is grayish brown and yellowish brown channery clay loam and channery sandy clay loam; to 55 inches, it is firm and very firm and brittle, mottled, brown and yellowish brown channery sandy clay loam and channery loam. Acid, gray sandstone bedrock is at a depth of 55 inches.

Included with this soil in mapping are small areas of Cookport, Ernest, Brinkerton, and Cavode soils. Some areas of these included soils have a stony surface. Included soils make up 10 to 20 percent of this map unit.

Permeability is slow, and available water capacity is high. Runoff is slow, and the hazard of erosion is slight. A high water table is at a depth of 0 to 6 inches. The rooting depth is restricted by the fragipan. In unlimed areas, reaction is very strongly acid or extremely acid in the surface layer and subsoil.

Most areas of this soil are used for pasture. Some areas are used for cropland and woodland. This soil has fair potential for cropland and pasture. It is suited to trees. Potential for nonfarm uses is limited because of the slowly permeable subsoil and the high water table.

This soil is used for cultivated crops, where drainage is adequate. Surface and subsurface drains, where outlets are available, help improve drainage and allow for timely tillage.

The soil has fair potential for pasture. Where this soil is used for pasture, overgrazing and grazing when the soil is wet are major concerns in management. The surface compacts easily if grazed when wet. Surface drains, where outlets are available, help improve drainage. Proper stocking rates to maintain desired plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are the chief management needs.

This soil is suited to water-tolerant trees. Productivity is moderately high. The rooting depth is restricted by the fragipan and the high water table. The use of equipment is restricted for long periods because of the high water table.

This soil has limitations for nonfarm uses because it is slowly permeable and has a high water table. The slow permeability and the high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IVw. The woodland ordination symbol is 3w.

NoB—Nolo loam, 3 to 8 percent slopes. This gently sloping, deep, poorly drained soil is on lower slopes of mountains and ridges, along drainageways, and in depressions. Slopes are smooth or concave and range from 200 to 500 feet in length. Areas are irregular in shape and range from 5 to 10 acres in size.

Typically, this soil has a black organic layer on the surface. The surface layer is mottled, very dark brown loam about 5 inches thick. The subsurface layer is about 6 inches of mottled, grayish brown loam. The subsoil, to a depth of 29 inches, is grayish brown and yellowish brown channery clay loam and channery sandy clay loam; to 55 inches, it is mottled, brown and yellowish brown, very firm and firm and brittle, channery sandy clay loam and channery loam. Acid, gray sandstone bedrock is at a depth of 55 inches.

Included with this soil in mapping are small areas of Cookport, Ernest, Brinkerton, Wharton, and Cavode soils. Some areas of these included soils have a stony surface. Included soils make up 15 to 25 percent of this map unit.

Permeability is slow, and available water capacity is high. Runoff is slow, and the hazard of erosion is moderate. A high water table is at a depth of 0 to 6 inches. The root zone is restricted by the fragipan. In unlimed areas, reaction is very strongly acid or extremely acid in the surface layer and subsoil.

Most areas of this soil are used for pasture. Some areas are used for cropland and woodland. This soil has fair potential for cropland and pasture. It is suited to water-tolerant trees. Potential for many nonfarm uses is limited because of the slowly permeable subsoil and high water table.

This soil is used occasionally for cultivated crops, where drainage is adequate. Surface and subsurface drains, where outlets are available, help improve drainage and allow for timely tillage. Minimum tillage, stripcropping, diversions, and cover crops help reduce erosion.

This soil has fair potential for pasture. Where this soil is used for pasture, grazing when the soil is wet and overgrazing are major concerns in management. The surface layer is easily compacted if the soil is grazed when wet. Surface drains, where outlets are available, help improve drainage. Proper stocking rates to maintain desired plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are the chief management needs.

This soil is suited to water-tolerant trees. Productivity is moderately high. The rooting depth is restricted by the high water table. The use of equipment is restricted for long periods because of the high water table.

This soil has limitations for nonfarm uses, because it is slowly permeable and has a high water table. The slow permeability and the high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IVw. The woodland ordination symobl is 3w.

NsB—Nolo very stony loam, 0 to 8 percent slopes. This nearly level and gently sloping, deep, poorly drained stony soil is on lower slopes of mountains and ridges. Large stones cover about 3 to 15 percent of the surface. Slopes are smooth or concave and range from 300 to 800 feet in length. Areas are irregular and fan-shaped and range from 5 to 50 acres in size.

Typically, this soil has a black organic layer on the surface. The surface layer is mottled, very dark brown loam about 5 inches thick. The subsurface layer is about 6 inches of mottled, grayish brown loam. The subsoil, to a depth of 29 inches, is grayish brown and yellowish brown channery clay loam and channery sandy clay loam; to 55 inches, it is mottled, brown and yellowish brown, very firm and firm and brittle, channery sandy clay loam and channery loam. Acid, gray sandstone bedrock is at a depth of 55 inches.

Included with this soil in mapping are small areas of stony Cookport, Ernest, Brinkerton, and Cavode soils.

Some areas of these included soils have a nonstony surface. Included soils make up 15 to 20 percent of this map unit.

Permeability is slow, and available water capacity is high. Surface runoff is very slow to slow. A high water table is at a depth of 0 to 6 inches. The root depth is restricted by the fragipan and high water table. In unlimed areas, reaction is very strongly acid or extremely acid in the surface layer and subsoil.

Most areas of this soil are used for woodland. This soil has poor potential for cropland and pasture. It has fair potential for water-tolerant trees. Potential for many nonfarm uses is limited because of the surface stones, the slowly permeable subsoil, and the high water table.

This soil is not suited to cultivated crops and pasture. Removing the surface stones and trees and reducing the water table for these uses is not feasible.

This soil is suited to water-tolerant trees. Productivity is moderately high. Removal of undesirable trees helps production. The use of equipment is restricted during wet periods because of the high water table. Surface stones interfere in places with harvesting.

This soil has limitations for nonfarm uses because of the surface stones, the slowly permeable subsoil, and the high water table. The slowly permeable subsoil and the high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass VIIs. The woodland ordination symbol is 3w.

Ph—Philo silt loam. This nearly level, deep, moderately well drained soil is on flood plains in major stream valleys. Slopes are smooth and range from 100 to 300 feet in length. Areas are long and narrow or elongated in shape and range from 5 to 20 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil, to a depth of 38 inches, is dark brown and brown silt loam. The substratum to a depth of 64 inches is light brownish gray and dark grayish brown silt loam and sandy loam.

Included with this soil in mapping are small areas of Pope, Atkins, Monongahela, Tyler, and Purdy soils. Included soils make up 10 to 20 percent of this map unit.

Permeability is moderate or moderately slow, and available water capacity is high. Runoff is slow or very slow, and the hazard of erosion is slight. A seasonal high water table is at a depth of 18 to 30 inches. In unlimed areas, reaction ranges from medium acid to very strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cultivated crops. Small areas are used for pasture. This soil has good potential for cropland and pasture. It has limited potential for many urban uses because of flooding and the seasonal high water table.

This soil is suited to cultivated crops. Use of cover crops, crop residue management, and including grasses and legumes in the cropping system help maintain tilth and fertility. Crops can be damaged by flooding in areas of stream overflow.

Where this soil is used for pasture, overgrazing and grazing when the soil is wet are major concerns in management. Proper seeding rates to maintain desired plant species, rotation of pasture, deferment of grazing and restricted grazing during wet periods are the chief management needs.

This soil is well suited to trees, but only a small acreage is wooded. Productivity is very high. Removal of undesirable trees helps production. The use of equipment is restricted during wet seasons because of the seasonal high water table.

This soil has limitations for nonfarm uses mainly because of flooding and the seasonal high water table. Flooding and the seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IIw. The woodland ordination symbol is 1w.

Po—Pope fine sandy loam. This nearly level, deep, well drained soil is on flood plains in major stream valleys. Slopes are smooth and range from 200 to 400 feet in length. Areas are long and narrow in shape and range from 5 to 20 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 6 inches thick. The subsoil, to a depth of 26 inches, is brown fine sandy loam; to 50 inches, it is brown silt loam. The substratum to a depth of 61 inches is strong brown loam.

Included with this soil in mapping are small areas of Philo, Atkins, Allegheny, and Chavies soils. Included soils make up 10 to 15 percent of this map unit.

Permeability is moderate to moderately rapid, and available water capacity is high. Runoff is slow, and the hazard of erosion is slight. In unlimed areas, reaction ranges from strongly acid to extremely acid in the surface layer and subsoil.

Most areas of this soil are used for cultivated crops. Small areas are used for pasture. This soil has excellent potential for crops and pasture. It is well suited to trees. Potential for nonfarm uses is limited because of flooding.

This soil is well suited to cultivated crops. Growing cover crops, utilizing crop residue, and including hay in the cropping system help maintain organic matter content and good tilth.

Where this soil is used for pasture, overgrazing, proper stocking rates to maintain desired plant species, and rotation of pasture are the chief management concerns. Optimum production requires maintenance of fertility through periodic application of nutrients.

This soil is well suited to trees, but only a very small acreage is wooded. Productivity is high. Management concerns are slight. Removal of undesirable trees helps production.

This soil has limitations for nonfarm uses because of flooding. Flooding is a serious limitation for homesites and onsite waste disposal.

This soil is in capability class I. The woodland ordination symbol is 2o.

Pu—Purdy silt loam. This nearly level, deep, poorly drained and very poorly drained soil is on stream terraces. Slopes are smooth and range from 200 to 400 feet in length. Areas are elongated in shape and range from 3 to 15 acres in size.

Typically, the surface layer is gray silt loam about 9 inches thick. The subsoil, to a depth of 15 inches, is mottled, gray silty clay loam; to 50 inches, it is mottled, gray silty clay. The substratum to a depth of 65 inches is mottled, gray clay loam.

Included with this soil in mapping are small areas of Brinkerton, Tyler, Monongahela, and Atkins soils. Included soils make up 10 to 15 percent of this map unit.

Permeability is slow or very slow, and available water capacity is high. Surface runoff is slow, and the hazard of erosion is slight. A high water table is near the surface, and it restricts rooting depth. In unlimed areas, reaction ranges from strongly acid to extremely acid in the surface layer and subsoil.

Most areas of this soil are used for pasture. Small areas are used for cropland and woodland. This soil has fair potential for cultivated crops and pasture. It is suited to water-tolerant trees. Potential for many nonfarm uses is limited because of the high water table and slow and very slow permeability.

This soil can be used for cultivated crops if drainage is adequate. Surface and subsurface drains can be used, where outlets are available, to improve drainage.

The soil is fairly well suited to pasture. Where this soil is used for pasture, overgrazing and grazing when the soil is wet are major concerns in management. The surface layer compacts easily when wet. Proper stocking rates, deferment of grazing, restricted grazing during wet periods, and rotation of pasture are important in management. Production requires periodic application of nutrients.

This soil is suited to water-tolerant trees, but only a few acres are wooded. Productivity is very high. The use of equipment is restricted during wet seasons. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses because it is slowly and very slowly permeable and has a high water table. The slow and very slow permeability and the high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IVw. The woodland ordination symbol is 1w.

Qu—Quarries. This map unit is made up of mined areas and spoil areas that have resulted from the excavation of limestone. The material exposed in these areas is mainly limestone, but some is sandstone and shale. Slopes are very complex. They range from sloping to very steep. Areas are 40 to 50 acres.

Included with this unit in mapping are areas of Leck Kill, Albrights, Rayne, Gilpin, and Wharton soils. Included areas make up about 5 percent of the unit.

Permeability, runoff, and internal drainage are variable. These quarries are in operation, and potential for other uses is very limited. Onsite investigation is needed on individual sites to determine potential and limitations.

A capability subclass and woodland ordination symbol are not assigned to this map unit.

RgB—Rayne-Gilpin channery silt loams, 3 to 8 percent slopes. These gently sloping, deep and moderately deep, well drained soils are on broad ridges and hilltops on uplands. The soils of this complex were mapped together because areas of the soils were so small and the soils were so intermingled that separating them was not practical. About 60 percent of this complex is Rayne soils, 25 percent is Gilpin soils, and 15 percent is included soils. Areas are oval, irregular, or oblong in shape and range from 3 to 20 acres in size.

Typically, the Rayne soils have a surface layer of dark grayish brown channery silt loam about 8 inches thick. The subsoil, to a depth of 13 inches, is yellowish brown channery silty clay loam; to 47 inches, it is strong brown channery silty clay loam. The substratum is strong brown channery silty clay loam. Bedrock is at a depth of 55 inches. It is weathered shale that has interbedded siltstone and sandstone.

Typically, the Gilpin soils have a surface layer of dark brown channery silt loam about 6 inches thick. The subsoil, to a depth of 24 inches, is brown and yellowish brown channery silt loam. Brown shale bedrock is at a depth of 24 inches.

Included with these soils in mapping are a few small areas of Wharton, Cavode, Ernest, Cookport, Hazleton, and Berks soils. Included soils make up 15 percent of this map unit.

Permeability is moderate, and available water capacity is moderate. Runoff is slow, and the hazard of erosion is moderate. In unlimed areas, reaction is strongly acid and very strongly acid throughout.

Most areas of these soils are used for cropland. These soils have good potential for cropland and pasture. They have limitations for many nonfarm uses because of bedrock at a depth of 2 to 6 feet and because of the coarse fragments.

These soils are well suited to cultivated crops. Control of erosion is a main concern in management. If these soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion. Stripcropping and diversions, where topography is suitable, also help control erosion.

Where these soils are used for pasture, proper stocking rates to maintain desired plant species, and rotation of pasture are the chief management needs. Optimum production requires maintenance of fertility through periodic application of nutrients.

These soils are suited to trees, but only a very small acreage is wooded. Productivity is high. Concerns in management are slight. Removal of undesirable trees helps production.

These soils have limitations for nonfarm uses because of bedrock at a depth of 2 to 6 feet and because of the coarse fragments. The depth to bedrock is a serious limitation for onsite waste disposal.

This map unit is in capability subclass IIe. The woodland ordination symbol is 2o.

RgC—Rayne-Gilpin channery silt loams, 8 to 15 percent slopes. These sloping, deep and moderately deep, well drained soils are on upper side slopes of hills, mountains, and ridges. The soils of this complex were mapped together because areas of the soils were so small and the soils were so intermingled that separating them was not practical. About 50 percent of this complex is Rayne soils, 30 percent is Gilpin soils, and 20 percent is included soils. Slopes are convex and range from 200 to 500 feet in length. Areas are long and narrow in shape and range from 3 to 10 acres in size.

Typically, the Rayne soils have a surface layer of very dark grayish brown channery silt loam about 8 inches thick. The subsoil, to a depth of 13 inches, is yellowish brown channery silty clay loam; to 47 inches, it is strong brown channery silty clay loam. The substratum is strong brown channery silty clay loam. Bedrock is at a depth of 55 inches. It is weathered shale that has interbedded siltstone and sandstone.

Typically, the Gilpin soils have a surface layer of dark brown channery silt loam about 6 inches thick. The subsoil, to a depth of 24 inches, is brown and yellowish brown channery silt loam. Brown shale bedrock is at a depth of 24 inches.

Included with these soils in mapping are a few small areas of Wharton, Ernest, Cookport, Hazleton, and Berks soils. Some areas of these included soils have a stony surface.

Permeability is moderate, and available water capacity is moderate. Runoff is medium, and the hazard of erosion is severe. In unlimed areas, reaction is strongly acid and very strongly acid.

Most areas of these soils are used for cultivated crops. Small areas are used for pasture and woodland. These soils have good potential for cropland, pasture, and woodland. Bedrock at a depth of 2 to 6 feet, coarse fragments, and slope are limitations for most nonfarm uses.

These soils are suited to cultivated crops. Control of erosion is a main concern in management. Minimum tillage, use of cover crops, and grasses and legumes in the cropping system help reduce runoff and control erosion. Stripcropping (fig. 14) and diversions, where the topography is suitable, also help control erosion.

Where these soils are used for pasture, proper stocking rates to maintain desired plant species and rotation of pasture are the chief management needs. Optimum production requires maintenance of fertility through periodic application of nutrients. Overgrazing of these soils is a main concern in management.

These soils are suited to trees, but only a small acreage is wooded. Productivity is high. The moderate limitation to use of equipment is a concern in management. Removal of undesirable trees helps production. Machine planting is feasible in large areas.

These soils have limitations for many nonfarm uses because of the slope, the bedrock at a depth of 2 to 6 feet, and the coarse fragments. The depth to bedrock is a serious limitation for onsite waste disposal.

These soils are in capability subclass IIIe. The woodland ordination symbol is 2o.

RgD—Rayne-Gilpin channery silt loams, 15 to 25 percent slopes. These moderately steep, deep and moderately deep, well drained soils are on side slopes of hills, mountains, and ridges. The soils of this complex were mapped together because areas of the soils were so small and the soils were so intermingled that separating them in mapping was not practical. About 50 percent of this complex is Rayne soils, 40 percent is Gilpin soils, and 10 percent is included soils. Slopes are convex and range from 200 to 300 feet in length.

Typically, the Rayne soils have a surface layer of very dark grayish brown channery silt loam about 8 inches thick. The subsoil, to a depth of 13 inches, is yellowish brown channery silty clay loam; to 47 inches, it is strong brown channery silty clay loam. The substratum is strong brown channery silty clay loam. Bedrock is at a depth of 55 inches. It is weathered shale that has interbedded siltstone and sandstone.

Typically, the Gilpin soils have a surface layer of dark brown channery silt loam about 6 inches thick. The subsoil, to a depth of 24 inches, is brown and yellowish brown channery silt loam. Brown shale bedrock is at a depth of 24 inches.

Included with these soils in mapping are a few small areas of Wharton, Hazleton, Berks, and Weikert soils. Some areas of these included soils have a stony surface.

Permeability is moderate, and available water capacity is moderate. Runoff is rapid, and the hazard of erosion is very severe. In unlimed areas, reaction is strongly acid and very strongly acid.

Most areas of these soils are used for cropland and pasture. Potential for cropland is fair because of the moderately steep slopes. Potential for pasture is good.

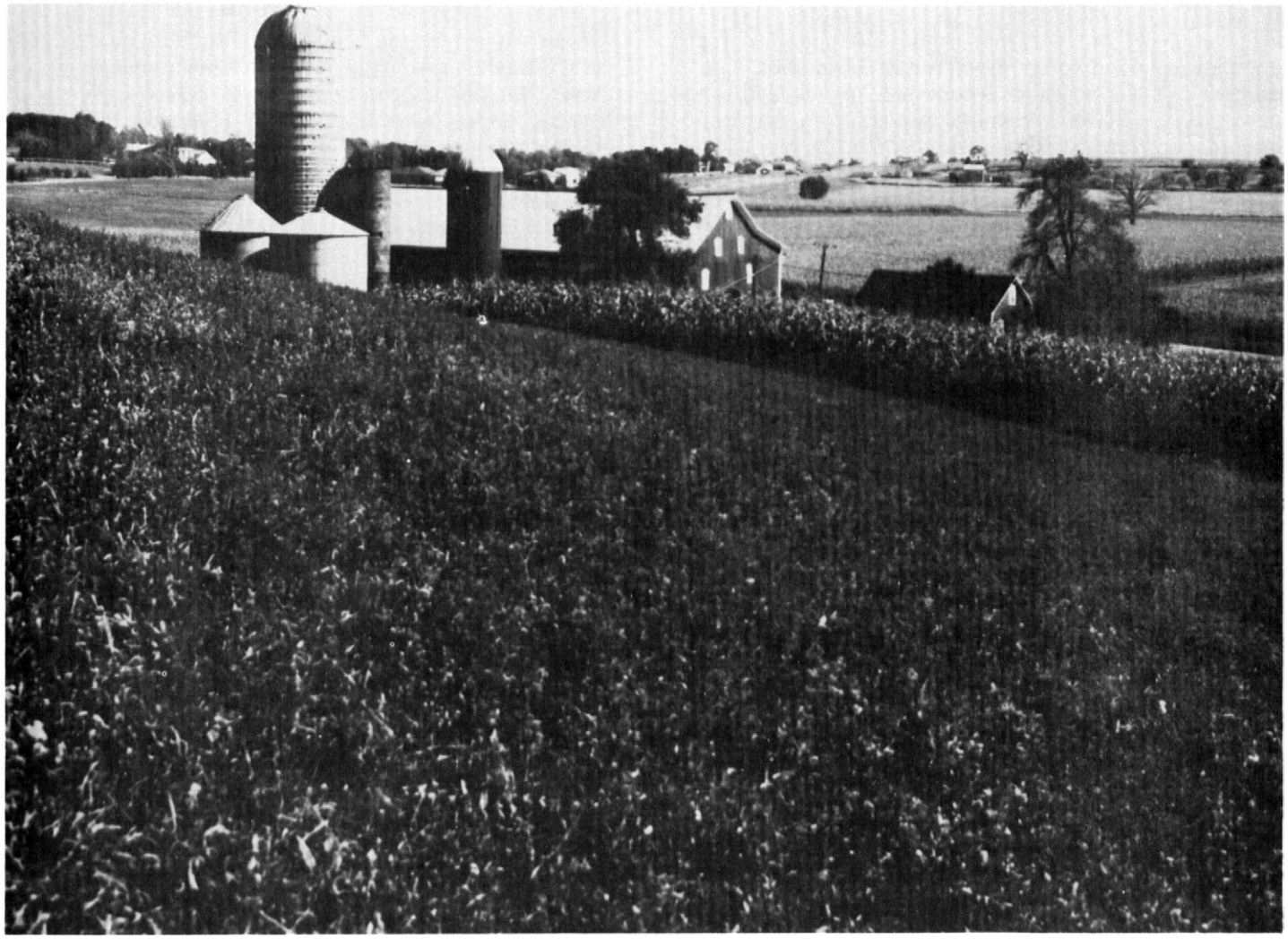


Figure 14.—Contour stripcropping reduces erosion and runoff on Rayne-Gilpin channery silt loams, 8 to 15 percent slopes.

These soils have limited potential for nonfarm uses because of bedrock at a depth of 2 to 6 feet and because of moderately steep slopes.

These soils can be used for row crops where management is adequate. Minimum tillage, diversions, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Stripcropping can be used where the topography is suitable. Incorporating crop residue and manure into the surface layer helps maintain organic matter content and tilth.

Where these soils are used for pasture, overgrazing is the main concern in management. Proper stocking rates to maintain desired species and rotation of pasture are the chief management needs. Optimum production requires periodic application of nutrients.

These soils are suited to trees. Productivity is high. Removal of undesirable trees helps production. These soils have equipment limitations because of slope.

These soils have limitations for nonfarm uses because of the moderately steep slopes and the bedrock at a depth of 2 to 6 feet. The depth to bedrock and slope are serious limitations for homesites and onsite waste disposal.

These soils are in capability subclass IVe. The woodland ordination symbol is 2r.

RgF—Rayne-Gilpin channery silt loams, 25 to 65 percent slopes. These steep and very steep, deep and moderately deep, well drained soils are on side slopes of hills, ridges, and mountains. The soils of this complex were mapped together because areas of the soils were so small and the soils were so intermingled that separat-

ing them was not practical. About 50 percent of this complex is Rayne soils, 25 percent is Gilpin soils, and 25 percent is included soils. Slopes are convex and range from 200 to 500 feet in length. Areas are in long bands and range from 10 to several hundred acres in size.

Typically, the Rayne soils have a surface layer of very dark grayish brown channery silt loam about 8 inches thick. The subsoil, to a depth of 13 inches, is yellowish brown channery silty clay loam; to 47 inches, it is strong brown channery silty clay loam. The substratum is strong brown channery silty clay loam. Bedrock is at a depth of 55 inches. It is weathered shale that has interbedded siltstone and sandstone.

Typically, the Gilpin soils have a surface layer of dark brown channery silt loam about 6 inches thick. The subsoil, to a depth of 24 inches, is brown and yellowish brown channery silt loam. Brown shale bedrock is at a depth of 24 inches.

Included with these soils in mapping are small areas of Hazleton, Berks, Weikert, and Leck Kill soils and small areas of very stony Rayne and Gilpin soils.

Permeability is moderate, and available water capacity is moderate. Runoff is very rapid, and the hazard of erosion is very severe. In unlimed areas, reaction is very strongly acid and strongly acid throughout.

Most areas of these soils are used for woodland. Some areas are used for pasture. These soils have poor potential for cropland and pasture because of the steep and very steep slopes. The steep and very steep slopes and the bedrock at a depth of 2 to 6 feet are limitations for nonfarm uses.

These soils are too steep for cultivated crops and pasture.

These soils are suited to trees. Productivity is high. Removal of undesirable species helps production. Steepness of slope interferes with harvesting. Roads need to be constructed on the contour to reduce erosion.

These soils have limitations for nonfarm uses because of the steepness of slope and the bedrock at a depth of 2 to 6 feet. They have serious limitations for homesites and onsite waste disposal.

These soils are in capability subclass VIe. The woodland ordination symbol is 2r.

RpB—Rayne-Gilpin very stony silt loams, 3 to 8 percent slopes. These gently sloping, deep and moderately deep, well drained soils are on upper side slopes and tops of hills, mountains, and ridges. The soils of this complex were mapped together because areas of the soils were so small and the soils were so intermingled that separating them was not practical. About 60 percent of this complex is Rayne soils, 25 percent is Gilpin soils, and 15 percent is included soils. Large stones cover about 3 to 15 percent of the surface. Slopes are convex and generally range from 200 to 800 feet in length. Areas are mainly oval or oblong in shape and range from 4 to 20 acres in size.

Typically, the Rayne soils have a surface layer of very dark grayish brown channery silt loam about 8 inches thick. The subsoil, to a depth of 13 inches, is yellowish brown channery silty clay loam; to 47 inches, it is strong brown channery silty clay loam. The substratum is strong brown channery silty clay loam. Bedrock is at a depth of 55 inches. It is weathered shale that has interbedded siltstone and sandstone.

Typically, the Gilpin soils have a surface layer of dark brown channery silt loam about 6 inches thick. The subsoil, to a depth of 24 inches, is brown and yellowish brown channery silt loam. Brown shale bedrock is at a depth of 24 inches.

Included with these soils in mapping are small areas of Hazleton, Berks, Weikert, and Leck Kill soils and areas of nonstony Rayne and Gilpin soils.

Permeability is moderate, and available water capacity is moderate. Runoff is slow to very slow, and the hazard of erosion is slight. In unlimed areas, reaction is very strongly acid and strongly acid throughout.

Most areas of these soils are used for woodland. A few small areas are used for pasture. These soils have poor potential for cropland and pasture because of the surface stones. The surface stones and the bedrock at a depth of 2 to 6 feet are limitations for nonfarm uses.

These soils are poorly suited to cropland and pasture because of the surface stones. Removal of the stones and trees is not feasible.

These soils are suited to trees. Productivity is high. Removal of undesirable trees helps production. Large stones interfere with harvesting.

These soils have limitations for nonfarm uses because of the surface stones and the bedrock at a depth of 2 to 6 feet. These are serious limitations for homesites and onsite waste disposal.

These soils are in capability subclass VIs. The woodland ordination symbol is 2o.

RpD—Rayne-Gilpin very stony silt loams, 8 to 25 percent slopes. These sloping and moderately steep, deep and moderately deep, well drained soils are on side slopes of hills, mountains, and ridges. The soils of this complex were mapped together because areas of the soils were so small and the soils were so intermingled that separating them was not practical. About 50 percent of this complex is Rayne soils, 35 percent is Gilpin soils, and 15 percent is included soils. Large stones cover 3 to 15 percent of the surface. Slopes are convex and generally range from 200 to 1,200 feet in length. Areas are oblong or in long, wide bands and range from 5 to 50 acres or more in size.

Typically, the Rayne soils have a surface layer of very dark grayish brown channery silt loam about 8 inches thick. The subsoil, to a depth of 13 inches, is yellowish brown channery silty clay loam; to 47 inches, it is strong brown channery silty clay loam. The substratum is strong brown channery silty clay loam. Bedrock is at a depth of

55 inches. It is weathered shale that has interbedded siltstone and sandstone.

Typically, the Gilpin soils have a surface layer of dark brown channery silt loam about 6 inches thick. The subsoil, to a depth of 24 inches, is brown and yellowish brown channery silt loam. Brown shale bedrock is at a depth of 24 inches.

Included with these soils in mapping are a few small, very stony areas of Hazleton, Dekalb, Leck Kill, Wharton, Ernest, and Weikert soils and small areas of nonstony Rayne and Gilpin soils.

Permeability is moderate, and available water capacity is moderate. Runoff is medium to rapid, and the hazard of erosion is moderate. In unlimed areas, reaction is very strongly acid and strongly acid throughout.

Most areas of these soils are used for woodland. A few small areas are used for pasture. These soils have poor potential for cropland and pasture because of the surface stones. They have limited potential for nonfarm uses because of the surface stones and slope and the bedrock at a depth of 2 to 6 feet.

These soils are not suited to cultivated crops and pasture because of the surface stones. Removal of the stones and trees is not feasible.

These soils are suited to trees. Productivity is high. Removal of undesirable trees helps production. Many large surface stones interfere with harvesting.

These soils have limitations for most nonfarm uses because of the surface stones, the slope, and the bedrock at a depth of 2 to 6 feet. Surface stones and slopes are serious limitations for homesites and onsite waste disposal.

These soils are in capability subclass VIs. The woodland ordination symbol is 2r.

Ty—Tyler silt loam. This nearly level, deep, somewhat poorly drained soil is on stream terraces in major valleys. Slopes are smooth or slightly concave and range from 200 to 400 feet in length. Areas are elongated in shape and range from 4 to 10 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil, to a depth of 24 inches, is mottled, pale brown and yellowish brown silty clay loam; to 52 inches, it is very firm and brittle, mottled, yellowish brown silt loam and silty clay loam. The substratum to a depth of 60 inches is dark yellowish brown loam.

Included with this soil in mapping are small areas of Monongahela, Purdy, Atkins, and Philo soils. Included soils make up about 10 percent of this map unit.

Permeability is slow to very slow, and available water capacity is moderate. Surface runoff is slow, and the hazard of erosion is slight. A seasonal high water table is within a depth of 12 to 18 inches during wet periods. The root zone is restricted by the fragipan. In unlimed areas, reaction ranges from strongly acid to extremely acid in the surface layer and subsoil.

Most areas of this soil are used for cropland. Some areas are used for pasture. This soil has fair potential for cultivated crops and pasture. It is suited to trees. Potential for nonfarm uses is limited because of the very slow to slow permeability and the seasonal high water table.

This soil is suited to cultivated crops. Use of surface and subsurface drains helps remove excess water. Use of cover crops, including grasses and legumes in the cropping system, and incorporating crop residue and manure into the surface layer help maintain organic matter content and good tilth.

Where this soil is used for pasture, overgrazing and grazing when the soil is wet are major concerns in management. Proper stocking rates to maintain desired plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are the chief management needs.

This soil is suited to trees, but only a small acreage is wooded. Productivity is high, but the rooting depth is restricted by the fragipan. The use of equipment is restricted during wet periods because of the seasonal high water table.

This soil has limitations for nonfarm uses, because it is slowly permeable and has a seasonal high water table. These are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IIIw. The woodland ordination symbol is 2d.

UDA—Udorthents mine spoil, 0 to 8 percent slopes. This map unit consists of areas that have been surface mined for coal (fig. 15). The areas were created by excavating soil and bedrock material over lying coal deposits. The material was thoroughly mixed when it was deposited in huge piles and then backfilled after the coal had been extracted. Slopes are nearly level and gently sloping. Areas range from 10 to 200 acres in size.

Typically, the soil to a depth of 60 inches or more is a mixture of soil and geological material. The fine earth is sandy loam through silty clay loam. Coarse fragments are variable amounts of shale and sandstone ranging from 1/4 inch to 6 inches in diameter to as much as 12 inches wide. The coarse fragment content ranges from 15 to 80 percent.

Included with this unit in mapping are areas of natural soil that have not been altered by cutting and filling. Also included are areas where the surface has bare shale and rock fragments; small areas where the soil material is in mounds or small piles; and areas of small, narrow streams. Included areas make up about 10 percent of this unit.

Permeability and available water capacity are variable. Runoff is slow, and the hazard of erosion is slight to moderate. Where unlimed, the soil is slightly acid to extremely acid.

This map unit has variable potential for cultivated crops, pasture, and woodland. In areas where the material has been replaced and the percentage of fine earth is

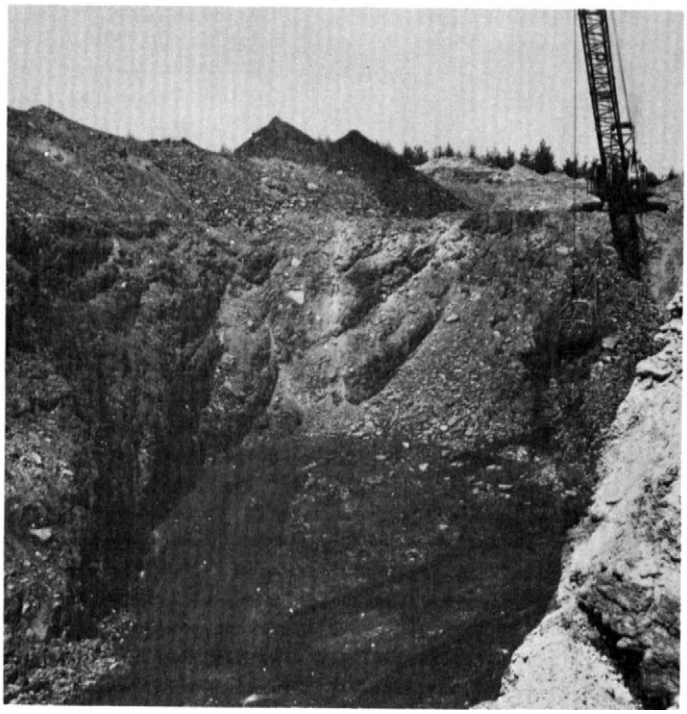


Figure 15.—A typical coal mine operation in an area of Udorthents.

high, the potential for these uses is good; however, a main management need is heavy application of nutrients. In areas where the soil contains very little fine earth, the potential for cultivated crops, pasture, and woodland is poor. Onsite investigations of individual sites are needed to determine potential.

This map unit has variable potential for most nonfarm uses. Onsite investigation is needed to determine potentials and limitations.

A capability subclass and woodland ordination symbol are not assigned to this map unit.

UDD—Udorthents, mine spoil, 8 to 25 percent slopes. This map unit consists of areas that have been surface mined for coal. The areas were created by excavating soil and bedrock material over lying coal deposits. The material was thoroughly mixed when it was deposited in huge piles and then backfilled after the coal had been extracted. These soils are sloping and moderately steep. Areas range from 10 to 150 acres or more in size.

Typically, the soil to a depth of 60 inches or more is a mixture of soil and geological material. The fine earth is sandy loam through silty clay loam. The coarse fragments are variable amounts of shale and sandstone. They range in size from 1/4 inch to 6 inches in diameter to as much as 12 inches wide. The coarse fragment content ranges from 15 to 80 percent.

Included with this unit in mapping are areas of natural soil that have not been altered by cutting and filling, areas where the surface has bare shale and rock fragments, small areas where the fill material is in piles, and small, narrow drainageways and steep banks. Included areas make up about 10 percent of this map unit.

Permeability, available water capacity, and runoff are variable. The hazard of erosion is severe to very severe. Where unlimed, the soil ranges from slightly acid to extremely acid.

This map unit has variable potential for cultivated crops, pasture, and woodland. In areas where the material has been replaced and the percentage of fine earth is high, potential for these uses is fair to good; however, a main management need is the heavy application of nutrients. In areas where the soil contains very little fine earth, potential for cultivated crops, pasture, and woodland is poor.

Potential is variable for most nonfarm uses. Onsite investigation is needed to determine potential and limitations for most uses of this unit.

A capability subclass and woodland ordination symbol are not assigned to this map unit.

UDF—Udorthents, mine spoil, 25 to 70 percent slopes. This map unit consists of areas that have been surface mined for coal. The areas were created by excavating soil and bedrock material over lying coal deposits. The material was thoroughly mixed when it was deposited in huge piles. Slopes are steep and very steep. Areas range from 5 to 100 acres in size.

Typically, the soil to a depth of 60 inches or more is a mixture of soil, shale, and sandstone fragments of various sizes. The fine earth is sandy loam through silty clay loam. The coarse fragments range from 1/4 inch to 6 inches in diameter to several feet wide. The coarse fragment content ranges from 15 to 80 percent.

Included with this unit in mapping are small areas of natural soil that have not been disturbed by excavation. Also included are small areas that have been backfilled and small areas of Udorthents that have 8 to 25 percent slopes. Included areas make up about 10 percent of this map unit.

Permeability, available water capacity, and runoff are variable. The hazard of erosion is also variable because of the manner in which the excavated material was piled. Where unlimed, the soil ranges from slightly acid to extremely acid.

This map unit has poor potential for cultivated crops and pasture because of the steep and very steep slopes. Potential for woodland is variable. Potential for most nonfarm uses is poor because of the slopes. Onsite investigation is needed to determine limitations other than slope.

A capability subclass and woodland ordination symbol are not assigned to this map unit.

UOA—Udorthents, smoothed. This map unit consists of areas that have been cut and filled during grading for roads, railroads, housing developments, high schools, commercial areas, recreation areas, and similar nonfarm uses. Areas are generally elongated in shape and are commonly along four-lane highways and railroads. These areas range from 3 to 150 acres in size. Slopes are very complex; they are nearly level to steep and range from 0 to 70 percent.

The fill areas are mainly made up of material removed from the cuts, are generally nearly level or gently sloping, and are bordered by steeper banks. The fill material is mainly a heterogeneous mixture of soil and geological material and is highly compacted in some places. The fine earth ranges from sandy loam to silty clay loam. The coarse fragment content ranges from 15 to 80 percent.

Included with this unit in mapping are soils that have not been altered by the cutting and filling. Also included are a few areas of small, narrow alluvial stream channels and small, ponded areas. Included areas make up about 10 percent of this map unit.

Permeability, available water capacity, internal drainage, and runoff are variable. The hazard of erosion is variable. In unlimed areas, reaction ranges from slightly acid to extremely acid.

Potential for most uses is variable. Onsite investigation is needed on individual sites to determine potential and limitations for specific uses.

A capability subclass and woodland ordination symbol are not assigned to this map unit.

WhB—Wharton silt loam, 3 to 8 percent slopes. This gently sloping, deep, moderately well drained soil is on broad hills and ridges. Slopes are smooth and convex and range from 200 to 800 feet in length. Areas are oval or irregular in shape and range from 3 to 20 acres in size.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil, to a depth of 19 inches, is yellowish brown silty clay loam; to 56 inches, it is mottled, strong brown silty clay and silty clay loam. The substratum to a depth of 65 inches is brown, shaly silty clay loam.

Included with this soil in mapping are small areas of Rayne, Gilpin, Cavode, Ernest, Cookport, and Armagh soils. Some areas of these included soils have a stony surface. Included soils make up 10 to 20 percent of this map unit.

Permeability is slow or moderately slow, and available water capacity is high. Runoff is medium, and the hazard of erosion is moderate. A seasonal high water table is within a depth of 18 to 24 inches during wet periods. The root zone is restricted by the seasonal high water table. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture. This soil has good potential for cultivated crops, pasture, and woodland. It has limited potential for nonfarm uses because of the slow or moderately slow permeability and seasonal high water table.

This soil is suited to cultivated crops. Stripcropping (fig. 16), use of cover crops, minimum tillage, diversions, and sod waterways help reduce runoff and control erosion. Surface and subsurface drains help improve drainage and production. Incorporating crop residue and manure into the surface layer helps maintain organic matter content and tilth.

Where this soil is used for pasture, overgrazing and grazing when the soil is wet are the main concerns in management. The surface layer compacts easily when the soil is wet. Restricted grazing during wet periods and rotation of pasture are good management practices. Optimum production requires maintenance of fertility through periodic application of nutrients.

This soil is suited to trees, but only a small acreage is wooded. Productivity is high. Removal of undesirable trees helps production. The use of equipment is restricted for short periods during wet seasons. Machine planting is feasible in large areas.

This soil has limitations for most nonfarm uses, because it is slowly or moderately slowly permeable and has a seasonal high water table. The slow or moderately slow permeability and the seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IIe. The woodland ordination symbol is 2o.

WhC—Wharton silt loam, 8 to 15 percent slopes. This sloping, deep, moderately well drained soil is on upper and lower side slopes of broad hills and ridges. Slopes are smooth or concave and range from 200 to 500 feet in length. Areas are oblong in shape and range from 3 to 10 acres in size.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil, to a depth of 19 inches, is yellowish brown silty clay loam; to 56 inches, it is mottled, strong brown silty clay and silty clay loam. The substratum to a depth of 65 inches is brown, shaly silty clay loam.

Included with this soil in mapping are small areas of Rayne, Gilpin, Cavode, Ernest, and Cookport soils. Some areas of these included soils have a stony surface. Included soils make up 10 to 15 percent of this map unit.

Permeability is slow or moderately slow, and available water capacity is high. Runoff is medium, and the hazard of erosion is severe. A seasonal high water table is within a depth of 18 to 24 inches during the wet periods. The root zone is restricted by the seasonal high water table. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture. This soil has good

Figure 16.—Stripcropping hay and corn protects an area of Wharton silt loam, 3 to 8 percent slopes, from erosion.

potential for cultivated crops and pasture. It has limitations for many nonfarm uses because of the slow or moderately slow permeability, the seasonal high water table, and the slope.

This soil is suited to cultivated crops. Stripcropping (fig. 17), use of cover crops, minimum tillage, diversions, and sod waterways help reduce runoff and control erosion. Incorporating crop residue and manure into the surface layer helps maintain organic matter content and tilth. Subsurface drains help improve drainage and production.

Where this soil is used for pasture, overgrazing and grazing when the soil is wet are the main concerns in management. The surface layer compacts easily when wet. Proper stocking rates to maintain desired plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are the chief management needs. Optimum production requires periodic application of nutrients.

This soil is suited to trees but only a small acreage is wooded. Productivity is high. Removal of undesirable trees helps increase production. The use of equipment is restricted for short periods during wet seasons. Machine planting is feasible in large areas.

This soil has limitations for nonfarm uses, because it is slowly or moderately slowly permeable, is sloping, and has a seasonal high water table. The slow or moderately slow permeability and the seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass IIIe. The woodland ordination symbol is 2r.

Figure 17.—Hay and contour stripcropping on Wharton silt loam, 8 to 15 percent slopes, reduces runoff and erosion.

WhD—Wharton silt loam, 15 to 25 percent slopes. This moderately steep, deep, moderately well drained soil is on side slopes of hills and ridges. Slopes are smooth or slightly convex and range from 200 to 300 feet in length. Areas are oblong in shape and range from 3 to 5 acres in size.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil, to a depth of 19 inches, is yellowish brown silty clay loam; to 56 inches, it is strong brown silty clay and silty clay loam. The substratum to a depth of 65 inches is brown, shaly silty clay loam.

Included with this soil in mapping are small areas of Rayne, Gilpin, Hazleton, Berks, and Leck Kill soils. Included soils make up 10 to 20 percent of this map unit.

Permeability is slow or moderately slow, and available water capacity is high. Runoff is rapid, and the hazard of erosion is very severe. A seasonal high water table is within a depth of 18 to 24 inches. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for pasture. Some areas are used for cropland. This soil has fair potential for cropland and good potential for pasture and trees. It has limited potential for nonfarm uses because of the slow or moderately slow permeability, the seasonal high water table, and the moderately steep slopes.

This soil can be used in places for crops if management is adequate. However, the hazard of erosion is very severe. Minimum tillage, diversions, use of cover crops, and including grasses and legumes in the cropping system help reduce runoff and control erosion. Stripcropping can be used where the topography is suitable. Incorporating crop residue and manure into the surface layer helps maintain organic matter content and tilth.

When this soil is used for pasture, overgrazing and grazing when the soil is wet are the major concerns in management. If this soil is grazed when wet, the surface

layer compacts easily. Proper stocking rates to maintain desired plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are the chief management needs.

This soil is suited to trees, but only a small acreage is wooded. Productivity is high. Use of equipment is restricted for short periods during wet seasons. Removal of undesirable trees helps increase production.

This soil has limitations for nonfarm uses because of the slow or moderately slow permeability, the moderately steep slopes, and the seasonal high water table. The slow or moderately slow permeability, slope, and seasonal high water table are serious limitations for homesites and waste disposal.

This soil is in capability subclass IVe. The woodland ordination symbol is 2r.

WvB—Wharton very stony silt loam, 3 to 8 percent slopes. This gently sloping, deep, moderately well drained soil is on broad hills and ridges on uplands. Large stones cover 5 to 15 percent of the surface. Slopes are smooth and slightly concave and range from 200 to 800 feet in length. Areas are irregular in shape and range from 5 to 25 acres in size.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil, to a depth of 19 inches, is yellowish brown silty clay loam; to 56 inches, it is strong brown silty clay and silty clay loam. The substratum to a depth of 65 inches is brown, shaly silty clay loam.

Included with this soil in mapping are small areas of very stony Rayne, Gilpin, Cavode, Blairton, Ernest, Cookport, and Albrights soils. Also included are small areas of Wharton soils that have a nonstony surface. Included soils make up 10 to 20 percent of this map unit.

Permeability is slow or moderately slow, and available water capacity is high. Runoff is slow, and the hazard of erosion is slight. The rooting depth is restricted by the seasonal high water table at a depth of 18 to 24 inches. In unlimed areas, the reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for woodland. Small areas are used for pasture. This soil has poor potential for cropland and pasture. It has good potential for trees. Potential for many nonfarm uses is limited because of surface stones, slow or moderately slow permeability, and the seasonal high water table.

This soil is not suited to cropland or pasture because of the surface stones. Removing the surface stones and trees and draining the soil is not feasible.

This soil is suited to trees. Productivity is high. The rooting depth is restricted in places by the seasonal high water table. Surface stones interfere with harvesting. Removal of undesirable trees helps increase production. The use of equipment is restricted during wet seasons because of the seasonal high water table.

This soil has limitations for most nonfarm uses because of the surface stones, the slow or moderately slow permeability, and the seasonal high water table. The slow or moderately slow permeability and the seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass VIs. The woodland ordination symbol is 2o.

WvD—Wharton very stony silt loam, 8 to 25 percent slopes. This sloping and moderately steep, deep, moderately well drained soil is on side slopes of broad hills and ridges on uplands. Large stones cover 5 to 15 percent of the surface. Slopes are smooth or convex and range from 300 to 800 feet in length. Areas are elongated or irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil, to a depth of 19 inches, is yellowish brown silty clay loam; to 56 inches, it is strong brown silty clay and silty clay loam. The substratum to a depth of 65 inches is brown, shaly silty clay loam.

Included with this soil in mapping are small areas of stony Rayne, Gilpin, Ernest, Cookport, and Albrights soils. Also included are small areas of Wharton soils that have a nonstony surface. Included soils make up 15 to 30 percent of this map unit.

Permeability is slow or moderately slow, and available water capacity is high. Surface runoff is rapid, and the hazard of erosion is moderate. The rooting depth is restricted by the seasonal high water table at a depth of 18 to 24 inches. In unlimed areas, reaction is very strongly acid and strongly acid in the surface layer and subsoil.

Most areas of this soil are used for woodland. Small areas are used for pasture. This soil has poor potential for cultivated crops and pasture and good potential for trees. It has limited potential for many nonfarm uses because of the surface stones, the sloping and moderately steep slopes, the slow or moderately slow permeability, and the seasonal high water table.

The soil is not suited to cropland or pasture because of surface stones. Removal of the surface stones and trees is not feasible.

This soil is suited to trees. Productivity is high. The rooting depth is restricted in places by the seasonal high water table. Surface stones interfere with harvesting. Removal of undesirable trees helps production.

This soil has limitations for most nonfarm uses because of the surface stones, the slope, the slow or moderately slow permeability, and the seasonal high water table. The slow or moderately slow permeability, slope, and seasonal high water table are serious limitations for homesites and onsite waste disposal.

This soil is in capability subclass VIs. The woodland ordination symbol is 2r.

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; 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, helped to prepare 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 "Soil maps for detailed planning." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Farming is a major land use in Somerset County. In 1974, farmland consisted of 224,780 acres. Of this total, 132,437 acres was cropland. The total number of acres harvested was 96,782; cropland used only for pasture was 28,320 acres; all other cropland was 7,335 acres. The harvested cropland consisted of 12,565 acres for corn; 13,266 acres for silage; 1,343 acres for wheat; 49,232 acres for hay; 1,158 acres for potatoes; 740 acres for vegetables; 141 acres for orchards; 16,518 acres for oats; 1,316 acres for barley; 12,551 acres for alfalfa hay; 644 acres for sweet corn; 86 acres for apples; and the rest for miscellaneous purposes.

Soil erosion is the main concern in management on most of the soils used for cropland and pasture in Somerset County. The Rayne, Gilpin, Leck Kill, Berks, and Hazleton soils are potentially productive soils for crops and pasture, but areas having slopes exceeding 3 percent have a moderate to severe hazard of erosion.

Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced, because the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a layer in or below the subsoil that limits the depth of the root zone. These include fragipans such as those in the Ernest, Cookport, Albrights, Monongahela, and Tyler soils or bedrock such as that in the Weikert and Dekalb soils. Erosion also reduces the productivity of soils that tend to be droughty, such as the Hazleton and Berks soils. Second, the erosion of soil on farmland results in sediment deposition in streams and reservoirs. Control of erosion minimizes the pollution of streams by sediment and improves the water quality for municipal use, for recreation, and for fish and wildlife.

In many sloping fields, preparation of a good seedbed and tillage are difficult on channery soils, because the original surface layer has been eroded away, leaving a high content of coarse fragments on the surface. Such areas are common on Berks-Weikert channery silt loams.

Methods of erosion control 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 holds soil erosion losses to an amount that will not reduce the productive capacity of the soils. On livestock farms, which require pasture and hay, legumes and grass forage crops in the cropping system help reduce erosion on sloping land and also provide nutrients and improve tilth for the following crop.

Slopes are so short and irregular that contour tilling or terracing is not practical in most areas of the Dekalb, Chavies, and Allegheny soils. On these soils, cropping systems that provide substantial vegetative cover help control erosion. Minimum tillage provides additional soil protection.

Minimizing tillage and leaving crop residue on the surface help to increase infiltration and reduce the hazard

of erosion. These methods can be adapted to most soils in the survey area. No-tillage for corn helps reduce erosion on sloping land and can be adapted to most soils in the survey area, except the poorly drained and very poorly drained soils.

Terraces and diversions reduce the length of slope, which helps reduce the surface water runoff and erosion. These methods are most practical on well drained soils that have regular slopes. The Rayne, Gilpin, Leck Kill, and Hazleton soils are suitable for terraces and diversions. Some of the soils are less suitable for terraces or diversions because of irregular slopes, excessive wetness in the terrace channels, or bedrock at a depth of less than 40 inches.

Contour farming and stripcropping (fig. 18) are common methods of erosion control in the survey area. They are best suited to soils having smooth, uniform slopes, including most areas of the sloping Rayne, Gilpin, Hazleton, Wharton, Ernest, and Leck Kill soils.

Information on methods of erosion control for each kind of soil is in the Technical Guide, available in local field offices of the Soil Conservation Service.

Soil drainage is the main management need on about 20 percent of the acreage used for crops and pasture in the survey area. Some soils are naturally so wet that the production of common crops is generally not successful without the use of artificial drainage. Such soils are the poorly drained and very poorly drained Armagh, Brinkerton, Purdy, and Atkins soils.

Unless they are artificially drained, the somewhat poorly drained soils are so wet that crop damage results during most years. In this category are the Cavode, Tyler, and Nolo soils.

Some soils that are wet are along drainageways and in swales and are commonly included in areas of the moderately well drained Philo, Ernest, Wharton, Blairton, Monongahela, and Albrights soils. Artificial drainage is needed in most of these wetter soils.

The design of both surface and subsurface drainage systems varies, depending on the kinds of soil involved. A combination of surface drainage and tile drainage is needed in most areas of the poorly drained soils used for more intensive cropping systems. Drains need to be more closely spaced in soils that have slow permeability than in soils that are more permeable. Adequate outlets for tile drainage systems are commonly difficult to find in

Figure 18.—Stripcropping reduces erosion and runoff on Rayne and Gilpin soils.

areas of the Wharton, Cavode, Ernest, Nolo, Albrights, and Cookport soils.

Fertility is naturally low in many soils in the survey area. Many upland soils are naturally very strongly acid. If they have never been limed, they require application of ground limestone to sufficiently raise the pH level for good growth of alfalfa and other crops.

Available phosphorus and magnesium levels are naturally low in most soils. Additions of lime and fertilizer on soils should be based on the results of soils tests, crop needs, and the expected level of yields. The Cooperative Extension Service helps determine the kinds and amounts of fertilizer and lime to apply.

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

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

Fall plowing is generally not practical on soils that have a silt loam surface layer and a low content of organic matter, because of the crust that forms in winter and spring. Many of the fall-plowed soils are nearly as dense and hard at planting time 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 fall.

Field crops suited to the soils and climate of the survey area include many that are not now commonly grown. Corn is the major row crop, although grain sorghum, potatoes, soybeans, and similar crops are grown if economic conditions are favorable. Wheat, oats, and barley are the common close-grown crops.

The most 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 spring are best suited for these crops. Good air drainage is needed to reduce frost damage.

In the survey area, the Hazleton, Rayne, Gilpin, and Leck Kill soils are best suited to fruits and vegetables because these soils have good physical properties. Their landscape positions generally provide good air drainage. The Pope, Chavies, and Allegheny soils also have good suitability for vegetables.

The latest information and suggestions for growing special crops can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

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.

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

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

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

Capability classes and subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to cranberries, horticultural crops, or other crops that require special management. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forest trees, or for engineering purposes.

In the capability system, all kinds of soil are grouped at three levels: capability class, subclass, and unit.

These levels are defined in the following paragraphs. A survey area may not have soils of all classes.

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 few limitations that restrict their use.

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

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

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

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

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

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

Class VIII soils and landforms 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 too cold or too 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, though they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is indicated in table 6. All soils in the survey area except those named at a level higher than the series are included. Some of the soils that are well suited to crops and pasture may be in low-intensity use, for example, soils in capability classes I and II. Data in this table can be used to determine the farming potential of such soils.

The capability subclass is identified in the description of each soil map unit in the section "Soil maps for detailed planning."

Woodland

Paxton G. Wolfe, woodland conservationist, Soil Conservation Service, helped prepare this section.

Somerset county has approximately 443,400 acres of woodland (*8*). This is nearly 64 percent of the total land area in the county. Farmers own 41 percent, private concerns own 45 percent, forest industries own 2 percent, and the State owns 12 percent of the commercial woodland in the county. One percent of the woodland is classified as noncommercial.

Stands of second- and third-growth trees make up the woodland in the county. The principal forest cover types (*6*) making up the present woodland and the extent of each, as given by the Forest Service, are described in the following paragraphs.

Oak-hickory makes up 52 percent of the total woodland. This cover type mainly consists of white oak, red oak, and hickory, although black oak and chestnut oak are predominant in some stands. The principal associates are yellow-poplar, shagbark hickory, white ash, red maple, and beech.

Elm-ash-red maple makes up 8 percent of the total woodland. White ash, American elm, and red maple are predominant. Associates are slippery elm, yellow birch, sycamore, and hemlock.

Maple-beech-birch makes up 24 percent of the total woodland. Sugar maple, beech, and yellow birch are the component species in this cover type. Associates are varying admixtures of basswood, red maple, hemlock, red oak, white ash, white pine, black birch, black cherry, yellow-poplar, and cucumbertree.

Aspen-birch makes up 6 percent of the total woodland. Quaking aspen, bigtooth aspen, and gray birch predominate the mixture of the cover type. Principal associates are pin cherry, red maple, yellow birch, white pine, ash, and sugar maple.

Chestnut oak makes up 6 percent of the total woodland. Chestnut oak is in pure stands or is predominant. Common associates are red oak, white oak, black oak, scarlet oak, pitch pine, blackgum, and red maple.

Virginia pine-pitch pine makes up 2 percent of the total woodland. Virginia pine and pitch pine predominate. Principal associates are red oak, black oak, scarlet oak, chestnut oak, and hickory.

White pine makes up 2 percent of the total woodland. White pine is pure or is predominant. The principal associates are Virginia and pitch pine, ash, sugar and red maple, hemlock, red and white oak, quaking and bigtooth aspen, and paper, yellow, and black birch.

Seventy-five percent of the woodland in the county is on soils that have very high to moderately high potential productivity. Fifteen percent is on soils that have moderate productivity, and 10 percent is on soils that have low productivity.

Approximately 50 percent of the commercial forest acreage is sawtimber, 28 percent is poletimber, 19 percent is seedlings and saplings, and 3 percent is classified as nonstocked or forest land that is stocked with less than 10 percent desirable trees.

Generally, the soils in this county are capable of supporting good stands of red oak, sugar maple, yellow-poplar, ash, and white pine. Trees grow more slowly on the shallow and poorly drained soils than on the deeper, well drained soils.

Good woodland management in areas where potential productivity is very high to moderately high helps encourage the growth of desirable trees. The local service forester or a consulting forester can provide assistance for a woodland improvement program. Those soils rated low for potential productivity generally will not economically justify any management to increase yields of wood crops. Soils that are rated moderate are the most difficult to appraise for management of wood crops. An onsite inventory of the growing stock and its quality is needed. An investigation of market potential is needed to determine if woodland management is economically feasible where soils rated moderate are mixed with more productive soils.

The county has an ideal climate for the production of maple syrup. Most 'sugar bushes' are on the Rayne, Gilpin, and Ernest soils in the maple-beech-birch forest cover type. The service forester or a consulting forester helps woodland owners develop their stands for the production of maple syrup by the proper silvicultural treatment. The sap of individual sugar maples are checked for sugar percentage to determine which trees are to remain in the stand for tapping in February and March.

The woodland in Somerset County has watershed protection and recreational and esthetic values as well as a source of income for woodland owners. The better sites return a good profit to the owner, if they are properly managed for wood crops and are protected from fire, disease, insects, and livestock grazing.

Woodland management and productivity

Table 7 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Map unit symbols for soils suitable for wood crops are listed, and the ordination (woodland suitability) symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *d*, restricted root depth; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates insignificant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the following order: x, w, d, f, and r.

In table 7 the soils are also rated for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of major soil limitations.

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

Considered in the ratings of *windthrow hazard* are characteristics of the soil that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that trees in wooded areas are not expected to be blown down by commonly occurring winds; *moderate*, that some trees are 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. Site index is listed for trees that woodland managers generally favor for wood crop production. They are the most important tree species in regard to growth rate, quality, value, and marketability. Other trees that commonly occur on the soil are also listed, regardless of potential value and growth.

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

Engineering

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 8 shows, for each kind of soil, the degree and kind of limitations for building site development; table 9, for sanitary facilities; and table 11, for water management. Table 10 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

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

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 8. A *slight* limitation indicates that soil properties generally are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, communications and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or

extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 8 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious hazard.

Local roads and streets referred to in table 8 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to hard rock or very compact layers, and content of large stones affect stability and ease of excavation.

Lawns and landscaping require soils that are suitable for the establishment and maintenance of turf for lawns and ornamental trees and shrubs for landscaping. The best soils are firm after rains, are not dusty when dry, and absorb water readily and hold sufficient moisture for plant growth. The surface layer should be free of stones. If shaping is required, the soils should be thick enough over bedrock or hardpan to allow for necessary grading. In rating the soils, the availability of water for sprinkling is assumed.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 9 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good*, *fair*, or *poor*, which, respectively, mean about the same as the terms *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones, boulders, and shallowness to bedrock interfere with installation. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand and gravel or fractured bedrock is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold 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. Soils that are very high in content of organic matter and those that have cobbles, stones, or boulders are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon

floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soil material affect the performance of embankments.

Sanitary landfill is a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil material. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness can be a limitation, because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

Ease of excavation affects the suitability of a soil for the trench type of landfill. A suitable soil is deep to bedrock and free of large stones and boulders. If the seasonal water table is high, water will seep into trenches.

Unless otherwise stated, the limitations in table 9 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry periods. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 10 by ratings of good, fair, or poor. The texture, thickness, and organic matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 14 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, low potential frost action, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*.

Sand and *gravel* are used in great quantities in many kinds of construction. The ratings in table 10 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 14.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in

preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slope, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of gravel, stones, or soluble salt; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 11 the soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Pond reservoir areas hold water behind a dam or embankment (fig. 19). Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

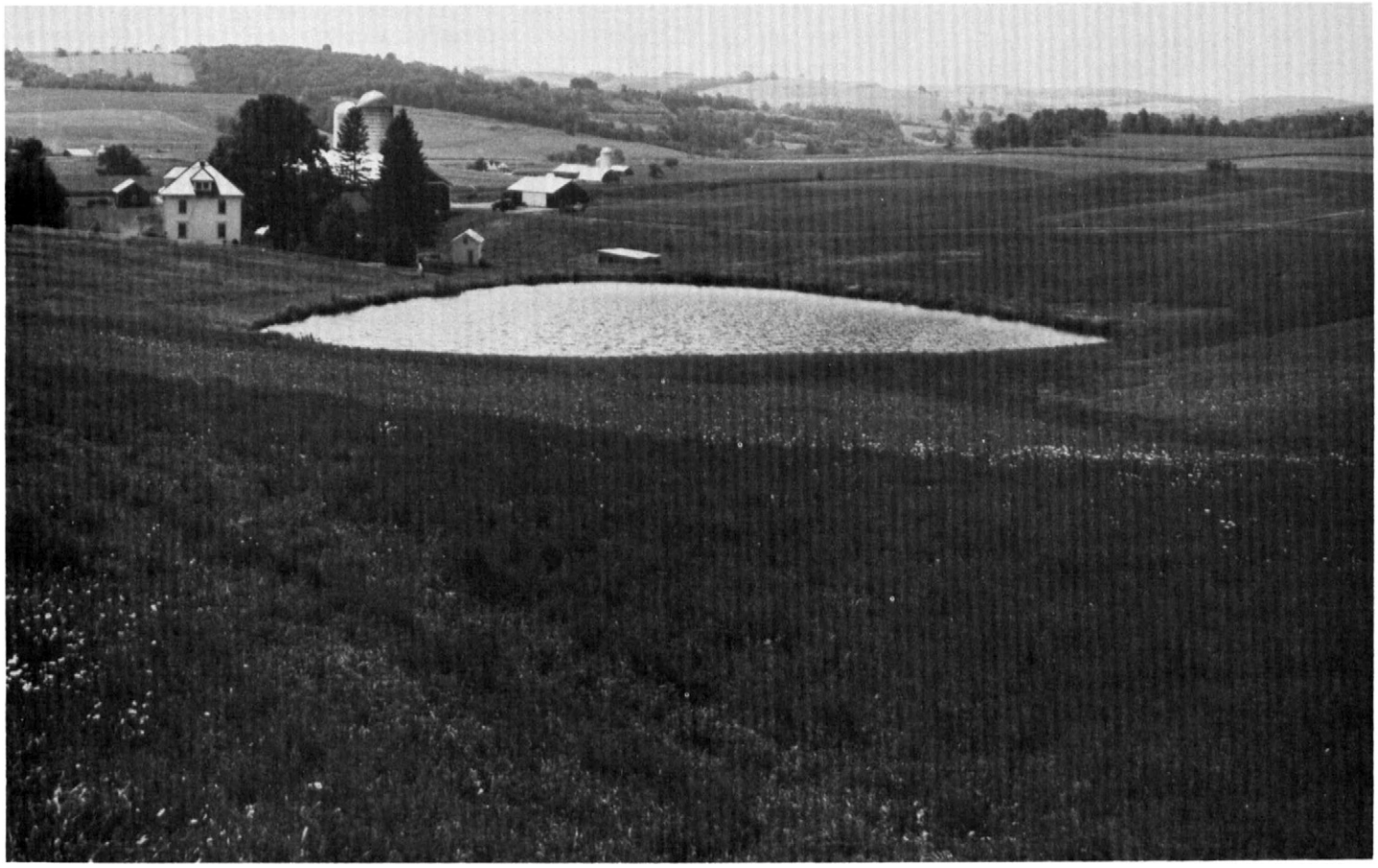


Figure 19.—A farm pond on Cavode silt loam, 3 to 8 percent slopes. The high content of clay in the subsoil is desirable for sealing ponds.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Large stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

Aquifer-fed excavated ponds are bodies of water made by excavating a pit or dugout into a ground-water aquifer. Excluded are ponds that are fed by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Ratings in table 11 are for ponds that are properly designed, located, and constructed. Soil properties and site features that affect aquifer-fed ponds are depth to a permanent water table, permeability of the aquifer, quality of the water, and ease of excavation.

Drainage of soil is affected by such soil properties as permeability; texture; depth to bedrock, hardpan, or other layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; salinity and alkalinity; and availability of outlets for drainage.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock, hardpan, or other unfavorable material; large stones; permeability; ease of establishing vegetation; and resistance to water erosion, soil blowing, soil slipping, and piping.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

Recreation

Recreation is an important activity in Somerset County. The many and diversified recreational facilities attract thousands of tourists and residents each year and provide important sources of income.

Among the major attractions are several large resorts, approximately ten golf courses over 100 acres in size, and six large lakes over 100 acres in size. More than 20 percent of the land area in Somerset County is used for recreation. The two largest parks are Laurel Hill State Park, 4,126 acres, and Kooser State Park, 350 acres. Laurel Hill State Park has an estimated 650,000 visitors, annually, and Kooser State Park has 363,000 visitors.

Hunting in Somerset County is of major economic importance. The Pennsylvania Game Commission operates five tracts of land consisting of 15,615 acres, and the Pennsylvania Department of Environmental Resources, Bureau of Forestry, has five tracts consisting of 28,385 acres. Seven farm game cooperative projects consisting of 75,000 acres are also used for hunting. Some private lands are owned by sports organizations.

About 75 percent of the soils in the county have potential for recreational development. The deep, well drained Rayne, Hazleton, and Leck Kill soils having as much as 15 percent slopes have the best potential for most recreational uses. About 40 percent of the soils in the county have very stony or bouldery surfaces which seriously limit potential for more intensive uses. These stony soils have some potential for hiking trails, hunting, and other types of recreation that require slight or no land alteration. The soils that have poorest potential for most recreational uses are the poorly drained and very poorly drained Armagh, Brinkerton, Purdy, Nolo, and Atkins soils and the steep and very steep Rayne, Gilpin, Hazleton, Berks, Weikert, and Leck Kill soils.

The soils of the survey area are rated in table 12 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the 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 12 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 9, and interpretations for dwellings without basements and for local roads and streets, given in table 8.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facili-

ties and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use 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 camping sites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as 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 will 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 or boulders, is firm after rains, and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil over bedrock or hardpan should be enough to allow necessary grading.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the annual period of use. They should have moderate slopes and have 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 should have a surface that is free of stones and boulders and have moderate slopes. Suitability of the soil for traps, tees, or greens was not considered in rating the soils. Irrigation is an assumed management practice.

Wildlife

Clayton L. Heiney, wildlife biologist, Soil Conservation Service, helped prepare this section.

The abundance of some kinds of wildlife in Somerset County is related to the kinds of soils present. The relationships, however, are not always easily distinguished. Soils affect wildlife by their influence on the vegetation that supplies food and cover.

Under natural conditions, the distribution of various kinds of vegetation in an area depends on the pattern or combination of soils. An area is inhabited by the kinds of wildlife whose habitat requirements are met by the vegetation in the area. If the natural conditions in the area are altered by drainage or other methods of farm and woodland management, the kinds and patterns of vegetation change. In turn, the kinds and numbers of wildlife change.

The main species of game in the county are white-tailed deer, black bear, gray squirrels, cottontail rabbits, ruffed grouse, bobwhite quail, turkey, ring-necked pheasant, woodcock, and waterfowl. Important furbearers are the beaver, muskrat, raccoon, and fox. A large variety of other wildlife is also present, including songbirds, reptiles, amphibians, and small mammals. Both game and nongame species are important to man. Together they contribute to maintaining the diversity and stability of ecosystems in the county.

White-tailed deer are throughout Somerset County. They are considered forest species, but they neither prefer nor do well in large, mature forests. They prefer a combination of brush or young trees, smaller areas of mature trees, and small open areas.

Gray squirrels, cottontail rabbits, and ruffed grouse are also throughout the county. Ruffed grouse prefer young brushy stands of trees and open areas similar to those that white-tailed deer frequent. Squirrels are especially common in areas that have mature, nut-producing trees. Cottontail rabbits are mostly in areas of present or past agricultural activity. Abandoned farms, growing up in brush, generally have a high population of cottontail rabbits.

Black bear prefer forests that have mixed stands of conifers and hardwoods of various ages. They prefer areas that have ample water sources in streams, ponds, and lakes. In Somerset County, bear are mostly in the Hazleton-Cookport and Leck Kill-Albrights soil associations.

Muskrat, beaver, and river otter live along rivers, lakes, and ponds. Muskrats are throughout the county, whereas river otter and beaver are generally in the more remote areas.

Bobwhite quail and ring-necked pheasant are in the central part of Somerset County. Quail are in a small area almost entirely within the Hazleton-Cookport soil association. Ring-necked pheasant are in a larger area mostly within the Rayne-Gilpin-Wharton-Cavode, Berks-Weikert, and Leck Kill-Albrights soil associations.

The distribution and abundance of wildlife in Somerset County have been greatly affected by patterns of land use, especially the increasing urban development. The distribution of species such as the black bear and river otter is affected more by man's activities and development than by the soil type or vegetation.

Wildlife habitat

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover,

and water. If any one of these elements is missing, is inadequate, or is inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 13, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and 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* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

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

Grain and seed crops are seed-producing annuals used by wildlife. The major soil properties 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 that are planted for wildlife food and cover. Major soil properties 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, that provide food and cover for wildlife. Major soil properties 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 ragweed.

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

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Soil properties that have a major effect on the growth of coniferous plants 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, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, rushes, sedges, and reeds.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control structures in marshes or streams. Major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat 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.

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants.

Wetland habitat consists of open, marshy or swampy, shallow water areas where water-tolerant plants grow.

Soil properties

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features.

Engineering properties

Table 14 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 14 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil series and morphology."

Texture is described in table 14 in the standard terms used by the U.S. Department of Agriculture (*7*). These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (Unified) (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*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, plasticity index, liquid limit, and organic matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging 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. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The estimated classification, without group index numbers, is given in table 14. Also in table 14 the percentage, by weight, of rock fragments more than 3 inches in diameter is estimated for each major horizon. These estimates are determined mainly by observing volume percentage in the field and then converting that, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Range in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount across classification boundaries (1 or 2 percent), the classification in the marginal zone is omitted.

Physical and chemical properties

Table 15 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss 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 percent, 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 of the soil. It is a source of nitrogen and other nutrients for crops.

Soil and water features

Table 16 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received 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 chiefly of deep, well drained to excessively drained sands or gravels. 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 that have a layer that impedes the downward movement of water or soils that have 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 clay soils 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 materi-

al. These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains or after snow melts is not considered flooding, nor is water in swamps and marshes. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. 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. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 5 to 6 feet or less. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils. The kind of bedrock and its hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

Potential frost action refers to the likelihood of damage to pavements and other structures by frost heaving and low soil strength after thawing. Frost action results from the movement of soil moisture into the freezing temperature zone in the soil, which causes ice lenses to form. Soil texture, temperature, moisture content, porosity, permeability, and content of organic matter are the most important soil properties that affect frost action. It is assumed that the soil is not covered by insulating vegetation or snow and is not artificially drained. Silty and clayey soils that have a high water table in winter are most susceptible to frost action. Well drained very gravelly or sandy soils are the least susceptible.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Factors of soil formation

Soils form through the interaction of five major factors: parent material, relief, plant and animal life, climate, and time. The relative influence of each factor varies from place to place. In places, one factor can dominate formation of the soil and determine most properties. In Somerset County, local variations in soils are mainly because of differences in parent material, topography, and drainage.

Parent material

Parent material is the unconsolidated mass in which the soils form. It determines the initial mineral and chemical composition of the soil and influences the rate and balance of soil-forming processes. In Somerset County, soils have formed in materials weathered in place from many kinds of rock or in transported materials moved by water or in colluvial material. Most of the soils, however, are residual soils that formed in place. Many differences among such soils are related directly to variations in the parent rock.

The Rayne, Gilpin, Wharton, Cavode, and Armagh soils formed in material weathered from brown shale and siltstone.

The Albrights and Leck Kill soils formed in material weathered from red shale and siltstone. The Hazleton, Cookport, Dekalb, and Nolo soils formed in material weathered from gray and brown sandstone. The Ernest and Brinkerton soils formed in colluvial material. The Pope, Philo, Atkins, Chavies, Allegheny, Monongahela, Tyler, and Purdy soils formed in old and recent alluvium. Soils that formed in old alluvium, such as the Allegheny, Chavies, Monongahela, Tyler, and Purdy soils have more strongly developed horizons and are on terraces.

Relief

Relief is a modifying factor in the formation of soils. The extensive areas of rolling relief in Somerset County have contributed to the large acreage of well drained soils, such as the Rayne, Gilpin, Berks, and Leck Kill soils. In areas that have low relief, slow surface drainage contributes to a high water table. Examples are the Atkins, Brinkerton, Armagh, Tyler, Cavode, Nolo, and Purdy soils. In areas that have more relief, the soils generally have very steep slopes, the surface water rapidly drains away, and the soils are well drained. Examples are the Hazleton, Dekalb, Berks, and Weikert soils.

Plant and animal life

Plants, animals, insects, bacteria, and fungi contribute to the soil-forming processes. Plants are largely responsible for the amount of organic matter, the color of the surface layer, and the amount of nutrients. Earthworms, cicada, and other burrowing animals help keep the soil open and porous. Bacteria and fungi decompose the vegetation, thus recycling nutrients for plant food. In Somerset County, the native forest has profoundly influenced soil formation. Man has greatly influenced the soil surface where he has cleared the forest and plowed the land. He has added fertilizers, has artificially drained, has mixed some of the soil horizons, and has even moved soil material from place to place.

Climate

The climate in Somerset County is humid-temperate. It affects the formation of soils by influencing the rate at which rock weathers and the rate of which organic and mineral materials decompose.

Time

The effect of plants, animals, climate, and topography on changing the parent material to soil is influenced by the length of time these factors have acted on the parent material. The degree of profile development generally indicates the age of the soil.

The Pope, Philo, and Atkins soils on flood plains are younger than other soils in the county. Organic matter has accumulated in the surface layer of these soils, but their subsoil has less developed layers than the subsoil of older soils on uplands. The Rayne, Wharton, Cavode, and Leck Kill soils have a well developed profile. These soils are on uplands and have been in place long enough for a distinct horizon to form.

Processes of soil formation

Several processes are involved in the formation of soil in Somerset County. These include the accumulation of organic matter; the leaching of soluble salts; the reduction and translocation of iron; the formation of soil structure; and some translocation and loss of clay minerals, aluminum, silica, and iron. These processes proceed at variable rates, depending on soil properties and environment.

In the humid-temperate climate of this area, carbonate minerals are decomposed by water that has been made slightly acid by dissolved carbon dioxide and organic acids. The calcium and magnesium, dissolved from carbonates and other soluble salts formed during weathering of primary minerals, are largely leached from the soil and passed into the drainage water.

During storms of high intensity, water percolates through the soil and washes suspended clay particles from the upper horizon to the lower horizon. As the clay particles accumulate, they form characteristic films of oriented clay on the surfaces of cracks and openings. These are referred to as clay films. This process increases the clay content of the B horizon as much as 12 to 25 percent. These clay-enriched subsurface horizons are diagnostic for classification of the soil.

The oxidation and reduction of iron depend mainly on the height of the water table in the soil. The brown or strong brown B horizon of well drained soils, such as those of the Rayne and Gilpin series, indicates the presence of oxidized iron compounds and the absence of a water table. Brownish or reddish soils mottled with gray indicate some reduction of iron resulting from a fluctuating water table. Poorly drained soils, such as those of the Armagh series, have a grayish B horizon, indicative of iron reduction caused by a more permanent water table.

Many moderately well drained and poorly drained soils have a well developed subsurface horizon that is firm or very firm and brittle when moist. This horizon has a closely packed soil matrix, high bulk density, and, in many places, large polyhedrons separated by gray material. The process by which this horizon is formed is not completely understood, but clay bridges or silica and aluminum oxides are thought to be involved as bonding agents between soil particles. Horizons that have these characteristics are called fragipans. The Ernest, Cookport, and Albrights soils have a fragipan.

Classification of the soils

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to "Soil taxonomy" (*9*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 17, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Fluvaquents (*Fluv*, meaning water deposited, plus *aquent*, the suborder of Entisols that have an aquic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups 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 is thought to typify the great group. An example is Typic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is fine-loamy, mixed, nonacid, mesic, Typic Fluvaquents.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

Soil series and morphology

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil that is typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*7*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series. Phases, or map units, of each soil series are described in the section "Soil maps for detailed planning."

Albrights series

The Albrights series consists of fine-loamy, mixed, mesic Aquic Fragiudalfs. These deep, moderately well drained and somewhat poorly drained soils are on mountaintops, hills, valley side slopes, and benches. They formed in colluvium from red shale.

Albrights soils are in close association on the landscape with the Leck Kill, Rayne, Gilpin, Hazleton, Berks, and Weikert soils. They are not so well drained as Leck Kill, Rayne, Gilpin, Hazleton, Berks, and Weikert soils. They have reddish colors, whereas Ernest soils have brownish colors.

Typical pedon of Albrights silt loam, 8 to 15 percent slopes, in a cultivated field, 3,200 feet southeast of the intersection of Routes T712 and 160 in Wittenberg:

Ap—0 to 7 inches; dark reddish brown (5YR 3/3) silt loam; weak fine granular structure; friable, slightly sticky, nonplastic; 10 percent coarse fragments; medium acid; abrupt wavy boundary.

B1—7 to 11 inches; red (2.5YR 4/6) channery silt loam; moderate medium subangular blocky structure; friable, sticky, slightly plastic; thin clay films; 15 percent coarse fragments; medium acid; gradual smooth boundary.

B2t—11 to 18 inches; reddish brown (5YR 4/4) clay loam; few fine faint reddish gray (5YR 5/2) mottles; moderate coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few roots; thin continuous clay films; 10 percent coarse fragments; medium acid; abrupt irregular boundary.

Bx1—18 to 38 inches; reddish brown (5YR 5/4) channery silty clay loam; few faint light gray (10YR 7/1) mottles, dark reddish brown (2.5YR 3/4) prism faces; moderate very coarse prismatic structure parting to moderate medium platy; very firm and brittle, slightly sticky, nonplastic; thin discontinuous clay films; 15 percent coarse fragments; common black oxide concretions; strongly acid; abrupt irregular boundary.

Bx2—38 to 54 inches; yellowish red (5YR 5/6) shaly clay loam; common fine distinct gray (5YR 6/1) mottles; reddish gray (5YR 5/2) prism faces; moderate very coarse prismatic structure parting to moderate thick platy and medium angular blocky; firm and brittle, sticky, plastic; thin continuous clay films; 15 percent coarse fragments; common black concretions; strongly acid; abrupt irregular boundary.

C—54 to 65 inches; yellowish red (5YR 5/6) shaly silty clay loam; massive; firm, slightly sticky, slightly plastic; few thin clay films on peds and in pores; 20 percent coarse fragments; strongly acid.

The solum ranges from 48 to 65 inches in thickness. Depth to bedrock ranges from 6 to 8 feet or more. Depth to the fragipan ranges from 18 to 28 inches. Coarse fragments range from 5 to 15 percent in horizons above the fragipan and 15 to 30 percent in the fragipan. In unlimed areas, reaction in the solum is very strongly acid or strongly acid.

The Ap horizon has hue of 7.5YR through 5YR, value of 3 through 5, and chroma of 2 through 4.

The B1 and B2 horizons have hue of 5YR through 2.5YR, value of 5 and 4, and chroma of 3 through 6. These horizons are heavy silt loam through clay loam.

The Bx horizon has hue of 2.5YR through 5YR, value of 4 and 5, and chroma of 2 through 6. The fine earth is loam through silty clay loam.

The C horizon has hue of 2.5YR and 5YR, value of 4 and 5, and chroma of 2 through 6. The fine earth is silt loam through silty clay loam.

Allegheny series

The Allegheny series consists of fine-loamy, mixed, mesic Typic Hapludults. These deep, well drained soils are on old terraces adjacent to the main streams in the county. They formed in old alluvium deposits derived largely from acid shale, siltstone, and sandstone.

Allegheny soils are in close association on the landscape with the Chavies, Pope, Monongahela, Philo, Purdy, and Atkins soils. Allegheny soils are as well drained as the Pope and Chavies soils, but the Pope and Chavies soils are coarse-loamy. Allegheny soils are better drained than the Monongahela, Purdy, Philo, and Atkins soils.

Typical pedon of Allegheny silt loam, gravelly substratum, 3 to 8 percent slopes, in cropland in Summit Township on Route 219, 1/4 mile south of the intersection with Route T363, in a roadcut opposite the entrance to the Meyersdale High School on Route 55143:

Ap—0 to 10 inches; dark brown (7.5YR 4/2) silt loam; weak fine granular structure; friable, nonsticky, nonplastic; many roots; neutral; clear smooth boundary.

B1—10 to 15 inches; strong brown (7.5YR 5/8) gravelly loam; weak fine and medium subangular blocky structure; friable, slightly sticky, nonplastic; many roots; 15 percent coarse fragments; strongly acid; clear smooth boundary.

B2t—15 to 32 inches; strong brown (7.5YR 5/6) gravelly silty clay loam; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; common roots; 15 percent coarse fragments; thick continuous silt and clay films; strongly acid; clear smooth boundary.

B3—32 to 40 inches; strong brown (7.5YR 5/8) gravelly loam; weak fine subangular blocky structure; friable, nonsticky, nonplastic; few roots; 30 percent coarse fragments; strongly acid; clear smooth boundary.

IIC—40 to 60 inches; brown (10YR 5/3) gravelly sand; massive; very friable; 35 percent coarse fragments; strongly acid.

The solum ranges from 40 to 80 inches in thickness. Depth to bedrock is more than 6 feet. Coarse fragments are 0 to 15 percent in the upper part of the solum and 10 to 30 percent in the lower part of the solum. Typically, these soils have IIC horizons that have 30 to 60 percent coarse fragments. Reaction in the solum ranges from strongly acid to extremely acid in unlimed areas.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 through 4.

The B1 horizon has hue of 10YR and 7.5YR, value of 4 and 5, and chroma of 3 through 8. The fine earth is loam or silt loam.

The B2 and B3 horizons have hue of 7.5YR and 10YR, value of 4 or 5, and chroma of 3 through 8. Fine earth of the B2 horizon ranges from loam through silty clay loam, and in the B3 horizon it ranges from loam to silt loam.

The C horizon has hue of 7.5YR or 10YR, value of 3 through 6, and chroma of 3 through 8.

Armagh series

The Armagh series consists of clayey, mixed, mesic Typic Ochraquults. These deep, poorly drained soils are on upland flats and in depressions. They formed in materials weathered from gray and brown shale and siltstone.

Armagh soils are in close association on the landscape with the Brinkerton, Cavode, Wharton, and Ernest soils. Armagh soils have more clayey subsoil than the Brinkerton and Ernest soils, and they are more poorly drained than the Cavode and Wharton soils.

Typical pedon of Armagh silt loam, in grassland, on the Brothersvalley Township line, in a roadcut on Route 31 approximately 2/3 mile east of Brotherton:

Ap—0 to 6 inches; very dark grayish brown (2.5Y 3/2) silt loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many roots; very strongly acid; clear smooth boundary.

B1g—6 to 11 inches; light gray (10YR 7/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and brownish yellow (10YR 6/6) mottles; moderate very thick platy structure parting to moderate fine angular blocky; firm, very sticky, plastic; few roots; very strongly acid; clear wavy boundary.

B2t—11 to 50 inches; light gray (10YR 7/1) silty clay; many coarse prominent strong brown (7.5YR 5/6) mottles; strong medium prismatic structure parting to moderate medium angular blocky; very firm, very sticky, plastic; 5 percent coarse fragments in lower part; no roots; very strongly acid; gradual wavy boundary.

C—50 to 60 inches; light gray (10YR 7/1) shaly silty clay loam; many coarse prominent strong brown (7.5YR 5/6) mottles; strong very coarse prismatic structure; firm, sticky, slightly plastic; 25 percent coarse fragments; very strongly acid.

R—60 inches; weathered gray and brown shale with some interbedded siltstone.

The solum ranges from 36 to 50 inches in thickness. Depth to bedrock ranges from 4 to 6 feet. Coarse fragments are 0 to 10 percent throughout the solum and 20 to 30 percent in the C horizon. Reaction in the solum is very strongly acid and strongly acid.

The Ap horizon has hue of 10YR and 2.5Y, value of 3 and 4, and chroma of 1 and 2.

The B horizon has hue of 10YR, value of 5 through 7, and chroma of 1 and 2. Mottles have hue of 7.5YR and 10YR, value of 5 or 6, and chroma of 6. The B horizon is silty clay loam through silty clay and has more than 35 percent clay.

The C horizon has hue of 10YR, value of 5 through 7, and chroma of 1 and 2.

Atkins series

The Atkins series consists of fine-loamy, mixed, acid, mesic Typic Fluvaquents. These deep, poorly drained soils are on flood plains and along the main streams of the county. The soils formed in alluvium washed mainly from upland soils derived from interbedded acid sandstone and shale.

Atkins soils are in close association on the landscape with the Pope, Chavies, Allegheny, Philo, and Monongahela soils. Atkins soils are more poorly drained than the associated soils.

Typical pedon of Atkins silt loam, in a pasture, about 2 miles west of Somerset and .06 mile northwest of the intersection of Routes 31 and 55064, along the streambank of the west branch of Coxes Creek:

A1—0 to 4 inches; dark gray (10YR 4/1) silt loam; weak fine granular structure; friable, nonsticky, slightly plastic; many roots; strongly acid; clear smooth boundary.

A2—4 to 9 inches; gray (10YR 6/1) silt loam; common medium distinct dark brown (7.5YR 4/4) mottles; moderate thin platy structure parting to granular; friable, sticky, plastic; many roots; very strongly acid; clear wavy boundary.

B2g—9 to 46 inches; gray (10YR 6/1) clay loam; common medium distinct brown (7.5YR 5/4) and strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure; firm, very sticky, very plastic; many small pores; very strongly acid; gradual wavy boundary.

C—46 to 60 inches; light brownish gray (10YR 6/2) loam; massive; friable; very strongly acid.

The solum ranges from 34 to 48 inches in thickness. Depth to bedrock is more than 6 feet. Reaction in the solum is strongly acid or very strongly acid.

The A1 and A2 horizons have hue of 10YR, value of 4 through 6, and chroma of 1 and 2. These horizons are dominantly silt loam but are loam or fine sandy loam in some areas.

The B2 horizon has hue of 10YR and 2.5Y, value of 4 through 6, and chroma of 0 through 2. If value is 5 or less, chroma can be 1 or less. This horizon is silt loam through clay loam.

The C horizon has hue of 10YR and 2.5Y, value of 5 and 6, and chroma of 1 through 8. This horizon is sandy loam through clay loam.

Berks series

The Berks series consists of loamy-skeletal, mixed, mesic Typic Dystrochrepts. These moderately deep, well drained soils are on hills and ridges on uplands. They formed in material derived from acid, brown shale and siltstone.

Berks soils are in close association on the landscape with the Weikert, Blairton, Rayne, Gilpin, Leck Kill, and Hazleton soils. The Berks soils are not so deep to bedrock as the Rayne, Leck Kill, and Hazleton soils. They are deeper to bedrock than the Weikert soils and are better drained than the Blairton soils. The Berks soils have more coarse fragments in the subsoil than the Gilpin soils.

Typical pedon of Berks channery silt loam, 15 to 25 percent slopes, in a cultivated field, 2 miles south of New Baltimore, 0.5 mile north of Route 31:

Ap—0 to 9 inches; dark brown (10YR 4/3) channery silt loam; weak fine granular structure; friable, slightly sticky, nonplastic; 20 percent coarse fragments; strongly acid; abrupt wavy boundary.

B1—9 to 15 inches; yellowish brown (10YR 5/6) channery silt loam; weak fine subangular blocky structure; friable, slightly sticky, nonplastic; 30 percent coarse fragments; strongly acid; clear wavy boundary.

B2—15 to 24 inches; yellowish brown (10YR 5/6) channery silt loam; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; 35 percent coarse fragments; strongly acid; abrupt wavy boundary.

B3—24 to 29 inches; strong brown (7.5YR 5/6) channery silt loam; moderate medium subangular blocky structure; very firm, slightly sticky, slightly plastic; 40 percent coarse fragments; strongly acid; abrupt wavy boundary.

C—29 to 38 inches; strong brown (7.5YR 5/6) very channery loam; massive; very firm, slightly sticky, nonplastic; 70 percent coarse fragments; strongly acid.

R—38 inches; gray and brown shale and siltstone.

The solum ranges from 20 to 34 inches in thickness. Depth to bedrock ranges from 26 to 40 inches. Coarse fragments range from 20 to 35 percent in the Ap horizon and from 30 to 60 percent in the B horizon. Reaction is very strongly acid or strongly acid throughout the solum.

The Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 3. The fine earth is silt loam or loam.

The B2 horizon has hue of 7.5YR and 10YR, value of 5, and chroma of 6. The fine earth is silt loam or loam.

The C horizon has hue of 7.5YR and 10YR, value of 5, and chroma of 4 through 6.

Blairton series

The Blairton series consists of fine-loamy, mixed, mesic Aquic Hapludults. These moderately deep, moderately well drained and somewhat poorly drained soils are on upper side slopes of hills and ridges on uplands. They formed in material weathered from brown, acid shale.

Blairton soils are in close association on the landscape with the Berks, Gilpin, Rayne, Hazleton, Wharton, and Cookport soils. The Blairton soils are not so deep as the Wharton and Cookport soils. They are not so well drained as the Berks, Gilpin, Rayne, and Hazleton soils.

Typical pedon of Blairton channery silt loam, 8 to 15 percent slopes, in a cultivated field, 1 mile southeast of Bakersville on U.S. Route 31 and 150 feet north of Route 31:

Ap—0 to 9 inches; dark grayish brown (2.5Y 4/2) channery silt loam; moderate fine granular structure; friable, slightly sticky, slightly plastic; 15 percent coarse fragments; many roots; few thin clay films; very strongly acid; abrupt smooth boundary.

B21t—9 to 21 inches; strong brown (7.5YR 5/6) channery silty clay loam; yellowish brown (10YR 5/4) clay film on ped faces; moderate fine subangular blocky structure; friable, sticky, slightly plastic; many roots; thin continuous clay films; 25 percent coarse fragments; very strongly acid; gradual wavy boundary.

B22tg—21 to 31 inches; strong brown (7.5YR 5/6) channery silty clay loam; common medium prominent light gray (2.5Y 7/1) mottles; weak coarse subangular blocky structure parting to moderate medium angular blocky; friable, sticky, slightly plastic; many roots; thin continuous clay films; 25 percent coarse fragments; very strongly acid; clear wavy boundary.

B3tg—31 to 39 inches; grayish brown (2.5Y 5/2) shaly silty clay loam; common fine distinct light gray (5Y 7/1) mottles; weak coarse subangular blocky structure; firm, sticky, slightly plastic; few roots; thin continuous clay films; 45 percent coarse fragments; common black concretions; very strongly acid; abrupt wavy boundary.

R—39 inches; grayish brown thin-bedded shale with some fragments having black coatings; loose, easily rippable.

The solum ranges from 24 to 40 inches in thickness. Depth to bedrock ranges from 30 to 40 inches. Coarse fragments range from 15 to 25 percent in the Ap horizon and from 25 to 45 percent in individual Bt horizons. They average less than 35 percent in the control section. Coarse fragments in the C horizon range from 35 to 70 percent. In unlimed areas, reaction in the solum ranges from extremely acid to strongly acid.

The Ap horizon has hue of 10YR and 2.5Y, value of 3 and 4, and chroma of 2 through 4.

B21t and B22t horizons have hue of 7.5YR through 2.5Y, value of 5 and 6, and chroma of 2 through 8.

The upper part of the B22t horizon has many low chroma mottles which are between depths of 12 and 30 inches. The fine earth is silty clay loam through loam.

The C horizon, if present, has hue of 7.5YR through 2.5Y, value of 5 and 6, and chroma of 2 through 8. The fine earth is silt loam or loam.

Brinkerton series

The Brinkerton series consists of fine-silty, mixed, mesic Typic Fragiaqualfs. These deep, poorly drained soils are at the base of hills, mountains, and valleys. They formed in colluvium from acid, brown shale and siltstone.

Brinkerton soils are in close association on the landscape with the Atkins, Armagh, Purdy, Tyler, Cavode, and Ernest soils. Brinkerton soils have a fragipan, whereas the Atkins and Armagh soils do not. Brinkerton soils are less clayey than the Purdy soils, and they are more poorly drained than the Cavode, Tyler, and Ernest soils.

Typical pedon of Brinkerton silt loam, 0 to 3 percent slopes, in idle land, along Route 55042, 1/2 mile southwest of the intersection of old U.S. Route 219 and State Route 31, 350 feet northeast of Somerset High School:

Ap1—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; many roots; medium acid; clear smooth boundary.

Ap2—4 to 10 inches; dark gray (10YR 4/1) silt loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; many roots; strongly acid; abrupt smooth boundary.

B2t—10 to 24 inches; gray (10YR 5/1) silty clay loam; common fine and medium prominent strong brown (7.5YR 5/6 and 5/8) mottles; light brownish gray (10YR 6/2) ped faces; moderate medium angular blocky structure; firm, sticky, plastic; many roots; thin continuous clay films; very strongly acid; gradual wavy boundary.

Bx1—24 to 38 inches; gray (2.5Y 5/1) silty clay loam; many medium prominent strong brown (7.5YR 5/6 and 5/8) mottles; grayish brown (2.5Y 5/2) prism faces; moderate coarse prismatic structure parting to moderate coarse angular blocky; very firm and brittle, sticky, plastic; few fine prominent black coatings on ped faces; 5 percent coarse fragments; few roots; vertical root channels lined with thick clay films; thin continuous clay films on prism faces and in pores; very strongly acid; diffuse wavy boundary.

Bx2—38 to 46 inches; gray (2.5Y 5/0) silty clay loam; many medium prominent strong brown (7.5YR 5/8) mottles; grayish brown (2.5Y 5/2) prism faces; moderate coarse prismatic structure parting to weak coarse angular blocky; very firm and brittle, sticky, plastic; common medium prominent dark coatings on ped faces; few roots only on ped faces; 5 percent coarse fragments; thick clay films on vertical ped faces; very strongly acid; clear irregular boundary.

C—46 to 60 inches; brown (10YR 5/3) silt loam; massive; firm, slightly sticky, slightly plastic; 10 percent coarse fragments; strongly acid; abrupt smooth boundary.

The solum ranges from 40 to 50 inches in thickness. Depth to bedrock is more than 6 feet. Depth to the fragipan is from 16 to 26 inches. Coarse fragments are 0 to 10 percent in horizons above the fragipan, 5 to 20 percent in the fragipan, and 10 to 50 percent in the C horizon. In unlimed areas, reaction ranges from very strongly acid to strongly acid in the solum and is strongly acid or medium acid in the C horizon.

The Ap1 horizon has hue of 10YR, value of 2 and 4, and chroma of 1 and 2. The Ap2 horizon has hue of 10YR, value of 3 and 4, and chroma of 1 through 3.

The B2t horizon has hue of 10YR and 2.5Y, value of 5 and 6, and chroma of 1 and 2. This horizon is silt loam through silty clay loam.

The Bx horizon has hue of 10YR and 2.5Y, value of 5 and 6, and chroma of 0 through 2. This horizon is silt loam through silty clay loam.

The C horizon has hue of 10YR and 2.5Y, value of 4 and 5, and chroma of 3 and 4. The fine earth is loam through silty clay loam.

Cavode series

The Cavode series consists of clayey, mixed, mesic Aeric Ochraquults. These deep, somewhat poorly drained soils are in depressions and on flats on uplands. They formed in material derived from acid, brown shale and siltstone.

Cavode soils are in close association on the landscape with the Wharton, Ernest, Armagh, Brinkerton, Rayne, and Gilpin soils. The Cavode soils are more poorly drained than the Rayne, Gilpin, Wharton, and Ernest soils. They are better drained than the Armagh and Brinkerton soils.

Typical pedon of Cavode silt loam, 0 to 3 percent slopes, in a cultivated field, approximately 1 1/4 miles east of Brotherton at the northwest corner of the intersection of Routes 31 and T662:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; many roots; strongly acid; abrupt smooth boundary.

B21t—8 to 12 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm, sticky, plastic; many roots; thin discontinuous clay films; strongly acid; clear smooth boundary.

B22tg—12 to 28 inches; gray (10YR 6/1) silty clay; common medium prominent yellowish red (5YR 5/6) mottles; moderate medium angular blocky structure; firm, very sticky, very plastic; many roots; thick clay

films on ped faces; very strongly acid; gradual smooth boundary.

B23tg—28 to 42 inches; gray (10YR 6/1) silty clay; many coarse prominent yellowish red (5YR 5/6) mottles; gray (10YR 6/1) prism faces; moderate coarse prismatic structure parting to moderate coarse subangular blocky; firm, very sticky, very plastic; thick clay films on ped faces; very strongly acid; gradual smooth boundary.

B3t—42 to 54 inches; light brownish gray (10YR 6/2) silty clay loam; many medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; clay films on ped faces; 10 percent coarse fragments; strongly acid; gradual wavy boundary.

C—54 to 66 inches; dark yellowish brown (10YR 4/4) silty clay loam; massive; sticky and plastic; 10 percent coarse fragments; very strongly acid.

The solum ranges from 32 to 54 inches in thickness. Depth to bedrock ranges from 3 1/2 to 6 feet. Coarse fragments are 0 to 15 percent in the upper part of the solum and 10 to 30 percent in the lower part of the solum and C horizon. In unlimed areas, reaction in the solum is very strongly acid or strongly acid.

The Ap horizon has hue of 10YR, value of 3 and 4, and chroma of 2 through 4.

The upper part of the B horizon has hue of 10YR and 2.5Y, value of 4 and 5, and chroma of 3 through 6. The lower part of the B horizon has hue of 10YR and 2.5Y, value of 5 and 6, and chroma of 2 or less. The B horizon is silty clay loam through silty clay and has more than 35 percent clay in the control section.

The C horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 through 4. The fine earth is loam through silty clay loam.

Chavies series

The Chavies series consists of coarse-loamy, mixed, mesic Ultic Hapludalfs. These deep, well drained soils are on stream terraces in main valleys. They formed in stream deposits washed from acid shale and sandstone from uplands.

Chavies soils are in close association on the landscape with the Allegheny, Pope, Philo, Monongahela, Atkins, Tyler, and Purdy soils. Chavies soils are coarse-loamy, whereas the Allegheny soils are fine-loamy. They have a more clayey subsoil than the Pope soils and are better drained than the Philo, Atkins, Monongahela, Tyler, and Purdy soils.

Typical pedon of Chavies silt loam, 0 to 3 percent slopes, in a cultivated field, 1 1/2 miles north of Meyersdale on Route T385 and 1/4 mile west of the intersection of U.S. Route 219 and Route T385, approximately 450 feet north of T385 and 35 feet west of the farm equipment building:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam; weak medium platy structure; friable, nonsticky, slightly plastic; many fine roots; 5 percent coarse fragments; medium acid; abrupt smooth boundary.

B1—10 to 18 inches; brown (7.5YR 5/4) silt loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots; 10 percent coarse fragments; medium acid; clear smooth boundary.

B21t—18 to 28 inches; brown (7.5YR 5/4) silt loam; moderate, medium subangular blocky structure; friable, slightly sticky, slightly plastic; few thin clay films; many fine roots; 10 percent coarse fragments; medium acid; clear smooth boundary.

B22t—28 to 42 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few thin clay films; 10 percent coarse fragments; medium acid; clear smooth boundary.

C—42 to 65 inches; yellowish brown (10YR 5/4) gravelly sandy loam; massive; very friable, nonsticky, nonplastic; 15 percent coarse fragments; strongly acid.

The solum ranges from 32 to 46 inches in thickness. Depth to bedrock is more than 6 feet. Coarse fragments range from 0 to 15 percent in the solum. In unlimed areas, reaction in the solum ranges from very strongly acid to medium acid.

The Ap horizon has hue of 7.5YR and 10YR, value of 4 and 5, and chroma of 2 through 4.

The B horizon has hue of 7.5YR and 10YR value of 4 and 5, and chroma of 4 through 6. This horizon is fine sandy loam through silt loam.

The C horizon has hue of 7.5YR and 10YR, value of 5, and chroma of 4. This horizon is loamy sand through sandy loam.

Cookport series

The Cookport series consists of fine-loamy, mixed, mesic Aquic Fragiudults. These deep, moderately well drained soils are on ridges, benches, and the side slopes of valleys. They formed in material weathered from acid, gray sandstone.

Cookport soils are in close association on the landscape with the Hazleton, Nolo, Rayne, Gilpin, Ernest, and Blairton soils. The Cookport soils have a fragipan and are not so well drained as the Hazleton, Rayne, and Gilpin soils. They are better drained than the Nolo soils and have a sandier texture throughout than the Ernest and Blairton soils.

Typical pedon of Cookport loam, from an area of Cookport very stony loam, 3 to 8 percent slopes, in woodland on Allegheny Mountain, 5 miles south of Berlin and 100 feet east of the intersection of Routes 160 and T5028, 20 feet south of T5028:

O2—1 inch to 0; matted roots and decayed leaves.
A1—0 to 4 inches; very dark brown (10YR 2/2) loam; weak fine granular structure; very friable, nonsticky; 10 percent coarse fragments; very strongly acid; abrupt smooth boundary.
A2—4 to 12 inches; yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; friable, slightly sticky, nonplastic; 5 percent coarse fragments; very strongly acid; clear smooth boundary.
B1t—12 to 18 inches; yellowish brown (10YR 5/6) sandy clay loam; few fine faint light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; few thin patchy clay films on ped faces; 10 percent coarse fragments; very strongly acid; clear wavy boundary.
B2t—18 to 22 inches; yellowish brown (10YR 5/6) sandy clay loam; few medium faint light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few thin patchy clay films on ped faces; 10 percent coarse fragments; very strongly acid; clear wavy boundary.
Bx1—22 to 32 inches; yellowish brown (10YR 5/6) gravelly sandy clay loam; many medium distinct gray (10YR 6/1) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm and brittle, slightly sticky, slightly plastic; 30 percent coarse fragments; very strongly acid; gradual wavy boundary.
Bx2—32 to 40 inches; strong brown (7.5YR 5/6) gravelly sandy clay loam; many coarse distinct gray (10YR 6/1) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm and brittle, slightly sticky, slightly plastic; 30 percent sandstone fragments; very strongly acid; clear wavy boundary.
C1—40 to 58 inches; grayish brown (10YR 5/2) gravelly sandy loam; massive; friable, slightly sticky, nonplastic; 30 percent sandstone fragments; very strongly acid; clear wavy boundary.
C2—58 to 62 inches; dark brown (10YR 4/3) gravelly sandy loam; massive; friable, slightly sticky, nonplastic; 30 percent sandstone fragments; very strongly acid.

The solum ranges from 30 to 40 inches in thickness. Depth to bedrock ranges from 3 1/2 to 6 feet. Depth to the fragipan ranges from 18 to 26 inches. Coarse fragments range from 5 to 30 percent throughout the profile. In unlimed areas, reaction in the solum is very strongly acid or strongly acid.

The A1 horizon has hue of 10YR and 2.5Y, value of 2 and 3, and chroma of 2 and 3. The A2 horizon has hue of 10YR and 2.5Y, value of 4 and 5, and chroma of 3 and 4. Fine earth of the A horizon is dominantly loam but is silt loam or sandy loam in some areas.

The Bt horizon has hue of 7.5YR through 2.5Y, value of 4 and 5, and chroma of 4 through 6. Mottles having chroma of 2 or less are in the upper 19 inches of the argillic horizon. The fine earth is loam through sandy clay loam.

The Bx horizon has hue of 7.5YR and 10YR, value of 4 and 5, and chroma of 4 through 8. The fine earth is loam through sandy clay loam.

The C horizon has 10YR and 2.5Y hue, value of 4 and 5, and chroma of 2 through 4. The fine earth is loam or sandy loam.

Dekalb series

The Dekalb series consists of loamy-skeletal, mixed, mesic Typic Dystrochrepts. These moderately deep, well drained soils are on tops of mountains and ridges. They formed in material derived from acid, gray sandstone.

Dekalb soils are in close association on the landscape with the Hazleton, Berks, Cookport, Ernest, and Blairton soils. The Dekalb soils are more shallow to bedrock than the Hazleton soils and are better drained than the Cookport, Ernest, and Blairton soils. They are sandy, and the Berks soils are silty.

Typical pedon of Dekalb channery sandy loam, in an area of Dekalb-Hazleton very stony sandy loams, 3 to 8 percent slopes, in woodland, 3 miles east of Roxbury, on top of Dividing Ridge, 1/4 mile southwest of the intersection of Route 31 and Township Road 55039:

O1—1 inch to 0; hardwood leaf and twig litter.
A1—0 to 4 inches; black (10YR 2/1) channery sandy loam; weak very fine granular structure; very friable, nonsticky, nonplastic; 50 percent coarse fragments; very strongly acid; clear smooth boundary.
A2—4 to 12 inches; yellowish brown (10YR 5/6) channery sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; 40 percent sandstone fragments; extremely acid; gradual wavy boundary.
B2—12 to 24 inches; strong brown (7.5YR 5/6) channery sandy loam; weak fine subangular blocky structure; friable, nonsticky, nonplastic; very few clay films; 40 percent sandstone fragments; extremely acid; gradual wavy boundary.
C—24 to 35 inches; brown (7.5YR 5/4) very channery sandy loam; single grain; friable; 75 percent sandstone fragments; extremely acid; abrupt smooth boundary.
R—35 inches; gray sandstone.

The solum ranges from 20 to 36 inches in thickness. Depth to bedrock ranges from 26 to 40 inches. Coarse fragments range from 35 to 60 percent in the solum and from 60 to 75 percent in the C horizon. In unlimed areas, reaction in the solum is extremely acid or very strongly acid.

The A1 horizon has hue of 10YR, value of 2 and 3, and chroma of 1 and 2. The A2 horizon has hue of 10YR, value of 4 and 5, and chroma of 4 through 6. The fine earth is dominantly sandy loam but is loam in some areas.

The B horizon has hue of 7.5YR and 10YR, value of 5 and 6, and chroma of 4 through 8. The fine earth is sandy loam and loam.

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

Ernest series

The Ernest series consists of fine-loamy, mixed, mesic Aquic Fragiudults. These deep, moderately well drained soils are on side slopes of valleys, benches, and lower slopes of hills and mountains. They formed in colluvium from weathered shale and siltstone.

Ernest soils are in close association on the landscape with the Wharton, Cookport, Blairton, Albrights, Cavode, Nolo, Rayne, and Hazleton soils. Ernest soils have a sandier texture than the Wharton soils and a more silty texture than the Cookport soils. They have a fragipan, whereas Blairton soils do not. Ernest soils have yellowish brown colors, and Albrights soils have reddish colors in the subsoil. They are better drained than the Cavode and Nolo soils and not so well drained as the Rayne and Hazleton soils.

Typical pedon of Ernest silt loam, 8 to 15 percent slopes, in a cultivated field, 3 miles southwest of Central City, 3/4 mile north of the intersection of Routes T744 and T649 and 500 feet west of T744:

Ap—0 to 10 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; 10 percent coarse fragments; very strongly acid; abrupt smooth boundary.

B1—10 to 19 inches; yellowish brown (10YR 5/6) silty clay loam; weak fine and medium subangular blocky structure; friable, slightly sticky, nonplastic; thin discontinuous clay films; 10 percent coarse fragments; very strongly acid; gradual wavy boundary.

B2t—19 to 28 inches; light yellowish brown (10YR 6/4) channery silty clay loam; common fine distinct strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; many thin continuous clay films; 15 percent coarse fragments; very strongly acid; clear wavy boundary.

Bxt—28 to 48 inches; brown (10YR 5/3) channery silty clay loam; many medium distinct strong brown (7.5YR 5/8) mottles; moderate very coarse prismatic structure; very firm and brittle, slightly sticky, plastic; many thin continuous clay films; 20 percent coarse fragments; very strongly acid; gradual wavy boundary.

C—48 to 60 inches; brownish yellow (10YR 6/6) silty clay; many medium distinct gray (10YR 6/1) mottles; massive; firm, sticky, plastic; 10 percent coarse fragments; very strongly acid; clear wavy boundary.

The solum ranges from 36 to 60 inches in thickness. Depth to the top of the fragipan ranges from 25 to 30 inches. Depth to bedrock is 5 feet or more. Coarse fragments range from 10 to 20 percent in the B and C horizons. In unlimed areas, reaction in the solum is very strongly acid or strongly acid.

The Ap horizon has hue of 10YR and 7.5YR, value of 4 and 5, and chroma of 2 through 4. This horizon is dominantly silt loam but is loam in some areas.

The B1 horizon has hue of 7.5YR and 10YR, value of 4 through 6, and chroma of 3 through 6. This horizon is silt loam and silty clay loam and has less than 20 percent sand.

The B2t horizon has hue of 7.5YR and 10YR, value of 4 through 6, and chroma of 3 through 6. Mottles having chroma of 2 or less are in the upper 10 inches of the argillic horizon. This horizon is silt loam and silty clay loam and has less than 20 percent sand.

The Bx horizon has hue of 10YR and 7.5YR, value of 4 through 6, and chroma of 3 through 6. This horizon is silt loam and silty clay loam.

The C horizon has hue of 10YR and 7.5YR, value of 4 through 6, and chroma of 2 through 6 in the matrix and of 1 through 8 in the mottles. The C horizon is silt loam through silty clay.

Fluvaquents

Fluvaquents consists of deep, poorly drained to moderately well drained soils on flood plains and in drainageways. They formed in material ranging from stratified sand to clayey alluvial sediment.

Fluvaquents are in close association on the landscape with the Atkins, Pope, Philo, and Brinkerton soils. They do not have the distinct horizon development of the Atkins, Pope, Philo, and Brinkerton soils.

Because of the variability of these soils, a typical pedon is not described. Typically, these soils have a solum that ranges from 15 inches to more than 60 inches in thickness. Depth to bedrock is more than 5 feet. Coarse fragments range from 0 to 65 percent in individual subhorizons. The soils are very strongly acid or strongly acid.

The A horizon dominantly has hue of 7.5YR through 2.5Y, value of 2 through 4, and chroma of 1 through 5. The fine earth is sandy loam to silty clay loam. The A horizon ranges from 6 to 18 inches in thickness.

The B horizon dominantly has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 1 through 3. The depth to low chroma mottles ranges from 6 to 36 inches. Some pedons have a matrix chroma of 1 or less and are not mottled. The fine earth is sandy loam through clay.

The B horizon ranges from 9 to more than 42 inches in thickness.

The fine earth in the C horizon ranges from sand through silty clay.

Gilpin series

The Gilpin series consists of fine-loamy, mixed, mesic Typic Hapludults. These moderately deep, well drained soils are on hills, knobs, and broad areas on uplands. They formed in materials weathered from shale and siltstone.

Gilpin soils are in close association on the landscape with the Wharton, Cookport, Ernest, Cavode, Armagh, Blairton, Rayne, Hazleton, and Berks soils. Gilpin soils are better drained than the Wharton, Cookport, Ernest, Cavode, Armagh, and Blairton soils. They are not so deep to bedrock as the Rayne and Hazleton soils, and they have fewer coarse fragments than the Berks soils.

Typical pedon of Gilpin channery silt loam, in an area of Rayne-Gilpin channery silt loams, 3 to 8 percent slopes, in a cultivated field, 1 1/2 miles south of Meyersdale, on Allegheny Mountain, approximately 700 feet west of the intersection of Routes 55009 and U.S. 219:

Ap—0 to 6 inches; dark brown (10YR 3/3) channery silt loam; weak fine granular structure; friable, nonsticky, nonplastic; 25 percent coarse fragments; strongly acid; abrupt wavy boundary.

B21t—6 to 12 inches; brown (10YR 5/4) channery silt loam; weak fine subangular blocky structure; friable, slightly sticky, nonplastic; 30 percent coarse fragments; strongly acid; clear wavy boundary.

B22t—12 to 24 inches; yellowish brown (10YR 5/6) channery silt loam; moderate fine and medium subangular blocky structure; firm, slightly sticky, slightly plastic; 35 percent coarse fragments; strongly acid; abrupt wavy boundary.

R—24 inches; acid, brown shale with black weathered coatings.

The solum ranges from 22 to 34 inches in thickness. Depth to bedrock ranges from 24 to 40 inches. Coarse fragments range from 15 to 35 percent in the solum and from 30 to 75 percent in the C horizon. Reaction is strongly acid and very strongly acid in unlimed areas.

The Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 2 through 4. The fine earth fraction is dominantly silt loam but is loam in some areas.

The B horizon has hue of 10YR and 7.5YR, value of 5, and chroma of 4 through 8. The fine earth is silt loam and silty clay loam.

Hazleton series

The Hazleton series consists of loamy-skeletal, mixed, mesic Typic Dystrochrepts. These deep, well drained soils are on side slopes and tops of mountains, hills, and ridges. They formed in material weathered from acid sandstone.

Hazleton soils are in close association on the landscape with the Cookport, Ernest, Nolo, Blairton, Rayne, Gilpin, Berks, Weikert, Leck Kill, and Dekalb soils. The Hazleton soils are better drained than the Cookport, Ernest, Blairton, and Nolo soils. They have a sandier texture than Rayne, Gilpin, Berks, Weikert, and Leck Kill soil. They are deeper to bedrock than the Dekalb, Gilpin, Berks, and Weikert soils.

Typical pedon of Hazleton channery sandy loam, 3 to 8 percent slopes, in a cultivated field, 1 1/2 miles north of Somerset on Route 55067, 0.7 mile north of the intersection of Routes 55067 and T559, 1,000 feet east of 55067:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) channery sandy loam; weak medium and coarse granular structure; very friable, nonsticky, nonplastic; many roots; 20 percent coarse fragments; slightly acid; abrupt smooth boundary.

B1—7 to 14 inches; yellowish brown (10YR 5/6) channery sandy loam; moderate medium subangular blocky structure; friable, slightly sticky, nonplastic; many roots; 35 percent coarse fragments; slightly acid; gradual wavy boundary.

B2—14 to 36 inches; yellowish brown (10YR 5/6) channery sandy loam; moderate medium subangular blocky structure; friable, slightly sticky, nonplastic; many roots; 45 percent coarse fragments; medium acid; gradual wavy boundary.

C—36 to 70 inches; yellowish brown (10YR 5/6) channery loamy sand; weak medium platy structure; friable; few roots; 40 percent coarse fragments; very strongly acid.

The solum ranges from 25 to 45 inches in thickness. Depth to bedrock ranges from 5 to 10 feet or more. Coarse fragments average more than 35 percent in the solum but range from 15 to 50 percent. They range from 35 to 75 percent in the C horizon. In unlimed areas, reaction in the solum ranges from extremely acid to strongly acid.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The fine earth is dominantly sandy loam but is loam in some areas.

The B horizon has hue of 7.5YR and 10YR, value of 5 and 6, and chroma of 3 through 6. The fine earth is loam and sandy loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 6. The fine earth ranges from loam to loamy sand.

Leck Kill series

The Leck Kill series consists of fine-loamy, mixed, mesic Typic Hapludults. These deep, well drained soils are on side slopes and tops of hills and ridges on uplands. They formed in material weathered from shale.

Leck Kill soils are in close association on the landscape with the Hazleton, Berks, Rayne, Gilpin, Albrights, Blairton, Ernest, and Cookport soils. Leck Kill soils are better drained than the Albrights, Ernest, Blairton, and Cookport soils. These soils have redder hue in the subsoil than the Hazleton, Berks, Rayne, and Gilpin soils.

Typical pedon of Leck Kill channery silt loam, 3 to 8 percent slopes, in idle land, 3/4 mile southwest of Sand Patch, on Route T363, 150 feet north of the intersection of Routes T363 and 55155:

Ap—0 to 6 inches; dark reddish brown (5YR 3/3) channery silt loam; weak fine granular structure; friable, nonsticky, nonplastic; many fine roots; 20 percent coarse fragments; very strongly acid; clear wavy boundary.

B1—6 to 14 inches; reddish brown (5YR 4/4) channery silt loam; weak fine subangular blocky structure; friable, nonsticky, nonplastic; many fine roots; 20 percent coarse fragments; very strongly acid; clear wavy boundary.

B21t—14 to 28 inches; dark red (2.5YR 3/6) channery clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots; few clay films; 25 percent coarse fragments; very strongly acid; clear wavy boundary.

B22t—28 to 45 inches; dark red (2.5YR 3/6) channery clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots; few clay films; 35 percent coarse fragments; very strongly acid; clear wavy boundary.

C—45 to 58 inches; dark red (2.5YR 3/6) very channery loam; massive; very firm, nonsticky, slightly plastic; few roots; 70 percent coarse fragments; very strongly acid; abrupt wavy boundary.

R—58 inches; dark red shale and siltstone.

The solum ranges from 30 to 46 inches in thickness. Depth to bedrock ranges from 3 1/2 to 6 feet. Coarse fragments range from 5 to 25 percent in the upper part of the solum, from 20 to 50 percent in the lower part, and from 60 to 80 percent in the C horizon. In unlimed areas, reaction is very strongly acid or strongly acid throughout.

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

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

The C horizon has hue of 5YR through 10R, value of 3 through 5, and chroma of 4 through 6. The fine earth is loam through clay loam.

Monongahela series

The Monongahela series consists of fine-loamy, mixed, mesic Typic Fragiudults. These deep, moderately well drained soils are on terraces along the main streams. They formed in deposits washed from upland areas derived from acid shale and sandstone.

Monongahela soils are in close association on the landscape with the Allegheny, Chavies, Pope, Philo, Tyler, Purdy, and Atkins soils. The Monongahela soils are not so well drained as the Allegheny, Chavies, and Pope soils, but they are better drained than the Tyler, Purdy, and Atkins soils. They have a fragipan, whereas the Philo soils do not.

Typical pedon of Monongahela silt loam, 0 to 3 percent slopes, in a cultivated field, at the south edge of confluence, 200 feet north of Western Maryland Railroad, between Casselman and Youghiogheny Rivers:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable, slightly sticky, nonplastic; medium acid; abrupt smooth boundary.

B21t—6 to 14 inches; dark brown (7.5YR 4/4) light silty clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; thin discontinuous clay films on ped faces; strongly acid; clear smooth boundary.

B22t—14 to 22 inches; yellowish brown (10YR 5/6) light silty clay loam; moderate medium subangular blocky structure; friable, sticky, slightly plastic; thin discontinuous clay films on ped faces; medium acid; gradual wavy boundary.

Bx1—22 to 30 inches; brown (7.5YR 5/4) light silty clay loam; few fine faint yellowish brown (10YR 5/4) mottles; weak very coarse prismatic structure parting to moderate medium angular blocky; firm and brittle, sticky, plastic; thin continuous clay films on ped faces; 10 percent coarse fragments; strongly acid; gradual wavy boundary.

Bx2—30 to 42 inches; yellowish brown (10YR 5/4) clay loam; common fine distinct light gray (10YR 7/2) mottles; weak to moderate very coarse prismatic structure parting to weak thick platy; firm and brittle, slightly sticky, slightly plastic; thin patchy clay films on ped faces; 10 percent coarse fragments; strongly acid; gradual wavy boundary.

Bx3—42 to 55 inches; yellowish brown (10YR 5/4) gravelly clay loam; many medium prominent grayish brown (10YR 5/2) mottles; weak very coarse prismatic structure parting to weak very thick platy; firm and brittle; 20 percent coarse fragments; strongly acid; gradual wavy boundary.

C—55 to 63 inches; brown (10YR 5/3) gravelly clay loam; massive; friable; 30 percent coarse fragments; very strongly acid.

The solum ranges from 42 to 70 inches in thickness. Depth to bedrock is more than 60 inches. Depth to the fragipan ranges from 20 to 30 inches. Coarse fragments are 0 to 10 percent in horizons above the fragipan, 10 to 25 percent in the fragipan, and 15 to 35 percent in the C horizon. Reaction in the solum is very strongly acid or strongly acid in unlimed areas.

The Ap horizon has hue of 10YR, value of 4 and 5, and chroma of 2 and 3. This horizon is dominantly silt loam but is loam in some areas.

The B2t horizon has hue of 7.5YR and 10YR, value of 4 through 6, and chroma of 4 through 8. This horizon is silt loam and light silty clay loam.

The Bx horizon has hue of 7.5YR to 2.5Y, value of 5 and 6, and chroma of 2 through 6. The fine earth is loam through sandy clay loam or silt loam.

The C horizon has hue of 7.5YR and 10YR, value of 5 through 7, and chroma of 2 through 8. The fine earth is sandy loam through clay loam.

Nolo series

The Nolo series consists of fine-loamy, mixed, mesic Typic Fragiaquults. These deep, poorly drained soils are in depressions and on lower foot slopes of mountains. They formed in material derived from acid, gray sandstone.

Nolo soils are in close association on the landscape with the Cookport, Ernest, Wharton, Brinkerton, Armagh, Hazleton, and Rayne soils. Nolo soils are more poorly drained than the Cookport, Ernest, Wharton, Hazleton, and Rayne soils. They have a sandier subsoil than the Brinkerton and Armagh soils.

Typical pedon of Nolo loam, 0 to 3 percent slopes, in a wooded area, 2 1/2 miles southeast of Somerset, on State Gamelands 50, 3/4 mile west of the intersection of Routes T505 and 55051, 100 yards north of the road:

O1—4 to 3 inches; loose leaf litter.

O2—3 inches to 0; black (5Y 2/1) well disintegrated humus in a mat of many roots.

A1—0 to 5 inches; very dark brown (10YR 2/2) loam; common fine distinct light brownish gray (10YR 6/2) mottles; weak thick platy structure parting to weak medium and coarse granular; friable, slightly sticky, slightly plastic; many roots; 10 percent coarse fragments; very strongly acid; clear wavy boundary.

A3—5 to 11 inches; grayish brown (10YR 5/2) loam; few fine prominent strong brown (7.5YR 5/8) mottles; weak very coarse to fine granular structure; friable, slightly sticky, slightly plastic; many roots; 10 percent coarse fragments; very strongly acid; clear wavy boundary.

B21tg—11 to 23 inches; grayish brown (2.5Y 5/2) channery clay loam; few fine prominent strong brown (7.5YR 5/6) mottles; moderate coarse and medium subangular blocky structure; friable, slightly sticky, slightly plastic; common roots; 20 percent coarse fragments; few thin clay films; very strongly acid; gradual wavy boundary.

B22tg—23 to 29 inches; yellowish brown (10YR 5/4) channery sandy clay loam; common fine prominent gray (10YR 5/1) mottles; light brownish gray (2.5Y 6/2) ped faces; moderate coarse and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few thin clay films; few roots; 20 percent coarse fragments; very strongly acid; clear irregular boundary.

Bx1—29 to 42 inches; brown (10YR 5/4) channery sandy clay loam; common fine distinct gray (N 6/0) mottles; gray (10YR 6/1) prism faces; moderate very coarse prismatic structure parting to weak thick platy and moderate coarse subangular blocky; firm and brittle, slightly sticky, slightly plastic; few roots; 15 percent coarse fragments; very strongly acid; clear smooth boundary.

Bx2—42 to 55 inches; yellowish brown (10YR 5/4) channery loam; gray (N 6/0) prism faces; yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak very coarse prismatic structure parting to moderate thick platy; very firm and brittle, slightly sticky, slightly plastic; 15 percent coarse fragments; very strongly acid.

R—55 inches; acid gray sandstone.

The solum ranges from 40 to 55 inches in thickness. Depth to bedrock ranges from 3 1/2 to 5 feet or more. Depth to the top of the fragipan ranges from 18 to 30 inches. Coarse fragments range from 5 to 20 percent in horizons above the fragipan and from 15 to 25 percent in the fragipan. In unlimed areas, reaction is extremely acid or very strongly acid in the solum.

The A1 horizon has hue of 10YR, value of 1 and 2, and chroma of 2. This horizon is loam. The A3 horizon has hue of 10YR and 2.5Y, value of 5 and 6, and chroma of 2.

Faces of peds in the B2tg horizon have hue of 10YR and 2.5Y, value of 5 and 6, and chroma of 1 and 2. Interiors of peds have hue of 10YR or 2.5Y, value of 4 and 5, and chroma of 2 through 4. The fine earth is loam through clay loam or sandy clay loam.

Faces of prisms in the Bx horizon have hue of 7.5YR and 2.5Y, value of 5 and 6, and chroma of 1. Interiors of peds have hue of 10YR and 2.5Y, value of 4 through 6, and chroma of 2 through 4. The Bx horizon is loam through sandy clay loam.

Philo series

The Philo series consists of coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts. The Philo series consists of deep, moderately well drained soils on flood plains. They formed in stream-deposited material derived from acid shale, siltstone, and sandstone washed from the uplands.

Philo soils are in close association on the landscape with the Pope, Allegheny, Chavies, Monongahela, Atkins, Tyler, and Purdy soils. Philo soils are not so well drained as the Pope, Allegheny, and Chavies soils, and they are better drained than the Atkins, Tyler, and Purdy soils. They do not have a fragipan, such as the Monongahela soils.

Typical pedon of Philo silt loam, in a cultivated field, 1 mile northwest of Boynton in Summit Township, 700 feet west of the intersection of Routes T351 and T514, east side of the Casselman River:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam; weak medium granular structure; friable; many roots; neutral; gradual wavy boundary.

B21—9 to 18 inches; dark brown (10YR 4/3) silt loam; weak very thick platy structure parting to weak fine angular blocky; friable; many roots; neutral; gradual wavy boundary.

B22—18 to 31 inches; dark brown (10YR 4/3) silt loam; few fine grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; common roots; medium acid; gradual smooth boundary.

B23—31 to 38 inches; brown (10YR 5/3) silt loam; few fine faint grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; common roots; medium acid; gradual smooth boundary.

C1—38 to 50 inches; light brownish gray (10YR 6/2) silt loam; many fine prominent strong brown (7.5YR 5/8) mottles; massive; firm, sticky, slightly plastic; few roots; medium acid; clear smooth boundary.

C2—50 to 64 inches; dark grayish brown (10YR 4/2) sandy loam; few common distinct light brownish gray (10YR 6/2) mottles; massive; friable, slightly sticky, slightly plastic; 5 percent coarse fragments; medium acid.

The solum ranges from 26 to 40 inches in thickness. Depth to bedrock is 6 feet or more. Depth to low chroma mottles ranges from 15 to 24 inches. In unlimed areas, reaction ranges from medium acid to very strongly acid.

The Ap horizon has hue of 10YR, value of 3 and 4, and chroma of 2 and 3.

The B horizon has hue of 10YR and 7.5YR, value of 4 through 6, and chroma of 3 through 6. This horizon is silt loam through sandy loam.

The C horizon has hue of 10YR and 7.5YR, value of 4 through 6, and chroma of 0 through 2. This horizon is sandy loam to silt loam.

Pope series

The Pope series consists of coarse-loamy, mixed, mesic Fluventic Dystrochrepts. These deep, well drained soils are on flood plains. They formed in stream-deposited material derived from acid shale, siltstone, and sandstone washed from the uplands.

Pope soils are in close association on the landscape with the Allegheny, Chavies, Philo, Monongahela, Tyler, Purdy, and Atkins soils. Pope soils do not have an argillic horizon such as the Allegheny and Chavies soils. They are better drained than the Philo, Monongahela, Tyler, Purdy, and Atkins soils.

Typical pedon of Pope fine sandy loam, approximately 500 feet west of sewage pumping station at the north end of Meyersdale Borough:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; many roots; strongly acid; clear smooth boundary.

B1—6 to 16 inches; brown (10YR 4/3) fine sandy loam; weak medium subangular blocky structure; friable, nonsticky, nonplastic; many roots; strongly acid; clear wavy boundary.

B21—16 to 26 inches; brown (10YR 4/3) fine sandy loam; weak medium and coarse subangular blocky structure; friable, nonsticky, nonplastic; many roots; very strongly acid; gradual wavy boundary.

B22—26 to 50 inches; brown (10YR 4/3) silt loam; moderate medium subangular blocky structure; friable, slightly sticky, nonplastic; few roots; strongly acid; clear wavy boundary.

C—50 to 61 inches; strong brown (7.5YR 5/6) loam; few fine prominent dark grayish brown mottles (10YR 4/2); massive; friable, slightly sticky, nonplastic; strongly acid.

The solum ranges from 30 to 50 inches in thickness. Depth to bedrock is more than 6 feet. Coarse fragments are 0 to 20 percent in the solum and 0 to 40 percent in the C horizon. In unlimed areas, reaction ranges from strongly acid to extremely acid.

The Ap horizon has hue of 10YR, value of 4 and 5, and chroma of 2 through 4. This horizon is dominantly sandy loam but is silt loam in some areas.

The B horizon has hue of 10YR and 7.5YR, value of 4 through 6, and chroma of 3 through 6. This horizon is silt loam through sandy loam.

The C horizon has hue of 10YR and 7.5YR, value of 4 through 6, and chroma of 3 through 6. Mottles having chroma of 2 or less are many. The fine earth is loam through sandy loam.

Purdy series

The Purdy series consists of clayey, mixed, mesic Typic Ochraquults. These deep, poorly drained and very poorly drained soils are on stream terraces. They formed in old stream deposits from material derived from acid shale, siltstone, and sandstone washed from the uplands.

Purdy soils are in close association on the landscape with the Tyler, Atkins, Philo, Monongahela, Chavies, and Allegheny soils. Purdy soils are more poorly drained than the Tyler, Philo, Monongahela, Chavies, and Allegheny soils. They have more clay in the subsoil than the Atkins soils.

Typical pedon of Purdy silt loam, in cropland, at western part of Ursina, on the edge of Borough Ball Park:

Ap—0 to 9 inches; gray (10YR 5/1) silt loam; many fine distinct strong brown (7.5YR 5/8) mottles in the lower part of the horizon; moderate fine granular structure; firm, sticky, slightly plastic; many roots; strongly acid; abrupt smooth boundary.

B1tg—9 to 15 inches; gray (10YR 5/1) silty clay loam; common fine distinct strong brown (7.5YR 5/6) mottles; moderate coarse subangular blocky structure parting to moderate fine subangular blocky; firm, sticky, plastic; many roots; thin continuous clay films on ped faces; strongly acid; clear irregular boundary.

B21tg—15 to 27 inches; gray (N 5/0) silty clay; many medium prominent strong brown (7.5YR 5/8) mottles; moderate coarse prismatic structure parting to moderate medium angular blocky; firm, plastic, very sticky; few roots; thin continuous clay films on peds and in pores; strongly acid; gradual wavy boundary.

B22tg—27 to 50 inches; gray (N 5/0) silty clay; many medium prominent strong brown (7.5YR 5/8) mottles; moderate coarse prismatic structure parting to moderate coarse angular blocky; firm, very sticky, very plastic; continuous clay films on ped faces and in pores; strongly acid; clear wavy boundary.

Cg—50 to 65 inches; gray (N 5/0) clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; massive; very firm, slightly sticky, slightly plastic; strongly acid.

The solum ranges from 35 to 50 inches in thickness. Depth to bedrock is more than 6 feet. In unlimed areas, reaction ranges from strongly acid to extremely acid.

The Ap horizon is neutral or has hue of 10YR, value of 4 and 5, and chroma of 2 or less. This horizon is dominantly silt loam but is silty clay loam in some areas.

The B horizon is neutral or has hue of 10YR or 2.5Y, value of 4 and 5, and chroma of 2 or less. This horizon is clay to silty clay loam.

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

Rayne series

The Rayne series consists of fine-loamy, mixed, mesic Typic Hapludults. These deep, well drained soils are on hills, knobs, and broad areas on uplands. They formed in materials weathered from shale and siltstone.

Rayne soils are in close association on the landscape with the Wharton, Cookport, Ernest, Cavode, Armagh, Blairton, Gilpin, Hazleton, and Berks soils. Rayne soils are better drained than the Wharton, Cookport, Ernest, Cavode, Armagh, and Blairton soils. They are deeper to bedrock than the Berks and Gilpin soils. Rayne soils have a silty texture, and Hazleton soils have a sandy texture.

Typical pedon of Rayne channery silt loam, in an area of Rayne-Gilpin channery silt loams, 3 to 8 percent slopes, in a cultivated field 1,320 feet northeast of Sipesville:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) channery silt loam; weak fine granular structure; very friable; 15 percent coarse fragments; many small roots; very strongly acid; clear smooth boundary.

B1t—8 to 13 inches; yellowish brown (10YR 5/6) channery silt clay loam; moderate fine subangular blocky structure; friable, slightly sticky, nonplastic; 15 percent coarse fragments; many small roots; thin patchy clay films on ped faces; very strongly acid; gradual wavy boundary.

B21t—13 to 21 inches; strong brown (7.5YR 5/6) channery silty clay loam; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; few roots; continuous clay films on ped faces; 15 percent coarse fragments; very strongly acid; gradual wavy boundary.

B22t—21 to 40 inches; strong brown (7.5YR 5/6) channery silty clay loam; moderate fine and medium subangular blocky structure; firm, sticky, slightly plastic; thin continuous clay films on ped faces and in pores; 20 percent coarse fragments; very strongly acid; gradual wavy boundary.

B3—40 to 47 inches; strong brown (7.5YR 5/6) channery silty clay loam; moderate fine and medium subangular blocky structure; firm, slightly sticky, slightly plastic; few clay films; 30 percent coarse fragments; very strongly acid; clear wavy boundary.

C—47 to 55 inches; strong brown (7.5YR 5/6) channery silty clay loam; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; 40 percent coarse fragments; very strongly acid; gradual wavy boundary.

R—55 inches; weathered acid shale with interbedded siltstone.

The solum ranges from 36 to 60 inches in thickness. Depth to bedrock ranges from 3 1/2 to 6 feet. Coarse fragments range from 15 to 40 percent in the solum and

from 30 to 80 percent in the C horizon. In unlimed areas, reaction is strongly acid or very strongly acid.

The Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 2 through 4. This horizon is dominantly silt loam but is loam in some areas.

The B horizon has hue of 7.5YR and 10YR, value of 4 and 5, and chroma of 4 through 8. The fine earth fraction is silt loam through silty clay loam.

The C horizon has hue of 7.5YR and 10YR, value of 4 and 5, chroma of 4 through 8, and is mottled in some pedons. This horizon ranges from sandy loam through silty clay loam.

Tyler series

The Tyler series consists of fine-silty, mixed, mesic Aeric Fragiaquults. These deep, somewhat poorly drained soils are on terraces adjacent to main streams. They formed in stream-deposited material derived from shale and sandstone washed from the uplands.

Tyler soils are in close association on the landscape with the Monongahela, Allegheny, Chavies, Pope, Philo, Purdy, and Atkins soils. Tyler soils are more poorly drained than the Monongahela, Allegheny, Chavies, Pope, and Philo soils and are better drained than the Purdy and Atkins soils.

Typical pedon of Tyler silt loam, in cropland, at the west end of Seventh Avenue in Meyersdale, approximately 250 feet east of the Casselman River:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; firm, sticky, slightly plastic; many roots; neutral; abrupt smooth boundary.

B1t—8 to 17 inches; pale brown (10YR 6/3) silty clay loam; many fine distinct strong brown (7.5YR 5/6) mottles; moderate coarse subangular blocky structure; firm, slightly sticky, slightly plastic; few roots; thin continuous clay films on ped faces; strongly acid; gradual wavy boundary.

B2tg—17 to 24 inches; yellowish brown (10YR 5/6) silty clay loam; light gray (5Y 6/1) prism faces; common fine prominent light gray (5Y 7/1) mottles; moderate coarse prismatic structure parting to moderate coarse angular blocky; firm, very sticky, plastic; few roots; thin continuous clay films on ped faces; strongly acid; clear wavy boundary.

Bx1—24 to 42 inches; yellowish brown (10YR 5/6) silt loam; common medium prominent light gray (5Y 7/1) mottles; light gray (5Y 6/1) prism faces; moderate very coarse prismatic structure parting to moderate medium subangular blocky; very firm and brittle, nonsticky, nonplastic; few oxide concretions; 5 percent coarse fragments; strongly acid; abrupt smooth boundary.

Bx2—42 to 52 inches; yellowish brown (10YR 5/6) silty clay loam; common medium prominent light gray (5Y 7/1) mottles and ped faces; moderate very coarse prismatic structure parting to moderate medium subangular blocky; very firm and brittle, slightly sticky, slightly plastic; few oxide concretions; strongly acid; abrupt wavy boundary.

IIC—52 to 60 inches; dark yellowish brown (10YR 4/4) loam; common medium prominent light gray (5Y 7/1) mottles; massive; friable, nonsticky, nonplastic; few oxide concretions; 5 percent coarse fragments; medium acid.

The solum ranges from 50 to 80 inches in thickness. Depth to bedrock is more than 8 feet. Depth to the top of the fragipan ranges from 18 to 24 inches. Coarse fragments are less than 10 percent in the solum. In unlimed areas, reaction ranges from strongly acid to extremely acid in the solum.

The A horizon has hue of 10YR through 5Y, value of 5 and 6, and chroma of 1 through 3. This horizon is dominantly silt loam but is silty clay loam in some areas.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 and 6, and chroma of 3 through 6. This horizon is silt loam to silty clay loam.

The Bx horizons have hue of 10YR or 2.5Y, value of 5 and 6, and chroma of 3 through 6. Faces of peds have chroma of 2 or less. This horizon is silt loam through silty clay loam.

The C horizon has hue of 10YR and 2.5Y, value of 4 and 5, and chroma of 3 through 5. This horizon is silty clay loam through stratified loamy sand.

Udorthents

Udorthents are deep, well drained soils on uplands. The regolith is a mixture of soil and unconsolidated fragments of shale, sandstone, and coal.

Udorthents are in close association on the landscape with the Dekalb, Hazleton, Cookport, Gilpin, and Rayne soils. They do not have distinct horizon development such as the associated soils.

Because of the variability of the soils, a typical pedon is not described. Some of the soils have a solum that ranges from 7 to 20 inches in thickness. The C horizon extends to a depth of more than 60 inches. The fine earth of individual horizons ranges from sandy loam to silty clay loam. Coarse fragment content ranges from 15 to 80 percent. The soils have hue of 7.5YR through 10YR, value of 3 through 5, and chroma of 2 through 8. In unlimed areas, reaction ranges from slightly acid through extremely acid throughout. Organic carbon content regularly decreases as depth increases.

Weikert series

The Weikert series consists of loamy-skeletal, mixed, mesic Lithic Dystrochrepts. These shallow, well drained

soils are on side slopes of hills and ridges. They formed from brown shale.

Weikert soils are in close association on the landscape with the Berks, Rayne, Gilpin, Blairton, Hazleton, and Leck Kill soils. Weikert soils are more shallow to bedrock than the associated soils.

Typical pedon of Weikert channery silt loam (fig. 20) in an area of Berks and Weikert soils, 25 to 70 percent slopes, 4 miles east of McDonaldton Township on Route 421, about 3/4 mile southeast from its intersection with Route 55020:

A1—0 to 3 inches; very dark grayish brown (10YR 3/2) channery silt loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots; 20 percent coarse fragments; very strongly acid; abrupt wavy boundary.

A2—3 to 7 inches; yellowish brown (10YR 5/4) channery silt loam; weak medium granular structure; very friable, nonsticky, nonplastic; many fine roots; 40 percent coarse fragments; very strongly acid; abrupt wavy boundary.

B2—7 to 14 inches; dark brown (10YR 4/3) very channery silt loam; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; many fine roots; 50 percent coarse fragments; very strongly acid; abrupt wavy boundary.

R—14 inches; gray and brown shale and siltstone.

The solum ranges from 8 to 20 inches in thickness. Depth to bedrock ranges from 10 to 20 inches. Coarse fragments range from 20 to 40 percent in the A horizon, from 30 to 60 percent in the B horizon, and from 60 to 80 percent in the C horizon. In unlimed areas, reaction is strongly acid and very strongly acid in the solum.

The A1 horizon has hue of 7.5YR and 10YR, value of 2 and 3, and chroma of 2 or 3. The A2 horizon has 10YR hue, value of 5, and chroma of 4 through 8.

Figure 20.—Typical profile of Weikert channery silt loam showing shallow depth to shale bedrock.

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

The C horizon, if present, has hue of 7.5YR and 10YR, value of 4 through 6, and chroma of 3 through 6. The fine earth is silt loam or loam. The underlying bedrock is interbedded gray and brown shale and siltstone.

Wharton series

The Wharton series consists of clayey, mixed, mesic Aquic Hapludults. These deep, moderately well drained soils are on broad hills and ridges on uplands. They formed in material derived from acid shale.

Wharton soils are in close association on the landscape with the Rayne, Gilpin, Berks, Cavode, Armagh, Ernest, Cookport, Blairton, and Albrights soils. The Wharton soils are not so well drained as the Rayne, Gilpin, and Berks soils and are better drained than Cavode and Armagh soils. They have a more clayey subsoil than the Ernest, Cookport, Blairton, and Albrights soils.

Typical pedon of Wharton silt loam, 3 to 8 percent slopes, in a pasture, approximately 2 miles south by southwest of Summit Mills and 350 feet east of the intersection of Routes 55008 and T371, 50 feet south of T371:

Ap—0 to 10 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable, slightly sticky, nonplastic; many roots; 5 percent coarse fragments; slightly acid; abrupt smooth boundary.

B21t—10 to 19 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm, sticky, plastic; many roots; thin patchy clay films on ped faces; 5 percent coarse fragments; very strongly acid; gradual wavy boundary.

B22tg—19 to 28 inches; strong brown (7.5YR 5/6) silty clay; many medium prominent gray (10YR 6/1) and strong brown (7.5YR 5/6) mottles; gray (10YR 6/1) prism faces; strong medium angular blocky structure; firm, sticky, plastic; thin continuous clay films in pores and on ped faces; 5 percent coarse fragments; very strongly acid; gradual wavy boundary.

B23tg—28 to 44 inches; strong brown (7.5YR 5/6) silty clay; many coarse prominent gray (10YR 6/1) and strong brown (7.5YR 5/6) mottles; gray (10YR 6/1) prism faces; strong medium angular blocky structure; firm, sticky, very plastic; thin continuous clay films on ped faces; 10 percent coarse fragments; very strongly acid; gradual wavy boundary.

B24tg—44 to 56 inches; strong brown (7.5YR 5/6) silty clay loam; many coarse prominent gray (10YR 6/1) and strong brown (7.5YR 5/6) mottles; gray (10YR 6/1) prism faces; moderate medium subangular blocky structure; firm, sticky, plastic; few thin clay films; 10 percent coarse fragments; very strongly acid; diffuse wavy boundary.

C—56 to 65 inches; brown (7.5YR 5/4) shaly silty clay loam; few medium distinct gray (10YR 6/1) mottles; massive; firm, sticky, slightly plastic; 30 percent coarse fragments; very strongly acid.

The solum ranges from 40 to 60 inches in thickness. Depth to bedrock ranges from 50 to 70 inches. Coarse fragments are 0 to 10 percent in the upper part of the solum, 10 to 50 percent in the lower part, and 20 to 60 percent in the C horizon. In unlimed areas, reaction is strongly acid or very strongly acid in the solum and very strongly acid or extremely acid in the C horizon.

The Ap horizon has hue of 7.5YR through 2.5Y, value of 4 and 5, and chroma of 2 through 4.

The B2t horizon has hue of 7.5YR through 2.5Y, value of 5 and 6, and chroma of 2 through 8. Prism faces have hue of 10YR and 2.5Y, value of 5 and 6, and chroma of 1 through 4.

The C horizon has hue of 7.5YR and 10YR, value of 5, and chroma of 2 through 8. The fine earth is silty clay loam and clay loam.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

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	5.2 to 12
Very high	More than 12

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

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

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. Mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

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

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

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 (or contour farming). 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.

Deferred grazing. Postponing grazing or arresting grazing for a prescribed period.

Depth to rock. 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 for 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.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

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

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

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

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.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7

days. Probable dates are expressed in months; *November-May,* for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

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.

Forage. Plant material used as feed by domestic animals. Forage can be grazed or cut for hay.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

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

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

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

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Habitat. The natural abode of a plant or animal; refers to the kind of environment in which a plant or animal normally lives, as opposed to the range or geographical distribution.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

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.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

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.

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 areas. Areas that have little or no natural soil and support 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, differences in 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.

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 be-

cause it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

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

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

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

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called groundwater runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

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

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

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

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.

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.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	Less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from

the processes of soil formation are called horizons; those inherited from the parent material are called strata.

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 grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

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

Substratum. The part of the soil below the solum.

Subsurface layer. 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 soil. 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."

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 it can soak into the soil or flow slowly to a prepared outlet without harm. 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, silt loam, 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.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

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

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

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.

TABLES

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

Month	Temperature[1]						Precipitation[1]				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days[2]	Average	Less than--	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	36.5	17.7	27.1	66	-8	16	3.26	1.96	4.42	9	15.3
February	38.4	18.1	28.3	65	-8	17	2.87	1.65	3.86	8	17.1
March	47.0	25.5	36.3	78	6	79	4.02	2.57	5.33	10	13.5
April	60.0	35.2	47.6	84	18	238	3.86	2.57	5.04	10	1.8
May	70.7	44.1	57.4	88	27	539	4.03	2.18	5.53	10	.1
June	79.1	52.9	66.0	93	37	780	4.11	2.05	5.78	8	.0
July	82.5	57.0	69.8	94	43	924	4.35	2.57	5.93	9	.0
August	81.2	56.4	68.8	93	42	893	3.84	2.38	5.15	8	.0
September	75.5	49.5	62.5	92	32	675	3.28	1.80	4.48	7	.0
October	64.5	38.4	51.5	84	20	364	2.58	1.14	3.74	6	.2
November	50.7	30.2	38.9	74	9	249	2.70	1.78	3.52	8	3.9
December	39.1	21.9	30.6	70	-2	45	3.34	1.87	4.53	9	14.0
Year	60.4	37.2	48.7	96	-12	4,819	42.24	36.55	47.73	102	65.9

[1]Recorded in the period 1951-75 at Confluence, Pa.

[2]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

Probability	Temperature[1]		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 28	May 9	May 23
2 years in 10 later than--	April 23	May 5	May 18
5 years in 10 later than--	April 14	April 26	May 10
First freezing temperature in fall:			
1 year in 10 earlier than--	October 13	October 3	September 24
2 years in 10 earlier than--	October 19	October 9	September 28
5 years in 10 earlier than--	October 30	October 19	October 8

[1]Recorded in the period 1951-75 at Confluence, Pa.

TABLE 3.--GROWING SEASON LENGTH

Probability	Daily minimum temperature during growing season[1]		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	180	154	130
8 years in 10	187	162	137
5 years in 10	199	175	151
2 years in 10	211	189	164
1 year in 10	217	196	171

[1]Recorded in the period 1951-75 at Confluence, Pa.

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

Map symbol	Soil name	Acres	Percent
AbB	Albrights silt loam, 3 to 8 percent slopes	2,663	0.4
AbC	Albrights silt loam, 8 to 15 percent slopes	1,119	0.2
AgB	Albrights very stony silt loam, 3 to 8 percent slopes	1,274	0.2
AgD	Albrights very stony silt loam, 8 to 25 percent slopes	1,266	0.2
AhB	Allegheny silt loam, gravelly substratum, 3 to 8 percent slopes	303	*
AhC	Allegheny silt loam, gravelly substratum, 8 to 15 percent slopes	318	*
Ar	Armagh silt loam	2,810	0.4
AsB	Armagh very stony silt loam, 0 to 8 percent slopes	848	0.1
At	Atkins silt loam	9,999	1.4
BeB	Berks channery silt loam, 3 to 8 percent slopes	2,907	0.4
BeC	Berks channery silt loam, 8 to 15 percent slopes	5,923	0.9
BeD	Berks channery silt loam, 15 to 25 percent slopes	6,164	0.9
BkB	Berks-Weikert channery silt loams, 3 to 8 percent slopes	2,755	0.4
BkC	Berks-Weikert channery silt loams, 8 to 15 percent slopes	3,972	0.6
BkD	Berks-Weikert channery silt loams, 15 to 25 percent slopes	6,807	1.0
BkF	Berks and Weikert soils, 25 to 70 percent slopes	23,080	3.3
BnB	Blairton channery silt loam, 3 to 8 percent slopes	2,706	0.4
BnC	Blairton channery silt loam, 8 to 15 percent slopes	552	0.1
BrA	Brinkerton silt loam, 0 to 3 percent slopes	10,626	1.5
BrB	Brinkerton silt loam, 3 to 8 percent slopes	6,559	0.9
BtB	Brinkerton very stony silt loam, 0 to 8 percent slopes	6,134	0.9
CaA	Cavode silt loam, 0 to 3 percent slopes	2,891	0.4
CaB	Cavode silt loam, 3 to 8 percent slopes	22,443	3.2
CaC	Cavode silt loam, 8 to 15 percent slopes	7,238	1.0
CbB	Cavode very stony silt loam, 0 to 8 percent slopes	5,996	0.9
ChA	Chavies silt loam, 0 to 3 percent slopes	1,979	0.3
ChB	Chavies silt loam, 3 to 8 percent slopes	612	0.1
CoB	Cookport loam, 3 to 8 percent slopes	4,773	0.7
CoC	Cookport loam, 8 to 15 percent slopes	1,151	0.2
CpB	Cookport very stony loam, 3 to 8 percent slopes	23,814	3.4
CpD	Cookport very stony loam, 8 to 25 percent slopes	5,457	0.8
DhB	Dekalb-Hazleton channery sandy loams, 3 to 8 percent slopes	589	0.1
DkB	Dekalb-Hazleton very stony sandy loams, 3 to 8 percent slopes	2,450	0.4
ErB	Ernest silt loam, 3 to 8 percent slopes	18,219	2.6
ErC	Ernest silt loam, 8 to 15 percent slopes	9,198	1.3
EsB	Ernest very stony silt loam, 3 to 8 percent slopes	14,335	2.1
EsD	Ernest very stony silt loam, 8 to 25 percent slopes	12,200	1.8
FV	Fluvaquents	2,788	0.4
HaB	Hazleton channery sandy loam, 3 to 8 percent slopes	10,205	1.5
HaC	Hazleton channery sandy loam, 8 to 15 percent slopes	3,867	0.6
HaD	Hazleton channery sandy loam, 15 to 25 percent slopes	1,806	0.3
HbB	Hazleton very stony sandy loam, 3 to 8 percent slopes	25,890	3.7
HbD	Hazleton very stony sandy loam, 8 to 25 percent slopes	32,243	4.6
HbF	Hazleton very stony sandy loam, 25 to 65 percent slopes	20,183	2.9
HzB	Hazleton very bouldery sandy loam, 0 to 8 percent slopes	11,484	1.7
HzD	Hazleton very bouldery sandy loam, 8 to 25 percent slopes	7,740	1.1
HzF	Hazleton very bouldery sandy loam, 25 to 60 percent slopes	6,553	0.9
LeB	Leck Kill channery silt loam, 3 to 8 percent slopes	4,268	0.6
LeC	Leck Kill channery silt loam, 8 to 15 percent slopes	7,642	1.1
LeD	Leck Kill channery silt loam, 15 to 25 percent slopes	7,045	1.0
LkB	Leck Kill very stony silt loam, 3 to 8 percent slopes	793	0.1
LkD	Leck Kill very stony silt loam, 8 to 25 percent slopes	5,832	0.8
LmF	Leck Kill soils, 25 to 70 percent slopes	19,229	2.8
MoA	Monongahela silt loam, 0 to 3 percent slopes	659	0.1
MoB	Monongahela silt loam, 3 to 8 percent slopes	477	0.1
NoA	Nolo loam, 0 to 3 percent slopes	2,233	0.3
NoB	Nolo loam, 3 to 8 percent slopes	1,122	0.2
NsB	Nolo very stony loam, 0 to 8 percent slopes	10,702	1.5
Ph	Philo silt loam	2,953	0.4
Po	Pope fine sandy loam	1,723	0.2
Pu	Purdy silt loam	1,411	0.2
Qu	Quarries	147	*
RgB	Rayne-Gilpin channery silt loams, 3 to 8 percent slopes	33,570	4.8
RgC	Rayne-Gilpin channery silt loams, 8 to 15 percent slopes	41,591	6.0
RgD	Rayne-Gilpin channery silt loams, 15 to 25 percent slopes	24,301	3.5
RgF	Rayne-Gilpin channery silt loams, 25 to 65 percent slopes	42,983	6.2
RpB	Rayne-Gilpin very stony silt loams, 3 to 8 percent slopes	12,338	1.8
RpD	Rayne-Gilpin very stony silt loams, 8 to 25 percent slopes	33,721	4.9
Ty	Tyler silt loam	1,221	0.2
UDA	Udorthents, mine spoil, 0 to 8 percent slopes	7,532	1.1

See footnote at end of table.

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

Map symbol	Soil name	Acres	Percent
UDD	Udorthents, mine spoil, 8 to 25 percent slopes	12,936	1.9
UDF	Udorthents, mine spoil, 25 to 70 percent slopes	10,046	1.4
UOA	Udorthents, smoothed	1,256	0.2
WhB	Wharton silt loam, 3 to 8 percent slopes	23,268	3.4
WhC	Wharton silt loam, 8 to 15 percent slopes	11,453	1.6
WhD	Wharton silt loam, 15 to 25 percent slopes	3,014	0.4
WvB	Wharton very stony silt loam, 3 to 8 percent slopes	6,735	1.0
WvD	Wharton very stony silt loam, 8 to 25 percent slopes	5,705	0.8
	Water	1,605	0.2
	Total	694,400	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 figure indicates that the soil is not suited to the crop or the crop is not generally 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*
AbB---- Albrights	100	20	70	40	3.5	3.0	6.5
AbC---- Albrights	90	18	65	40	3.5	3.0	6.5
AgB, AgD---- Albrights	---	---	---	---	---	---	---
AhB---- Allegheny	120	24	75	45	4.5	3.5	8.5
AhC---- Allegheny	110	22	70	40	4.0	3.0	8.0
Ar---- Armagh	80	16	60	---	---	2.5	5.0
AsB---- Armagh	---	---	---	---	---	---	---
At---- Atkins	100	20	60	---	---	3.0	5.5
BeB---- Berks	80	16	60	35	3.5	3.0	6.5
BeC---- Berks	75	15	55	35	3.0	2.5	5.5
BeD---- Berks	70	14	50	30	3.0	2.5	5.5
BkB---- Berks	70	14	55	30	2.9	2.6	5.4
BkC---- Berks	65	13	50	30	2.8	2.4	5.1
BkD---- Berks	---	---	---	---	---	---	---
BkF---- Berks	---	---	---	---	---	---	---
BnB---- Blairton	75	15	60	35	---	2.5	5.0
BnC---- Blairton	70	14	55	30	---	2.0	4.0
BrA---- Brinkerton	90	18	60	---	---	2.5	5.0
BrB---- Brinkerton	90	18	60	---	---	2.5	5.0
BtB---- Brinkerton	---	---	---	---	---	---	---
CaA---- Cavode	85	17	65	35	---	3.0	5.5

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*
CaB---- Cavode	85	17	65	35	---	3.0	5.5
CaC---- Cavode	80	16	60	30	---	3.0	5.5
CbB---- Cavode	---	---	---	---	---	---	---
ChA---- Chavies	120	24	75	45	5.0	3.5	7.0
ChB---- Chavies	115	23	75	45	5.0	3.5	7.0
CoB---- Cookport	100	20	65	40	3.5	3.0	6.5
CoC---- Cookport	90	18	60	35	3.5	3.0	6.5
CpB---- Cookport	---	---	---	---	---	---	---
CpD---- Cookport	---	---	---	---	---	---	---
DhB, DkB---- Dekalb	---	---	---	---	---	---	---
ErB---- Ernest	100	20	65	40	3.5	---	6.5
ErC---- Ernest	95	18	60	35	3.5	---	6.5
EsB, EsD---- Ernest	---	---	---	---	---	---	---
FV**. Fluvaquents							
HaB---- Hazleton	120	24	70	45	4.5	3.5	5.0
HaC---- Hazleton	110	22	65	40	4.5	3.5	5.0
HaD---- Hazleton	105	21	55	35	4.0	3.0	4.5
HbB---- Hazleton	---	---	---	---	---	---	---
HbD---- Hazleton	---	---	---	---	---	---	---
HbF---- Hazleton	---	---	---	---	---	---	---
HzB---- Hazleton	---	---	---	---	---	---	---
HzD---- Hazleton	---	---	---	---	---	---	---
HzF---- Hazleton	---	---	---	---	---	---	---

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*
LeB---- Leck Kill	125	25	80	50	4.5	3.0	8.0
LeC---- Leck Kill	120	24	75	50	4.0	3.0	7.5
LeD---- Leck Kill	105	21	70	45	4.0	2.5	7.0
LkB, LkD, LmF---- Leck Kill	---	---	---	---	---	---	---
MoA---- Monongahela	110	22	65	40	3.5	3.0	6.5
MoB---- Monongahela	110	22	65	40	3.5	3.0	6.5
NoA---- Nolo	80	16	60	---	---	2.5	5.0
NoB---- Nolo	80	16	60	---	---	2.5	5.0
NsB---- Nolo	---	---	---	---	---	---	---
Ph---- Philo	130	26	80	45	4.5	3.5	8.5
Po---- Pope	130	26	80	45	5.0	3.5	8.5
Pu---- Purdy	80	16	55	---	---	2.5	---
Qu**. Quarries							
RgB---- Rayne	100	20	70	45	4.0	3.5	7.0
RgC---- Rayne	95	19	65	40	4.0	3.5	7.0
RgD---- Rayne	90	18	60	35	3.5	3.0	6.5
RgF, RpB, RpD---- Rayne	---	---	---	---	---	---	---
Ty---- Tyler	95	19	60	30	---	3.0	6.5
UDA**, UDD**, UDF**, UOA**. Udorthents							

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*
WhB---------- Wharton	90	18	65	40	3.5	3.0	6.5
WhC---------- Wharton	80	16	60	35	3.5	3.0	6.5
WhD---------- Wharton	70	14	55	30	3.0	2.5	5.5
WvB, WvD---------- Wharton	---	---	---	---	---	---	---

* 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 the composition and behavior characteristics of the map unit.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	3,702	---	---	---
II	105,466	101,854	3,612	---
III	131,515	92,255	39,260	---
IV	71,615	48,854	24,761	---
V	---	---	---	---
VI	266,045	49,790	---	216,255
VII	82,535	42,309	2,788	37,438
VIII	---	---	---	---

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	
AbB---- Albrights	3w	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- White ash---------- Red maple----------	70 75 70 70	Red pine, eastern white pine, European larch, Norway spruce, white spruce.
AbC---- Albrights	3w	Moderate	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- White ash---------- Red maple----------	70 75 70 70	Red pine, eastern white pine, European larch, Norway spruce, white spruce.
AgB---- Albrights	3w	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- White ash---------- Red maple----------	70 75 70 70	Red pine, eastern white pine, European larch, Norway spruce, white spruce.
AgD---- Albrights	3r	Severe	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- White ash---------- Red maple----------	70 75 70 70	Red pine, eastern white pine, European larch, Norway spruce, white spruce.
AhB, AhC---- Allegheny	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar------- Virginia pine------- Eastern white pine-- Shortleaf pine------	80 90 75 90 75	Eastern white pine, Austrian pine, yellow-poplar, black walnut, European larch, red pine, Norway spruce.
Ar, AsB---- Armagh	3w	Slight	Severe	Severe	Severe	Northern red oak----	70	Eastern white pine, Norway spruce.
At---- Atkins	1w	Slight	Severe	Severe	Moderate	Pin oak----------	100	Eastern white pine, white spruce.
BeB, BeC---- Berks	3f	Slight	Slight	Moderate	Slight	Northern red oak---- Black oak---------- Virginia pine-------	70 70 70	Virginia pine, eastern white pine, Norway spruce, red pine.
BeD---- Berks	3f	Slight	Moderate	Moderate	Slight	Northern red oak---- Black oak---------- Virginia pine-------	70 70 70	Virginia pine, eastern white pine, Norway spruce, red pine.
BkB*, BkC*: Berks----	3f	Slight	Slight	Moderate	Slight	Northern red oak---- Black oak---------- Virginia pine-------	70 70 70	Viginia pine, eastern white pine, Norway spruce, red pine.
Weikert----	4d	Slight	Slight	Severe	Moderate	Northern red oak---- Virginia pine-------	59 56	Virginia pine, shortleaf pine, red pine, eastern white pine.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
Pu---------- Purdy	1w	Slight	Severe	Severe	Severe	Pin oak---------- Shortleaf pine------ Virginia pine------- Yellow-poplar-------	85 75 75 90	Virginia pine, eastern white pine.
RgB*, RgC*: Rayne----------	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar------- Eastern white pine-- Virginia pine------- Shortleaf pine------	80 90 90 75 75	Eastern white pine, yellow-poplar, black cherry, Virginia pine, Norway spruce.
Gilpin----------	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 95	European larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
RgD*: Rayne----------	2r	Moderate	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- Eastern white pine-- Virginia pine------- Shortleaf pine------	80 90 90 75 75	Eastern white pine, yellow-poplar, black cherry, Virginia pine, Norway spruce.
Gilpin----------	2r	Moderate	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 95	European larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
RgF*: Rayne----------	2r	Moderate	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- Eastern white pine-- Virginia pine------- Shortleaf pine------	80 90 90 75 75	Eastern white pine, yellow-poplar, black cherry, Virginia pine, Norway spruce.
Gilpin----------	2r	Severe	Severe	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 95	European larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
RpB*: Rayne----------	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar------- Eastern white pine-- Virginia pine------- Shortleaf pine------	80 90 90 75 75	Eastern white pine, yellow-poplar, black cherry, Virginia pine, Norway spruce.
Gilpin----------	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 95	European larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
RpD*: Rayne----------	2r	Moderate	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- Eastern white pine-- Virginia pine------- Shortleaf pine------	80 90 90 75 75	Eastern white pine, yellow-poplar, black cherry, Virginia pine, Norway spruce.

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	
HbF---------- Hazleton	3r	Moderate	Severe	Slight	Slight	Northern red oak----	70	European larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
HzB---------- Hazleton	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	European larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
HzD---------- Hazleton	3r	Slight	Moderate	Slight	Slight	Northern red oak----	70	European larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
HzF---------- Hazleton	3r	Moderate	Severe	Slight	Slight	Northern red oak----	70	European larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
LeB, LeC---------- Leck Kill	3o	Slight	Slight	Slight	Slight	Northern red oak----	65	Eastern white pine, Virginia pine.
LeD---------- Leck Kill	3r	Slight	Moderate	Slight	Slight	Northern red oak----	65	Eastern white pine, Virginia pine.
LkB---------- Leck Kill	3o	Slight	Slight	Slight	Slight	Northern red oak----	65	Eastern white pine, Virginia pine.
LkD---------- Leck Kill	3r	Slight	Moderate	Slight	Slight	Northern red oak----	65	Eastern white pine, Virginia pine.
LmF*---------- Leck Kill	3r	Moderate	Severe	Slight	Slight	Northern red oak----	65	Eastern white pine, Virginia pine.
MoA, MoB---------- Monongahela	3w	Slight	Moderate	Slight	Slight	Northern red oak----	70	Eastern white pine, Virginia pine, yellow-poplar, black cherry, European larch.
						Yellow-poplar-------	85	
						Eastern white pine--	72	
						Virginia pine-------	77	
NoA, NoB, NsB------ Nolo	3w	Slight	Severe	Severe	Moderate	Northern red oak----	70	Eastern white pine, Norway spruce, red maple.
						Black cherry--------	70	
Ph---------- Philo	1w	Slight	Moderate	Slight	Slight	Virginia pine-------	74	Eastern white pine, yellow-poplar.
						Northern red oak----	85	
						Yellow-poplar-------	102	
						Shortleaf pine------	80	
Po---------- Pope	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Eastern white pine, yellow-poplar, black walnut, black cherry, Norway spruce, European larch.
						Yellow-poplar-------	102	
						Eastern white pine--	89	
						Virginia pine-------	74	

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	
CpD---------- Cookport	2w	Moderate	Moderate	Slight	Slight	Northern red oak----	76	Yellow-poplar, eastern white pine, European larch, Norway spruce.
						Black cherry--------	92	
						Yellow-poplar-------	92	
						White ash----------	86	
						Sugar maple---------	80	
DhB*:								
Dekalb----------	3f	Slight	Slight	Moderate	Slight	Northern red oak----	70	Norway spruce, yellow-poplar, black cherry.
						Black cherry--------	88	
						White ash----------	80	
Hazleton----------	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	European larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
DkB*:								
Dekalb----------	3f	Slight	Slight	Moderate	Slight	Northern red oak----	70	Norway spruce, yellow-poplar, black cherry.
						Black cherry--------	88	
						White ash----------	80	
Hazleton----------	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	European larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
ErB---------- Ernest	2w	Slight	Moderate	Slight	Slight	Northern red oak----	80	Eastern white pine, Norway spruce.
						Yellow-poplar-------	90	
ErC---------- Ernest	2w	Moderate	Moderate	Slight	Slight	Northern red oak----	80	Eastern white pine, Norway spruce.
						Yellow-poplar-------	90	
EsB---------- Ernest	2w	Moderate	Moderate	Slight	Slight	Northern red oak----	80	Eastern white pine, Norway spruce.
						Yellow-poplar-------	90	
						White ash----------	80	
						Black walnut--------	80	
EsD---------- Ernest	2w	Severe	Moderate	Slight	Slight	Northern red oak----	80	Eastern white pine, Norway spruce.
						Yellow-poplar-------	90	
						White ash----------	80	
						Black walnut--------	80	
HaB, HaC---------- Hazleton	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	European larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
HaD---------- Hazleton	3r	Slight	Moderate	Slight	Slight	Northern red oak----	70	European larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
HbB---------- Hazleton	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	European larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
HbD---------- Hazleton	3r	Slight	Moderate	Slight	Slight	Northern red oak----	70	European larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	

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	
BkD*:								
Berks	3f	Slight	Moderate	Moderate	Slight	Northern red oak Black oak Virginia pine	70 70 70	Virginia pine, eastern white pine, Norway spruce, red pine.
Weikert	4d	Slight	Moderate	Severe	Moderate	Northern red oak Virginia pine	64 60	Eastern white pine, shortleaf pine, Virginia pine.
BkF*:								
Berks	3f	Moderate	Severe	Moderate	Slight	Northern red oak Black oak Virginia pine	70 70 70	Virginia pine, eastern white pine, Norway spruce, red pine.
Weikert	4d	Moderate	Severe	Severe	Moderate	Northern red oak Virginia pine	64 60	Eastern white pine, shortleaf pine, Virginia pine.
BnB Blairton	3w	Slight	Moderate	Slight	Slight	Northern red oak White ash Sugar maple Yellow-poplar	70 70 70 80	Yellow-poplar, European larch, eastern white pine, Norway spruce.
BnC Blairton	3w	Moderate	Moderate	Slight	Slight	Northern red oak White ash Sugar maple Yellow-poplar	70 70 70 80	Yellow-poplar, European larch, eastern white pine, Norway spruce.
BrA, BrB, BtB Brinkerton	2w	Slight	Severe	Severe	Moderate	Northern red oak	77	Eastern white pine, white spruce, red maple, yellow-poplar.
CaA, CaB Cavode	2w	Slight	Moderate	Moderate	Moderate	Northern red oak Yellow-poplar	83 95	Eastern white pine, yellow-poplar, black cherry, Norway spruce, white spruce.
CaC Cavode	2w	Moderate	Moderate	Moderate	Moderate	Northern red oak Yellow-poplar	83 95	Eastern white pine, yellow-poplar, black cherry, Norway spruce, white spruce.
CbB Cavode	2w	Slight	Moderate	Moderate	Moderate	Northern red oak Yellow-poplar	83 95	Eastern white pine, yellow-poplar, black cherry, Norway spruce, white spruce.
ChA, ChB Chavies	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar Pin oak Black walnut Black cherry Sugar maple	80 90 90 80 92 80	Eastern white pine, yellow-poplar, black walnut.
CoB, CoC Cookport	2w	Slight	Moderate	Slight	Slight	Northern red oak Black cherry Yellow-poplar White ash Sugar maple	76 92 92 86 80	Yellow-poplar, eastern white pine, black cherry, European larch, Norway spruce.
CpB Cookport	2w	Slight	Moderate	Slight	Slight	Northern red oak Black cherry Yellow-poplar White ash Sugar maple	76 92 92 86 80	Yellow-poplar, eastern white pine, European larch, Norway spruce.

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	
RpD*: Gilpin	2r	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar	80 95	Yellow-poplar, eastern white pine, black cherry, Virginia pine, Norway spruce.
Ty: Tyler	2d	Slight	Moderate	Moderate	Moderate	Northern red oak Yellow-poplar Pin oak Red maple White ash	80 90 90 80 80	Eastern white pine, yellow-poplar.
WhB: Wharton	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar	76 90	Eastern white pine, yellow-poplar.
WhC: Wharton	2r	Moderate	Slight	Slight	Slight	Northern red oak Yellow-poplar	76 90	Eastern white pine. yellow-poplar.
WhD: Wharton	2r	Severe	Moderate	Slight	Slight	Northern red oak Yellow-poplar	76 90	Eastern white pine, yellow-poplar.
WvB: Wharton	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar	76 90	Eastern white pine, yellow-poplar.
WvD: Wharton	2r	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar	76 90	Eastern white pine, yellow-poplar.

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

TABLE 8.--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
AbB--- Albrights	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: wetness.
AbC--- Albrights	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Moderate: slope, wetness, frost action.	Moderate: slope, wetness.
AgB--- Albrights	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: large stones, wetness.
AgD--- Albrights	Severe: slope, wetness.	Severe: slope, wetness.	Severe: slope, wetness.	Severe: slope, wetness.	Severe: slope.	Severe: slope.
AhB--- Allegheny	Slight---	Moderate: frost action.	Slight---	Moderate: slope, frost action.	Moderate: low strength, frost action.	Slight.
AhC--- Allegheny	Moderate: slope.	Moderate: slope, frost action.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength, frost action.	Moderate: slope.
Ar, AsB--- Armagh	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, frost action.	Severe: wetness.
At--- Atkins	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness, floods.
BeB--- Berks	Moderate: depth to rock.	Slight---	Moderate: depth to rock.	Moderate: slope.	Slight---	Severe: small stones.
BeC--- Berks	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.	Severe: small stones.
BeD--- Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BkB*:						
Berks---	Moderate: depth to rock.	Slight---	Moderate: depth to rock.	Moderate: slope.	Slight---	Severe: small stones.
Weikert---	Severe: depth to rock.	Moderate: depth to rock, frost action.	Moderate: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	Moderate: small stones, depth to rock.
BkC*:						
Berks---	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.	Severe: small stones.
Weikert---	Severe: depth to rock.	Moderate: slope, depth to rock, frost action.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Moderate: slope, small stones, depth to rock.

See footnote at end of table.

TABLE 8.--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
BkD*, BkF*:						
Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Weikert	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BnB Blairton	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: frost action.	Moderate: depth to rock, wetness.
BnC Blairton	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: slope, wetness.	Severe: frost action.	Moderate: slope, depth to rock, wetness.
BrA, BrB, BtB Brinkerton	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, frost action.	Severe: wetness.
CaA, CaB Cavode	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: frost action.	Moderate: wetness.
CaC Cavode	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: slope, wetness.	Severe: frost action.	Moderate: wetness, slope.
CbB Cavode	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: frost action.	Moderate: large stones, wetness.
ChA, ChB Chavies	Moderate: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.	Slight.
CoB Cookport	Severe: wetness.	Moderate: wetness, frost action.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: frost action.	Slight.
CoC Cookport	Severe: wetness.	Moderate: wetness, frost action.	Severe: wetness.	Severe: slope.	Moderate: frost action.	Moderate: slope.
CpB Cookport	Severe: wetness.	Moderate: large stones.	Severe: wetness.	Moderate: large stones, wetness.	Moderate: frost action.	Moderate: large stones.
CpD Cookport	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
DhB*:						
Dekalb	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Severe: small stones.
Hazleton	Moderate: small stones.	Moderate: frost action.	Slight	Moderate: slope, frost action.	Moderate: frost action.	Moderate: small stones.
DkB*:						
Dekalb	Severe: depth to rock.	Moderate: depth to rock, large stones.	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Moderate: depth to rock.	Severe: small stones.
Hazleton	Moderate: large stones.	Moderate: large stones, frost action.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: frost action.	Moderate: large stones.

See footnote at end of table.

TABLE 8.--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
ErB---------- Ernest	Severe: wetness.	Moderate: wetness, frost action, shrink-swell.	Severe: wetness.	Moderate: slope, wetness, frost action.	Moderate: frost action.	Slight.
ErC---------- Ernest	Severe: wetness.	Moderate: wetness, frost action, slope.	Severe: wetness.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
EsB---------- Ernest	Severe: wetness.	Moderate: large stones, wetness.	Severe: wetness.	Moderate: slope, large stones.	Moderate: frost action.	Moderate: large stones.
EsD---------- Ernest	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
FV*. Fluvaquents						
HaB---------- Hazleton	Moderate: small stones.	Moderate: frost action.	Slight---------	Moderate: slope, frost action.	Moderate: frost action.	Moderate: small stones.
HaC---------- Hazleton	Moderate: slope, small stones.	Moderate: slope, frost action.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, small stones.
HaD---------- Hazleton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
HbB---------- Hazleton	Moderate: large stones.	Moderate: large stones, frost action.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: frost action.	Moderate: large stones.
HbD, HbF---------- Hazleton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
HzB---------- Hazleton	Moderate: large stones.	Moderate: large stones, frost action.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: frost action.	Moderate: large stones.
HzD---------- Hazleton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
HzF---------- Hazleton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LeB---------- Leck Kill	Moderate: depth to rock.	Moderate: frost action.	Slight---------	Moderate: slope, frost action.	Moderate: frost action.	Moderate: small stones.
LeC---------- Leck Kill	Moderate: slope, depth to rock.	Moderate: slope, frost action.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, small stones.
LeD---------- Leck Kill	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LkB---------- Leck Kill	Moderate: depth to rock.	Moderate: frost action, large stones.	Moderate: large stones.	Moderate: slope, frost action.	Moderate: frost action.	Moderate: large stones.
LkD---------- Leck Kill	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LmF*---------- Leck Kill	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--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
MoA, MoB---------- Monongahela	Severe: wetness.	Severe: frost action.	Moderate: wetness.	Severe: frost action.	Severe: frost action.	Slight.
NoA, NoB---------- Nolo	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, frost action.	Severe: wetness.
NsB---------- Nolo	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Ph---------- Philo	Severe: floods, wetness.	Severe: floods.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods.	Moderate: floods.
Po---------- Pope	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.
Pu---------- Purdy	Severe: wetness, too clayey.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, low strength.	Severe: wetness.
Qu*. Quarries						
RgB*: Rayne----------	Slight---------	Moderate: frost action.	Slight---------	Moderate: slope, frost action.	Moderate: frost action.	Moderate: small stones.
Gilpin----------	Moderate: depth to rock.	Moderate: frost action.	Moderate: depth to rock.	Moderate: slope, frost action.	Moderate: depth to rock, frost action.	Moderate: depth to rock, small stones.
RgC*: Rayne----------	Moderate: slope.	Moderate: slope, frost action.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action, low strength.	Moderate: slope, small stones.
Gilpin----------	Moderate: slope, depth to rock.	Moderate: slope, frost action.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, depth to rock, small stones.
RgD*, RgF*: Rayne----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Gilpin----------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
RpB*: Rayne----------	Moderate: large stones.	Moderate: large stones, frost action.	Moderate: large stones.	Moderate: slope, frost action.	Moderate: frost action, low strength.	Moderate: large stones, small stones.
Gilpin----------	Moderate: large stones, depth to rock.	Moderate: depth to rock, frost action, large stones.	Moderate: depth to rock, slope.	Moderate: slope, frost action.	Moderate: frost action.	Moderate: depth to rock, large stones.
RpD*: Rayne----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Gilpin----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--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
Ty---------- Tyler	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength, wetness.	Severe: wetness.
UDA*, UDD*, UDF*, UOA*. Udorthents						
WhB---------- Wharton	Severe: wetness.	Severe: frost action.	Severe: wetness.	Severe: frost action.	Severe: frost action.	Moderate: too clayey.
WhC---------- Wharton	Severe: wetness.	Severe: frost action.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: too clayey.
WhD---------- Wharton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WvB---------- Wharton	Severe: wetness.	Severe: frost action.	Severe: wetness.	Severe: frost action.	Severe: frost action.	Moderate: large stones.
WvD---------- Wharton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

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

TABLE 9.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," and "fair." 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
AbB Albrights	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: thin layer.
AbC Albrights	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: slope, thin layer.
AgB Albrights	Severe: wetness, percs slowly.	Moderate: slope, large stones.	Severe: wetness.	Severe: wetness.	Fair: large stones, thin layer.
AgD Albrights	Severe: slope, wetness.	Severe: slope.	Severe: wetness.	Severe: slope, wetness.	Poor: slope.
AhB Allegheny	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
AhC Allegheny	Moderate: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Fair: slope.
Ar Armagh	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
AsB Armagh	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
At Atkins	Severe: floods, wetness.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Poor: wetness.
BeB Berks	Severe: depth to rock.	Severe: seepage, depth to rock, small stones.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
BeC Berks	Severe: depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
BeD Berks	Severe: slope, depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
BkB*: Berks	Severe: depth to rock.	Severe: seepage, depth to rock, small stones.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
Weikert	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: thin layer.

See footnote at end of table.

TABLE 9.--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
BkC*:					
Berks	Severe: depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
Weikert	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: thin layer.
BkD*:					
Berks	Severe: slope, depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
Weikert	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, thin layer.
BkF*:					
Berks	Severe: slope, depth to rock.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
Weikert	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, thin layer.
BnB Blairton	Severe: wetness, percs slowly, depth to rock.	Severe: depth to rock, wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Fair: thin layer, small stones.
BnC Blairton	Severe: wetness, percs slowly, depth to rock.	Severe: slope, depth to rock, wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Fair: slope, thin layer, small stones.
BrA Brinkerton	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
BrB Brinkerton	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
BtB Brinkerton	Severe: wetness, percs slowly.	Moderate: slope, large stones.	Severe: wetness.	Severe: wetness.	Poor: wetness.
CaA, CaB Cavode	Severe: percs slowly, wetness.	Moderate: depth to rock.	Severe: wetness.	Severe: wetness.	Poor: too clayey.
CaC Cavode	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: too clayey.
CbB Cavode	Severe: percs slowly, wetness.	Moderate: depth to rock.	Severe: wetness.	Severe: wetness.	Poor: too clayey.
ChA, ChB Chavies	Moderate: floods.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.

See footnote at end of table.

TABLE 9.--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
CoB---------- Cookport	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: thin layer.
CoC---------- Cookport	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: thin layer.
CpB---------- Cookport	Severe: wetness, percs slowly.	Moderate: slope, large stones.	Severe: wetness.	Severe: wetness.	Fair: large stones, thin layer.
CpD---------- Cookport	Severe: slope, wetness.	Severe: slope.	Severe: wetness.	Severe: slope, wetness.	Poor: slope.
DhB*: Dekalb----------	Severe: depth to rock.	Severe: depth to rock, small stones, seepage.	Severe: seepage, depth to rock.	Severe: seepage.	Poor: small stones.
Hazleton----------	Slight----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
DkB*: Dekalb----------	Severe: depth to rock.	Severe: depth to rock, seepage, small stones.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
Hazleton----------	Moderate: large stones.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
ErB---------- Ernest	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: thin layer.
ErC---------- Ernest	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: thin layer.
EsB---------- Ernest	Severe: percs slowly, wetness.	Moderate: slope, large stones.	Severe: wetness.	Severe: wetness.	Fair: large stones, thin layer.
EsD---------- Ernest	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: slope, wetness.	Poor: slope.
FV*. Fluvaquents					
HaB---------- Hazleton	Slight----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
HaC---------- Hazleton	Moderate: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
HaD---------- Hazleton	Severe: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: slope, seepage.	Poor: slope, small stones.
HbB---------- Hazleton	Moderate: depth to rock, large stones.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.

See footnote at end of table.

TABLE 9.--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
HbD---------- Hazleton	Severe: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: slope, seepage.	Poor: slope, small stones.
HbF---------- Hazleton	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
HzB---------- Hazleton	Moderate: large stones.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
HzD---------- Hazleton	Severe: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: slope, seepage.	Poor: slope, small stones.
HzF---------- Hazleton	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
LeB---------- Leck Kill	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Fair: small stones.
LeC---------- Leck Kill	Moderate: slope, wetness.	Severe: slope, seepage.	Severe: seepage, wetness.	Severe: seepage.	Fair: slope, small stones.
LeD---------- Leck Kill	Severe: slope.	Severe: slope, seepage.	Severe: seepage, wetness.	Severe: slope, seepage	Poor: slope.
LkB---------- Leck Kill	Moderate: large stones, wetness.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Fair: large stones.
LkD---------- Leck Kill	Severe: slope.	Severe: slope, seepage.	Severe: seepage, wetness.	Severe: slope, seepage.	Severe: slope.
LmF*---------- Leck Kill	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, seepage.	Poor: slope.
MoA---------- Monongahela	Severe: percs slowly, wetness.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Fair: thin layer.
MoB---------- Monongahela	Severe: percs slowly, wetness.	Moderate: slope, seepage.	Severe: wetness.	Severe: wetness.	Fair: thin layer.
Noa, NoB, NsB------- Nolo	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ph---------- Philo	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Good.
Po---------- Pope	Severe: floods.	Severe: floods, seepage.	Severe: floods, seepage.	Severe: floods.	Good.
Pu---------- Purdy	Severe: wetness, percs slowly.	Slight----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey.
Qu*. Quarries					

See footnote at end of table.

TABLE 9.--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
RgB*:					
Rayne	Moderate: depth to rock, wetness.	Moderate: slope, depth to rock, seepage.	Severe: wetness.	Moderate: wetness.	Fair: thin layer.
Gilpin	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Slight	Fair: small stones, thin layer.
RgC*:					
Rayne	Moderate: slope, depth to rock, wetness.	Severe: slope.	Severe: wetness.	Moderate: slope, wetness.	Fair: slope, thin layer.
Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Moderate: slope.	Fair: small stones, slope.
RgD*:					
Rayne	Severe: slope.	Severe: slope.	Severe: wetness.	Severe: slope.	Poor: slope.
Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: slope.	Poor: slope.
RgF*:					
Rayne	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
RpB*:					
Rayne	Moderate: depth to rock, large stones, wetness.	Moderate: slope, seepage.	Severe: wetness.	Moderate: wetness.	Fair: large stones, small stones, thin layer.
Gilpin	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Slight	Fair: thin layer, large stones.
RpD*:					
Rayne	Severe: slope.	Severe: slope.	Severe: wetness.	Severe: slope.	Poor: slope.
Gilpin	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Poor: slope.
Ty Tyler	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Fair: too clayey.
UDA*, UDD*, UDF*, UOA*. Udorthents					
WhB Wharton	Severe: percs slowly, wetness.	Moderate: depth to rock.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: too clayey.

See footnote at end of table.

TABLE 9.--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
WhC---------- Wharton	Severe: percs slowly, wetness.	Severe: slope.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: too clayey.
WhD---------- Wharton	Severe: slope, wetness.	Severe: slope.	Severe: depth to rock, wetness.	Severe: slope, wetness.	Poor: slope, too clayey.
WvB---------- Wharton	Severe: percs slowly, wetness.	Moderate: depth to rock, large stones.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: too clayey.
WvD---------- Wharton	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: depth to rock, wetness.	Severe: slope, wetness.	Poor: slope, too clayey.

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

TABLE 10.--CONSTRUCTION MATERIALS

[Some terms used that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AbB---- Albrights	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
AbC---- Albrights	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
AgB---- Albrights	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
AgD---- Albrights	Fair: slope, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.
AhB---- Allegheny	Fair: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
AhC---- Allegheny	Fair: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
Ar---- Armagh	Poor: wetness, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
AsB---- Armagh	Poor: wetness, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, large stones.
At---- Atkins	Poor: wetness, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
BeB, BeC---- Berks	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
BeD---- Berks	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
BkB*, BkC*:				
Berks----	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
Weikert----	Poor: thin layer.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones, thin layer.
BkD*:				
Berks----	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
Weikert----	Poor: thin layer.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, small stones, thin layer.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BkF*:				
Berks	Poor: slope, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
Weikert	Poor: slope, thin layer.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, small stones, thin layer.
BnB, BnC Blairton	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
BrA, BrB, BtB Brinkerton	Poor: wetness, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
CaA, CaB, CaC Cavode	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
CbB Cavode	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
ChA, ChB Chavies	Fair: low strength, frost action.	Poor: excess fines.	Unsuited: excess fines.	Good.
CoB Cookport	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
CoC Cookport	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
CpB Cookport	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
CpD Cookport	Fair: slope, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.
DhB*:				
Dekalb	Poor: thin layer.	Poor: excess fines.	Poor: excess fines.	Poor: small stones.
Hazleton	Fair: frost action.	Poor: excess fines.	Poor: excess fines.	Poor: small stones.
DkB*:				
Dekalb	Poor: thin layer.	Poor: excess fines.	Poor: excess fines.	Poor: small stones, large stones.
Hazleton	Fair: frost action.	Poor: excess fines.	Poor: excess fines.	Poor: large stones, small stones.
ErB Ernest	Fair: frost action, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
ErC Ernest	Fair: frost action, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
EsB---------- Ernest	Fair: frost action, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
EsD---------- Ernest	Fair: slope, frost action, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
FV*. Fluvaquents				
HaB, HaC---------- Hazleton	Fair: frost action.	Poor: excess fines.	Poor: excess fines.	Poor: small stones.
HaD---------- Hazleton	Fair: slope, frost action.	Poor: excess fines.	Poor: excess fines.	Poor: slope, small stones.
HbB---------- Hazleton	Fair: frost action.	Poor: excess fines.	Poor: excess fines.	Poor: large stones, small stones.
HbD---------- Hazleton	Fair: slope, frost action.	Poor: excess fines.	Poor: excess fines.	Poor: slope, large stones, small stones.
HbF---------- Hazleton	Severe: slope.	Poor: excess fines.	Poor: excess fines.	Poor: slope, large stones, small stones.
HzB---------- Hazleton	Fair: frost action.	Poor: excess fines, large stones.	Poor: excess fines, large stones.	Poor: large stones, small stones.
HzD---------- Hazleton	Fair: slope, frost action.	Poor: excess fines.	Poor: excess fines.	Poor: slope, large stones, small stones.
HzF---------- Hazleton	Poor: slope.	Poor: excess fines.	Poor: excess fines.	Poor: slope, large stones, small stones.
LeB, LeC---------- Leck Kill	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
LeD---------- Leck Kill	Fair: frost action, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
LkB---------- Leck Kill	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
LkD---------- Leck Kill	Fair: slope, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.
LmF*---------- Leck Kill	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
MoA, MoB---------- Monongahela	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
NoA, NoB---------- Nolo	Poor: wetness, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
NsB---------- Nolo	Poor: wetness, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, large stones.
Ph---------- Philo	Fair: low strength, frost action.	Poor: excess fines.	Unsuited: excess fines.	Good.
Po---------- Pope	Fair: low strength, frost action.	Poor: excess fines.	Unsuited: excess fines.	Good.
Pu---------- Purdy	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Qu*. Quarries				
RgB*, RgC*: Rayne----------	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
Gilpin----------	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
RgD*: Rayne----------	Fair: slope, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
Gilpin----------	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
RgF*: Rayne----------	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
Gilpin----------	Poor: thin layer, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
RpB*: Rayne----------	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
Gilpin----------	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
RpD*: Rayne----------	Fair: slope, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.
Gilpin----------	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ty---------- Tyler	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
UDA*, UDD*, UDF*, UOA*. Udorthents				
WhB, WhC---------- Wharton	Poor: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
WhD---------- Wharton	Poor: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
WvB---------- Wharton	Poor: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
WvD---------- Wharton	Poor: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.

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

TABLE 11.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Pond reservoir areas	Embankments dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
AbB, AbC---------- Albrights	Slope----------	Piping, low strength.	Deep to water--	Percs slowly, wetness.	Slope, percs slowly.	Percs slowly, wetness.
AgB, AgD---------- Albrights	Slope----------	Large stones, piping, low strength.	Deep to water, large stones.	Percs slowly, wetness.	Slope, large stones, percs slowly.	Percs slowly, wetness, large stones.
AhB---------- Allegheny	Seepage--------	Seepage, piping.	No water-------	Not needed-----	Favorable------	Favorable.
AhC---------- Allegheny	Seepage--------	Seepage, piping.	No water-------	Not needed-----	Favorable------	Slope.
Ar---------- Armagh	Favorable------	Low strength---	Favorable------	Wetness, percs slowly.	Not needed-----	Wetness, percs slowly.
AsB---------- Armagh	Favorable------	Low strength, large stones.	Large stones---	Wetness, percs slowly.	Not needed-----	Wetness, large stones, percs slowly.
At---------- Atkins	Seepage, wetness.	Piping, floods.	Favorable------	Floods, wetness.	Not needed-----	Wetness, floods.
BeB, BeC, BeD----- Berks	Depth to rock, seepage.	Seepage, thin layer, piping.	No water-------	Not needed-----	Depth to rock, slope, small stones.	Depth to rock, droughty, slope.
BkB*, BkC*, BkD*, BkF*:						
Berks----------	Depth to rock, seepage.	Seepage, thin layer, piping.	No water-------	Not needed-----	Depth to rock, slope, small stones.	Depth to rock, droughty, slope.
Weikert---------	Seepage, slope, depth to rock.	Thin layer, low strength, seepage.	No water-------	Not needed-----	Depth to rock, rooting depth.	Depth to rock, rooting depth, droughty.
BnB, BnC---------- Blairton	Depth to rock	Piping---------	Slow refill----	Depth to rock, percs slowly, wetness.	Depth to rock, percs slowly, wetness.	Rooting depth, percs slowly, wetness.
BrA, BrB, BtB----- Brinkerton	Slope----------	Piping, low strength.	Favorable------	Wetness, percs slowly.	Percs slowly, erodes easily, wetness.	Percs slowly, wetness, erodes easily.
CaA, CaB, CaC----- Cavode	Slope----------	Low strength---	Deep to water--	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
CbB---------- Cavode	Slope----------	Low strength, large stones.	Deep to water, large stones.	Wetness, percs slowly.	Wetness, percs slowly, large stones.	Wetness, percs slowly, large stones.
ChA, ChB---------- Chavies	Seepage, slope.	Piping---------	No water-------	Not needed-----	Slope----------	Slope.
CoB, CoC---------- Cookport	Slope----------	Piping, low strength.	Slope, deep to water.	Percs slowly, wetness.	Percs slowly, wetness.	Percs slowly, erodes easily.
CpB, CpD---------- Cookport	Slope----------	Large stones, piping, low strength.	Large stones, slope, deep to water.	Percs slowly, wetness.	Percs slowly, wetness, large stones.	Percs slowly, erodes easily, large stones.

See footnote at end of table.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
DhB*:						
Dekalb	Depth to rock, seepage.	Piping, seepage.	No water	Not needed	Slope, depth to rock.	Slope, droughty, rooting depth.
Hazleton	Slope, seepage.	Low strength, piping.	No water	Not needed	Slope	Slope.
DkB*:						
Dekalb	Depth to rock, seepage.	Piping, seepage, large stones.	No water, large stones.	Not needed	Depth to rock, large stones.	Droughty, rooting depth, large stones.
Hazleton	Slope, large stones, seepage.	Low strength, piping, large stones.	No water	Not needed	Slope, large stones.	Slope, large stones.
ErB, ErC Ernest	Slope	Piping, low strength.	Slope, deep to water.	Percs slowly, wetness.	Percs slowly, wetness.	Percs slowly, erodes easily.
EsB, EsD Ernest	Slope	Large stones, piping, low strength.	Large stones, slope, deep to water.	Percs slowly, wetness.	Percs slowly, wetness, large stones.	Percs slowly, large stones.
FV*. Fluvaquents						
HaB, HaC, HaD Hazleton	Slope, seepage.	Low strength, piping.	No water	Not needed	Slope, depth to rock.	Slope.
HbB, HbD, HbF, HzB, HzD, HzF Hazleton	Slope, large stones, seepage.	Low strength, piping, large stones.	No water	Not needed	Slope, large stones.	Slope, large stones.
LeB, LeC, LeD Leck Kill	Seepage	Low strength, compressible, piping.	No water	Not needed	Slope	Slope.
LkB, LkD Leck Kill	Large stones, seepage.	Low strength, compressible, piping.	No water	Not needed	Large stones, slope.	Large stones, slope.
LmF* Leck Kill	Seepage	Low strength, compressible, piping.	No water	Not needed	Slope	Slope.
MoA, MoB Monongahela	Slope, seepage.	Low strength, piping.	No water	Slope, percs slowly.	Percs slowly, piping, rooting depth.	Slope, percs slowly, erodes easily.
NoA, NoB Nolo	Slope	Piping, low strength.	Favorable	Wetness, percs slowly.	Percs slowly, erodes easily, wetness.	Percs slowly, wetness, erodes easily.
NsB Nolo	Slope	Piping, low strength, large stones.	Large stones	Wetness, percs slowly.	Percs slowly, erodes easily, wetness.	Large stones, wetness, erodes easily.
Ph Philo	Seepage	Piping	Deep to water	Floods, poor outlets.	Not needed	Not needed.
Po Pope	Seepage	Piping	No water	Not needed	Not needed	Not needed.
Pu Purdy	Slope	Low strength, compressible.	Slow refill	Percs slowly	Wetness, percs slowly.	Wetness.

See footnote at end of table.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
Qu*. Quarries						
RgB*, RgC*, RgD*, RgF*: Rayne	Slope, seepage, depth to rock.	Low strength, compressible, piping.	No water	Not needed	Slope, depth to rock.	Slope.
Gilpin	Slope, depth to rock, seepage.	Thin layer	No water	Not needed	Slope, depth to rock.	Slope, depth to rock.
RpB*, RpD*: Rayne	Slope, large stones, seepage.	Large stones, low strength, piping.	No water	Not needed	Slope, large stones.	Slope, large stones.
Gilpin	Depth to rock, slope, seepage.	Large stones, thin layer.	No water	Not needed	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
Ty--- Tyler	Favorable	Wetness	Slow refill	Percs slowly, frost action.	Not needed	Wetness, erodes easily, rooting depth.
UDA*, UDD*, UDF*, UOA*. Udorthents						
WhB, WhC, WhD--- Wharton	Slope	Low strength	Deep to water	Percs slowly	Slope, percs slowly.	Slope, percs slowly.
WvB, WvD--- Wharton	Slope, large stones.	Low strength, large stones.	Deep to water, large stones.	Percs slowly	Slope, percs slowly, large stones.	Slope, percs slowly, large stones.

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

TABLE 12.--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
AbB Albrights	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
AbC Albrights	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness.	Moderate: slope, wetness.
AgB Albrights	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: slope, wetness, large stones.	Moderate: wetness, large stones.	Moderate: large stones, wetness.
AgD Albrights	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Moderate: slope, large stones, wetness.	Severe: slope.
AhB Allegheny	Slight	Slight	Moderate: slope.	Slight	Slight.
AhC Allegheny	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Ar, AsB Armagh	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
At Atkins	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
BeB Berks	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Severe: small stones.
BeC Berks	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Severe: small stones.
BeD Berks	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.
BkB*: Berks	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Severe: small stones.
Weikert	Moderate: small stones.	Moderate: small stones.	Severe: depth to rock.	Moderate: small stones.	Moderate: small stones, depth to rock.
BkC*: Berks	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Severe: small stones.
Weikert	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, depth to rock.	Moderate: small stones.	Moderate: slope, small stones, depth to rock.
BkD*: Berks	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BkD*:					
Weikert	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Moderate: slope, small stones.	Severe: slope.
BkF*:					
Berks	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope, small stones.
Weikert	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.
BnB	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: depth to rock, wetness.
BnC	Moderate: slope, percs slowly, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness.	Moderate: slope, depth to rock, wetness.
BrA, BrB, BtB	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
CaA, CaB	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
CaC	Moderate: wetness, percs slowly.	Moderate: wetness.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.
CbB	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: large stones, wetness.
ChA	Slight	Slight	Slight	Slight	Slight.
ChB	Slight	Slight	Moderate: slope.	Slight	Slight.
CoB	Moderate: percs slowly.	Slight	Moderate: percs slowly.	Slight	Slight.
CoC	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
CpB	Moderate: percs slowly, large stones.	Slight	Moderate: percs slowly, slope, large stones.	Moderate: large stones.	Moderate: large stones.
CpD	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: large stones.	Severe: slope.
DhB*:					
Dekalb	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Severe: small stones.
Hazleton	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
DkB*:					
Dekalb	Moderate: small stones, large stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones, large stones.	Severe: small stones.
Hazleton	Moderate: large stones, small stones.	Moderate: small stones.	Severe: small stones.	Moderate: large stones, small stones.	Moderate: large stones.
ErB---------- Ernest	Moderate: percs slowly.	Slight----------	Moderate: slope, percs slowly.	Slight----------	Slight.
ErC---------- Ernest	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
EsB---------- Ernest	Moderate: large stones, percs slowly.	Slight----------	Moderate: slope, large stones, percs slowly.	Moderate: large stones.	Moderate: large stones.
EsD---------- Ernest	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, large stones.	Severe: slope.
FV*. Fluvaquents					
HaB---------- Hazleton	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
HaC---------- Hazleton	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope.	Moderate: small stones.	Moderate: slope, small stones.
HaD---------- Hazleton	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, small stones.	Severe: slope.
HbB---------- Hazleton	Moderate: large stones, small stones.	Moderate: small stones.	Severe: small stones.	Moderate: large stones, small stones.	Moderate: large stones.
HbD---------- Hazleton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, large stones, small stones.	Severe: slope.
HbF---------- Hazleton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
HzB---------- Hazleton	Moderate: large stones, small stones.	Moderate: small stones.	Severe: small stones.	Moderate: large stones.	Moderate: large stones.
HzD---------- Hazleton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, large stones, small stones.	Severe: slope.
HzF---------- Hazleton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
LeB---------- Leck Kill	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LeC---------- Leck Kill	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, small stones.
LeD---------- Leck Kill	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope.
LkB---------- Leck Kill	Moderate: large stones, small stones.	Moderate: small stones.	Severe: small stones.	Moderate: large stones, small stones.	Moderate: large stones.
LkD---------- Leck Kill	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, large stones, small stones.	Severe: slope.
LmF*---------- Leck Kill	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
MoA---------- Monongahela	Moderate: wetness, percs slowly.	Slight----------	Moderate: wetness, percs slowly.	Slight----------	Slight.
MoB---------- Monongahela	Moderate: wetness, percs slowly.	Slight----------	Moderate: slope, wetness, percs slowly.	Slight----------	Slight.
NoA, NoB, NsB--------- Nolo	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ph---------- Philo	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight----------	Moderate: floods.
Po---------- Pope	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight----------	Moderate: floods.
Pu---------- Purdy	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Qu*. Quarries					
RgB*: Rayne----------	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
Gilpin----------	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: depth to rock, small stones.
RgC* Rayne----------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, small stones.
Gilpin----------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: small stones, slope.	Moderate: small stones. small stones.	Moderate: slope, depth to rock, small stones.
RgD*: Rayne----------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
Gilpin----------	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
RgF*:					
Rayne	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Gilpin	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope.
RpB*:					
Rayne	Moderate: large stones, small stones.	Moderate: small stones.	Severe: small stones.	Moderate: large stones, small stones.	Moderate: large stones, small stones.
Gilpin	Moderate: large stones, small stones.	Moderate: small stones.	Severe: small stones.	Moderate: large stones, small stones.	Moderate: depth to rock, large stones.
RpD*:					
Rayne	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, large stones, small stones.	Severe: slope.
Gilpin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: large stones, small stones, slope.	Severe: slope.
Ty Tyler	Severe: percs slowly.	Moderate: wetness.	Severe: percs slowly.	Moderate: wetness.	Severe: wetness.
UDA*, UDD*, UDF*, UOA*. Udorthents					
WhB Wharton	Moderate: percs slowly.	Slight	Moderate: percs slowly.	Slight	Moderate: too clayey.
WhC Wharton	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight	Moderate: too clayey.
WhD Wharton	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
WvB Wharton	Moderate: percs slowly, large stones.	Slight	Moderate: percs slowly, large stones.	Moderate: large stones.	Moderate: large stones.
WvD Wharton	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, large stones.	Severe: slope.

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

TABLE 13.--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
AbB---- Albrights	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
AbC---- Albrights	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
AgB---- Albrights	Very poor	Poor	Good	Good	Good	Poor	Very poor	Poor	Good	Very poor.
AgD---- Albrights	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
AhB---- Allegheny	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
AhC---- Allegheny	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Ar---- Armagh	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
AsB---- Armagh	Very poor	Poor	Fair	Fair	Fair	Poor	Very poor	Poor	Fair	Very poor.
At---- Atkins	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
BeB---- Berks	Poor	Fair	Fair	Poor	Poor	Poor	Very poor	Fair	Poor	Very poor.
BeC---- Berks	Poor	Fair	Fair	Poor	Poor	Very poor	Very poor	Fair	Poor	Very poor.
BeD---- Berks	Poor	Fair	Fair	Poor	Poor	Very poor	Very poor	Fair	Poor	Very poor.
BkB*:										
Berks----	Poor	Fair	Fair	Poor	Poor	Poor	Very poor	Fair	Poor	Very poor.
Weikert----	Very poor	Poor	Poor	Very poor	Very poor	Poor	Very poor	Poor	Very poor	Very poor.
BkC*:										
Berks----	Poor	Fair	Fair	Poor	Poor	Very poor	Very poor	Fair	Poor	Very poor.
Weikert----	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor	Very poor.
BkD*:										
Berks----	Poor	Fair	Fair	Poor	Poor	Very poor	Very poor	Fair	Poor	Very poor.
Weikert----	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor	Very poor.
BkF*:										
Berks----	Very poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor.

See footnote at end of table.

TABLE 13.--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
BkF*: Weikert	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor	Very poor.
BnB Blairton	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
BnC Blairton	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
BrA Brinkerton	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
BrB Brinkerton	Poor	Fair	Fair	Fair	Fair	Poor	Very poor	Fair	Fair	Very poor.
BtB Brinkerton	Very poor	Poor	Fair	Fair	Fair	Poor	Very poor	Poor	Fair	Very poor.
CaA Cavode	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
CaB Cavode	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
CaC Cavode	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
CbB Cavode	Very poor	Poor	Good	Good	Good	Poor	Very poor	Poor	Good	Very poor.
ChA, ChB Chavies	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
CoB Cookport	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
CoC Cookport	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
CpB Cookport	Very poor	Poor	Good	Good	Good	Poor	Very poor	Poor	Good	Very poor.
CpD Cookport	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
DhB*: Dekalb	Poor	Fair	Fair	Poor	Poor	Poor	Very poor	Fair	Poor	Very poor.
Hazleton	Fair	Good	Good	Good	Good	Poor	Very poor	Very poor	Good	Very poor.
DkB*: Dekalb	Very poor	Poor	Fair	Poor	Poor	Poor	Very poor	Poor	Poor	Very poor.
Hazleton	Very poor	Poor	Good	Good	Good	Poor	Very poor	Poor	Good	Very poor.
ErB Ernest	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
ErC Ernest	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.

See footnote at end of table.

TABLE 13.--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
EsB---- Ernest	Very poor	Poor	Good	Good	Good	Poor	Very poor	Poor	Good	Very poor.
EsD---- Ernest	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
FV*. Fluvaquents										
HaB---- Hazleton	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
HaC---- Hazleton	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
HaD---- Hazleton	Poor	Good	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
HbB---- Hazleton	Very poor	Poor	Good	Good	Good	Poor	Very poor	Poor	Good	Very poor.
HbD, HbF---- Hazleton	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
HzB---- Hazleton	Very poor	Poor	Good	Good	Good	Poor	Very poor	Poor	Good	Very poor.
HzD---- Hazleton	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
HzF---- Hazleton	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
LeB---- Leck Kill	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
LeC---- Leck Kill	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
LeD---- Leck Kill	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
LkB---- Leck Kill	Very poor	Poor	Good	Good	Good	Poor	Very poor	Poor	Good	Very poor.
LkD---- Leck Kill	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
LmF*---- Leck Kill	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
MoA---- Monongahela	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
MoB---- Monongahela	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
NoA---- Nolo	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
NoB---- Nolo	Poor	Fair	Fair	Fair	Fair	Poor	Very poor	Fair	Fair	Very poor.
NsB---- Nolo	Very poor	Poor	Fair	Fair	Fair	Poor	Very poor	Poor	Fair	Very poor.
Ph---- Philo	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

See footnote at end of table.

TABLE 13.--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
Po---------- Pope	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
Pu---------- Purdy	Very poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Qu*. Quarries										
RgB*: Rayne----------	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
Gilpin----------	Fair	Good	Good	Fair	Fair	Poor	Very poor	Good	Fair	Very poor.
RgC*: Rayne----------	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Gilpin----------	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor.
RgD*: Rayne----------	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Gilpin----------	Poor	Fair	Good	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
RgF*: Rayne----------	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
Gilpin----------	Very poor	Poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
RpB*: Rayne----------	Very poor	Poor	Good	Good	Good	Poor	Very poor	Poor	Good	Very poor.
Gilpin----------	Very poor	Poor	Good	Fair	Fair	Poor	Very poor	Poor	Fair	Very poor.
RpD*: Rayne----------	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
Gilpin----------	Very poor	Poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
Ty---------- Tyler	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
UDA*, UDD*, UDF*, UOA*. Udorthents										

See footnote at end of table.

TABLE 13.--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
WhB---------- Wharton	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
WhC---------- Wharton	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
WhD---------- Wharton	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
WvB---------- Wharton	Very poor	Poor	Good	Good	Good	Poor	Very poor	Poor	Good	Very poor.
WvD---------- Wharton	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor.

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

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[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		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AbB, AbC----------	0-7	Silt loam-------	ML, CL	A-4	0-10	80-100	80-95	70-90	55-80	---	---
Albrights	7-18	Channery clay loam, gravelly silt loam, silty clay loam.	ML, CL, SM, SC	A-4, A-6	0-15	80-100	80-95	60-90	40-85	25-40	3-15
	18-65	Silt loam, gravelly silty clay loam, channery clay loam.	CL, ML, SC, GM-GC	A-4, A-2, A-6	0-15	65-100	55-95	40-90	25-85	20-40	3-15
AgB----------	0-7	Very stony silt loam.	ML, CL, GM	A-4	3-15	65-100	60-90	55-85	50-80	---	---
Albrights	7-21	Channery clay loam, gravelly silt loam, silty clay loam.	ML, CL, SM, SC	A-4, A-6,	0-15	80-100	65-95	60-90	40-85	25-40	3-15
	21-60	Silt loam, gravelly silty clay loam, channery clay loam.	CL, ML, SC, GM-GC	A-4, A-2, A-6, A-1	0-15	65-100	55-95	40-90	25-80	20-40	3-15
AgD----------	0-7	Very stony silt loam.	ML, CL, GM	A-4	3-15	65-100	60-90	55-85	50-80	---	---
Albrights	7-21	Channery clay loam, gravelly silt loam, silty clay loam.	ML, CL, SM, SC	A-4, A-6	0-15	80-100	65-95	60-90	40-85	25-40	3-15
	21-65	Silt loam, gravelly silty clay loam, channery clay loam.	CL, ML, SC, GM-GC	A-4, A-2, A-6, A-1	0-15	65-100	55-95	40-90	25-80	20-40	3-15
AhB, AhC----------	0-10	Silt loam-------	ML, CL, CL-ML	A-4	0	90-100	85-100	65-100	55-95	<35	NP-10
Allegheny	10-40	Clay loam, loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0	90-100	65-100	55-95	35-80	<35	NP-15
	40-60	Gravelly sandy loam, sand, gravelly sandy clay loam.	GC, SM, GW-GC, SW-SC	A-1, A-2, A-4	0-15	30-65	20-55	15-50	10-40	<35	NP-15
Ar----------	0-6	Silt loam-------	ML, CL	A-4, A-6	0-5	95-100	90-100	80-95	75-85	---	---
Armagh	6-50	Silt loam, silty clay, shaly clay.	ML, CL, CH, MH	A-4, A-6, A-7	0-5	85-95	80-90	70-85	65-85	35-55	9-25
	50-60	Silty clay, shaly clay loam, very shaly loam.	GM, SC, GC, SM	A-4, A-6, A-2, A-7	0-10	65-85	55-75	45-60	35-45	30-45	9-15

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--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	
AsB---------- Armagh	0-6	Very stony silt loam.	ML, CL	A-4, A-6	3-15	95-100	90-100	80-95	75-85	---	---
	6-50	Silt loam, silty clay, shaly clay.	ML, CL, CH	A-4, A-6, A-7	0-5	85-95	80-90	70-85	65-85	35-55	9-25
	50-60	Silty clay, shaly clay loam, very shaly loam.	GM, SC, GC, SM	A-4, A-6, A-2, A-7	0-10	65-85	55-75	45-60	35-45	30-45	9-15
At---------- Atkins	0-9	Silt loam-------	ML, CL	A-4, A-6	0	90-100	90-100	75-100	60-95	25-50	2-25
	9-46	Silty clay loam, loam, silt loam.	SM, SC, ML, CL-ML	A-5, A-4, A-6 A-7	0-5	85-100	80-100	60-100	35-85	20-50	1-25
	46-60	Stratified silty clay loam to sandy loam.	SM, SC, GM, ML	A-2, A-4, A-6	0-15	60-100	60-100	50-95	15-85	20-45	1-15
BeB, BeC, BeD------ Berks	0-9	Channery silt loam.	GM, ML, GC, SC	A-2, A-4	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	9-29	Channery loam, very channery loam, channery silt loam.	GM, SM, GM-GC, SM-SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	29-38	Channery loam, very channery loam, channery silt loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	38	Weathered bedrock.	---	---	---	---	---	---	---	---	---
BkB*, BkC*, BkD*, BkF*:											
Berks----------	0-9	Channery silt loam.	GM, ML, GC, SC	A-2, A-4	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	9-29	Channery loam, very channery loam, channery silt loam.	GM, SM, GM-GC, SM-SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	29-38	Channery loam, very channery loam, channery silt loam.	GM, SM	A-1, A-2-4	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	38	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Weikert----------	0-7	Channery silt loam.	GM, ML, SM	A-1, A-2, A-4	0-10	35-70	35-70	25-65	20-55	30-40	4-10
	7-14	Shaly loam, very shaly silt loam, cherty loam.	GM, GP, SM-SP	A-1, A-2	0-20	15-60	10-45	5-35	5-35	28-36	3-9
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
BnB, BnC---------- Blairton	0-9	Channery silt loam.	ML	A-4	0	70-90	65-75	55-70	50-65	---	---
	9-39	Silt loam, channery silty clay loam, very shaly loam.	ML, CL, GM, SM-SC	A-4, A-2 A-6, A-7	0-5	40-90	20-70	20-60	15-50	25-45	5-15
	39	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--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	
BrA, BrB----------	0-10	Silt loam-------	ML, CL	A-4, A-6	0-10	90-100	85-100	85-100	75-100	---	---
Brinkerton	10-24	Silty clay loam, silt loam.	ML	A-4, A-6, A-7	0-10	90-100	85-100	85-100	65-100	30-45	5-15
	24-46	Silt loam, shaly loam, channery silty clay loam.	ML	A-4, A-6, A-7	0-10	75-100	75-100	65-100	55-100	30-45	5-15
	46-66	Silt loam, shaly loam, channery silt loam.	ML, GM, SM, GC	A-4, A-6, A-2	0-15	70-90	35-85	30-85	25-75	30-40	5-15
BtB----------	0-10	Very stony silt loam.	ML, CL	A-4, A-6	3-10	90-100	85-100	85-100	75-100	---	---
Brinkerton	10-24	Silty clay loam, silt loam.	ML	A-4, A-6, A-7	0-10	90-100	85-100	85-100	65-100	30-45	5-15
	24-46	Silt loam, shaly loam, channery silty clay loam.	ML, CL	A-4, A-6, A-7, A-5	0-10	75-100	75-100	65-100	55-100	30-45	5-15
	46-66	Silt loam, shaly loam, channery silt loam.	ML, GM, SM	A-4, A-6, A-2	0-15	70-90	35-85	30-85	25-75	30-40	5-15
CaA, CaB, CaC------	0-8	Silt loam-------	ML, CL	A-4	0-5	90-100	80-100	80-95	75-95	---	---
Cavode	8-42	Silty clay loam, silty clay, clay.	ML, CL	A-4, A-5, A-7, A-6	0-5	85-100	80-100	80-95	70-95	25-49	4-20
	42-66	Shaly silty clay loam, silty clay, clay.	ML, CL, GC, SM	A-4, A-6	0-15	60-90	55-85	50-80	40-75	28-40	2-15
CbB----------	0-8	Very stony silt loam.	ML, CL	A-4	3-10	90-100	80-100	80-95	75-95	---	---
Cavode	8-42	Silty clay loam, silty clay, clay.	ML, CL	A-4, A-7, A-6	0-5	85-100	80-100	80-95	70-95	25-49	4-20
	42-66	Shaly silty clay loam, silty clay, clay.	ML, CL, GC, SM	A-4, A-6	0-15	60-90	55-85	50-80	40-75	28-40	2-15
ChA, ChB----------	0-10	Silt loam-------	SM, ML	A-4, A-2	0-30	75-100	55-100	40-95	25-75	<25	NP-5
Chavies	10-42	Fine sandy loam, gravelly fine sandy loam, silt loam.	SM, ML, ML-CL	A-4, A-2	0-5	70-100	60-100	45-100	25-85	<35	NP-8
	42-65	Fine sandy loam, gravelly fine sandy loam, loam.	SM, ML, ML-CL	A-4, A-2	0-5	70-100	60-95	40-85	20-75	<25	NP-5
CoB, CoC----------	0-12	Loam----------	ML, CL, SM, ML-CL	A-2, A-4, A-6	0-15	75-100	60-95	60-85	30-85	20-40	1-15
Cookport	12-22	Loam, sandy clay loam, clay loam.	ML, CL, SM ML-CL	A-4, A-6	0-15	95-100	75-95	60-95	40-75	20-40	1-20
	22-40	Loam, sandy clay loam, clay loam.	ML, CL, SM ML-CL	A-4, A-6	0-15	95-100	75-95	60-95	40-75	20-40	1-20
	40-62	Very channery sandy loam, gravelly loam.	ML, CL, SM, GM	A-2, A-4, A-6	0-15	60-100	50-95	40-95	30-75	20-40	1-15

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--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	
CpB, CpD---------- Cookport	0-12	Very stony loam	ML, CL, SM, ML-CL	A-2, A-4, A-6	2-40	75-95	70-95	60-85	30-70	20-40	1-15
	12-22	Loam, sandy clay loam, clay loam.	ML, CL, SM ML-CL	A-4, A-6	0-15	95-100	75-95	60-95	40-75	20-40	1-20
	22-40	Loam, gravelly sandy clay loam, loam.	ML, CL, SM, ML-CL	A-4, A-6	0-15	95-100	75-95	60-95	40-75	20-40	1-20
	40-62	Very channery sandy loam, channery loam.	ML, CL, SM, GM	A-2, A-4, A-6	0-15	60-100	50-95	40-95	30-75	20-40	1-15
DhB*:											
Dekalb-----------	0-12	Channery sandy loam.	SM, GM, ML, CL-ML	A-2, A-4 A-1	0-30	50-90	45-80	40-75	20-55	15-32	NP-7
	12-35	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML, GM-GC	A-2, A-4 A-1	5-40	50-85	40-80	40-75	20-55	15-32	NP-7
	35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Hazleton----------	0-7	Channery sandy loam.	ML, GM, SM	A-2, A-4	0-15	60-85	60-80	60-75	35-55	---	---
	7-36	Channery sandy loam, loam, very channery loam.	GM, SM-SC ML, SC	A-2, A-4, A-1	0-50	60-90	45-90	35-70	20-55	<30	NP-8
	36-70	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC-GM	A-2, A-1, A-4	0-60	60-80	55-75	25-65	15-50	<30	NP-8
DkB*											
Dekalb-----------	0-12	Very stony sandy loam.	SM, GM ML,	A-2, A-4 A-1	10-30	50-90	45-80	40-75	20-55	10-32	NP-7
	12-35	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML, GM-GC	A-2, A-4 A-1	5-40	50-85	40-75	40-75	20-55	15-32	NP-7
	35	Unweathered	---	---	---	---	---	---	---	---	---
Hazleton----------	0-7	Very stony sandy loam.	ML, GM, SM	A-4, A-2	5-15	60-85	50-80	50-70	35-55	---	---
	7-36	Channery sandy loam, channery loam, loam.	GM, SM ML, SC	A-2, A-4, A-1	0-50	60-95	45-90	35-70	20-55	<30	NP-8
	36-70	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC	A-2, A-1,	5-60	60-80	55-75	25-65	15-50	<30	NP-8

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--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	
ErB, ErC---------- Ernest	0-10	Silt loam-------	ML, CL	A-4, A-6	0-15	75-100	70-100	70-95	60-95	25-40	2-15
	10-19	Silt loam, silty clay loam.	ML, CL, ML-CL	A-4, A-5, A-6, A-7	0-15	75-100	75-100	70-95	65-95	25-50	2-25
	19-48	Silty clay loam, clay loam, channery silt loam.	GM, SM, ML, CL	A-4, A-5, A-6, A-7	5-20	70-95	55-95	50-95	40-95	25-50	2-25
	48-60	Silt loam, silty clay loam, silty clay.	GM, SM, ML, CL	A-4, A-5, A-6, A-7	5-20	70-95	55-95	50-95	40-95	25-50	2-25
EsB, EsD---------- Ernest	0-10	Very stony silt loam.	ML, CL, ML-CL,	A-4, A-6	3-20	75-100	70-100	70-95	60-95	15-40	2-15
	10-19	Silt loam, silty clay loam.	ML, CL, ML-CL	A-4, A-5, A-6, A-7	0-15	75-100	75-100	70-95	65-95	25-50	2-25
	19-48	Silty clay loam, clay loam, channery silt loam.	GM, SM, ML, CL	A-4, A-5, A-6, A-7	5-20	70-95	55-95	50-95	40-95	25-50	2-25
	48-60	Silt loam, silty clay loam, silty clay.	GM, SM, ML, CL	A-4, A-5, A-6, A-7	5-15	70-95	55-95	50-95	40-95	25-50	2-25
FV*. Fluvaquents											
HaB, HaC, HaD------ Hazleton	0-7	Channery sandy loam.	ML, GM, SM	A-2, A-4	0-15	60-85	60-80	60-75	35-55	---	---
	7-36	Channery sandy loam, loam, very channery loam.	GM, SM-SC, ML, SC	A-2, A-4, A-1	0-50	60-90	45-90	35-70	20-55	<30	NP-8
	36-70	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC-GM	A-2, A-1, A-4	0-60	60-80	55-75	25-65	15-50	<30	NP-8
HbB, HbD, HbF------ Hazleton	0-7	Very stony sandy loam.	ML, GM, SM	A-4, A-2	5-15	60-85	50-80	50-70	35-55	---	---
	7-36	Channery sandy loam, channery loam, loam.	GM, SM-SC, ML, SC	A-2, A-4, A-1	0-50	60-95	45-90	35-70	20-55	<30	NP-8
	36-70	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC-GM	A-2, A-1, A-4	5-60	60-80	55-75	25-65	15-50	<30	NP-8
HzB---------- Hazleton	0-7	Very bouldery sandy loam.	ML, GM, SM	A-4, A-2	5-15	60-85	50-80	50-70	35-55	---	---
	7-36	Channery sandy loam, channery loam, loam.	GM, SM-SC, ML, SC	A-2, A-4, A-1	0-50	60-95	45-90	35-70	20-55	<30	NP-8
	36-70	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC-GM	A-2, A-1, A-4	5-60	60-80	55-75	25-65	15-50	<30	NP-8

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--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	
HzD---------- Hazleton	0-7	Very bouldery sandy loam.	ML, GM, SM	A-4, A-2	5-15	60-85	50-80	50-70	35-55	---	---
	7-36	Channery sandy loam, channery loam, loam.	GM, SM-SC ML, SC	A-2, A-4, A-1	0-50	60-95	45-90	35-70	20-55	<30	NP-8
	36-70	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC-GM	A-2, A-1, A-4	5-60	60-80	55-75	25-65	15-50	<30	NP-8
HzF---------- Hazleton	0-7	Very bouldery sandy loam.	ML, GM, SM	A-4, A-2	5-15	60-85	50-80	50-70	35-55	---	---
	7-36	Channery sandy loam, channery loam, loam.	GM, SM-SC ML, SC	A-2, A-4, A-1	0-50	60-95	45-90	35-70	20-55	<30	NP-8
	36-70	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC-GM	A-2, A-1, A-4	5-60	60-80	55-75	25-65	15-50	<30	NP-8
LeB, LeC, LeD------ Leck Kill	0-14	Channery silt loam.	SM, ML, GM	A-2, A-4	0-5	70-85	60-80	50-80	35-70	---	---
	14-45	Silt loam, channery loam, shaly silty clay loam.	GM, SC, GC, CL	A-4, A-2, A-6	0-10	60-90	50-85	40-80	30-70	23-40	2-17
	45-58	Very channery silt loam, very channery clay loam, very shaly loam.	SM, GM, GP-GM SP-SM	A-2, A-1	0-30	30-70	10-30	8-30	6-25	25-40	2-13
	58	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LkB, LkD---------- Leck Kill	0-14	Very stony silt loam.	ML, CL, GM, SM	A-4	3-15	75-100	65-80	55-80	40-70	---	---
	14-45	Silt loam, channery loam, shaly silty clay loam.	GM, SC, GC, CL	A-4, A-2, A-6	0-10	60-90	50-85	40-80	30-70	23-40	2-17
	45-58	Very channery silt loam, very channery clay loam, very shaly loam.	SM, GP-GM, GM, SP-SM	A-2, A-1	0-30	30-70	10-30	8-30	6-25	25-40	2-13
	58	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LmF*---------- Leck Kill	0-14	Channery silt loam.	ML, SM,GM	A-4	0-5	70-100	60-90	50-80	35-70	---	---
	14-45	Silt loam, channery loam, shaly silty clay loam.	GM, SC, GC, CL	A-4, A-2, A-6	0-10	60-90	50-85	40-80	30-70	23-40	2-17
	45-58	Very channery silt loam, very channery clay loam, very shaly loam.	SM, GM, GP-GM, SP-SM	A-2, A-1	0-30	30-70	10-30	8-30	6-25	25-40	2-13
	58	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
MoA, MoB---------- Monongahela	0-6	Silt loam-------	ML, SM, CL-ML, SM-SC	A-4	0-5	90-100	85-100	75-100	45-90	20-35	1-10
	6-22	Loam, silt loam, clay loam.	ML, CL CL-ML	A-4, A-6	0-10	90-100	90-100	80-100	70-90	20-40	5-15
	22-55	Loam, silt loam, gravelly sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0-10	80-100	75-100	70-95	45-95	20-40	1-15
	55-63	Stratified sandy loam to clay loam.	ML, CL, SM, SC	A-4, A-6	5-20	75-100	60-100	60-95	40-95	20-40	1-15
NoA, NoB---------- Nolo	0-11	Loam----------	ML	A-4	0-5	90-100	90-100	80-100	55-90	---	---
	11-29	Silt loam, channery clay loam, channery sandy clay loam.	ML	A-4, A-6	0-15	80-100	80-100	80-95	55-85	25-40	4-11
	29-55	Loam, channery sandy clay loam, channery clay loam.	ML, CL, SM, GC	A-4, A-6	0-15	60-100	60-90	55-85	35-70	25-35	4-11
	55	Weathered bedrock.	---	---	---	---	---	---	---	---	---
NsB---------- Nolo	0-11	Very stony loam	ML	A-4	3-15	75-100	75-100	70-100	60-90	---	---
	11-29	Silt loam, channery clay loam, channery sandy clay loam.	ML, CL	A-6, A-4	0-15	80-100	80-100	80-95	55-85	25-40	4-11
	29-55	Loam, channery sandy clay loam, channery clay loam.	ML, CL, SM, GC	A-4, A-6	0-15	60-100	60-90	55-85	35-70	25-35	4-11
	55	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Ph---------- Philo	0-50	Silt loam-------	ML, SM	A-4	0	95-100	80-100	70-90	45-80	20-40	1-10
	50-64	Stratified sand to silt loam.	GM, SM, ML	A-2, A-4	0	60-95	50-90	40-85	30-85	20-40	1-10
Po---------- Pope	0-26	Fine sandy loam	SM, ML, ML-CL	A-2, A-1, A-4	0-5	75-100	65-100	40-85	15-55	<20	NP-5
	26-61	Fine sandy loam, silt loam, gravelly fine sandy loam.	SM, SM-SC, ML, GM	A-2, A-1, A-4	0-5	55-100	50-100	35-95	15-70	<30	NP-7
Pu---------- Purdy	0-15	Silt loam-------	ML, CL	A-4, A-5 A-6, A-7	0	95-100	90-100	90-100	90-100	25-50	2-25
	15-50	Silty clay, clay, clay loam.	ML, CL, CH	A-4, A-5 A-6, A-7	0	95-100	90-100	85-100	75-85	25-75	2-45
	50-65	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
Qu*. Quarries											

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--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	
RgB*, RgC*, RgD*, RgF*:											
Rayne	0-8	Channery silt loam.	GM, ML, SM, CL	A-4	0-10	60-85	55-80	50-80	45-65	---	---
	8-47	Loam, shaly silty clay loam, channery clay loam.	GM, ML, GC, CL	A-4, A-6, A-2	0-15	60-95	55-85	40-85	30-60	20-40	2-15
	47-55	Channery sandy loam, shaly silt loam, very shaly silty clay loam.	SM, ML, GM, GM-GC	A-4, A-2, A-1	0-35	40-90	15-80	15-75	10-60	20-35	NP-10
	55	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Gilpin	0-6	Channery silt loam.	GM, SM, CL, CL-ML	A-2, A-4, A-6	0-30	50-90	45-85	35-75	30-70	20-40	4-15
	6-24	Channery loam, shaly silt loam, silty clay loam.	GM, ML, CL, CL-ML	A-2, A-4, A-6	0-45	50-95	45-90	35-85	30-80	20-40	4-15
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
RpB*, RpD*:											
Rayne	0-8	Very stony silt loam.	GM, ML, SM, CL	A-4	5-15	60-85	55-80	50-80	45-65	---	---
	8-47	Loam, shaly silty clay loam, channery clay loam.	GM, ML, SC, CL	A-4, A-6, A-2	0-15	60-95	55-85	40-85	30-60	20-40	2-15
	47-55	Channery sandy loam, very shaly silty clay loam.	SC, ML, GM, GM-GC	A-4, A-2, A-1	0-50	40-90	15-80	15-75	10-60	20-35	NP-10
	55	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Gilpin	0-6	Very stony silt loam.	GM, SC, ML, CL	A-2, A-4, A-6	10-40	50-90	45-85	35-75	30-70	20-40	4-15
	6-24	Shaly silt loam, channery loam, silty clay loam.	GM, ML, CL, CL-ML	A-2, A-4, A-6	0-45	50-90	45-85	35-75	30-70	20-40	4-15
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ty	0-8	Silt loam	ML	A-4	0	100	100	95-100	80-95	30-40	4-10
Tyler	8-24	Silty clay loam, silt loam.	CL	A-6, A-5 A-7, A-4	0	100	100	95-100	85-100	25-45	8-20
	24-52	Silty clay loam, silt loam, clay loam.	CL	A-6, A-5 A-7, A-4	0	100	100	80-100	70-95	25-45	8-20
	52-60	Stratified loam to silty clay loam.	CL, ML, CL-ML	A-6, A-5 A-4, A-7	0	95-100	90-100	75-100	60-90	20-45	4-18
UDA*, UDD*, UDF*, UOA*. Udorthents											

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
WhB, WhC, WhD------ Wharton	0-10	Silt loam-------	ML, CL	A-4, A-6	0-5	95-100	90-100	80-95	70-90	---	---
	10-44	Clay loam, shaly silty clay loam, shaly clay.	ML, CL, MH, CH	A-7, A-6, A-4	0-10	75-100	70-100	65-95	60-90	35-55	10-30
	44-65	Silt loam, shaly clay, very shaly silt loam.	ML, SM, GM	A-4, A-6, A-7	0-20	60-100	50-100	45-95	40-90	30-45	5-15
WvB, WvD---------- Wharton	0-10	Very stony silt loam.	ML, CL	A-4, A-6	3-15	70-100	65-100	60-95	55-90	---	---
	10-44	Clay loam, shaly silty clay loam, shaly clay.	ML, CL, MH, CH	A-7, A-6, A-4, A-5	0-10	75-100	70-100	65-95	60-90	35-55	10-30
	44-65	Silt loam, shaly clay, very shaly silt loam.	ML, SM, GM	A-4, A-5 A-6, A-7	0-20	60-100	50-100	45-95	40-90	30-45	5-15

* See description of the map unit for the 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	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
						K	T	
	In	In/hr	In/in	pH				Pct
AbB, AbC--------- Albrights	0-7 7-18 18-65	0.6-2.0 0.6-2.0 0.2-0.6	0.16-0.20 0.10-0.14 0.04-0.08	4.5-5.5 4.5-5.5 4.5-6.5	Low---------- Low---------- Low----------	0.43 0.28 0.28	3-2	2.5-4.0
AgB--------------- Albrights	0-7 7-21 21-60	0.6-2.0 0.6-2.0 0.2-0.6	0.14-0.18 0.10-0.14 0.04-0.08	4.5-5.5 4.5-5.5 5.1-6.5	Low---------- Low---------- Low----------	0.37 0.28 0.28	3-2	2.5-4.0
AgD--------------- Albrights	0-7 7-18 18-65	0.6-2.0 0.6-2.0 0.2-0.6	0.14-0.18 0.10-0.14 0.04-0.08	3.6-5.5 3.6-5.5 4.5-6.5	Low---------- Low---------- Low----------	0.37 0.28 0.28	3-2	2.5-4.0
AhB, AhC--------- Allegheny	0-10 10-40 40-60	0.6-2.0 0.6-2.0 0.6-6.0	0.12-0.22 0.13-0.18 0.03-0.08	3.6-5.5 3.6-5.5 3.6-5.5	Low---------- Low---------- Low----------	0.32 0.28 0.28	4	2.5-4.0
Ar---------------- Armagh	0-6 6-50 50-60	0.6-2.0 0.06-0.2 0.06-0.6	0.18-0.22 0.10-0.14 0.08-0.12	4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Moderate-------- Moderate--------	0.43 0.28 0.17	3-2	2.5-4.0
AsB--------------- Armagh	0-6 6-50 50-60	0.6-2.0 0.06-0.2 0.06-0.6	0.18-0.22 0.10-0.14 0.08-0.12	4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Moderate-------- Moderate--------	0.43 0.28 0.17	3	2.5-4.0
At---------------- Atkins	0-9 9-46 46-60	0.6-2.0 0.06-2.0 0.2-6.0	0.14-0.22 0.14-0.18 0.08-0.18	4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Low---------- Low----------	--- --- ---	---	2.5-4.0
BeB, BeC, BeD----- Berks	0-9 9-29 29-38 38	0.6-6.0 0.6-6.0 2.0-6.0 ---	0.08-0.12 0.04-0.10 0.04-0.10 ---	4.5-5.5 4.5-5.5 4.5-6.0 ---	Low---------- Low---------- Low---------- ----------	0.28 0.17 0.17 ---	3	1.5-4.0
BkB*, BkC*, BkD*, BkF*: Berks---------- Weikert-------- BnB, BnC--------- Blairton BrA, BrB--------- Brinkerton BtB--------------- Brinkerton CaA, CaB, CaC----- Cavode	0-9 9-29 29-38 38 0-7 7-14 14 0-9 9-39 39 0-10 10-24 24-46 46-66 0-10 10-24 24-46 46-66 0-8 8-42 42-66	0.6-6.0 0.6-6.0 2.0-6.0 --- 2.0-6.0 2.0-6.0 --- 0.6-2.0 0.2-0.6 --- 0.6-2.0 0.6-2.0 0.06-0.2 0.06-0.6 0.6-2.0 0.6-2.0 0.06-0.2 0.06-0.6 0.6-2.0 0.06-0.2 0.06-0.2	0.08-0.12 0.04-0.10 0.04-0.10 --- 0.08-0.14 0.04-0.08 --- 0.12-0.16 0.08-0.14 --- 0.18-0.24 0.14-0.18 0.08-0.12 0.14-0.18 0.18-0.24 0.14-0.18 0.08-0.12 0.14-0.18 0.18-0.22 0.10-0.14 0.08-0.12	4.5-5.5 4.5-5.5 4.5-6.0 --- 4.5-5.5 4.5-5.5 --- 3.6-5.5 3.6-5.5 --- 4.5-5.5 4.5-5.5 4.5-5.5 5.1-6.5 4.5-5.5 4.5-5.5 4.5-5.5 5.1-6.5 4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Low---------- Low---------- ---------- Low---------- Low---------- ---------- Low---------- Low---------- ---------- Low---------- Moderate-------- Moderate-------- Low---------- Low---------- Moderate-------- Moderate-------- Low---------- Low---------- Moderate-------- Moderate--------	0.28 0.17 0.17 --- 0.28 0.28 --- 0.43 0.28 --- 0.43 0.32 0.32 0.20 0.43 0.32 0.32 0.20 0.43 0.28 0.28	3 2 3-2 3-2 3-2 3 2.0-3.5

See footnote at end of table.

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

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
						K	T	
	In	In/hr	In/in	pH				Pct
CbB----------	0-8	0.6-2.0	0.18-0.22	4.5-5.5	Low----------	0.43	3	2.0-3.5
Cavode	8-42	0.06-0.2	0.10-0.14	4.5-5.5	Moderate-------	0.28		
	42-66	0.06-0.2	0.08-0.12	4.5-5.5	Moderate-------	0.28		
ChA, ChB---------	0-10	2.0-6.0	0.11-0.18	4.5-6.0	Low----------	0.24	4	1.5-3.0
Chavies	10-42	2.0-6.0	0.11-0.20	4.5-6.0	Low----------	0.24		
	42-65	2.0-6.0	0.11-0.18	4.5-6.0	Low----------	0.24		
CoB, CoC---------	0-12	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.37	3	1.5-3.5
Cookport	12-22	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.28		
	22-40	0.2-0.6	0.08-0.12	4.5-5.5	Low----------	0.28		
	40-62	0.2-0.6	0.08-0.12	4.5-5.5	Low----------	0.28		
CpB, CpD---------	0-12	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.32	3	1.5-3.5
Cookport	12-22	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.28		
	22-40	0.2-0.6	0.08-0.12	4.5-5.5	Low----------	0.28		
	40-62	0.2-0.6	0.08-0.12	4.5-5.5	Low----------	0.28		
DhB*:								
Dekalb----------	0-12	2.0-20	0.08-0.12	4.5-5.5	Low----------	0.24	3	1.0-3.5
	12-35	2.0-20	0.06-0.12	4.5-5.5	Low----------	0.17		
	35	---	---	---	----------	---		
Hazleton--------	0-7	2.0-6.0	0.10-0.14	3.6-5.5	Low----------	0.24	3-2	1.0-3.5
	7-36	2.0-20	0.08-0.12	3.6-5.5	Low----------	0.17		
	36-70	2.0-20	0.04-0.10	3.6-5.5	Low----------	0.17		
DkB*:								
Dekalb----------	0-12	6.0-20	0.08-0.12	4.5-5.5	Low----------	0.24	3	1.0-3.5
	12-35	6.0-20	0.06-0.12	4.5-5.5	Low----------	0.17		
	35	---	---	---	----------	---		
Hazleton--------	0-7	2.0-6.0	0.10-0.16	3.6-5.5	Low----------	0.24	3-2	1.0-3.5
	7-36	2.0-20	0.08-0.12	3.6-5.5	Low----------	0.17		
	36-70	2.0-20	0.04-0.10	3.6-5.5	Low----------	0.17		
ErB, ErC---------	0-10	0.6-2.0	0.14-0.20	4.5-5.5	Low----------	0.43	3	1.5-3.5
Ernest	10-19	0.6-2.0	0.12-0.16	4.5-5.5	Moderate-------	0.28		
	19-48	0.06-0.6	0.08-0.12	4.5-5.5	Moderate-------	0.28		
	48-60	0.06-0.6	0.08-0.12	4.5-5.5	Moderate-------	0.28		
EsB, EsD---------	0-10	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.32	3	1.5-3.5
Ernest	10-19	0.6-2.0	0.12-0.16	4.5-5.5	Moderate-------	0.28		
	19-48	0.06-0.6	0.08-0.12	4.5-5.5	Moderate-------	0.28		
	48-60	0.06-0.6	0.08-0.12	4.5-5.5	Moderate-------	0.28		
FV*.								
Fluvaquents								
HaB, HaC, HaD----	0-7	2.0-6.0	0.10-0.14	3.6-5.5	Low----------	0.24	3-2	1.0-3.5
Hazleton	7-36	2.0-20	0.08-0.12	3.6-5.5	Low----------	0.17		
	36-70	2.0-20	0.04-0.10	3.6-5.5	Low----------	0.17		
HbB, HbD, HbF,								
HzB, HzD, HzF---	0-7	2.0-6.0	0.10-0.16	3.6-5.5	Low----------	0.24	3-2	1.0-3.5
Hazleton	7-36	2.0-20	0.08-0.12	3.6-5.5	Low----------	0.17		
	36-70	2.0-20	0.04-0.10	3.6-5.5	Low----------	0.17		
LeB, LeC, LeD----	0-14	0.6-6.0	0.14-0.18	4.5-7.3	Low----------	0.20	3	2.5-4.0
Leck Kill	14-45	0.6-6.0	0.12-0.16	4.5-7.3	Low----------	0.17		
	45-58	0.6-6.0	0.04-0.08	4.5-6.0	Low----------	0.28		
	58	---	---	---	----------	---		
LkB, LkD---------	0-14	0.6-6.0	0.14-0.20	4.5-7.3	Low----------	0.20	3	2.5-4.0
Leck Kill	14-45	0.6-6.0	0.12-0.16	4.5-7.3	Low----------	0.17		
	45-58	0.6-6.0	0.04-0.08	4.5-6.0	Low----------	0.28		
	58	---	---	---	----------	---		

See footnote at end of table.

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

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
						K	T	
	In	In/hr	In/in	pH				Pct
LmF*----------	0-14	0.6-6.0	0.16-0.20	4.5-7.3	Low----------	0.28	3	2.5-4.0
Leck Kill	14-45	0.6-6.0	0.12-0.16	4.5-7.3	Low----------	0.17		
	45-58	0.6-6.0	0.04-0.08	4.5-6.0	Low----------	0.28		
	58	---	---	---	----------	---		
MoA, MoB----------	0-6	0.6-2.0	0.18-0.24	4.5-5.5	Low----------	0.43	3	1.5-3.0
Monongahela	6-22	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.43		
	22-55	0.2-0.6	0.08-0.12	4.5-5.5	Low----------	0.43		
	55-63	0.2-0.6	0.08-0.12	4.5-5.5	Low----------	0.43		
NoA, NoB----------	0-11	0.6-2.0	0.16-0.20	4.0-5.0	Low----------	0.43	3-2	2.0-3.5
Nolo	11-29	0.6-2.0	0.12-0.16	4.0-5.0	Low----------	0.28		
	29-55	0.06-0.2	0.06-0.10	4.0-5.0	Low----------	0.17		
	55	---	---	---	----------	---		
NsB----------	0-11	0.6-2.0	0.14-0.20	4.0-5.0	Low----------	0.43	3-2	2.0-3.5
Nolo	11-29	0.6-2.0	0.12-0.16	4.0-5.0	Low----------	0.28		
	29-55	0.06-0.2	0.06-0.10	4.0-5.0	Low----------	0.17		
	55	---	---	---	----------	---		
Ph----------	0-50	0.2-2.0	0.12-0.20	4.5-6.0	Low----------	0.28	4	2.0-4.0
Philo	50-64	2.0-20	0.06-0.10	4.5-6.0	Low----------	0.28		
Po----------	0-26	2.0-6.0	0.12-0.14	3.6-5.5	Low----------	0.28	5	2.0-4.0
Pope	26-61	0.6-6.0	0.12-0.15	3.6-5.5	Low----------	0.28		
Pu----------	0-15	0.2-0.6	0.18-0.24	3.6-5.5	Moderate-------	0.43	3	2.5-4.5
Purdy	15-50	0.06-0.2	0.12-0.18	3.6-5.5	Moderate-------	0.28		
	50-65	0.06-0.2	0.10-0.16	3.6-5.5	Moderate-------	0.28		
Qu*.								
Quarries								
RgB*, RgC*, RgD*, RgF*:								
Rayne----------	0-8	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.28	4	2.5-4.0
	8-47	0.6-2.0	0.12-0.14	4.5-5.5	Low----------	0.28		
	47-55	0.6-2.0	0.10-0.14	4.5-5.5	Low----------	0.28		
	55	---	---	---	----------	---		
Gilpin----------	0-6	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.28	3	2.5-4.0
	6-24	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.28		
	24	---	---	---	----------	---		
RpB*, RpD*:								
Rayne----------	0-8	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.28	4	2.5-4.0
	8-47	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.28		
	47-55	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.28		
	55	---	---	---	----------	---		
Gilpin----------	0-3	0.6-2.0	0.08-0.14	4.5-5.5	Low----------	0.28	3	2.5-4.0
	3-24	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.28		
	24	---	---	---	----------	---		
Ty----------	0-8	0.6-2.0	0.18-0.22	3.6-6.5	Low----------	0.43	3	2.0-3.5
Tyler	8-24	0.2-0.6	0.16-0.20	3.6-5.5	Moderate-------	0.43		
	24-52	<0.2	0.04-0.12	3.6-5.5	Low----------	0.43		
	52-60	0.2-0.6	0.04-0.12	4.5-6.0	Low----------	0.43		
UDA*, UDD*, UDF*, UOA*.								
Udorthents								
WhB, WhC, WhD----	0-10	0.6-2.0	0.16-0.20	4.5-5.5	Low----------	0.43	3	2.0-3.5
Wharton	10-44	0.06-0.6	0.12-0.16	4.5-5.5	Moderate-------	0.28		
	44-65	0.06-0.6	0.08-0.12	4.0-5.0	Moderate-------	0.17		

See footnote at end of table.

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

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
						K	T	
	In	In/hr	In/in	pH				Pct
WvB, WvD--------- Wharton	0-10 10-56 56-65	0.6-2.0 0.06-0.6 0.06-0.6	0.14-0.20 0.12-0.16 0.08-0.12	4.5-5.5 4.5-5.5 4.0-5.0	Low---------- Moderate------- Moderate-------	0.43 0.28 0.17	3	2.0-3.5

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

TABLE 16.--SOIL AND WATER FEATURES

[The definitions of "Flooding" and "Water table" in the Glossary explain such terms as "rare," "apparent," "brief," and "perched." The symbol < means less than; > means more than. Absence of an entry indicates 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				
AbB, AbC---------- Albrights	C	None--------	---	---	1.0-2.0	Perched	Nov-Mar	>60	---	Moderate	High-----	High.
AgB, AgD---------- Albrights	C	None--------	---	---	1.0-2.0	Perched	Nov-Mar	>60	Rippable	Moderate	High-----	High.
AhB, AhC---------- Allegheny	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
Ar, AsB---------- Armagh	D	None--------	---	---	0.0-0.5	Apparent	Oct-Jun	48-72	Rippable	High-----	High-----	High.
At---------- Atkins	D	Common------	Very brief	Sep-Jul	0-0.5	Apparent	Nov-Jun	>60	---	High-----	High-----	Moderate.
BeB, BeC, BeD----- Berks	C	None--------	---	---	>6.0	---	---	26-40	Rippable	Low------	Low------	High.
BkB*, BkC*, BkD*, BkF*:												
Berks----------	C	None--------	---	---	>6.0	---	---	26-40	Rippable	Low------	Low------	High.
Weikert---------	C/D	None--------	---	---	>6.0	---	---	10-20	Rippable	Moderate	Moderate	Moderate.
BnB, BnC---------- Blairton	C	None--------	---	---	1.0-2.0	Perched	Nov-Mar	30-40	Rippable	High-----	High-----	High.
BrA, BrB, BtB----- Brinkerton	D	None--------	---	---	0.0-0.5	Perched	Sep-Jun	>60	---	High-----	High-----	High.
CaA, CaB, CaC, CbB---------- Cavode	C	None--------	---	---	1.0-1.5	Perched	Oct-May	40-72	Rippable	High-----	High-----	High.
ChA, ChB---------- Chavies	B	Rare--------	Brief	Sep-Jul	>6.0	---	---	>60	---	---	Low------	Moderate.
CoB, CoC, CpB, CpD---------- Cookport	C	None--------	---	---	1.5-2.5	Perched	Dec-Apr	40-72	Hard	Moderate	Moderate	Moderate.
DhB*, DkB*:												
Dekalb----------	C	None--------	---	---	>6.0	---	---	26-40	Hard	Low------	Low------	High.
Hazleton---------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
ErB, ErC, EsB, EsD---------- Ernest	C	None--------	---	---	1.5-2.5	Perched	Dec-Apr	>60	---	Moderate	Moderate	Moderate.

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				
FV*. Fluvaquents												
HaB, HaC, HaD, HbB, HbD, HbF---- Hazleton	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
HzB, HzD, HzF----- Hazleton	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
LeB, LeC, LeD, LkB, LkD, LmF*--- Leck Kill	B	None--------	---	---	5.0-6.0	Apparent	Nov-Apr	>40	Rippable	Moderate	Low------	Moderate.
MoA, MoB---------- Monongahela	C	None--------	---	---	1.5-2.5	Perched	Dec-Apr	>60	---	High-----	High-----	High.
NoA, NoB, NsB----- Nolo	D	None--------	---	---	0.0-0.5	Perched	Sep-Jun	40-60	Rippable	High-----	High-----	High.
Ph---------- Philo	B	Common------	Very brief	Nov-Apr	1.5-2.5	Apparent	Dec-Apr	>60	---	Moderate	Low------	High.
Po---------- Pope	B	Rare to common.	Very brief	Nov-Apr	>5.0	Apparent	Feb-Mar	>60	---	Moderate	Low------	High.
Pu---------- Purdy	D	None--------	---	---	0-0.5	Apparent	Nov-Jun	>60	---	High-----	High-----	High.
Qu*. Quarries												
RgB*, RgC*, RgD*, RgF*:												
Rayne----------	B	None--------	---	---	5.0-6.0	Apparent	Nov-Apr	40-72	Rippable	Moderate	Low------	High.
Gilpin----------	C	None--------	---	---	>6.0	---	---	24-40	Rippable	Moderate	Low------	High.
RpB*, RpD*:												
Rayne----------	B	None--------	---	---	5.0-6.0	Apparent	Nov-Apr	40-72	Rippable	Moderate	Low------	High.
Gilpin----------	C	None--------	---	---	>3.0	Apparent	Nov-Apr	24-40	Rippable	Moderate	Low------	High.
Ty---------- Tyler	D	None--------	---	---	1.0-1.5	Perched	Nov-May	>60	---	High-----	High-----	High.
UDA*, UDD*, UDF*, UOA*. Udorthents												
WhB, WhC, WhD, WvB, WvD--------- Wharton	C	None--------	---	---	1.5-2.0	Perched	Nov-Mar	50-72	Rippable	High-----	High-----	High.

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

TABLE 17.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Albrights	Fine-loamy, mixed, mesic Aquic Fragiudalfs
Allegheny	Fine-loamy, mixed, mesic Typic Hapludults
Armagh	Clayey, mixed, mesic Typic Ochraquults
Atkins	Fine-loamy, mixed, acid, mesic Typic Fluvaquents
Berks	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Blairton	Fine-loamy, mixed, mesic Aquic Hapludults
Brinkerton	Fine-silty, mixed, mesic Typic Fragiaqualfs
Cavode	Clayey, mixed, mesic Aeric Ochraquults
Chavies	Coarse-loamy, mixed, mesic Ultic Hapludalfs
Cookport	Fine-loamy, mixed, mesic Aquic Fragiudults
Dekalb	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Ernest	Fine-loamy, mixed, mesic Aquic Fragiudults
Gilpin	Fine-loamy, mixed, mesic Typic Hapludults
Hazleton	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Leck Kill	Fine-loamy, mixed, mesic Typic Hapludults
Monongahela	Fine-loamy, mixed, mesic Typic Fragiudults
Nolo	Fine-loamy, mixed, mesic Typic Fragiaquults
Philo	Coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts
Pope	Coarse-loamy, mixed, mesic Fluventic Dystrochrepts
Purdy	Clayey, mixed, mesic Typic Ochraquults
Rayne	Fine-loamy, mixed, mesic Typic Hapludults
Tyler	Fine-silty, mixed, mesic Aeric Fragiaquults
Weikert	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Wharton	Clayey, mixed, mesic Aquic Hapludults

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