United States Department of Agriculture

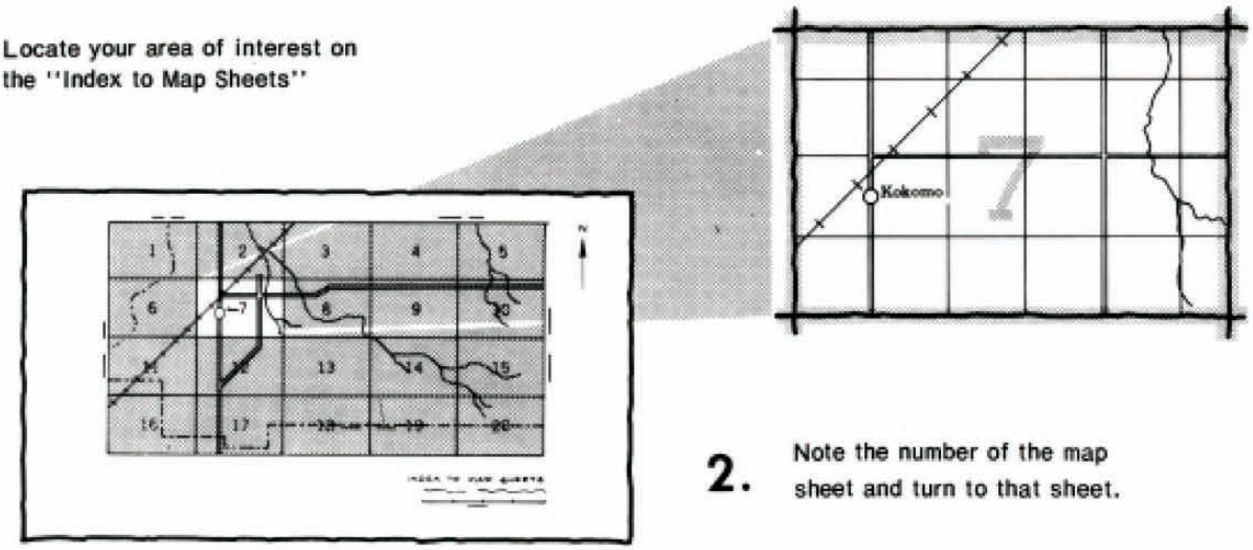
Soil Conservation Service

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

Soil Survey of Cumberland and Perry Counties, Pennsylvania

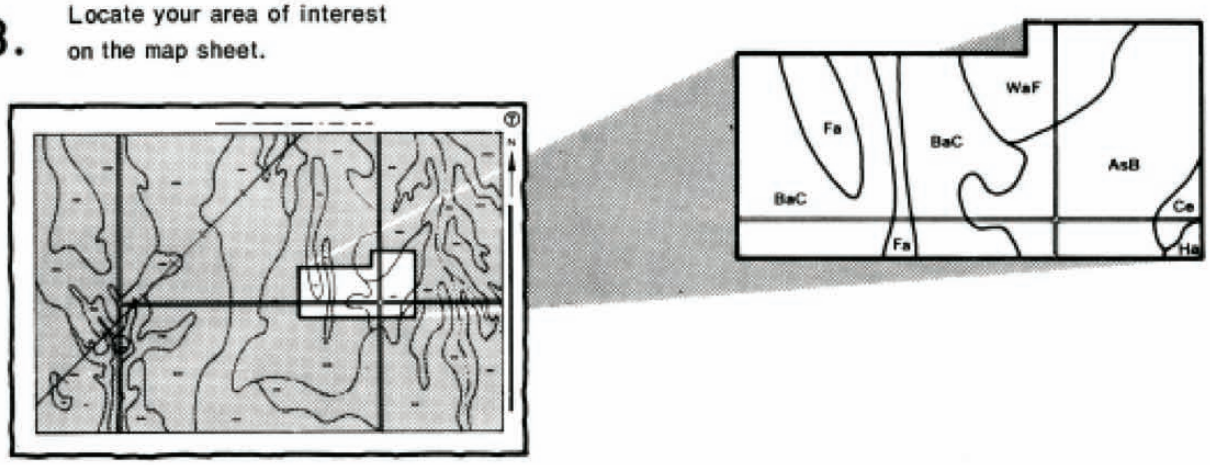
HOW TO USE

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

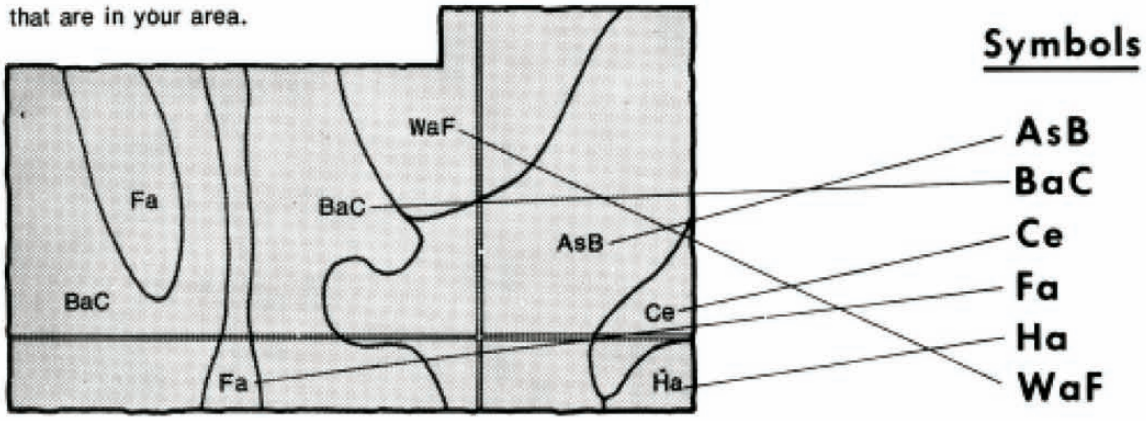


2. Note the number of the map sheet and turn to that sheet.

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

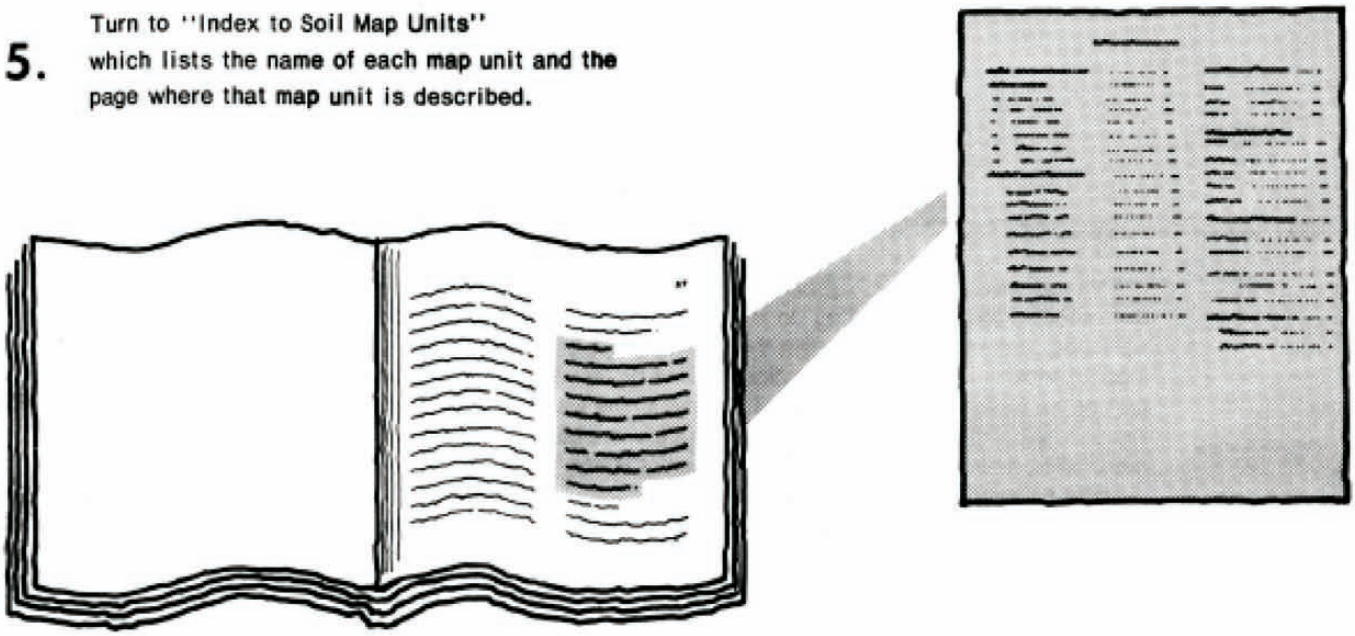


4. List the map unit symbols that are in your area.

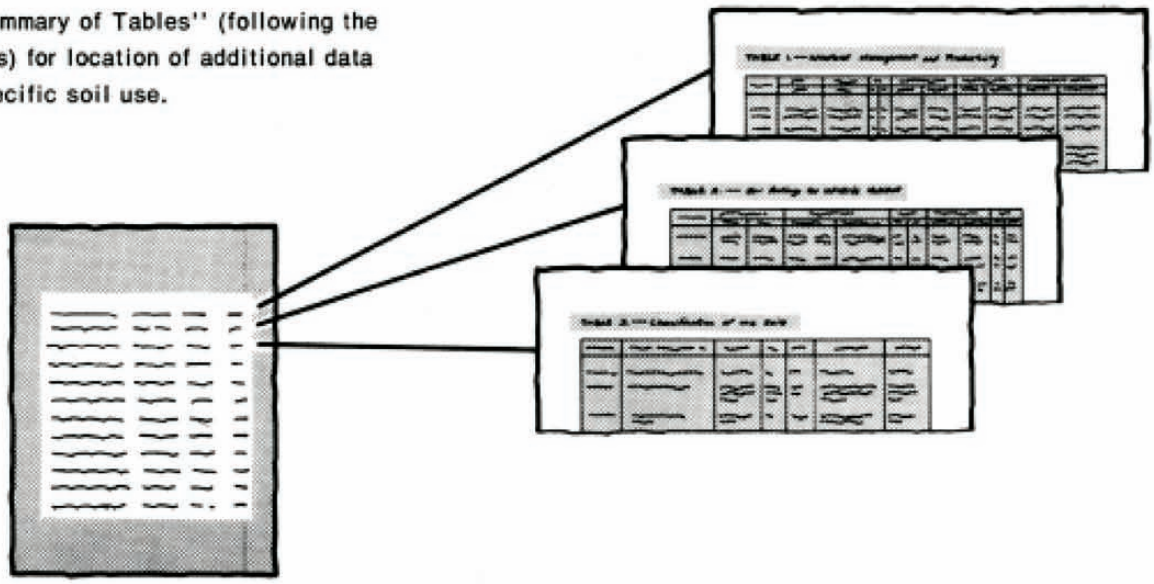


THIS SOIL SURVEY

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 completed in 1979. Soil names and descriptions were approved in 1980. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1980. This survey was made cooperatively by the Soil Conservation Service, The Pennsylvania State University, College of Agriculture, and the Pennsylvania Department of Environmental Resources, State Conservation Commission. It is part of the technical assistance furnished to the conservation districts of Cumberland and Perry Counties. Financial assistance was provided by the Department of Housing and Urban Development under provisions of section 701 of the amended Housing Act of 1954, by the Cumberland County Board of Commissioners, and by the Board of Supervisors of Penn Township, Perry County.

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

Cover: Contour stripcropping on Berks shaly silt loam, 8 to 15 percent slopes, helps prevent erosion. Hazleton soils are on the ridge in the left background.

Contents

Soil Series

Issued April 1986

Index to Map Units

Summary of Tables

Foreword

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

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

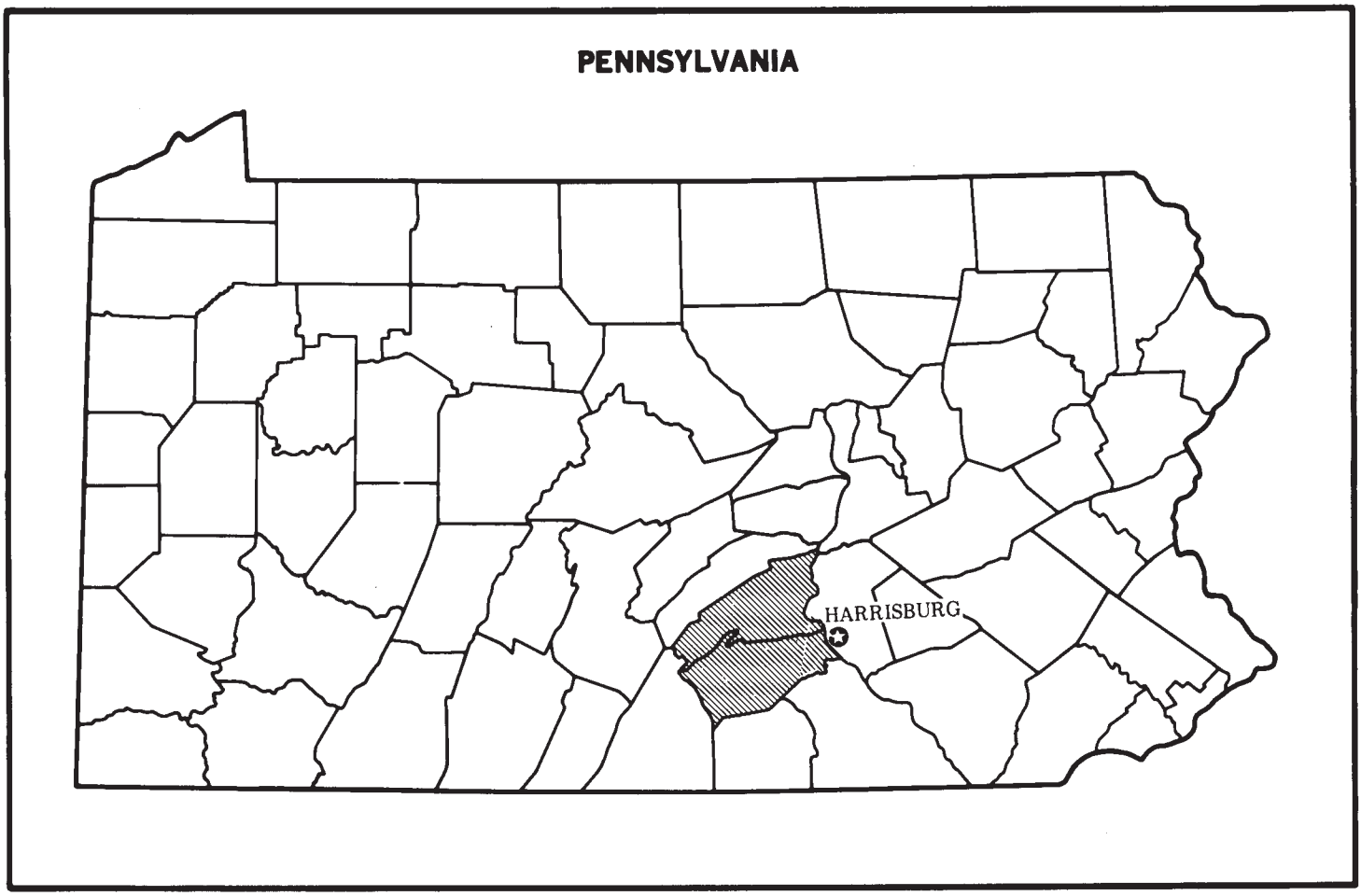
Great differences in soil properties can occur even within short distances. Some soils are seasonally wet or subject to flooding, and some are shallow to bedrock. Others are too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to onsite disposal, and soils that have a high water table are poorly suited to basements or underground utilities.

This report consists of two parts. The first part consists of the descriptions, potentials, hazards, and limitations of all soils in Cumberland and Perry Counties; the second part consists of detailed maps showing the soils on every acre of land in these counties.

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

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

Graham T. Munkittrick
State Conservationist
Soil Conservation Service



Location of Cumberland and Perry Counties in Pennsylvania.

Soil Survey of Cumberland and Perry Counties Pennsylvania

By John Zarichansky

Fieldwork by John Zarichansky, John W. Greenawalt,
Garland H. Lipscomb, and Leslie E. Lanyon

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

Cumberland and Perry Counties are located in the south-central part of Pennsylvania. They are adjoining counties and are separated at the top of Blue Mountain. Perry County lies to the north of Blue Mountain, and Cumberland County lies to the south. Perry County is bordered on the north by Juniata County, on the west by Franklin County, and on the east by Dauphin County. Cumberland County is bordered on the west by Franklin County, on the south by Adams County, on the southeast by York County, and on the east by Dauphin County. The Susquehanna River forms a natural boundary separating Cumberland and Perry Counties from Dauphin County. The area of Cumberland and Perry Counties combined is 709,120 acres, or 1,108 square miles.

According to the 1970 census, the population of Cumberland County is 158,177 and that of Perry County is 28,615. Cumberland County ranks 21st in population in the State, and Perry County ranks 57th. The population of Cumberland County is 67 percent urban and 33 percent rural. The county seat and largest community is Carlisle, which has a population of 18,079. Other principal communities are New Cumberland, Camp Hill, Mechanicsburg, and Shippensburg. The population of Perry County is 8 percent urban and 92 percent rural. The county seat is New Bloomfield, which has a population of 1,032. Other principal communities in Perry County are Marysville, Duncannon, and Newport.

Approximately 46 percent of the land area is in forest, and 41 percent is used for crops and pasture. The remaining 13 percent is used for industrial, commercial, and residential sites.

According to the Pennsylvania Industrial Census, manufacturing is the leading source of income in the survey area, followed by agriculture and agricultural products (*7,8*). Some of the major manufactured goods are electrical and electronic machinery, textiles, apparel, printing, rubber products, footwear, stone, glass, concrete, processors for food and kindred products, and metal products. Trucking terminals and warehouse distribution centers are also major industries.

Although agricultural production is diverse, dairy farming is the main enterprise. Beef cattle, sheep, hogs, and poultry are the main livestock raised. The main field crops include corn, wheat, oats, buckwheat, and hay. Woodlots and forest areas provide income from saw timber, pulpwood, and firewood.

Cumberland and Perry Counties have several educational, medical, cultural, and religious facilities. Cumberland County has three private colleges and one state college. There are 3 hospitals in the survey area, as well as 5 long-term health facilities in Perry County and 13 such facilities in Cumberland County. Carlisle Barracks, one of the oldest U.S. Army War Colleges in the country, provides training for selected military personnel. The Mechanicsburg Naval Depot, another federal installation, is a distributing center for the U.S. Navy.

The soils in the survey area formed mainly in residual, colluvial, and alluvial materials developed from shale, sandstone, limestone, chert, and diabase bedrock. Some of the soils are well suited to both farm and nonfarm uses. Most of the soils, however, have restrictions that limit their uses. Slope, wetness, flooding, and depth to

bedrock are the major restrictions. Erosion is a problem on unprotected sloping and steep soils. Ground water pollution is a severe hazard in areas underlain by limestone if the soil is used for onsite sewage disposal.

General Nature of the Survey Area

This section provides general information about Cumberland and Perry Counties. It describes the history, geology, mineral resources, water resources, transportation, and climate.

History

Cumberland County was settled by Scotch-Irish immigrants in 1730. It was organized in January 1750 as the 6th county in Pennsylvania, from part of Lancaster County. Perry County, the 51st county, was organized in March 1820 from part of Cumberland County (*4*). It was named after Oliver Hazard Perry, victor in the battle of Lake Erie.

Carlisle was the most notable settlement in the area and played a role in three American wars: the French and Indian War, the Revolutionary War, and the Civil War. It was the site of Fort Lowther and Carlisle Barracks.

The Cumberland Valley, with its beautiful landscape, fertile soils, and abundance of water and game attracted many settlers and traders. Lumbering and farming were the first major industries in Cumberland and Perry Counties and have remained important to the economy. The importance of limestone as building stone and for lime kilns was recognized as early as 1753 by John O'Neal, a representative of Governor Hamilton.

Many military officers and noted politicans were natives of the area, including James Wilson, George Loose, and James Smith, signers of the Declaration of Independence.

Geology

Bruce A. Benton, geologist, Soil Conservation Service, helped prepare this section and the sections on mineral resources and water resources.

Most of the geologic formations in the survey area date from the Paleozoic age, 600 to 230 million years ago (*3,10*). During most of this time, the area was covered by a shallow sea which received a sequence of deposits of sand, silt, clay, and limy material (fig. 1) at various times. Repeated deposition and consolidation formed the sediment into rock strata. Near the end of the Paleozoic age, intense forces from the southeast exerted pressure on the rock strata and raised them above sea level. Heat and pressure transformed some of the sedimentary and igneous rock into metamorphic rock. The intensity of the force created severe geologic disturbances, buckling the landscape and forming large mountains and valleys. Repeated disturbances and uplifts, as well as natural erosion, have exposed rocks of different ages and sculpted the present landscape.

The survey area lies in three physiographic provinces. All of Perry County is in the Appalachian Mountain section, and most of Cumberland County is in the Great Valley section of the Valley and Ridge province. The South Mountain is in the Blue Ridge province. A small area in the southeastern part of the survey area, along the York County line, is in the Triassic Lowland section of the Piedmont province. The elevation ranges from 300 feet at New Cumberland to 2,270 feet at Blue Mountain, north of Newburg along the Cumberland-Perry County line.

Exposed rocks in the area formed during seven geologic periods, the oldest of which is the Precambrian, followed by the Cambrian, Ordovician, Silurian, Devonian, Mississippian, and Triassic.

The Precambrian rocks are igneous rhyolite and metamorphic greenstone schists. Exposures are in the South Mountain area near the junction with Adams and York Counties. These rocks contain no fossils. The soils that formed in this weathered material are mostly in the Highfield-Glenville association.

The Cambrian rocks are metamorphic quartzite, quartzitic conglomerate, and quartzitic schist. In addition, sedimentary rocks of this period include purple shale and siliceous limestone. Exposures of these rocks are in the South Mountain area, extending from the edge of the Precambrian exposures north to the great valley. Most of these rocks contain marine fossils, indicating the first signs of life on earth. The soils that formed in this weathered material are mostly in the Hazleton-Clymer association.

The Ordovician rocks are sedimentary in origin and include limestone, conglomerate, dolomite, chert, and shale. These rocks form the floor of the Cumberland Valley and the south slopes of Blue Mountain. In western Perry County, olive gray weathered shale, red fine grained sandstone, and limestone are exposed in areas along the Franklin County line. The soils that formed in this weathered material are mostly in the Hagerstown-Duffield association.

Rocks of Silurian age are sedimentary in origin and consist of dark gray fossiliferous and argillaceous limestone, reddish purple and greenish gray fossiliferous shale, siltstone, and red, gray, or white quartzitic sandstone. The tops of the Blue, Tuscarora, and Conococheague Mountains are capped with white quartzitic sandstone. The north slopes of Blue Mountain and most of the mid and lower slopes in western and northern Perry County have exposures of limestone, red and gray shale, siltstone, and red and gray sandstone. The soils that formed in this weathered material are mostly in the Hazleton-Laidig-Buchanan association, in Perry County.

Rocks of Devonian age are sedimentary in origin and consist of red to brownish shale and sandstone, gray to

Figure 1.—The Cumberland Valley was covered by a shallow sea during the Paleozoic age.

olive brown shale, graywacke, and sandstone interbedded with limestone and calcareous shale and cherty limestone. The soils that formed in this weathered material are mostly in the Elliber-Kreamer association.

Rocks of Mississippian age are sedimentary in origin and include red shale, as well as brown to greenish gray flaggy sandstone in the rolling areas of Cove and Hunters Valleys. The steeper hillsides bordering these valleys are gray, hard, massive conglomerate and sandstone, and some shale. The soils that formed in this weathered material are mostly in the Weikert-Calvin-Berks association.

A small area in southeastern Cumberland County, along the York County line, has rock exposures of Triassic age. The rocks are mostly coarse grained quartzose sandstone with shale interbeds and quartz conglomerate. An intermittent diabase sill of gray plagioclase and black and green augite bisects the survey area, extending from a point east of Goodyear north to a point west of New Buffalo. The soils that formed in this weathered material are mostly in the Athol-Neshaminy association.

The soils throughout the rest of the survey area formed dominantly in material weathered from bedrock or from soil material eroded from upland areas. These soils are mostly in the Monongahela-Atkins-Middlebury association and exhibit the varied properties derived from the parent rock.

Mineral Resources

The chief mineral resources of Cumberland and Perry Counties are limestone, sandstone, shale, clay, sand, and gravel. Limited quantities of limonite and hemitite iron ore were mined during the Civil War period. However, these minerals do not have present commercial value. Perry County has some thin lenses of anthracite coal, mainly along the Susquehanna River, but they are not of commercial value.

There are several active limestone quarries in Cumberland County. The limestone is used mainly for aggregate, agricultural lime, and building stone. In the past it has been used for foundation stone, retaining walls, and stone fences.

Sandstone is actively quarried on South Mountain; most of it is crushed for use as building sand. In Perry County small quantities of sandstone are quarried from the Juniata and Tuscarora Formations for use as building stone.

Shale is mined throughout the survey area and is used principally for roadbeds and as fill material. Both red and gray shale are used for these purposes.

Clay is mined in the South Mountain area and transported for use as filler in the manufacture of cement.

There are active sand and gravel pits near Mount Holly Springs in Cumberland County and near Amity Hall in Perry County. Sand and gravel are used primarily for building, road material, and concrete.

Schist has been quarried in the South Mountain area near Goodyear. This stone contains hydrous aluminum silicates and has desirable anticaking qualities. It is used in fertilizer, filler for polishing waxes, asphalt, cement, and similar products.

Water Resources

The average annual precipitation for the survey area is 40 inches. Of this about 23 inches goes into the atmosphere by evaporation and transpiration. The remaining 18 inches goes to runoff, 6 inches to direct runoff and 12 inches to infiltration as ground water.

Natural drainage is mostly to the east, to the Susquehanna River Basin. However, about 2,000 acres in the western part of the survey area drains to the southwest, emptying into the Potomac River Basin. Most of Cumberland County is drained by the Conodoguinet and Yellow Breeches Creeks, which empty into the Susquehanna River. The drainage pattern of Perry County is to the east. Buffalo Creek drains the northern part of the county and flows into the Juniata River. Sherman Creek drains the western and southern parts and flows into the Susquehanna River at Marysville. The Juniata River flows in a southeasterly direction and drains part of eastern Perry County. It empties into the Susquehanna River near Duncannon. The eastern border of the survey area drains directly into the Susquehanna River.

The primary sources of water for urban, industrial, and agricultural uses are dug and drilled wells, springs, and storage reservoirs (*5,6*). Communities and industries get most of their water from streams, reservoirs, springs, and deep wells. Rural areas rely mostly on drilled or dug wells. Water for irrigation and animal consumption comes primarily from farm ponds, streams, and springs. In Cumberland County, a number of large springs are located throughout the limestone valley. Boiling Springs and Big Springs are the two largest springs in the state and have only a slight seasonal variation of flow. Springs and wells in cavernous limestone areas generally yield large quantities of water; however, the water is hard. In limestone areas contaminants from surface runoff can seep into ground water through solution channels and caverns. The highest quality water in the survey area comes from wells in areas underlain by sandstone aquifers.

There are three existing manmade lakes in the survey area; their combined surface area is more than 25 acres. These lakes were built specifically for recreational purposes.

Transportation

Cumberland and Perry Counties have a good network of highways. In Cumberland County, there are 79.8 miles of interstate and turnpike roads, 608 miles of state and federal highways, and more than 900 miles of surfaced secondary roads. Perry County has 482 miles of state and federal highways and more than 330 miles of surfaced secondary roads. Four major highways, PA 74, PA 34, U.S. 15, and U.S. 11, cross the two counties. In Perry County, PA 274 runs the entire length of the county and is the main road providing access to the western part of the county. Numerous firms provide intrastate and interstate trucking. Local and long-distance bus services are available for public and private use.

Residents of the survey area have easy access to two commercial passenger airports, Harrisburg International and Capital Area. More readily available air transportation is limited to small private airports that provide service for corporate and private planes. Cumberland County has three general service commercial airports, three heliports, and eight small private airports. Perry County has seven small private airports.

Three railroad lines provide freight service for the survey area: Conrail, Western Maryland, and Reading Railroads. There is no local rail passenger service. A large commercial railroad yard is located at Enola in Cumberland County.

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 Carlisle in the period 1951 to 1974. 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 32 degrees F, and the average daily minimum temperature is 24 degrees. The lowest temperature on record, which occurred at Carlisle on December 23, 1960, is -15 degrees. In summer the average temperature is 74 degrees, and the average daily maximum temperature is 86 degrees. The highest recorded temperature, which occurred at Carlisle on July 3, 1966, is 106 degrees.

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

The total annual precipitation is 40 inches. Of this, 22 inches, or 55 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 17 inches. The heaviest 1-day rainfall during the period of record was 5.4 inches at Carlisle on June 22, 1972. Thunderstorms occur on about 33 days each year, and most occur in summer.

The average seasonal snowfall is 34 inches. The greatest snow depth at any one time during the period of record was 18 inches. On an average of 15 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 55 percent. Humidity is higher at night, and the average at dawn is about 75 percent. The sun shines 65 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the west-northwest. Average windspeed is highest, 9 miles per hour, in spring.

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

How This Survey Was Made

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

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

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

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and of some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation to precisely define and locate the soil is needed to plan for intensive uses in small areas.

General Soil Map Units

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

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.

In some areas along the borders of Cumberland and Perry Counties the boundaries on the general soil map do not match those of adjoining counties. These discrepancies exist because of legend design, changes in the concept of an individual series, and different proportions of the same series in the counties. In some places, photographic distortion created overlapping or small gaps between county boundaries. Such distortion is evident in a few places between Perry and Franklin Counties and in places between Cumberland and Franklin Counties, resulting in a mapping overlap of about 50 acres or more.

Soil Descriptions

Cumberland County

1. Berks-Weikert-Bedington Association

Shallow to deep, gently sloping to very steep, well drained soils that formed in material weathered from gray and brown shale, siltstone, and sandstone; on uplands

This association consists of gently sloping to moderately steep soils on the sides of hills and ridges in upland areas and moderately steep to very steep soils on the sides of long narrow ridges and hills along streams and deeply cut drainageways.

This association makes up about 21 percent of Cumberland County. It is about 50 percent Berks soils, 25 percent Weikert soils, 10 percent Bedington soils, and 15 percent soils of minor extent (fig. 2).

Berks soils are moderately deep and well drained. They are mainly gently sloping and sloping.

Weikert soils are shallow and well drained. They are mainly sloping to very steep.

Bedington soils are deep and well drained. They are mainly gently sloping and sloping.

Of minor extent are the Blairton, Ernest, and Brinkerton soils on uplands and the Atkins and Middlebury soils on flood plains.

In most areas the soils in this association are used as cropland, pasture, and woodland. In other areas they are used as homesites and in a few areas, as industrial sites.

The soils in this association are fairly suited to use for cultivated crops and as pasture and woodland. The main limitations are shallow and moderate depth to bedrock and the very low to moderate available water capacity.

In a few areas these soils are suited to most nonfarm uses. Detailed investigation is needed to determine the suitability for a specific use. The main limitations are shallow and moderate depth to bedrock, high content of coarse fragments, and slope.

2. Hagerstown-Duffield Association

Deep, nearly level to moderately steep, well drained soils that formed in material weathered from limestone; on uplands

This association consists of nearly level and gently sloping soils on valley floors and sloping and moderately steep soils on intermediate ridges in upland areas.

This association makes up about 30 percent of Cumberland County. It is about 60 percent Hagerstown soils, 20 percent Duffield soils, and 20 percent soils of minor extent (fig. 3).

Hagerstown soils are deep and well drained. They are mainly nearly level to moderately steep.

Duffield soils are also deep and well drained. They are mainly nearly level to sloping.

Of minor extent in this association are Huntington, Edom, Penlaw, Murrill, and Neshaminy soils on uplands and Lindside and Melvin soils on flood plains.

In most areas the soils in this association are used as cropland, pasture, and woodland. Dairying is the major farm enterprise. In other areas these soils are used as sites for towns and villages and as industrial sites. Limestone is being quarried in several places.

The soils in this association are among those in Cumberland County best suited to use as cropland, pasture,

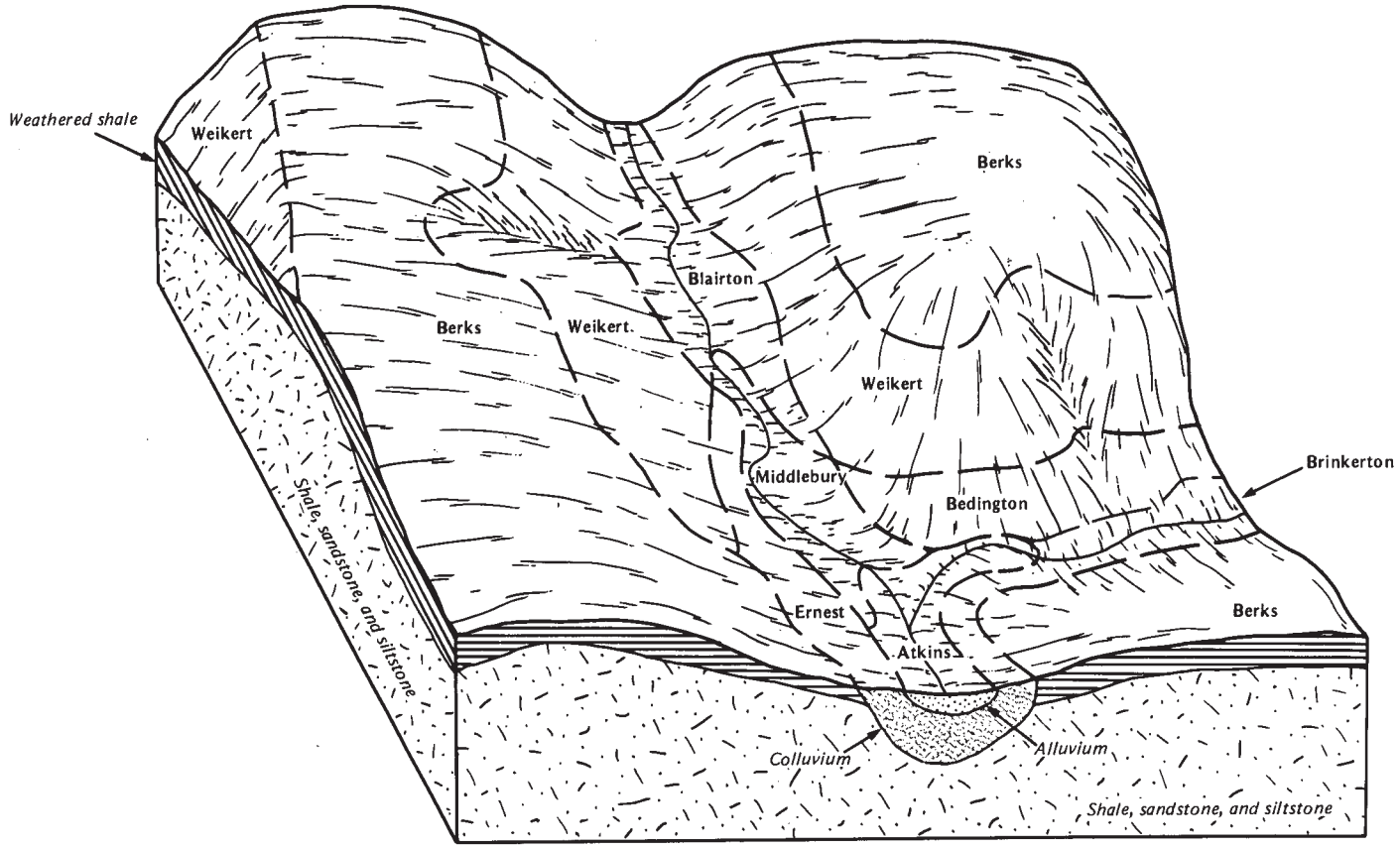


Figure 2.—Typical pattern of soils and underlying material in the Berks-Weikert-Bedington association.

and woodland. The major limitations are slope, erosion, rock outcrops, and sinkholes.

In most areas these soils are suited to many nonfarm uses. Detailed investigation is needed to determine suitability for a specific use. The main limitations are hazard of ground water contamination, sinkholes, rock outcrops, and slope (fig. 4).

3. Hazleton-Laidig-Buchanan Association

Deep, nearly level to very steep, well drained to somewhat poorly drained soils that formed in material weathered from gray and brown quartzite, sandstone, siltstone, and shale; on uplands

This association consists of nearly level to sloping soils on the sides of ridges and mountains and moderately steep to very steep soils on sides of ridges and mountains in upland areas.

This association makes up about 18 percent of Cumberland County. It is about 25 percent Hazleton soils, 15 percent Laidig soils, 5 percent Buchanan soils, and 55 percent soils of minor extent (fig. 5).

Hazleton soils are deep and well drained. They are mainly sloping to very steep.

Laidig soils are deep and well drained. They are gently sloping to moderately steep. A fragipan is in the subsoil.

Buchanan soils are deep and moderately well drained and somewhat poorly drained. They are nearly level to moderately steep. A fragipan is in the subsoil.

Of minor extent in this association are Albrights, Andover, Berks, Lehew, Bedington, Clymer, and Weikert soils and Dystrochrepts on uplands and Atkins, Middlebury, and Tioga soils on flood plains.

In most areas the soils in this association are in woodland. They are too stony or too steep to be used for farming. In some of the less sloping areas the soils have been cleared of trees and stones and are used as pasture. The major limitations are slope, stones on the surface, and a seasonal high water table.

In many areas the soils in this association are suited to many nonfarm uses. The major limitations are slope, large stones on the surface, and a seasonal high water table.

4. Monongahela-Atkins-Middlebury Association

Deep, nearly level and gently sloping, moderately well drained to poorly drained soils that formed in alluvium; on terraces and flood plains.

This association consists of nearly level and gently sloping soils along streams and river terraces and nearly level soils on flood plains.

This association makes up about 3 percent of Cumberland County. It is about 35 percent Monongahela soils, 25 percent Atkins soils, 10 percent Middlebury soils, and 30 percent soils of minor extent.

Monongahela soils are deep and moderately well drained. They are mainly nearly level and gently sloping and are on stream terraces.

Atkins soils are deep and poorly drained. They are nearly level and are on flood plains.

Middlebury soils are deep and are moderately well drained and somewhat poorly drained. They are nearly level and are on flood plains.

Of minor extent in this association are Allegheny, Purdy, Tyler, Raritan, and Birdsboro soils on terraces and Tioga soils on flood plains.

In most areas the soils in this association are used as pasture or woodland. In some areas they are used as cropland and in a few areas as homesites.

The soils in this association are well suited to fairly suited to use for cultivated crops and to use as pasture and woodland. The major limitations are a seasonal high water table and flooding.

In a few areas these soils are suited to many nonfarm uses. Detailed investigation is needed to determine suitability for a specific use. The main limitations are flooding and a seasonal high water table.

5. Murrill-Laidig-Buchanan Association

Deep, nearly level to moderately steep, well drained to somewhat poorly drained soils that formed in colluvium from gray sandstone, conglomerate, quartzite, and limestone; on uplands

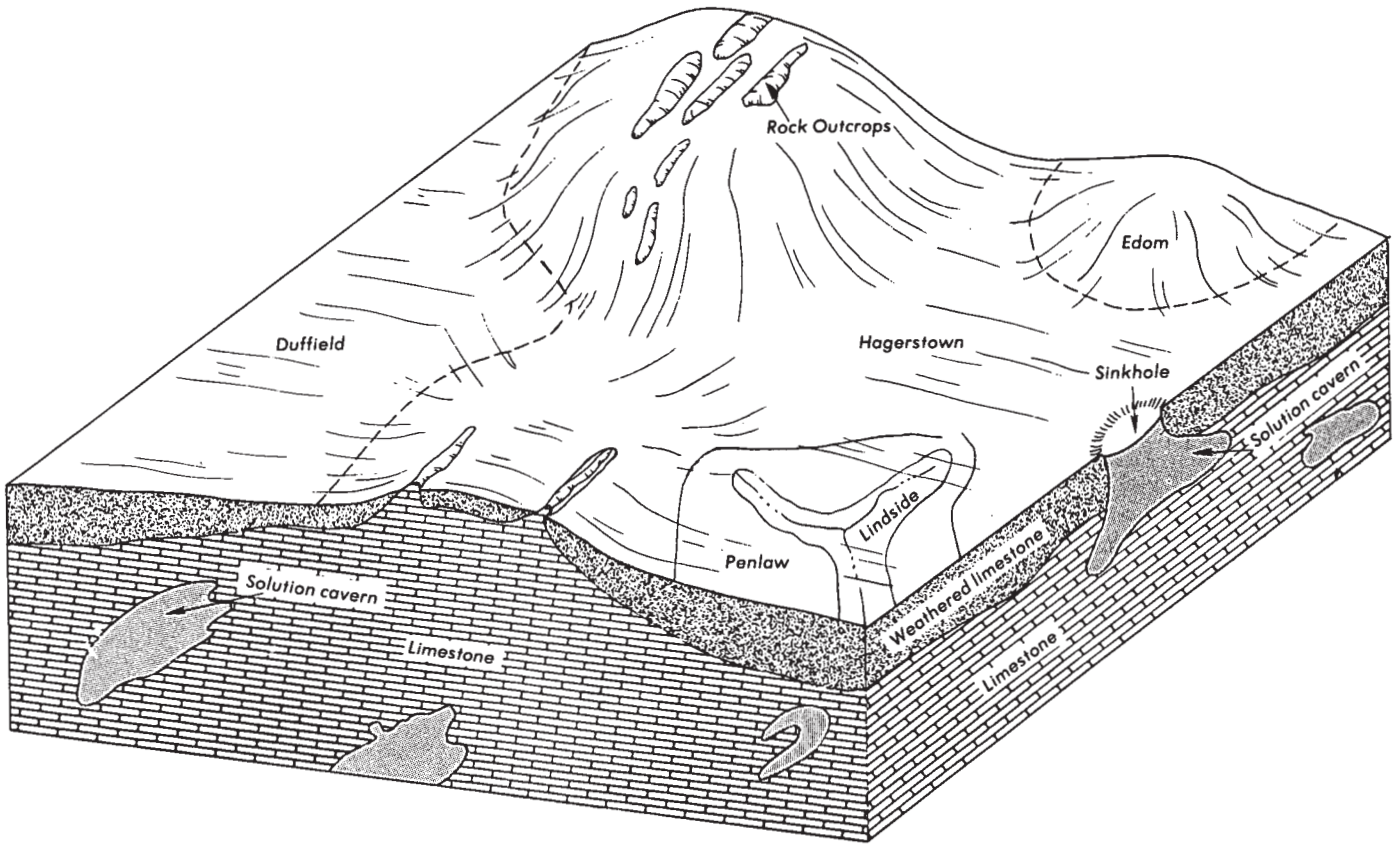


Figure 3.—Typical pattern of soils and underlying material in the Hagerstown-Duffield association.

Figure 4.—Sinkholes are a limitation for many uses in the Hagerstown-Duffield association.

This association consists of nearly level to moderately steep soils at the base of mountain slopes and in undulating upland areas.

This association makes up about 11 percent of Cumberland County. It is about 35 percent Murrill soils, 20 percent Laidig soils, 15 percent Buchanan soils, and 30 percent soils of minor extent (fig. 6).

Murrill soils are deep and well drained. They are mainly nearly level or gently sloping.

Laidig soils are deep and well drained. They are gently sloping to moderately steep. A fragipan is in the subsoil.

Buchanan soils are deep and are moderately well drained and somewhat poorly drained. They are mainly gently sloping to moderately steep. A fragipan is in the subsoil.

Of minor extent in this association are Andover, Clymer, and Hazleton soils on uplands and Atkins and Middlebury soils on flood plains.

In most areas the soils in this association are used as cropland, pasture, and woodland. In some areas they are used as homesites, as a source of sand and gravel, for orchards, and as industrial sites.

The soils in this association are suited to use for cultivated crops and to use as pasture and woodland. The major limitations are slope, stones on the surface, and a seasonal high water table.

In some areas these soils are suited to most nonfarm uses. Detailed investigation is needed to determine suitability for many specific uses. The main limitations are slope, stones on the surface, slow permeability, and a seasonal high water table.

6. Athol-Neshaminy Association

Deep, gently sloping and sloping, well drained soils that formed in material weathered from conglomerate, breccias, and diabase; on uplands

This association consists of gently sloping and sloping soils in upland valley areas.

This association makes up about 1 percent of Cumberland County. It is about 45 percent Athol soils, 40 percent Neshaminy soils, and 15 percent soils of minor extent.

Athol soils are deep and well drained. They are mainly gently sloping and sloping.

Neshaminy soils are deep and well drained. They are mainly gently sloping and sloping.

Of minor extent in this association are Duffield and Hagerstown soils on uplands, Allegheny, Birdsboro, and Monongahela soils on terraces, and Atkins, Middlebury, Lindside, and Melvin soils on flood plains.

In most areas the soils in this association are used as cropland and pasture. In some areas they are used as homesites.

The soils in this association are suited to cultivated crops and pasture. The major limitations are slope and the hazard of erosion.

These soils are suited to most nonfarm uses. Onsite investigation is needed to determine suitability for a specific use. The major limitations are high content of coarse fragments, low strength, and large stones on the surface.

7. Hazleton-Clymer Association

Deep, nearly level to very steep, well drained soils that formed in material weathered from gray sandstone and quartzite; on uplands

This association consists of nearly level to steep soils on ridgetops and very steep soils on side slopes of mountains.

This association makes up about 12 percent of Cumberland County. It is about 40 percent Hazleton soils, 15 percent Clymer soils, and 45 percent soils of minor extent (fig. 7).

Hazleton soils are deep and well drained. They are mainly sloping to very steep.

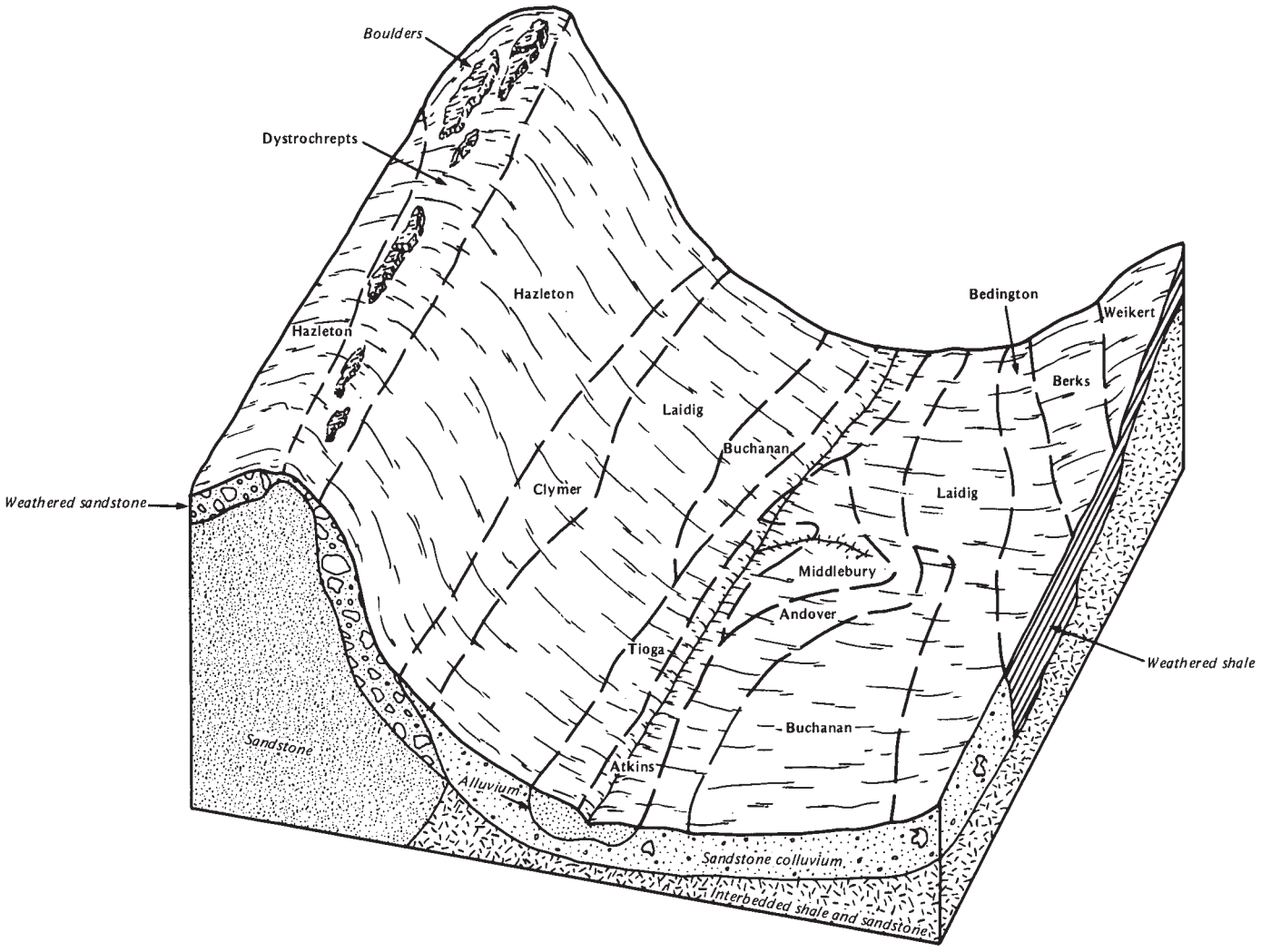


Figure 5.—Typical pattern of soils and underlying material in the Hazleton-Laidig-Buchanan association.

Clymer soils are deep and well drained. They are mainly nearly level to moderately steep.

Of minor extent in this association are Andover, Buchanan, Catoctin, Glenville, Highfield, and Laidig soils on uplands and Atkins and Middlebury soils on flood plains.

In nearly all of the areas the soils in this association are in woodland. In some areas they are used for orchards and in a few areas for cultivated crops and as pasture. In some areas they are used as homesites and for hunting camps and other nonfarm uses.

In most areas the soils in this association are suited to use as woodland and pasture. The major limitations are steep slopes and stones on the surface.

In some areas these soils are suited to most nonfarm uses. Onsite investigation is needed to determine suitability for a specific use. The major limitations are slope and stones on the surface.

8. Highfield-Glenville Association

Deep, nearly level to moderately steep, well drained to somewhat poorly drained soils that formed in material weathered from schist and rhyolite; on uplands

This association consists of nearly level to very steep soils on tops and sides of mountains and ridges.

This association makes up about 4 percent of Cumberland County. It is 65 percent Highfield soils, 25 percent Glenville soils, and 10 percent soils of minor extent.

Highfield soils are deep and well drained. They are mainly nearly level to moderately steep.

Glenville soils are deep and are moderately well drained and somewhat poorly drained. They are nearly level and gently sloping.

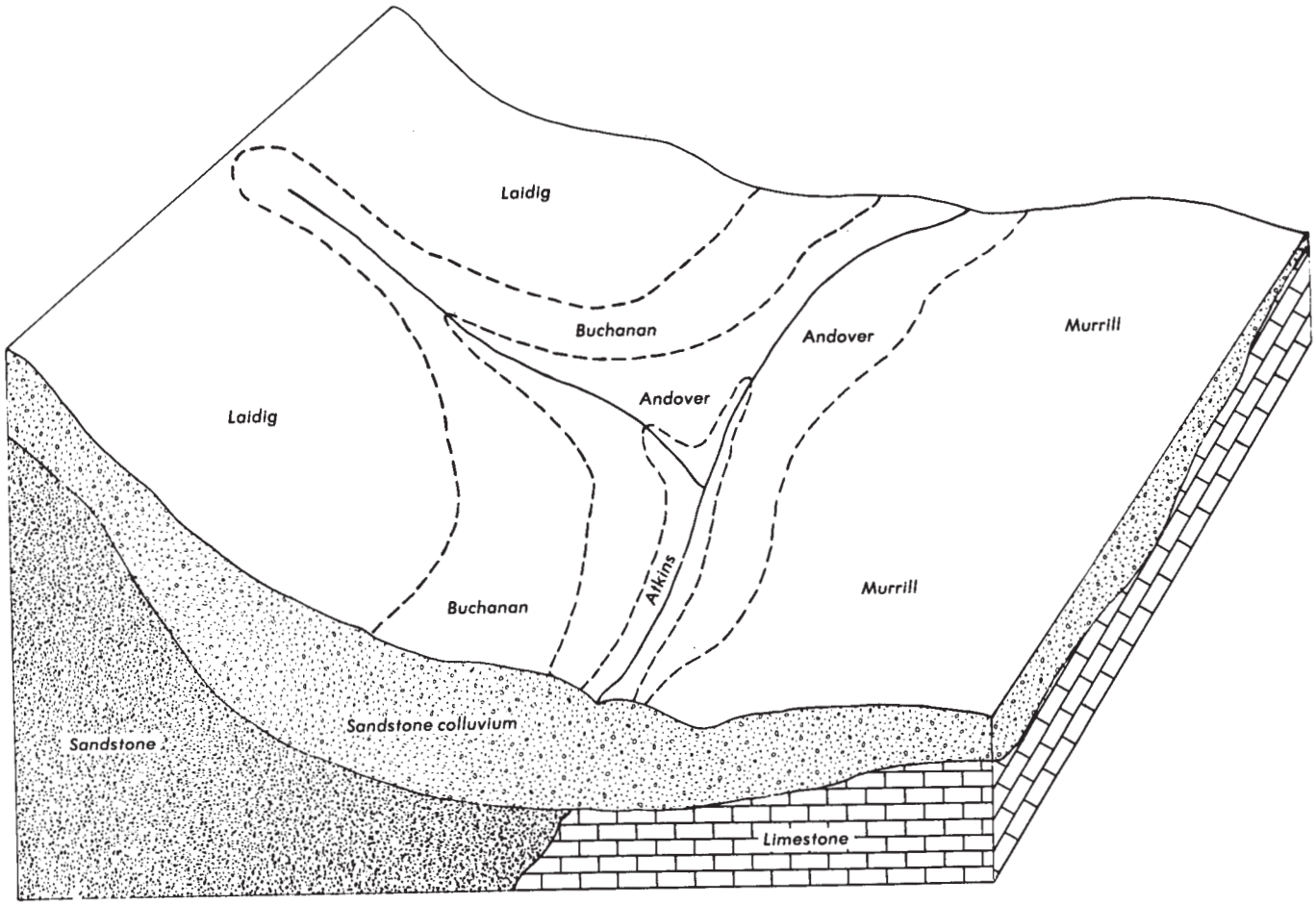


Figure 6.—Typical pattern of soils and underlying material in the Murrill-Laidig-Buchanan association.

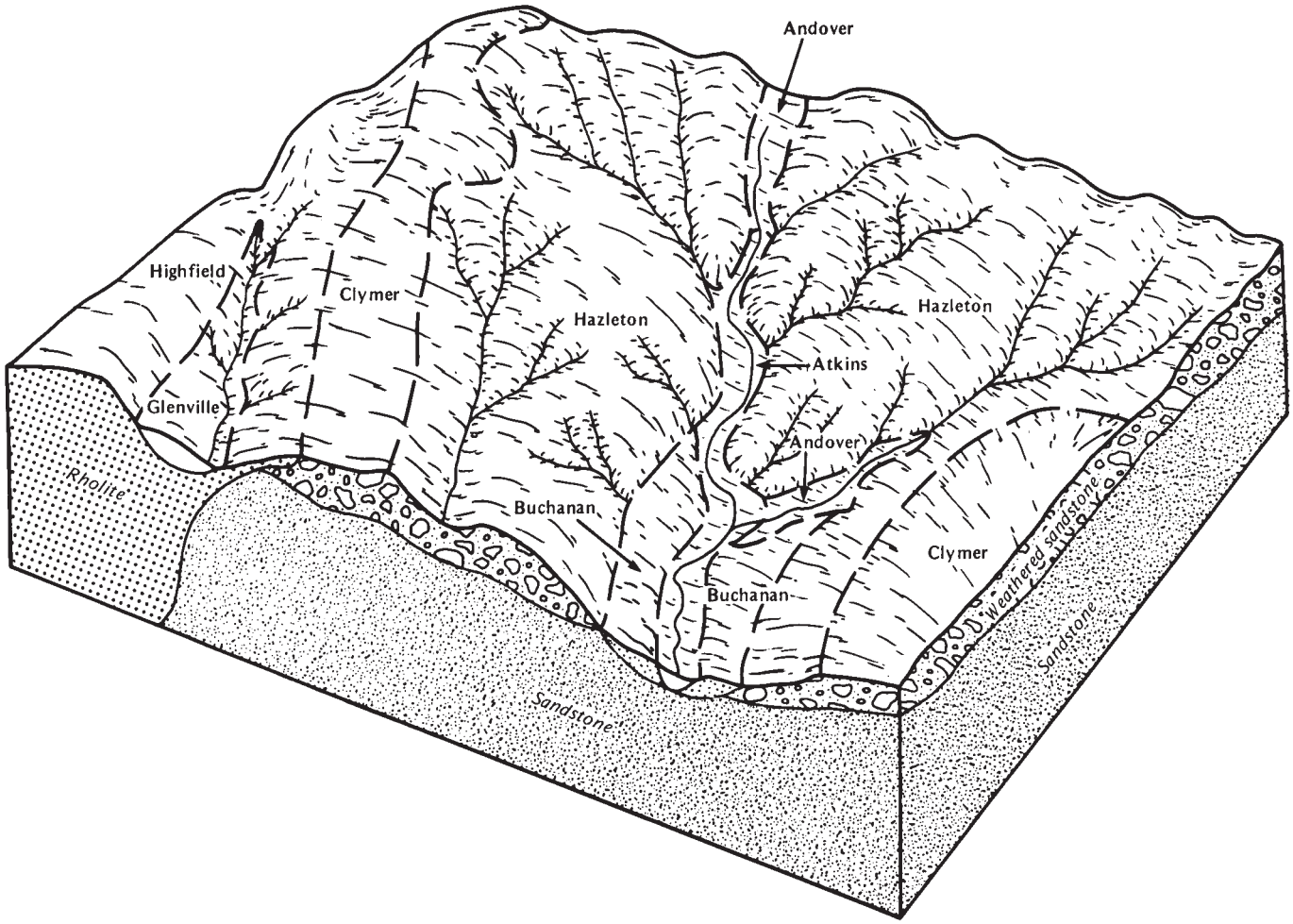


Figure 7.—Typical pattern of soils and underlying material in the Hazleton-Clymer association.

Of minor extent in this association are Andover, Buchanan, Catoctin, Clymer, and Hazleton soils on uplands and Atkins and Middlebury soils on flood plains.

In most areas the soils in this association are used as cropland, pasture, and woodland and for orchards. In some areas they are used as homesites and quarries.

The soils in this association are suited to use for cultivated crops and orchards and to use as pasture and woodland. The major limitations are slope, a seasonal high water table, moderate available water capacity, and stones on the surface.

In some areas these soils are suited to most nonfarm uses. Detailed investigation is needed to determine suitability for a specific use. The major limitations are a seasonal high water table, coarse fragments, stones on the surface, and slope.

Perry County

1. Berks-Weikert-Bedington Association

Shallow to deep, gently sloping to very steep, well drained soils that formed in material weathered from gray and brown shale, siltstone, and sandstone; on uplands

This association consists of gently sloping to moderately steep soils on hills and ridges in upland areas and moderately steep to very steep soils on long, narrow ridges and hillsides along streams and deeply cut drainageways.

This association makes up about 4 percent of Perry County. It is about 53 percent Berks soils, 35 percent Weikert soils, 2 percent Bedington soils, and 10 percent soils of minor extent.

Berks soils are moderately deep and well drained. They are mainly gently sloping and sloping.

Weikert soils are shallow and well drained. They are mainly moderately steep to very steep.

Bedington soils are deep and well drained. They are mainly gently sloping and sloping.

Of minor extent in this association are Klinesville, Calvin, Blairton, Ernest, and Brinkerton soils on uplands and Atkins and Middlebury soils on flood plains.

In most areas the soils in this association are used as cropland, pasture, and woodland. In some areas they are used as homesites, sites for small towns and villages, and a few industrial sites.

The soils in this association are fairly suited to use for cultivated crops and to use as pasture and woodland. The major limitations are shallow and moderate depth to bedrock and very low to moderate available water capacity.

In a few areas those soils are suited to most nonfarm uses. Detailed investigation is needed to determine suitability for a specific use. The major limitations are shallow and moderate depth to bedrock, high content of coarse fragments, and slope.

2. Hagerstown-Duffield Association

Deep, nearly level to moderately steep, well drained soils that formed in material weathered from limestone; on uplands

This association consists of nearly level and gently sloping soils on valley floors and sloping and moderately steep soils on intermediate ridges.

This association makes up about 3 percent of Perry County. It is about 22 percent Hagerstown soils, 16 percent Duffield soils, and 62 percent soils of minor extent.

Hagerstown soils are deep and well drained. They are mainly nearly level to moderately steep.

Duffield soils are deep and well drained. They are mainly nearly level to sloping.

Of minor extent in this association are Penlaw, Murrill, Huntington, Edom, and Neshaminy soils on uplands and Lindside and Melvin soils on flood plains.

In most areas the soils in this association are used as cropland, pasture, and woodland. Dairying is the major farm enterprise. In some areas these soils are used as homesites, sites for large towns and villages, and industrial sites. Limestone is being quarried in several places.

The soils in this association are among those in Perry County best suited to cultivated crops, pasture, and woodland. The major limitations are slope, hazard of erosion, rock outcrops, and sinkholes.

In most areas these soils are suited to many nonfarm uses. Detailed investigation is needed to determine suitability for a specific use. The major limitations are hazard of ground water contamination, sinkholes, rock outcrops, and slope.

3. Hazleton-Laidig-Buchanan Association

Deep, nearly level to very steep, well drained to somewhat poorly drained soils that formed in material weathered from gray and brown quartzite, sandstone, siltstone, and shale; on uplands

This association consists of nearly level to sloping soils on tops of ridges and mountains and moderately steep to very steep soils on sides of ridges and mountains.

This association makes up about 42 percent of Perry County. It is about 50 percent Hazleton soils, 10 percent Laidig soils, 5 percent Buchanan soils, and 35 percent soils of minor extent.

Hazleton soils are deep and well drained. They are mainly sloping to very steep.

Laidig soils are deep and well drained. They are nearly level to moderately steep. A fragipan is in the subsoil.

Buchanan soils are deep and are moderately well drained and somewhat poorly drained. They are nearly level to moderately steep. A fragipan is in the subsoil.

Of minor extent in this association are Meckesville, Albrights, Andover, Lehew, Berks, and Weikert soils and Dystrochrepts on uplands and Atkins, Middlebury, and Tioga soils on flood plains.

In most areas the soils in this association are in woodland. They are too stony or too steep to be used for farming. In some of the less sloping areas the soil has been cleared of trees and stones and is used as pasture. The major limitations are slope, stones on the surface, and a seasonal high water table.

In many areas the soils in this association are suited to many nonfarm uses. The major limitations are slope, large stones on the surface, and a seasonal high water table.

4. Monongahela-Atkins-Middlebury Association

Deep, nearly level and gently sloping, moderately well drained to poorly drained soils that formed in alluvium; on terraces and flood plains

This association consists of nearly level and gently sloping soils along stream terraces and nearly level soils on flood plains.

This association makes up about 4 percent of Perry County. It is about 19 percent Monongahela soils, 18 percent Atkins soils, 17 percent Middlebury soils, and 46 percent soils of minor extent.

Monongahela soils are deep and moderately well drained. They are mainly nearly level and gently sloping and are on stream terraces.

Atkins soils are deep and poorly drained. They are nearly level and are on flood plains.

Middlebury soils are deep and are moderately well drained and somewhat poorly drained. They are nearly level and are on flood plains.

Of minor extent in this association are Allegheny, Purdy, Tyler, and Birdsboro soils on terraces and Tioga soils on flood plains.

In most areas the soils in this association are in pasture or woodland. In some areas they are used as cropland, and in a few areas they are used as homesites.

The soils in this association are well suited to fairly suited to use for cultivated crops and to use as pasture and woodland. The major limitations are a seasonal high water table and flooding.

In a few areas these soils are suited to nonfarm uses. Detailed investigation is needed to determine suitability for a specific use. The major limitations are flooding and a seasonal high water table.

5. Murrill-Laidig-Buchanan Association

Deep, nearly level to moderately steep, well drained to somewhat poorly drained soils that formed in colluvium from gray sandstone, conglomerate, quartzite, and limestone; on uplands

This association consists of nearly level to moderately steep soils at the base of mountain slopes and in undulating upland areas.

This association makes up about 2 percent of Perry County. It is about 18 percent Murrill soils, 17 percent Laidig soils, 15 percent Buchanan soils, and 50 percent soils of minor extent.

Murrill soils are deep and well drained. They are mainly gently sloping and sloping.

Laidig soils are deep and well drained. They are gently sloping to moderately steep. A fragipan is in the subsoil.

Buchanan soils are deep and are moderately well drained and somewhat poorly drained. They are mainly nearly level to moderately steep. A fragipan is in the subsoil.

Of minor extent in this association are Andover, Elliber, Hazleton, and Kreamer soils on uplands and Atkins and Middlebury soils on flood plains.

In most areas the soils in this association are used as cropland, pasture and woodland. In some areas they are used as homesites, sites for communities, and industrial sites.

The soils in this association are suited to cultivated crops and to use as pasture and woodland. The major limitations are slope, stones on the surface, and a seasonal high water table.

In some areas these soils are suited to most nonfarm uses. Detailed investigation is needed to determine suitability for many specific uses. The major limitations are slope, stones on the surface, slow permeability, and a seasonal high water table.

6. Elliber-Kreamer Association

Deep, gently sloping to very steep, well drained and moderately well drained soils that formed in material weathered from cherty limestone; on uplands

This association consists of gently sloping to very steep soils on intermediate ridges and gently sloping to moderately steep soils on broad valley floors.

This association makes up about 11 percent of Perry County. It is about 50 percent Elliber soils, 14 percent Kreamer soils, and 36 percent soils of minor extent (fig. 8).

Elliber soils are deep and well drained. They are mainly gently sloping to very steep.

Kreamer soils are deep and moderately well drained. They are mainly gently sloping or sloping. A fragipan is in the subsoil.

Of minor extent in this association are Evendale, Morrison, Murrill, and Edom soils on uplands and Atkins, Melvin, and Middlebury soils on flood plains.

In most areas the soils in this association are used as cropland, pasture, and woodland. In some areas they are used as homesites, sites for communities, and a few industrial sites.

The soils in this association are suited to use for cultivated crops and to use as pasture and woodland. The major limitations are small and large stones, a seasonal high water table, and moderate to low available water capacity.

In a few areas these soils are suited to most nonfarm uses. Detailed investigation is needed to determine suitability for a specific use. The major limitations are slope, small and large stones, and a seasonal high water table.

7. Weikert-Calvin-Berks Association

Shallow and moderately deep, gently sloping to very steep, well drained soils that formed in material weathered from red, gray, and brown shale, siltstone, and sandstone; on uplands

This association consists of gently sloping to moderately steep soils on hills and ridges in upland areas and steep and very steep soils on long narrow ridges and hillsides along streams and deeply cut drainageways.

This association makes up about 34 percent of Perry County. It is about 20 percent Weikert soils, 20 percent Calvin soils, 15 percent Berks soils, and 45 percent soils of minor extent.

Weikert soils are shallow and well drained. They are mainly moderately steep to very steep.

Calvin soils are moderately deep and well drained. They are gently sloping or sloping.

Berks soils are moderately deep and well drained. They are gently sloping or sloping.

Of minor extent are the Albrights, Blairton, Brinkerton, Ernest, Klinesville, and Meckesville soils on uplands and Atkins, Barbour, Basher, and Middlebury soils on flood plains.

In most areas the soils in this association are used as cropland, pasture, and woodland. In other areas they are used as homesites.

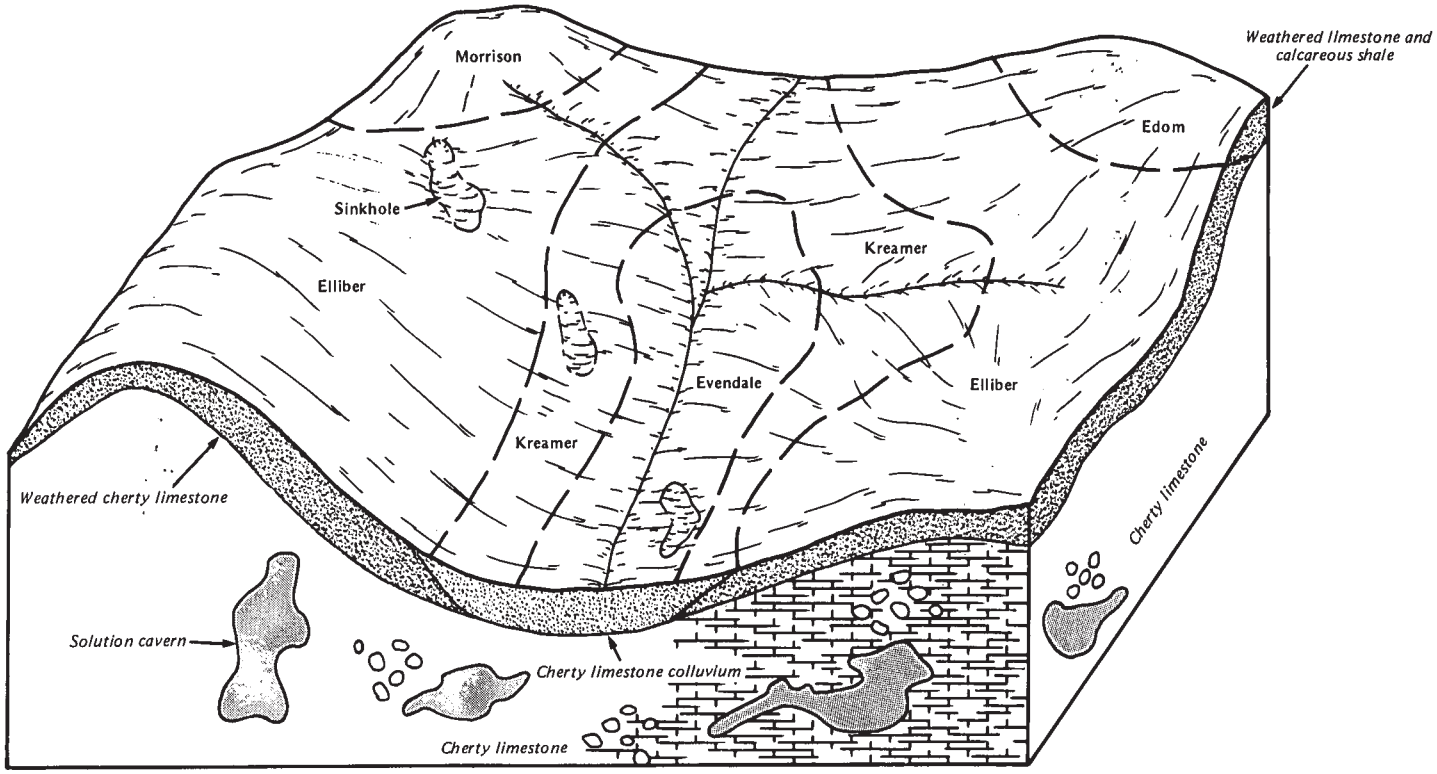


Figure 8.—Typical pattern of soils and underlying material in the Elliber-Kreamer association.

The soils in this association are generally suited to use for cultivated crops and to use as pasture and woodland. The main limitations are shallow and moderate depth to bedrock, slope, the very low to moderate available water capacity, and, in some areas, stones on the surface. In a few areas stones on the surface make the soil unsuited to cultivated crops.

In a few areas these soils are suited to most nonfarm uses. Detailed investigation is needed to determine the suitability for a specific use. The main limitations are shallow and moderate depth to bedrock, slope, and, in some areas, stones on the surface.

Detailed Soil Map Units

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Hagerstown silt loam, 0 to 3 percent slopes, is one of several phases in the Hagerstown series.

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

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Calvin-Berks shaly 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 similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Middlebury soils is an undifferentiated group in this survey area.

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

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

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

Soil Descriptions

AbB—Albrights silt loam, 3 to 8 percent slopes. This is a gently sloping, deep, moderately well drained and somewhat poorly drained soil on lower slopes and benches of ridges and along drainageways. Individual areas are long and narrow and range from 3 to 25 acres.

Typically, the surface layer is brown silt loam about 3 inches thick. The subsurface layer is dark reddish gray silt loam about 2 inches thick. The subsoil is 40 inches thick. In the upper 19 inches it is reddish brown silt loam and silty clay loam, and in the lower 21 inches it is a reddish brown silty clay loam and channery silty clay loam fragipan that is mottled. The substratum to a depth of 62 inches is reddish brown channery silt loam and is mottled.

Included with this soil in mapping are areas of Meckesville, Buchanan, and Andover soils. Also included are areas of Albrights soils that have slopes of less than 3 percent and areas of Albrights soils where the surface layer is channery silt loam. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately slow, and available water capacity is moderate. Runoff is medium. The seasonal

high water table is at a depth of 1/2 foot to 3 feet. If the soil is not limed, it is extremely acid to strongly acid in the upper part of the solum and very strongly acid to slightly acid in the lower part of the solum and in the substratum.

In most areas this soil is used for cultivated crops or hay or as pasture or woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. The seasonal high water table delays tillage and harvesting during wet seasons. Crops respond well to fertilizer and good management. Stripcropping, terraces, grassed waterways, and minimum tillage help reduce runoff and control erosion. Growing cover crops, returning crop residue, and including hay in the cropping system help maintain the content of organic matter and good tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland. Potential productivity is moderately high. Management problems are few. Machine planting is practical in the larger areas.

This soil has limitations for most nonfarm uses. The seasonal high water table and moderately slow permeability are severe limitations for homesites and onsite waste disposal.

This soil is in capability subclass IIe and in woodland group 3o.

AbC—Albrights silt loam, 8 to 15 percent slopes. This is a sloping, deep, moderately well drained and somewhat poorly drained soil on lower slopes and benches of ridges and along drainageways. Individual areas are long and broad and range from 5 to 30 acres.

Typically, the surface layer is brown silt loam about 3 inches thick. The subsurface layer is dark reddish gray silt loam about 2 inches thick. The subsoil is 40 inches thick. In the upper 19 inches it is reddish brown silt loam and silty clay loam, and in the lower 21 inches it is a reddish brown silty clay loam and channery silty clay loam fragipan that is mottled. The substratum to a depth of 62 inches is reddish brown channery silt loam and is mottled.

Included with this soil in mapping are small areas of Meckesville and Buchanan soils. Also included are some small areas of Albrights soils whose surface layer is stony and channery and a few areas where the slope is more than 15 percent. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderately slow, and available water capacity is moderate. Runoff is rapid. The seasonal high water table is at a depth of 1/2 foot to 3 feet. If the soil is not limed, it is extremely acid to strongly acid in the upper part of the solum and very strongly acid to slightly acid in the lower part of the solum and in the substratum.

In most areas this soil is cultivated. In other areas it is used as pasture and woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Crops respond well to fertilizer and good management. Stripcropping, cover crops, diversions, and grassed waterways help control erosion. Growing cover crops, returning crop residue, and including grasses in the cropping system help maintain the content of organic matter and good tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland. Potential productivity is moderately high. Management problems are few. Machine planting is practical in the larger areas.

This soil has limitations for most nonfarm uses. The seasonal high water table, slope, and moderately slow permeability are severe limitations to use as homesites and for onsite waste disposal.

This soil is in capability subclass IIIe and in woodland group 3o.

AgA—Allegheny silt loam, 0 to 3 percent slopes. This is a nearly level, deep, well drained soil on terraces along major streams. Individual areas are long and narrow or irregular in shape or oval, and range from 3 to 20 acres.

Typically, the surface layer is brown silt loam about 10 inches thick. The subsoil extends to a depth of 34 inches. It is brown and strong brown silt loam and clay loam. The substratum to a depth of 60 inches is strong brown gravelly loam.

Included with this soil in mapping are small areas of Monongahela, Raritan, and Birdsboro soils. Also included are small areas of Berks and Calvin soils at the base of ridges. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is slow. If the soil is not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used for cultivated crops or hay or as pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is well suited to most crops grown in the survey area. If it is used for cultivated crops, erosion is a slight hazard. Crops respond well to fertilizer and good management. Growing cover crops, utilizing crop residue, and including hay in the cropping system help maintain the content of organic matter and good tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland. Potential productivity is high. Management problems are few. Machine planting is practical in the larger areas.

This soil has few limitations for most nonfarm uses.

This soil is in capability class I and in woodland group 2o.

AgB—Allegheny silt loam, 3 to 8 percent slopes. This is a gently sloping, deep, well drained soil on terraces along major streams. Individual areas are long and narrow or irregular in shape or oval and range from 3 to 20 acres.

Typically, the surface layer is brown silt loam about 10 inches thick. The subsoil extends to a depth of 34 inches. It is brown and strong brown silt loam and clay loam. The substratum to a depth of 60 inches is strong brown gravelly loam.

Included with this soil in mapping are small areas of Monongahela, Raritan, and Birdsboro soils. Also included are small areas of Berks and Calvin soils at the base of ridges. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is medium. If the soil in not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used for cultivated crops or hay or as pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is well suited to most crops grown in the survey area. If it is used for cultivated crops, erosion is a moderate hazard. Crops respond well to fertilizer and good management. Contour stripcropping, cropland terraces, proper crop rotation, cover crops, and utilizing crop residue help reduce runoff and control erosion.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland. Potential productivity is high. Management problems are few. Machine planting is practical in the larger areas.

This soil has few limitations for most nonfarm uses.

This soil is in capability subclass IIe and in woodland group 2o.

AnB—Andover gravelly loam, 0 to 8 percent slopes. This is a nearly level and gently sloping, deep, poorly drained soil on lower slopes of ridges and along drainageways. At the head of drainageways individual areas are oval; at the base of slopes and along streams, areas are long. The areas range from 5 to 30 acres.

Typically, the surface layer is very dark gray gravelly loam about 3 inches thick. The subsurface layer is grayish brown gravelly loam about 6 inches thick. The subsoil is 33 inches thick. In the upper part, to a depth of 18 inches, it is grayish brown gravelly clay loam and is mottled. In the lower part, to a depth of 42 inches, it is a dark grayish brown gravelly clay loam fragipan that is mottled. The substratum to a depth of 60 inches is brown gravelly sandy clay loam and is mottled.

Included with this soil in mapping are areas of Buchanan and Atkins soils. Also included are areas of very poorly drained soils and areas of Andover soils that have slopes of more than 8 percent. Included areas make up about 10 percent of the mapped acreage.

Permeability is slow, and available water capacity is very low. Runoff is slow. The seasonal high water table is at a depth of 1/2 foot or less. If the soil is not limed, it is very strongly acid or strongly acid throughout.

In most areas this soil is used as pasture or woodland. In some areas it is used for cultivated crops.

If this soil is used for cultivated crops, erosion is a slight hazard. The high water table reduces crop yields. Surface and subsurface drains permit timely tillage and increase crop yields. Growing cover crops and including grasses in the cropping system help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates, restricted grazing during wet seasons, and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland. Potential productivity is moderately high for water-tolerent species. Rooting depth is restricted by the high water table. The use of equipment is restricted most of the year because of the high water table. Seedling mortality and windthrow losses are severe problems because of wetness.

This soil has serious limitations for homesites, onsite waste disposal, and most other nonfarm uses because of a high water table and slow permeability.

This soil is in capability subclass IVw and in woodland group 3w.

AoB—Andover very stony loam, 0 to 8 percent slopes. This is a nearly level and gently sloping, deep, poorly drained soil on lower slopes of ridges and along drainageways. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are long and broad and are oval and range from 5 to 30 acres.

Typically, the surface layer is very dark gray gravelly loam about 3 inches thick. The subsurface layer is grayish brown gravelly loam about 6 inches thick. The subsoil is 33 inches thick. In the upper part, to a depth of 18 inches, it is grayish brown gravelly clay loam and is mottled. In the lower part, to a depth of 42 inches, it is a dark grayish brown gravelly clay loam fragipan that is mottled. The substratum to a depth of 60 inches is brown gravelly sandy clay loam and is mottled.

Included with this soil in mapping are areas of stony Buchanan and Laidig soils. Also included are areas of very poorly drained soils and areas of Andover very stony loam that have slopes of more than 8 percent.

Included areas make up about 15 percent of the mapped acreage.

Permeability is slow, and available water capacity is very low. Runoff is slow to medium. The seasonal high water table is at a depth of 1/2 foot or less. If the soil is not limed, it is very strongly acid or strongly acid throughout.

In nearly all areas this soil is used as woodland. In a few areas it is used as pasture.

This soil is not used for cultivated crops or improved pasture because of stones on the surface and the high water table. Because of the expense involved, it is not economically feasible to remove trees and stones and reduce the water table in order to use this soil for cultivated crops and as pasture.

This soil is suited to use as woodland. Potential productivity is moderately high. Rooting depth is restricted by the high water table. The use of equipment is restricted most of the year because of the high water table. Seedling mortality and windthrow losses are severe problems because of wetness.

This soil has severe limitations for many nonfarm uses, especially for use as homesites and for onsite waste disposal because of the high water table, slow permeability, and large stones on the surface.

This soil is in capability subclass VIIs and in woodland group 3w.

AtB—Athol gravelly loam, 3 to 8 percent slopes. This is a gently sloping, deep, well drained soil on broad ridgetops and side slopes. Individual areas are irregular and oval in shape and range from 2 to 15 acres.

Typically, the surface layer is dark reddish brown gravelly loam about 9 inches thick. The subsoil is 46 inches thick. In the upper part, to a depth of 49 inches, it is reddish brown and dark reddish brown gravelly silt loam and gravelly silty clay loam. To a depth of 55 inches it is reddish brown gravelly loam. The substratum to a depth of 80 inches is reddish brown very gravelly loam.

Included with this soil in mapping are areas of a moderately deep, well drained soil that is more than 15 percent coarse fragments throughout and areas of moderately well drained and poorly drained soils. Also included are areas of Athol soils that are severely eroded. Also included are small areas of Neshaminy soils and areas where the subsoil has a lower reaction. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Runoff is medium. If the soil is not limed, it is very strongly acid or strongly acid in the upper part of the solum and strongly acid or medium acid in the lower part of the solum and in the C horizon.

In most areas this soil is used for cultivated crops or as pasture. In some areas it is used as woodland or homesites or for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Most crops respond well to fertilizer and good management. Terraces, grassed waterways, contour stripcropping, and cover crops help reduce runoff and control erosion. Returning crop residue and applying manure help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is high. Management problems are few. Machine planting is practical in the larger areas.

This soil has limitations for most nonfarm uses. The high content of coarse fragments is a limitation. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass IIe and in woodland group 2o.

AtC—Athol gravelly loam, 8 to 15 percent slopes. This is a sloping, deep, well drained soil in broad, irregularly shaped areas on side slopes of ridges and on rolling uplands. Individual areas range from 2 to 15 acres.

Typically, the surface layer is dark reddish brown gravelly loam about 9 inches thick. The subsoil is 46 inches thick. In the upper part, to a depth of 49 inches, it is reddish brown and dark reddish brown gravelly silt loam and gravelly silty clay loam. In the lower part, to a depth of 55 inches, it is reddish brown gravelly loam. The substratum to a depth of 80 inches is reddish brown gravelly loam.

Included with this soil in mapping are areas of moderately deep, well drained soil that is more than 15 percent coarse fragments throughout and areas of moderately well drained soils. Also included are areas where the subsoil has a lower reaction. Also included are areas of Athol soils that are severely eroded and small areas of Neshaminy soils. The included areas make up about 15 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Runoff is rapid. If the soil is not limed, it is very strongly acid or strongly acid in the upper part of the solum and strongly acid or medium acid in the lower part of the solum and in the C horizon.

In most areas this soil is used for cultivated crops or as pasture. In some areas it is used as woodland or homesites or for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Most crops respond well to fertilizer and good management. Diversions, grassed waterways, contour stripcropping, and cover crops help reduce runoff and control erosion. Returning crop residue and

applying manure help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is high. Management problems are few. Machine planting is practical in the larger areas.

This soil has limitations for most nonfarm uses. The high content of coarse fragments is a limitation. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass IIIe and in woodland group 2o.

AtD—Athol gravelly loam, 15 to 25 percent slopes. This is a moderately steep, deep, well drained soil on side slopes of ridges and on rolling uplands. Individual areas are long and narrow or irregular in shape and range from 2 to 10 acres.

Typically, the surface layer is dark reddish brown gravelly loam about 9 inches thick. The subsoil is 46 inches thick. In the upper part, to a depth of 49 inches, it is reddish brown and dark reddish brown gravelly silt loam and gravelly silty clay loam. In the lower part, to a depth of 55 inches, it is reddish brown gravelly loam. The substratum to a depth of 80 inches is reddish brown very gravelly loam.

Included with this soil in mapping are areas of a shallow or moderately deep, well drained soil that is more than 15 percent coarse fragments throughout and areas of moderately well drained soils. Also included are areas where the subsoil has a lower reaction. Also included are small areas of Neshaminy soils. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is very rapid. If the soil is not limed, it is very strongly acid or strongly acid in the upper part of the solum and strongly acid or medium acid in the lower part of the solum and in the C horizon.

In most areas this soil is used as pasture or woodland. In some areas it is used for cultivated crops. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a very severe hazard. Diversions, grassed waterways, contour stripcropping, and long-term rotations help reduce runoff and control erosion. Growing cover crops, returning crop residue, and adding manure help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is high. The use of equipment is restricted because of moderately steep slopes. Erosion is a problem during harvesting. Machine planting is generally practical in the larger areas.

This soil has severe limitations for use as homesites and onsite waste disposal because of slope. Steep slopes and the high content of coarse fragments are limitations for other nonfarm uses. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass IVe and in woodland group 2r.

Aw—Atkins silt loam. This is a nearly level, deep, poorly drained soil on flood plains. Slopes are generally smooth or slightly concave. Individual areas are long and narrow and range from 3 to 50 acres.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The subsoil extends to a depth of 42 inches and is dark gray and gray silt loam and silty clay loam and is mottled. The substratum to a depth of 60 inches is gray and strong brown stratified sand and gravel.

Included with this soil in mapping are small areas of Middlebury and Tioga soils. Also included are small areas of similar soils that are very gravelly and cobbly throughout. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderate to slow, and available water capacity is high. Runoff is very slow. The seasonal high water table is at a depth of 1/2 foot or less. This soil is frequently flooded. If the soil is not limed, it is strongly acid or very strongly acid throughout.

In most areas this soil is used as pasture or woodland. In some areas it is used for cultivated crops.

This soil is suited to cultivated crops if crops that can tolerate wetness are planted. Erosion is a slight hazard. Damage to crops from flooding following intensive rainfall can be expected, and crop yields tend to be reduced. Keeping natural drainageways open and constructing surface and subsurface drains where possible permit timely tillage and increase crop yields. Growing cover crops and including grasses in the cropping system help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates, restricted grazing during wet seasons, and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland. Potential productivity is very high for water-tolerant species. However, the high water table restricts use of machinery for long periods, and windthrow loss is a severe problem.

This soil has severe limitations for homesites, onsite waste disposal, and most other nonfarm uses because of frequent flooding and the high water table.

This soil is in capability subclass IIIw and in woodland group 1w.

Bb—Barbour soils. These are nearly level, deep, well drained soils on flood plains along major streams. Individual areas are long and narrow and range from 3 to 10 acres. Some areas consist mostly of Barbour fine sandy loam, some mostly have a silt loam, loam, very fine sandy loam, or sandy loam surface layer, and some areas of Barbour soils have a combination of these surface textures. These soils were mapped together because of similarity in use and management. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark reddish gray fine sandy loam about 8 inches thick. The subsoil is reddish brown sandy loam and loam to a depth of 24 inches. The substratum to a depth of 60 inches is reddish brown very gravelly loamy sand.

Included with these soils in mapping are small areas of Basher and Chavies soils. Also included are small areas where the subsoil is finer textured and areas of soils that are more than 60 percent coarse fragments in the substratum. The included areas make up about 10 percent of the mapped acreage.

Permeability is moderately rapid, and available water capacity is moderate. Runoff is slow. These soils are rarely flooded. If the soil is not limed, it ranges from very strongly acid to medium acid in the solum and from strongly acid to slightly acid in the substratum.

In most areas these soils are used for cultivated crops or as pasture or woodland. In a few areas they are used as homesites and for other nonfarm uses.

These soils are well suited to cultivated crops and in most areas are used as cropland. Erosion is a slight hazard. Flooding is rare. However, crop damage or loss can result if flooding occurs during the growing season. Growing cover crops and including grasses in the cropping system help maintain the content of organic matter and improve soil tilth.

If these soils are used as pasture, proper stocking rates, restricted grazing during wet seasons, and rotational grazing help key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

These soils are suited to use as woodland. Potential productivity is high, and management problems are few.

These soils have severe limitations for homesites, onsite waste disposal, and some other nonfarm uses because of the hazard of flooding.

These soils are in capability class I and in woodland group 2o.

Bc—Basher soils. These are nearly level, deep, moderately well drained and somewhat poorly drained soils on flood plains along major streams. Individual areas are long and narrow and range from 3 to 10 acres. Some areas consist mainly of Basher silt loam, some are mainly Basher loam or fine sandy loam, and some are a combination of textures. These soils were mapped together because of similarity in use and management. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark reddish gray silt loam about 10 inches thick. The subsoil extends to a depth of 38 inches and is reddish brown silt loam and is mottled. The substratum to a depth of 60 inches is reddish brown and gray gravelly loam, sand, and gravel.

Included with these soils in mapping are areas of poorly drained soils on flood plains that have more clay in the subsoil than Basher soils. Also included are areas of soils that have more gravel and shale throughout. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Runoff is slow. The seasonal high water table is at a depth of 1/2 foot to 2 feet. These soils are occasionally flooded. If the soil is not limed, it is extremely acid to medium acid in the surface layer and subsoil and very strongly acid to slightly acid in the substratum.

In most areas these soils are used as pasture or woodland. In some areas they are used for cultivated crops.

These soils are suited to cultivated crops. Erosion is a slight hazard. However, heavy crop damage or loss results if flooding occurs during the growing season. Keeping natural drainageways open and constructing surface and subsurface drains help facilitate timely tillage and increase yields. Returning crop residue, growing cover crops, and including grasses in the cropping system help maintain the content of organic matter and improve soil tilth.

If these soils are used as pasture, proper stocking rates, restricted grazing during wet seasons, and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

These soils are suited to use as woodland. Potential productivity is high and management problems are few.

These soils have severe limitations for homesites, onsite waste disposal, and most other nonfarm uses because of the hazard of flooding and the seasonal high water table.

These soils are in capability subclass IIw and in woodland group 2o.

BdB—Bedington shaly silt loam, 3 to 8 percent slopes. This is a gently sloping, deep, well drained soil on top of hills and ridges. Individual areas are broad and oval or irregular in shape and range from 5 to 80 acres.

Typically, the surface layer is dark brown shaly silt loam 9 inches thick. The subsoil is 39 inches thick. To a

depth of 20 inches, it is yellowish brown and strong brown shaly loam and shaly clay loam, and below that it is yellowish red shaly silty clay loam and very shaly loam. The substratum extends to a depth of 56 inches and is yellowish red very shaly silt loam. Olive shale bedrock is at a depth of 56 inches.

Included with this soil in mapping are small areas of Berks and Blairton soils and some areas of severely eroded Bedington soils. Also included are areas where the subsoil has more clay, areas of soils that have a higher reaction in the subsoil, and some wet spots. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is medium. Reaction, if the soil is not limed, ranges from very strongly acid to neutral in the surface layer and upper part of the subsoil and is very strongly acid or strongly acid in the lower part of the subsoil and in the substratum.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is in woodland. In other areas it is used as homesites and for industrial development and other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Crops respond well to fertilizer and good management. Contour stripcropping, terraces, grassed waterways, crop rotation, and cover crops reduce runoff and help control erosion. Seasonal springs and wet spots in the included areas can be drained by subsurface drains. Returning crop residue and green manure to the soil helps maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland. Potential productivity is high, and management problems are few. Machine planting is practical in the larger areas.

In some areas this soil has limitations for use as homesites and onsite waste disposal because of depth to bedrock. Limitations for other nonfarm uses include depth to bedrock and moderate permeability. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal in areas if the depth is less than 72 inches.

This soil is in capability subclass IIe and in woodland group 2o.

BdC—Bedington shaly silt loam, 8 to 15 percent slopes. This is a sloping, deep, well drained soil on rolling uplands, side slopes of ridges, and in valleys. Individual areas are irregular in shape or long and narrow and range from 5 to 50 acres.

Typically, the surface layer is dark brown shaly silt loam 9 inches thick. The subsoil is 39 inches thick. In the upper part, to a depth of 20 inches, it is yellowish brown and strong brown shaly loam and shaly clay loam. In the lower part, to a depth of 48 inches, it is yellowish red shaly silty clay loam and very shaly loam. The substratum extends to a depth of 56 inches and is yellowish red very shaly silt loam. Olive shale bedrock is at a depth of 56 inches.

Included with this soil in mapping are areas of Berks and Blairton soils and areas of severely eroded Bedington soils. Also included are areas of soils that have more clay in the subsoil and areas where the subsoil has a higher reaction. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is rapid. If the soil is not limed, it is very strongly acid to neutral in the surface layer and upper part of the subsoil and is very strongly acid or strongly acid in the lower part of the subsoil and in the substratum.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used as woodland. In other areas it is used as homesites, as industrial sites, and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Crops respond well to fertilizer and good management. Contour stripcropping, diversions, and grassed waterways help reduce runoff and control erosion. Growing cover crops, returning crop residue, and adding manure help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland. Potential productivity is high, and management problems are few. Machine planting is practical in the larger areas.

This soil has limitations for many nonfarm uses, especially for homesites and onsite waste disposal, because of slope and depth to bedrock. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass IIIe and in woodland group 2o.

BdD—Bedington shaly silt loam, 15 to 25 percent slopes. This is a moderately steep, deep, well drained soil on rolling uplands and side slopes of ridges. Individual areas are long and narrow and range from 5 to 25 acres.

Typically, the surface layer is dark brown shaly silt loam 9 inches thick. The subsoil is 39 inches thick. In the upper part, to a depth of 20 inches, it is yellowish brown and strong brown shaly loam and shaly clay loam. In the lower part, to a depth of 48 inches, it is yellowish red shaly silty clay loam and very shaly loam. The substratum extends to a depth of 56 inches and is

yellowish red very shaly silt loam. Olive shale bedrock is at a depth of 56 inches.

Included with this soil in mapping are small areas of Berks and Weikert soils and areas of Bedington soils that have slopes of more than 25 percent. Also included are areas of soils similar to Bedington soil except the subsoil has a higher reaction. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is very rapid. If the soil is not limed, it is very strongly acid to neutral in the surface layer and upper part of the subsoil and very strongly acid or strongly acid in the lower part of the subsoil and in the substratum.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used as woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a very severe hazard. Crops respond well to fertilizer and good management. Long-term crop rotations, diversions, grassed waterways, and contour stripcropping help reduce runoff and control erosion. Crop residue and manure incorporated into the soil help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland. Potential productivity is high. Erosion is a management problem, and the use of equipment is limited because of slope. Machine planting is practical in the large areas.

This soil has severe limitations for most nonfarm uses, especially for homesites and onsite waste disposal, because of slope, depth to bedrock, and moderate permeability. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass IVe and in woodland group 2r.

BeB—Berks shaly silt loam, 3 to 8 percent slopes. This is a gently sloping, moderately deep, well drained soil on rolling uplands and side slopes of ridges and in valleys. Individual areas are broad and irregular in shape or are long and narrow and range from 2 to 50 acres.

Typically, the surface layer is dark brown shaly silt loam 7 inches thick. The subsoil is yellowish brown shaly silt loam 21 inches thick. The substratum extends to a depth of 36 inches and is yellowish brown very shaly silt loam. Gray shale bedrock is at a depth of 36 inches.

Included with this soil in mapping are areas of Berks soils that have a channery loam surface layer and areas where the soil is severely eroded. Also included are small areas of Blairton, Bedington, Weikert, Calvin, and Edom soils. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderate and moderately rapid, and available water capacity is low. Surface runoff is medium. If the soil is not limed, it is very strongly acid and strongly acid in the surface layer and subsoil and very strongly acid to medium acid in the substratum.

In most areas this soil is used for cultivated crops and hay and as pasture and woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Crops respond fairly well to fertilizer and good management. Contour stripcropping, terraces, and grassed waterways reduce runoff and help control erosion. Cover crops and crop residue and manure left on the soil help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Seedling mortality is a problem because the available water capacity is low. Machine planting is practical in the larger areas.

This soil has limitations for most nonfarm uses, especially for use as onsite waste disposal, because of bedrock at a depth of 20 to 40 inches and the high content of coarse fragments.

This soil is in capability subclass IIe and in woodland group 3f.

BeC—Berks shaly silt loam, 8 to 15 percent slopes. This is a sloping, moderately deep, well drained soil on rolling uplands, side slopes of ridges, and in valleys. Individual areas are broad and irregular in shape or are long and narrow and range from 5 to 50 acres.

Typically, the surface layer is dark brown shaly silt loam 7 inches thick. The subsoil is yellowish brown shaly silt loam 21 inches thick. The substratum extends to a depth of 36 inches and is yellowish brown very shaly silt loam. Gray shale bedrock is at a depth of 36 inches.

Included with this soil in mapping are areas of Berks soils that have a channery loam surface layer, areas where the soil is severely eroded, and areas where the slopes are less than 8 percent. Also included are small areas of Bedington, Weikert, Calvin, and Edom soils. Included areas make up about 25 percent of the mapped acreage.

Permeability is moderate and moderately rapid, and available water capacity is low. Surface runoff is rapid. If the soil is not limed, it is very strongly acid and strongly acid in the surface layer and subsoil and very strongly acid to medium acid in the substratum.

In most areas this soil is used for cultivated crops or hay or as pasture or woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Crops respond fairly well to fertilizer and good management. Contour stripcropping, diversions, and grassed waterways help reduce runoff and control erosion (fig. 9). Growing cover crops, returning crop residue, and adding manure help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Seedling mortality is a management problem because the available water capacity is low. Machine planting is practical in the larger areas.

This soil has limitations for most nonfarm uses, especially for homesites and onsite waste disposal, because of bedrock at a depth of 20 to 40 inches, slope, and the high content of coarse fragments.

This soil is in capability subclass IIIe and in woodland group 3f.

BeD—Berks shaly silt loam, 15 to 25 percent slopes. This is a moderately steep, moderately deep, well drained soil on rolling uplands, side slopes of ridges, and in valleys. Individual areas are long and narrow and range from 5 to 30 acres.

Typically, the surface layer is dark brown shaly silt loam 7 inches thick. The subsoil is yellowish brown shaly silt loam 21 inches thick. The substratum extends to a depth of 36 inches and is yellowish brown very shaly silt loam. Gray shale bedrock is at a depth of 36 inches.

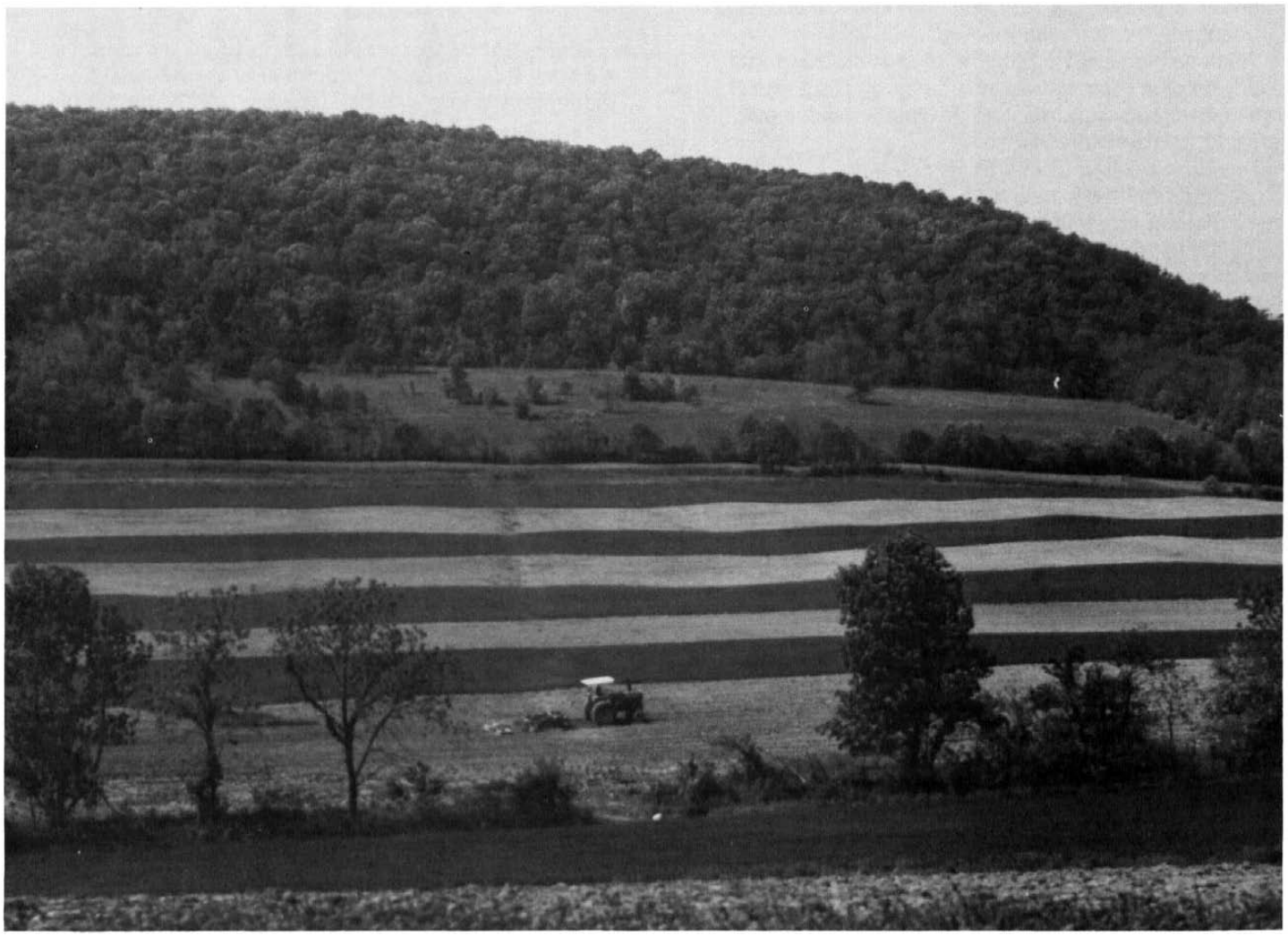


Figure 9.—Contour stripcropping on Berks shaly silt loam, 8 to 15 percent slopes, helps protect the soil from erosion.

Included with this soil in mapping are areas of Berks soils that have a channery loam surface layer, areas where the soil is severely eroded, and areas where the slopes are more than 25 percent. Also included are areas of Weikert and Klinesville soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate and moderately rapid, and available water capacity is low. Surface runoff is very rapid. If the soil is not limed, it is very strongly acid and strongly acid in the surface layer and subsoil and very strongly acid to medium acid in the substratum.

In most areas this soil is used as pasture or woodland or for cultivated crops. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a very severe hazard. Crops respond fairly well to fertilizer and good management. Contour stripcropping, diversions, grassed waterways, and long term crop rotation help reduce runoff and control erosion. Growing cover crops, returning crop residue, and adding manure help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Seedling mortality is a management problem because of the low available water capacity. In some areas, slope interferes with harvesting and seeding.

This soil has severe limitations for most nonfarm uses because of bedrock at a depth of 20 to 40 inches, slope, and the high content of coarse fragments.

This soil is in capability subclass IVe and in woodland group 3f.

BhB—Berks stony silt loam, 3 to 8 percent slopes. This is a gently sloping, moderately deep, well drained soil on rolling uplands, side slopes of ridges, and in valleys. Stones or boulders, 1 foot to 6 feet or more in diameter, cover 0.1 to 3.0 percent of the surface. Individual areas are broad and irregular in shape, or are long and narrow and range from 5 to 30 acres.

Typically, the surface layer is dark brown shaly silt loam 7 inches thick. The subsoil is yellowish brown shaly silt loam 21 inches thick. The substratum extends to a depth of 36 inches and is yellowish brown very shaly silt loam. Gray shale bedrock is at a depth of 36 inches.

Included with this soil in mapping are areas of nonstony and very stony Berks soils. Also included are areas of Laidig, Buchanan, Weikert, and Hazleton soils that have stones on the surface. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderate and moderately rapid, and available water capacity is low. Surface runoff is medium. If the soil is not limed, it is very strongly acid and strongly acid in the surface layer and subsoil and very strongly acid to medium acid in the substratum.

In most areas this soil is used as woodland or pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is too stony to be used for cultivated crops or as improved pasture. It is not economically feasible to remove the trees and surface stones in order to make this soil suitable for cultivated crops and pasture.

This soil is suited to use as woodland, and in most areas it is used as woodland. Potential productivity is moderately high. Seedling mortality is a management problem because of the low available water capacity. In places, large stones on the surface interfere with harvesting and tree planting.

This soil has limitations for most nonfarm uses because of bedrock at a depth of 20 to 40 inches and stones on the surface.

This soil is in capability subclass VIs and in woodland group 3f.

BhD—Berks stony silt loam, 8 to 25 percent slopes. This is a sloping and moderately steep, moderately deep, well drained soil on side slopes of ridges and in valleys. Stones or boulders, 1 foot to 6 feet or more in diameter, cover 0.1 to 3.0 percent of the surface. Individual areas are broad and irregular in shape or are long and narrow and range from 5 to 30 acres.

Typically, the surface layer is dark brown silt loam 7 inches thick. The subsoil is yellowish brown shaly silt loam 21 inches thick. The substratum extends to a depth of 36 inches and is yellowish brown very shaly silt loam. Gray shale bedrock is at a depth of 36 inches.

Included with this soil in mapping are areas of nonstony and very stony Berks soils. Also included are areas of Laidig, Buchanan, Weikert, and Hazleton soils that have stones on the surface and areas of soils that have slopes of more than 25 percent. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate and moderately rapid, and available water capacity is low. Surface runoff is rapid and very rapid. If the soil is not limed, it is very strongly acid and strongly acid in the surface layer and subsoil and very strongly acid to medium acid in the substratum.

In most areas this soil is used as woodland or pasture. In some areas it is used as homesites and for other nonfarm uses.

Because of the large stones on the surface, this soil is not used for cultivated crops or as improved pasture. It is not economically feasible to remove the trees and surface stones in order to make the soil suitable for cultivated crops and pasture.

This soil is suited to use as woodland, and in most areas it is used as woodland. Potential productivity is moderately high. Seedling mortality is a management problem because of the low available water capacity. The use of equipment is restricted because of the

moderately steep slopes. Large stones on the surface interfere with mechanical tree planting.

This soil has severe limitations for most nonfarm uses because of slope, bedrock at a depth of 20 to 40 inches, and stones on the surface.

This soil is in capability subclass VIs and in woodland group 3f.

BoA—Birdsboro silt loam, 0 to 5 percent slopes. This is a nearly level and gently sloping, deep, well drained soil on stream terraces above the flood plains of larger streams and rivers. Individual areas are oval or are long and narrow and range from 3 to 15 acres.

Typically, the surface layer is reddish brown silt loam about 9 inches thick. The subsoil is 35 inches thick. In the upper part, to a depth of 15 inches, it is reddish brown silt loam. In the lower part, to a depth of 44 inches, it is yellowish red and reddish brown silty clay loam and sandy clay loam. The substratum to a depth of 62 inches is reddish brown gravelly loam.

Included with this soil in mapping are areas of similar soils whose surface layer is gravelly fine sandy loam and areas of sloping soils. Also included are areas in natural drainageways of moderately well drained and somewhat poorly drained soils. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is slow to medium. If the soil is not limed, it is strongly acid to extremely acid.

In most areas this soil is used for cultivated crops or as pasture or woodland. In some areas it is used as homesites and for other nonfarm uses.

This soil is well suited to most crops grown in the survey area. If it is used for cultivated crops, erosion is a slight hazard. Crops respond very well to fertilizer and good management. Growing cover crops, returning crop residue, and including hay in the cropping system help maintain the content of organic matter and good tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is high. Management problems are few. Machine planting is practical in the larger areas.

This soil has few limitations for homesites, onsite waste disposal, and most other nonfarm uses.

This soil is in capability class I and in woodland group 2o.

BpB—Blairton silt loam, 3 to 8 percent slopes. This is a gently sloping, moderately deep, somewhat poorly drained and moderately well drained soil along heads of drainageways and in depressions on broader upland flats. Individual areas are broad and irregular in shape or are long and narrow and range from 2 to 10 acres.

Typically, the surface layer is dark brown silt loam 9 inches thick. The subsoil is 13 inches thick. In the upper 3 inches it is yellowish brown silt loam, and in the lower 10 inches it is yellowish brown shaly silty clay loam and is mottled. The substratum extends to a depth of 26 inches and is light yellowish brown very shaly silt loam and is mottled. Strong brown and brown shale bedrock is at a depth of 26 inches.

Included with this soil in mapping are areas of nearly level Blairton soils and areas where the slopes are more than 8 percent. Also included are small areas of Berks and Brinkerton soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately slow, and available water capacity is moderate. Surface runoff is medium. If the soil is not limed, it ranges from extremely acid to strongly acid throughout. The seasonal high water table is at a depth of 1/2 foot to 3 feet during wet periods.

In most areas this soil is used for cultivated crops or as pasture or woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. The seasonal high water table delays tillage and harvesting during wet seasons. Crops respond well to fertilizer and good management. Stripcropping, grassed waterways, and terraces help reduce runoff and control erosion. Returning crop residue and growing cover crops help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Wetness is a management problem. Machine planting is practical in the larger areas.

This soil has severe limitations for most nonfarm uses, especially for homesites and onsite waste disposal. Limitations for most nonfarm uses include moderately slow permeability, the seasonal high water table, and bedrock at a depth of 20 to 40 inches.

This soil is in capability subclass IIIw and in woodland group 3w.

BrA—Brinkerton silt loam, 0 to 3 percent slopes. This is a nearly level, deep, poorly drained soil on lower slopes, on benches of ridges, in depressions, and along drainageways. Individual areas are generally long and narrow or are irregular in shape and range from 5 to 15 acres.

Typically, the surface layer is brown silt loam about 12 inches thick. The subsoil is 32 inches thick. In the upper part, to a depth of 16 inches, it is dark grayish brown silty clay loam and is mottled. In the lower part, to a depth of 44 inches, it is a grayish brown and gray silty clay loam fragipan that is mottled. The substratum to a

depth of 62 inches is dark gray silty clay loam and is mottled.

Included with this soil in mapping are small areas of Ernest, Berks, Blairton, and Atkins soils. Also included are areas of very poorly drained soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is slow, and available water capacity is low. Runoff is slow to ponded. The high water table is at a depth of 1/2 foot or less during wet seasons. If the soil

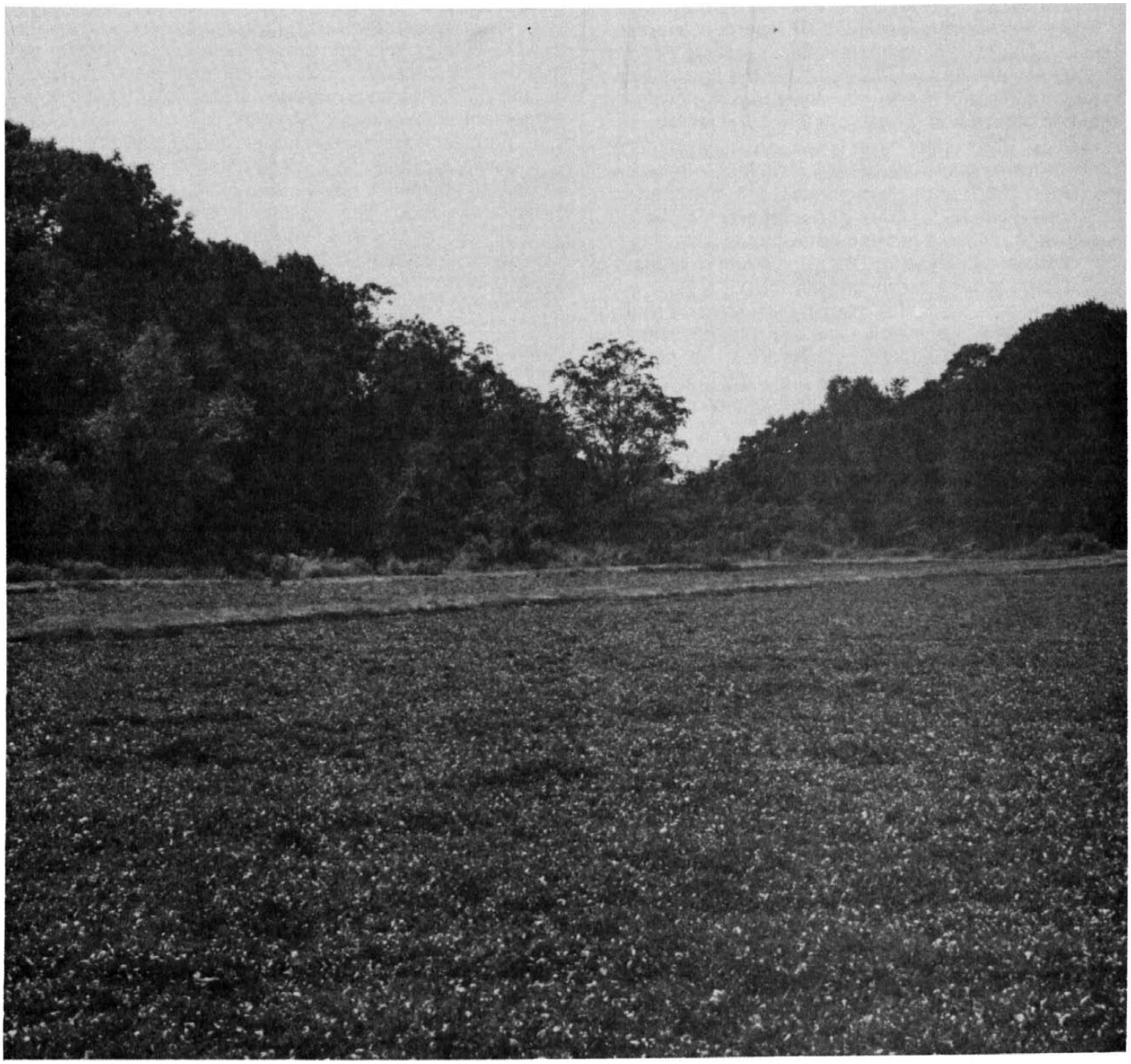


Figure 10.—In most areas Brinkerton silt loam, 0 to 3 percent slopes, is used as pasture or woodland. The high water table is a limitation for many uses.

is not limed, it ranges from very strongly acid to medium acid in the surface layer and subsoil and from strongly acid to slightly acid in the substratum.

In most areas this soil is used as pasture and woodland (fig. 10). In a few areas it is used for cultivated crops or for nonfarm uses.

This soil is too wet for most farm crops; however, crops that tolerate wetness can be grown in some years. Surface and subsurface drains facilitate timely tillage and increase crop yields. Growing cover crops and including grasses in the cropping system help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility. Grazing should not be done during wet seasons, when the water table is high, because it compacts the surface layer and damages the grasses.

This soil is suited to use as woodland. Potential productivity is high for water-tolerant species. Rooting depth is restricted by the high water table, and seedling mortality and windthrow losses are severe problems. The use of machinery for seeding and harvesting is restricted by the high water table.

This soil has severe limitations for homesites, onsite waste disposal, and most other nonfarm uses because of the high water table and slow permeability.

This soil is in capability subclass IVw and in woodland group 2w.

BrB—Brinkerton silt loam, 3 to 8 percent slopes. This is a gently sloping, deep, poorly drained soil on lower slopes, on benches of ridges, in depressions, and along drainageways. Individual areas are generally long and narrow or are irregular in shape and range from 5 to 20 acres.

Typically, the surface layer is brown silt loam about 12 inches thick. The subsoil is 32 inches thick. In the upper part, to a depth of 16 inches, it is dark grayish brown silty clay loam and is mottled. In the lower part, to a depth of 44 inches, it is a grayish brown and gray silty clay loam fragipan that is mottled. The substratum to a depth of 62 inches is dark gray silty clay loam and is mottled.

Included with this soil in mapping are small areas of Blairton, Ernest, and Berks soils. Also included are areas of Brinkerton soils that are severely eroded and areas where the slopes are more than 8 percent. Included areas make up about 15 percent of the mapped acreage.

Permeability is slow, and available water capacity is low. Runoff is medium. The high water table is at a depth of 1/2 foot or less during wet seasons. If the soil is not limed, it is very strongly acid to medium acid in the surface layer and subsoil and strongly acid to slightly acid in the substratum.

In most areas this soil is used as pasture and woodland. In some areas it is used for cultivated crops or nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Crops that tolerate wetness can be grown in some years. Surface and subsurface drains facilitate timely tillage and increase crop yields. Growing cover crops and including grasses in the cropping system help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help to maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility. Grazing should not be done during wet periods, when the water table is high, because it compacts the surface layer and damages the grasses.

This soil is suited to use as woodland. Potential productivity is high for water-tolerant species. Rooting depth is restricted because of the high water table, and windthrow loss is a severe problem. The high water table restricts the use of machinery for seeding and harvesting.

This soil has severe limitations for homesites, onsite waste disposal, and most other nonfarm uses because of the high water table and slow permeability.

This soil is in capability subclass IVw and in woodland ordination group 2w.

BuB—Buchanan gravelly loam, 3 to 8 percent slopes. This is a gently sloping, deep, moderately well drained and somewhat poorly drained soil on lower slopes of the mountains and along drainageways. Areas of this soil are long and narrow or are broad and irregular in shape and range from 10 to 40 acres.

Typically, the surface layer is dark gray gravelly loam 4 inches thick. The subsurface layer is brown gravelly loam 7 inches thick. The subsoil is 33 inches thick. In the upper 16 inches, it is yellowish brown gravelly silt loam and gravelly clay loam. In the lower 17 inches, it is a dark brown and reddish brown gravelly clay loam fragipan that is mottled. The substratum to a depth of 60 inches is mottled, strong brown gravelly clay loam.

Included with this soil in mapping are some areas of severely eroded Buchanan soils and small areas of Laidig, Murrill, and Andover soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is slow, and available water capacity is moderate. Surface runoff is medium. The seasonal high water table is at a depth of 1/2 foot to 3 feet. If the soil is not limed, it is extremely acid to strongly acid throughout.

In most areas this soil is used for cultivated crops or hay or as pasture or woodland. In some areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard (fig. 11). Crops respond well to fertilizer and good management. Contour stripcropping, terraces,

grassed waterways, and minimum tillage help reduce runoff and control erosion. Surface and subsurface drains help remove excess water. Growing cover crops and adding manure help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates, restricted grazing during wet periods, and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. Machine planting is practical in the larger areas.

This soil has severe limitations for most nonfarm uses, especially for homesites and onsite waste disposal, because of the seasonal high water table and slow permeability.

This soil is in capability subclass IIe and in woodland group 3o.

BuC—Buchanan gravelly loam, 8 to 15 percent slopes. This is a sloping, deep, moderately well drained and somewhat poorly drained soil on lower slopes of mountains and along drainageways. Individual areas of this soil are oval or are long and narrow and range from 10 to 40 acres.

Typically, the surface layer is dark gray gravelly loam 4 inches thick. The subsurface layer is brown gravelly loam 7 inches thick. The subsoil is 33 inches thick. In the upper 16 inches, it is yellowish brown gravelly silt loam and gravelly clay loam. In the lower 17 inches, it is a

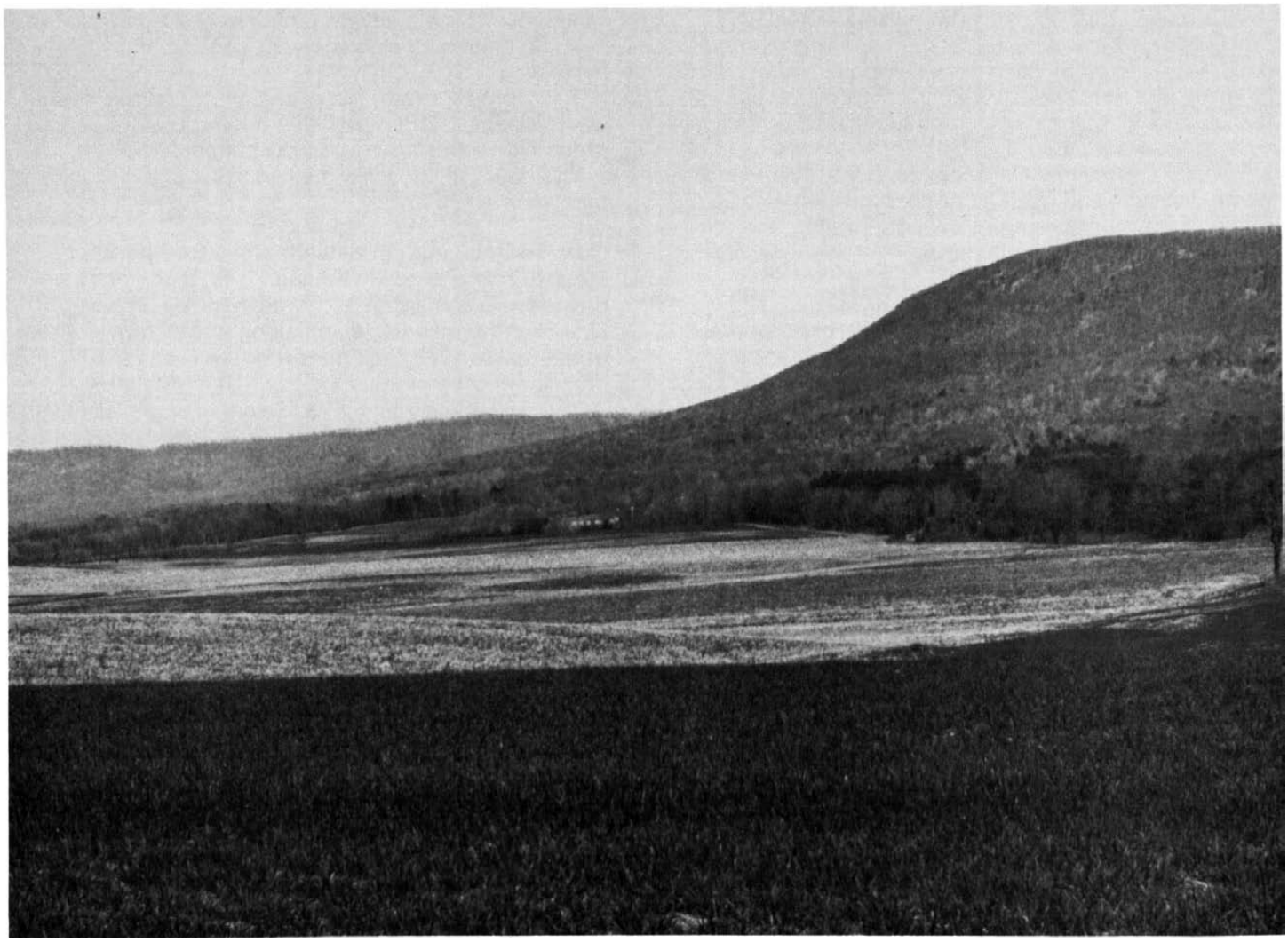


Figure 11.—If Buchanan gravelly loam, 3 to 8 percent slopes, is used as cropland, erosion control practices are needed to protect the soil.

dark brown and reddish brown gravelly clay loam fragipan that is mottled. The substratum to a depth of 60 inches is mottled, strong brown gravelly clay loam.

Included with this soil in mapping are areas of severely eroded Buchanan soils. Also included are areas of this soil that have slopes of more than 15 percent and areas of Laidig, Murrill, and Kreamer soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is slow, and available water capacity is moderate. Surface runoff is rapid. The seasonal high water table is at a depth of 1/2 foot to 3 feet. If the soil is not limed, it is extremely acid to strongly acid throughout.

In most areas this soil is used as cultivated crops. In some areas it is used as woodland and pasture. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Crops respond fairly well to fertilizer and good management. Contour stripcropping, diversions, grassed waterways, and minimum tillage help reduce runoff and control erosion. Surface and subsurface drains help control excess water. Growing cover crops and adding manure help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates, restricted grazing during wet periods, and rotational grazing help maintain key plant species. Pastures should not be grazed if the soil is wet. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. Machine planting is practical in the larger areas.

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

This soil is in capability subclass IIIe and in woodland group 3o.

BxB—Buchanan very stony loam, 0 to 8 percent slopes. This is a nearly level and gently sloping, deep, moderately well drained and somewhat poorly drained soil on lower slopes of mountains and along drainageways. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are long and narrow or are irregular in shape and range from 10 to 60 acres or more.

Typically, the surface layer is dark brown gravelly loam 4 inches thick. The subsurface layer extends to a depth of 11 inches and is brown gravelly loam. The subsoil extends to a depth of 44 inches. In the upper 16 inches it is yellowish brown gravelly silt loam and gravelly clay loam. In the lower 17 inches it is a dark brown and reddish brown gravelly clay loam fragipan that is mottled. The substratum to a depth of 60 inches is mottled, strong brown gravelly clay loam.

Included with this soil in mapping are small areas of Andover, Laidig, Elliber, Murrill, and Kreamer soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is slow, and available water capacity is moderate. Surface runoff is slow and medium. The seasonal high water table is at a depth of 1/2 foot to 3 feet. If the soil is not limed, it is extremely acid to strongly acid throughout.

In most areas this soil is used as woodland or pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is not suited to cultivated crops and improved pasture because of numerous large stones on the surface. It is not economically feasible to remove trees and stones in order to make the soil suitable for cultivated crops and pasture.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. In places machine planting is limited by the large stones on the surface.

This soil has limitations for most nonfarm uses, especially homesites and onsite waste disposal, because of large stones on the surface, the seasonal high water table, and slow permeability.

This soil is in capability subclass VIs and in woodland group 3o.

BxC—Buchanan very stony loam, 8 to 25 percent slopes. This is a sloping and moderately steep, deep, moderately well drained and somewhat poorly drained soil on lower slopes of mountains and along drainageways. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are long and narrow or are irregular in shape and range from 10 to 80 acres or more.

Typically, the surface layer is dark brown gravelly loam 4 inches thick. The subsurface layer extends to a depth of 11 inches and is brown gravelly loam. The subsoil extends to a depth of 44 inches. In the upper 16 inches it is yellowish brown gravelly silt loam and gravelly clay loam. In the lower 17 inches it is a dark brown and reddish brown gravelly clay loam fragipan that is mottled. The substratum to a depth of 60 inches is mottled, strong brown gravelly clay loam.

Included with this soil in mapping are areas of Andover, Laidig, Kreamer, Hazleton, and Clymer soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is slow, and available water capacity is moderate. Surface runoff is rapid and very rapid. The seasonal high water table is at a depth of 1/2 foot to 3 feet. If the soil is not limed, it is extremely acid to strongly acid throughout.

In nearly all of the areas this soil is used as woodland or pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is not suited to cultivated crops and improved pasture because of the large stones on the surface. It is not economically feasible to remove trees and stones in order to make this soil suitable for cultivated crops and pasture.

This soil is suited to use as woodland, and potential productivity is moderately high. Moderately steep slopes restrict the use of machinery and, in places, interfere with harvesting and tree planting.

This soil has severe limitations for most nonfarm uses, especially for homesites and onsite waste disposal, because of numerous stones on the surface, slope, the seasonal high water table, and slow permeability.

This soil is in capability subclass VIs and in woodland group 3r.

CaB—Calvin shaly silt loam, 3 to 8 percent slopes. This is a gently sloping, moderately deep, well drained soil on side slopes of ridges and in valleys. Individual areas are broad and irregular in shape or are long and narrow and range from 2 to 50 acres.

Typically, the surface layer is dark reddish brown shaly silt loam about 10 inches thick. The subsoil is 18 inches thick. In the upper 6 inches it is dark reddish brown shaly silt loam. In the lower 12 inches it is reddish brown shaly silty clay loam. The substratum extends to a depth of 38 inches and is dusky red very shaly silt loam. Red interbedded sandstone and shale bedrock is at a depth of 38 inches.

Included with this soil in mapping are areas of Calvin soils that have a channery loam surface layer and areas where the surface layer is less than 3 inches thick. Also included are small areas of soils that are more than 40 inches deep to bedrock and small areas of Klinesville, Berks, Weikert, and Edom soils. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderately rapid, and available water capacity is moderate. Runoff is medium. If the soil is not limed, it is very strongly acid to medium acid throughout.

In most areas this soil is used for cultivated crops or hay or as pasture or woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Crops respond fairly well to fertilizer and good management. Contour stripcropping, terraces, and grassed waterways help reduce runoff and control erosion. Growing cover crops, returning crop residue, and adding manure help maintain the content of organic matter.

If this soil is used for pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires maintenance of fertility through periodic applications of nutrients.

This soil is suited to use as woodland, and potential productivity is moderately high. Seedling mortality is a management problem because of the moderate available water capacity. Machine planting is practical in the larger areas.

This soil has limitations for most nonfarm uses because of depth to bedrock. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass IIe and in woodland group 3f.

CaC—Calvin shaly silt loam, 8 to 15 percent slopes. This is a sloping, moderately deep, well drained soil on side slopes of ridges and in valleys. Individual areas are broad and irregular in shape or are long and narrow and range from 2 to 50 acres.

Typically, the surface layer is dark reddish brown shaly silt loam about 10 inches thick. The subsoil is 18 inches thick. In the upper 6 inches it is dark reddish brown shaly silt loam, and in the lower 12 inches it is reddish brown shaly silty clay loam. The substratum extends to a depth of 38 inches and is dusky red very shaly silt loam. Red interbedded sandstone and shale bedrock is at a depth of 38 inches.

Included with this soil in mapping are areas of Calvin soils that have a channery loam surface layer and areas where the surface layer is less than 3 inches thick. Also included are areas of soils that are more than 40 inches deep to bedrock and areas of Klinesville, Berks, and Edom soils. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderately rapid, and available water capacity is moderate. Surface runoff is rapid. If the soil is not limed, it is very strongly acid to medium acid throughout.

In most areas this soil is used for cultivated crops or hay or as pasture or woodland. In some areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Crops respond fairly well to fertilizer and good management. Contour stripcropping, diversions, and grassed waterways help reduce runoff and control erosion. Returning crop residue, applying manure, and growing cover crops help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Seedling mortality is a management problem because of the moderate available water capacity. Machine planting is practical in the larger areas.

This soil has limitations for most nonfarm uses because of depth to bedrock and slope. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass IIIe and in woodland group 3f.

CaD—Calvin shaly silt loam, 15 to 25 percent slopes. This is a moderately steep, moderately deep, well drained soil on side slopes of ridges. Individual areas are long and narrow and range from 5 to 30 acres.

Typically, the surface layer is dark reddish brown shaly silt loam about 10 inches thick. The subsoil is 18 inches thick. In the upper 6 inches it is dark reddish brown shaly silt loam, and in the lower 12 inches it is reddish brown shaly silty clay loam. The substratum extends to a depth of 38 inches and is dusky red very shaly silt loam. Red interbedded sandstone and shale bedrock is at a depth of 38 inches.

Included with this soil in mapping are areas of Calvin soils that have a channery loam surface layer, areas where the soil is eroded and the surface layer is less than 3 inches thick, and areas where the slopes are more than 25 percent. Also included are areas of Klinesville, Berks, Edom, and Lehew soils. Included areas make up about 30 percent of the mapped acreage.

Permeability is moderately rapid, and available water capacity is moderate. Runoff is very rapid. If the soil is not limed, it is very strongly acid to medium acid throughout.

In most areas this soil is used for cultivated crops or hay or as pasture or woodland. In some areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a very severe hazard. Crops respond fairly well to fertilizer and good management. Contour stripcropping, diversions, and grassed waterways help reduce runoff and control erosion. Growing cover crops, returning crop residue, and adding manure help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Seedling mortality is a management problem because of the moderate available water capacity. In some areas, slope interferes with harvesting and seeding.

This soil has severe limitations for most nonfarm uses because of depth to bedrock and slope. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass IVe and in woodland group 3f.

CbB—Calvin-Berks shaly silt loams, 3 to 8 percent slopes. This complex consists of gently sloping, moderately deep, well drained soils on side slopes of ridges and in valleys. Individual areas are broad and irregular in shape or are long and narrow and range from 5 to 50 acres. Areas of these soils are so intricately mixed that it was not practical to map them separately. The Calvin soil makes up about 50 percent of this complex, the Berks soil makes up 35 percent, and included soils make up 15 percent.

Typically, the surface layer of the Calvin soil is dark reddish brown shaly silt loam about 10 inches thick. The subsoil is 18 inches thick. In the upper 6 inches it is dark reddish brown shaly silt loam. In the lower 12 inches it is reddish brown shaly silty clay loam. The substratum extends to a depth of 38 inches and is dusky red very shaly silt loam. Red interbedded sandstone and shale. bedrock is at a depth of 38 inches.

Typically, the surface layer of the Berks soil is dark brown shaly silt loam about 7 inches thick. The subsoil is yellowish brown shaly silt loam 21 inches thick. The substratum extends to a depth of 36 inches and is yellowish brown very shaly silt loam. Gray shale bedrock is at a depth of 36 inches.

Included with these soils in mapping are small areas of Blairton, Edom, Klinesville, and Weikert soils. Also included are areas of Calvin and Berks soils that have a channery loam surface layer and areas of soils that are more than 40 inches deep to bedrock. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate and moderately rapid, and available water capacity is moderate or low. Surface runoff is medium. In unlimed areas the Calvin soil is very strongly acid to medium acid throughout. The Berks soil is very strongly acid or strongly acid in the surface layer and subsoil.

In most areas these soils are used for cultivated crops or hay or as pasture or woodland. In a few areas they are used as homesites and for other nonfarm uses.

If these soils are used for cultivated crops, erosion is a moderate hazard. Crops respond fairly well to fertilizer and good management. Contour stripcropping, terraces, and grassed waterways help reduce runoff and control erosion. Growing cover crops, returning crop residue, and adding manure help maintain the content of organic matter.

If these soils are used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

These soils are suited to use as woodland, and potential productivity is moderately high. Seedling mortality is a management problem because of the

moderate or low available water capacity. Machine planting is practical in the larger areas.

These soils have limitations for most nonfarm uses, especially homesites and onsite waste disposal, because of bedrock at a depth of 20 to 40 inches and the high content of coarse fragments.

These soils are in capability subclass IIe and in woodland group 3f.

CbC—Calvin-Berks shaly silt loams, 8 to 15 percent slopes. This complex consists of sloping, moderately deep, well drained soils on rolling uplands, side slopes of ridges, and in valleys. Individual areas are long and narrow and range from 5 to 30 acres. Areas of these soils are so intricately mixed that it was not practical to map them separately. The Calvin soil makes up about 50 percent of this complex, the Berks soil makes up 35 percent, and included soils make up 15 percent.

Typically, the surface layer of the Calvin soil is dark reddish brown shaly silt loam about 10 inches thick. The subsoil is 18 inches thick. In the upper 6 inches it is dark reddish brown shaly silt loam. In the lower 12 inches it is reddish brown shaly silty clay loam. The substratum extends to a depth of 38 inches and is dusky red very shaly silt loam. Red interbedded sandstone and shale bedrock is at a depth of 38 inches.

Typically, the surface layer of the Berks soil is dark brown shaly silt loam about 7 inches thick. The subsoil is yellowish brown shaly silt loam 21 inches thick. The substratum extends to a depth of 36 inches and is yellowish brown very shaly silt loam. Gray shale bedrock is at a depth of 36 inches.

Included with these soils in mapping are small areas of Edom, Klinesville, and Weikert soils. Also included are areas that are more than 40 inches deep to bedrock. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate and moderately rapid, and available water capacity is moderate or low. Surface runoff is rapid. In unlimed areas the Calvin soil is very strongly acid to medium acid throughout, and the Berks soil is very strongly acid or strongly acid in the surface layer and subsoil.

In most areas these soils are used for cultivated crops or hay or as pasture or woodland. In some areas they are used as homesites for other nonfarm uses.

If these soils are used for cultivated crops, erosion is a severe hazard. Crops respond fairly well to fertilizer and good management. Contour stripcropping, diversions, and grassed waterways help reduce runoff and control erosion. Growing cover crops, returning crop residue, and adding manure help maintain the content of organic matter.

If these soils are used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

These soils are suited to use as woodland. Potential productivity is moderately high. Seedling mortality is a management problem because of the moderate or low available water capacity. Machine planting is practical in the larger areas.

These soils have limitations for most nonfarm uses, especially homesites and onsite waste disposal, because of bedrock at a depth of 20 to 40 inches, slope, and numerous coarse fragments.

These soils are in capability subclass IIIe and in woodland group 3f.

CbD—Calvin-Berks shaly silt loams, 15 to 25 percent slopes. This complex consists of moderately steep, moderately deep, well drained soils on rolling uplands and on side slopes of ridges. Individual areas are long and narrow and range from 5 to 30 acres. Areas of the two soils are so intricately mixed that it was not practical to map them separately. The Calvin soil makes up about 50 percent of this complex, the Berks soil makes up 35 percent, and included soils make up 15 percent.

Typically, the surface layer of the Calvin soil is dark reddish brown shaly silt loam about 10 inches thick. The subsoil is 18 inches thick. In the upper 6 inches, it is dark reddish brown shaly silt loam, and in the lower 12 inches, it is reddish brown shaly silty clay loam. The substratum extends to a depth of 38 inches and is dusky red very shaly silt loam. Red interbedded sandstone and shale bedrock is at a depth of 38 inches.

Typically, the surface layer of the Berks soil is dark brown shaly silt loam about 7 inches thick. The subsoil extends to a depth of 28 inches and is yellowish brown shaly silt loam. The substratum extends to a depth of 36 inches and is yellowish brown very shaly silt loam. Gray shale bedrock is at a depth of 36 inches.

Included with these soils in mapping are areas of Klinesville, Weikert, Edom, and Elliber soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate or moderately rapid, and available water capacity is moderate or low. Surface runoff is very rapid. In unlimed areas the Calvin soil is very strongly acid to medium acid throughout and the Berks soil is very strongly acid or strongly acid in the surface layer and subsoil.

In most areas these soils are used for cultivated crops or hay or as pasture or woodland. In some areas they are used as homesites and for other nonfarm uses.

If these soils are used for cultivated crops, erosion is a very severe hazard. Crops respond well to fertilizer and good management. Crop rotation, diversions, contour stripcropping, and grassed waterways help reduce runoff and control erosion. Growing cover crops, returning crop

residue, and adding manure help maintain the content of organic matter.

If these soils are used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

These soils are suited to use as woodland. Potential productivity is moderately high. Seedling mortality is a problem because of moderate or low available water capacity. In some areas, slope interferes with harvesting and seeding.

These soils have severe limitations for most nonfarm uses because of slope and bedrock at a depth of 20 to 40 inches.

These soils are in capability subclass IVe and in woodland group 3f.

CcC—Catoctin channery silt loam, 8 to 15 percent slopes. This is a sloping, moderately deep, well drained to excessively drained soil on rolling uplands and in valleys. Individual areas are long and narrow or are irregular in shape and range from 2 to 15 acres.

Typically, the surface layer is dark brown channery silt loam about 8 inches thick. The subsurface layer extends to a depth of 14 inches and is yellowish brown channery silt loam. The subsoil extends to a depth of 20 inches and is yellowish brown very channery silt loam. The substratum extends to a depth of 24 inches and is yellowish brown and olive brown very channery silt loam. Light reddish brown schist and rhyolite bedrock is at a depth of 24 inches.

Included with this soil in mapping are areas of Highfield, Glenville, and Clymer soils and areas of shallow soils that have rock outcrops. Also included are areas of Catoctin soils that are gently sloping and moderately steep. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderately rapid, and available water capacity is low. Surface runoff is moderately rapid. If the soil is not limed, it is strongly acid or medium acid in the surface layer and subsoil and strongly acid to slightly acid in the substratum.

In most areas this soil is used for cultivated crops or orchards or as pasture or woodland. In some areas it is used as homesites and for other nonfarm uses.

If this soil is used as cultivated crops, erosion is a severe hazard. Crops respond well to fertilizer and good management. Crop rotation, stripcropping, diversions, grassed waterways, and cover crops help reduce runoff and control erosion. Returning crop residue and applying manure help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is fairly suited to use as woodland, and potential productivity is moderate. High content of coarse fragments and low available water capacity are management problems. Machine planting is practical in the larger areas.

This soil has limitations for homesites and onsite waste disposal because of slope and bedrock at a depth of 20 to 40 inches. Limitations for other nonfarm uses include low available water capacity, slope, and bedrock at a depth of 20 to 40 inches.

This soil is in capability subclass IIIe and in woodland group 4f.

Ch—Chavies fine sandy loam. This is a nearly level, deep, well drained soil on stream terraces above flood plains of large streams and rivers. Individual areas are long and narrow and range from 2 to 15 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark brown fine sandy loam about 9 inches thick. The subsoil is reddish brown fine sandy loam 33 inches thick. The substratum to a depth of 60 inches is reddish brown sandy loam.

Included with this soil in mapping are areas of Barbour, Basher, Birdsboro, and Raritan soils. Also included are some areas where the soil has more clay and silt in the surface layer and where the surface layer is gravelly or shaly fine sandy loam. Included areas make up about 25 percent of the mapped acreage.

Permeability is moderately rapid, and available water capacity is high. Surface runoff is slow. This soil is rarely flooded. If the soil is not limed, it is very strongly acid to neutral in the surface layer and upper part of the subsoil and very strongly acid to medium acid in the lower part of the subsoil and in the substratum.

In most areas this soil is used for cultivated crops or as pasture or woodland. In some areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a slight hazard. Crops respond well to fertilizer and good management. Growing cover crops, returning crop residue, and including grasses in the cropping system help maintain the content of organic matter and soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is high. Management problems are few, and machine planting is practical in larger areas.

This soil has limitations for homesites and onsite waste disposal because of rare flooding. It has few limitations for most other nonfarm uses.

This soil is in capability class I and in woodland group 2o.

CmB—Clymer very stony loam, 0 to 8 percent slopes. This is a nearly level and gently sloping, deep,

well drained soil on ridgetops and on upper side slopes of mountains. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are long and broad or are oval and range from 10 to 50 acres.

Typically, the surface layer is very dark gray channery loam about 3 inches thick. The subsurface layer is yellowish brown channery loam 9 inches thick. The subsoil is 28 inches thick and is yellowish brown channery sandy loam. The substratum to a depth of 60 inches is strong brown very channery sandy loam.

Included with this soil in mapping are small areas of stony and extremely stony Clymer soils and areas of stony Highfield, Hazleton, Laidig, Buchanan, and Andover soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate and moderately rapid, and available water capacity is moderate. Surface runoff is slow and medium. If the soil is not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used as woodland or pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is too stony to be suitable for cultivated crops or improved pasture. It is not economically feasible to remove the trees and surface stones in order to make the soil suitable for cultivated crops or pasture.

This soil is suited to use as woodland. Potential productivity is high, and management problems are few. Machine planting is restricted because of the large stones on the surface.

This soil has limitations for homesites, onsite waste disposal, and other nonfarm uses because of depth to bedrock and large stones on the surface. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass VIs and in woodland group 2o.

CmD—Clymer very stony loam, 8 to 25 percent slopes. This is a sloping and moderately steep, deep, well drained soil on hills and side slopes of mountain ridges. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are long and broad or are oval and range from 10 to 50 acres.

Typically, the surface layer is very dark gray channery loam about 3 inches thick. The subsurface layer is yellowish brown channery loam 9 inches thick. The subsoil is 28 inches thick and is yellowish brown channery sandy loam. The substratum to a depth of 60 inches is strong brown very channery sandy loam.

Included with this soil in mapping are small areas of stony and extremely stony Clymer soils and areas of stony Highfield, Hazleton, and Laidig soils. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderate and moderately rapid, and available water capacity is moderate. Surface runoff is rapid and very rapid. If the soil is not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used as woodland or pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is too stony to be suitable for cultivated crops or improved pasture. It is not economically feasible to remove the trees and surface stones to make the soil suitable for cultivated crops or pasture.

This soil is suited to use as woodland. Potential productivity is high. Moderately steep slopes interfere with harvesting and tree planting.

This soil has severe limitations for homesites, onsite waste disposal, and most other nonfarm uses because of slope. Depth to bedrock and large stones on the surface are additional limitations for some uses. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass VIs and in woodland group 2r.

DuA—Duffield silt loam, 0 to 3 percent slopes. This is a nearly level, deep, well drained soil on uplands and in karst limestone valleys. Individual areas are long and narrow or are wide and irregular in shape and range from 5 to 25 acres.

Typically, the surface layer is dark yellowish brown silt loam 10 inches thick. The subsoil is 32 inches thick. In the upper part, to a depth of 30 inches, it is strong brown silt loam. In the lower part, to a depth of 42 inches, it is yellowish red and yellowish brown silty clay loam. The substratum to a depth of 78 inches is brownish yellow shaly silt loam.

Included with this soil in mapping are areas of Duffield soils that have a silty clay loam or clay loam surface layer. Also included are areas of Hagerstown, Murrill, and Edom soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Runoff is slow. If the soil is not limed, it is strongly acid to neutral above a depth of 50 inches.

In most areas this soil is used for cultivated crops or as pasture. In a few areas it is used as woodland. In some areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a slight hazard. Most crops respond well to fertilizer and good management (fig. 12). Crop rotation, cover crops, and crop residue returned to the soil help maintain the content of organic matter and soil tilth. Sinkholes are a potential hazard for equipment.

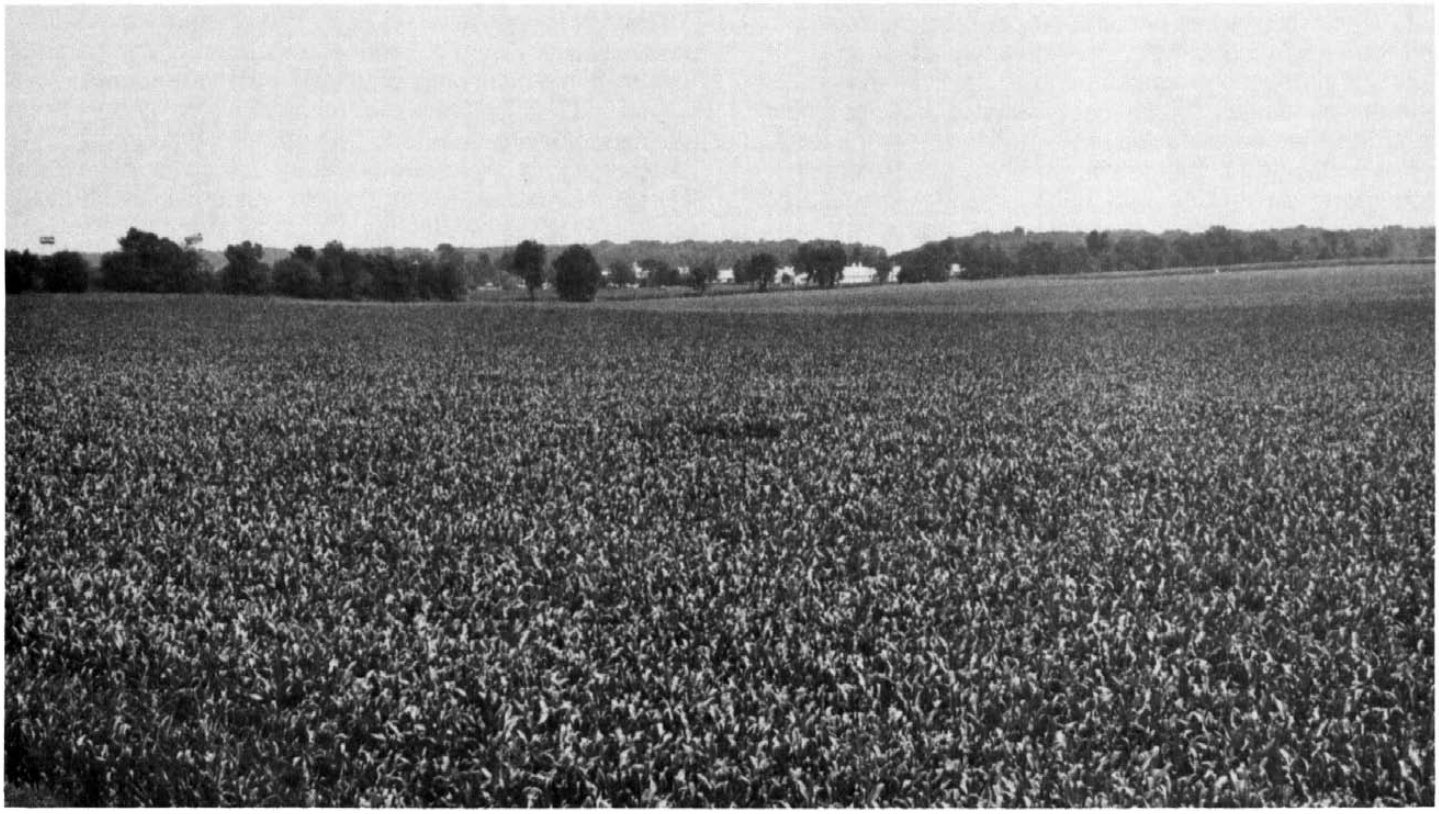


Figure 12.—Corn on Duffield silt loam, 0 to 3 percent slopes. This prime farmland soil is highly productive.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility. Sinkholes are a potential hazard for equipment.

This soil is well suited to use as woodland, and potential productivity is very high. Management problems are few. Machine planting is practical in the large areas.

This soil has limitations for some nonfarm uses because of moderate permeability and depth to bedrock. Although bedrock is at a depth of more than 48 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability class I and in woodland group 1o.

DuB—Duffield silt loam, 3 to 8 percent slopes. This is a gently sloping, deep, well drained soil on uplands and in karst limestone valleys. Individual areas are long and narrow or are wide and irregular in shape and range from 10 to 100 acres.

Typically, the surface layer is dark yellowish brown silt loam 10 inches thick. The subsoil is 32 inches thick. In the upper part, to a depth of 30 inches, it is strong brown silt loam. In the lower part, to a depth of 42 inches, it is yellowish red and yellowish brown silty clay loam. The substratum to a depth of 78 inches is brownish yellow shaly silt loam.

Included with this soil in mapping are areas of Duffield soils that have a silty clay loam or clay loam surface layer. Also included are areas of Hagerstown, Murrill, Huntington, Penlaw, and Edom soils. A few areas have limestone outcrops. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Runoff is medium. If the soil is not limed, it is strongly acid to neutral above a depth of 50 inches.

In most areas this soil is used for cultivated crops and as pasture. In some areas it is used as woodland or as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Most crops respond well to fertilizer and good management. Stripcropping, grassed waterways, terraces, and minimum tillage help reduce runoff and control erosion. Growing cover crops and returning crop residue help maintain the content of organic matter and soil tilth. Sinkholes are a potential hazard to the use of equipment.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility. Sinkholes are a potential hazard to the use of equipment.

This soil is well suited to use as woodland. Potential productivity is very high, and management problems are few. Machine planting is practical in the large areas.

This soil has limitations for homesites and most nonfarm uses because of moderate permeability and depth to bedrock. Although bedrock is at a depth of more than 48 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches. Ground water can be contaminated through solution channels and bedrock caverns if this soil is used for onsite waste disposal. Sinkholes are a potential hazard to buildings and roads.

This soil is in capability subclass IIe and in woodland group 1o.

DuC—Duffield silt loam, 8 to 15 percent slopes. This is a sloping, deep, well drained soil on uplands and in karst limestone valleys. Individual areas are long and narrow or are wide and irregular in shape and range from 5 to 80 acres.

Typically, the surface layer is dark yellowish brown silt loam 10 inches thick. The subsoil is 32 inches thick. In the upper part, to a depth of 30 inches, it is strong brown silt loam. In the lower part, to a depth of 42 inches, it is yellowish red and yellowish brown silty clay loam. The substratum to a depth of 78 inches is brownish yellow shaly silt loam.

Included with this soil in mapping are areas of Duffield soils that have a silty clay loam or clay loam surface layer. Also included are some areas of Hagerstown, Murrill, Huntington, Penlaw, and Edom soils. A few areas have limestone outcrops. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Runoff is rapid. If the soil is not limed, it is strongly acid to neutral above a depth of 50 inches.

In most areas this soil is used for cultivated crops. In some areas it is used as woodland or homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Most crops respond well to fertilizer and good management. Contour stripcropping, diversions, grassed waterways, and crop rotation help reduce runoff and control erosion. Growing cover crops and returning crop residue help maintain the content of organic matter and soil tilth. Sinkholes are a potential hazard to the use of equipment.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility. Sinkholes are a potential hazard to the use of equipment.

This soil is well suited to use as woodland. Potential productivity is very high, and management problems are few. Machine planting is practical in the large areas.

This soil has limitations for many nonfarm uses because of slope and depth to bedrock. Although bedrock is at a depth of more than 48 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches. Ground water can be contaminated through solution channels and bedrock caverns if this soil is used for onsite waste disposal. Sinkholes are a potential hazard to buildings and roads.

This soil is in capability subclass IIIe and in woodland group 1o.

DxA—Ducannon very fine sandy loam, 0 to 3 percent slopes. This is a nearly level, deep, well drained soil on terrace and bench positions along major streams and rivers. Individual areas are oval and irregular in shape or are long and narrow and range from 2 to 20 acres.

Typically, the surface layer is dark grayish brown very fine sandy loam 6 inches thick. The subsoil is 52 inches thick. In the upper part, to a depth of 33 inches, it is dark brown and yellowish brown very fine sandy loam and silt loam. In the lower part, to a depth of 58 inches, it is dark yellowish brown and brown very fine sandy loam. The substratum to a depth of 99 inches is reddish brown sandy loam and gravelly sandy loam.

Included with this soil in mapping are areas of Duncannon soils that have a silt loam and loam surface layer. Also included are small areas of Duncannon soils that are more than 10 percent coarse fragments in the surface layer and upper part of the subsoil and areas of soils that have mottles in the subsoil. Included areas make up 10 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is slow. If the soil is not limed, it is strongly acid or medium acid in the surface layer and subsoil.

In most areas this soil is suited to cultivated crops or hay or pasture. In some areas it is used as woodland. In a few areas it is used as homesites and for other nonfarm uses.

This soil is well suited to cultivated crops, and in most areas it is used as cropland. Erosion is a slight hazard. Crops respond well to fertilizer and good management. Growing cover crops, returning crop residue, and including hay in the cropping system help maintain the content of organic matter and good tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland. Potential productivity is high, and management problems are few. Machine planting is practical in the larger areas.

This soil has few limitations for most nonfarm uses.

This soil is in capability class I and in woodland group 2o.

DxB—Duncannon very fine sandy loam, 3 to 8 percent slopes. This is a gently sloping, deep, well drained soil on terraces and benches along major streams and rivers. Individual areas are oval and irregular in shape or are long and narrow and range from 2 to 15 acres.

Typically, the surface layer is dark grayish brown very fine sandy loam 6 inches thick. The subsoil is 52 inches thick. In the upper part, to a depth of 33 inches, it is dark brown and yellowish brown very fine sandy loam and silt loam. In the lower part, to a depth of 58 inches, it is dark yellowish brown and brown very fine sandy loam. The substratum to a depth of 99 inches is reddish brown sandy loam and gravelly sandy loam.

Included with this soil in mapping are areas of Duncannon soils that have a silt loam and loam surface layer. Also included are areas of Duncannon soils that are more than 10 percent coarse fragments in the surface layer and upper part of the subsoil and areas of soils that are mottled in the subsoil. Included areas make up 10 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is medium. If the soil is not limed, it is strongly acid or medium acid in the surface layer and subsoil.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used as woodland. In a few areas it is used as homesites and for other nonfarm uses.

This soil is suited to most crops, and in most areas it is used as cropland. Erosion is a moderate hazard. Crops respond well to fertilizer and good management. Contour stripcropping, terraces, and grassed waterways help reduce runoff and control erosion. Growing cover crops, returning crop residue, and adding manure help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland. Potential productivity is high, and management problems are few. Machine planting is practical in the larger areas.

This soil has few limitations for most nonfarm uses.

This soil is in capability subclass IIe and in woodland group 2o.

Dy—Dystrochrepts, bouldery. This is a nearly level to very steep, shallow to deep, well drained and somewhat excessively drained soil on mountaintops, side slopes of ridges, and in drainageways on mountains. Individual areas are long and narrow or are irregular in shape and range from 5 to several hundred acres. Boulders and large stones cover 50 to 90 percent of the surface. Slopes range from 0 to 80 percent.

Dystrochrepts vary considerably. The surface layer is 1 inch to 4 inches thick and ranges from dark brown to very dark grayish brown sandy loam to silt loam. The subsurface layer is dark brown channery sandy loam, loam, or silt loam. The subsoil is dark yellowish brown to reddish brown channery sandy loam to silt loam. The substratum is dark reddish brown to yellow very channery loamy sand to silt loam.

Included in mapping are areas of Hazleton, Laidig, Buchanan, Clymer, and Meckesville soils. Also included are areas where stones cover 90 percent or more of the surface. Included areas make up about 25 percent of the mapped acreage.

Permeability is moderate to rapid, and available water capacity is low or very low. Bedrock is at a depth of 10 to 60 inches or more. If the soil is not limed, it is extremely acid to strongly acid throughout.

In most areas this soil is used as woodland (fig. 13). Excessive stones, slope in places, and depth to bedrock are limitations to use for cultivated crops and as pasture.

Stone cover, slope, and depth to bedrock are major limitations in managing and harvesting timber. Large stones, slope, and depth to bedrock are severe limitations for homesites, onsite waste disposal, and most other nonfarm uses.

This soil is not assigned to a capability subclass or woodland group.

EdB—Edom silty clay loam, 3 to 8 percent slopes. This is a gently sloping, deep, well drained soil on ridgetops and in karst limestone valleys. Individual areas are long and narrow or are irregular in shape and range from 2 to 50 acres.

Typically, the surface layer is dark yellowish brown silty clay loam 8 inches thick. The subsoil is 27 inches thick. In the upper part, to a depth of 28 inches, it is yellowish brown and brown clay and shaly clay. In the lower part, to a depth of 35 inches, it is brown shaly silty clay. The substratum extends to a depth of 67 inches and is light yellowish brown and yellowish brown shaly clay loam and shaly silty clay loam. Grayish brown to black, calcareous shale bedrock is at a depth of 67 inches.

Included with this soil in mapping are small areas where the depth to bedrock is less than 40 inches and areas of rock outcrop. Also included are small areas of Hagerstown, Elliber, and Duffield soils. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderately slow or moderate, and available water capacity is moderate. Runoff is medium. If the soil is not limed, it is strongly acid to mildly alkaline in the surface layer and upper part of the subsoil.

In most areas this soil is used for cultivated crops or hay or pasture. In some areas it is used as woodland or homesites or for other nonfarm uses.

Figure 13.— In most areas Dystrochrepts, bouldery, is used as woodland. The stands are generally poor because of the low available water capacity and large stones on the surface.

If this soil is used for cultivated crops, erosion is a moderate hazard. Most crops respond well to fertilizer and good management. Contour stripcropping, terraces, grassed waterways, and minimum tillage help reduce runoff and control erosion. Growing cover crops and returning crop residue help maintain the content of organic matter and improve soil tilth. Sinkholes are a potential hazard to the use of equipment.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility. Sinkholes are a potential hazard to the use of equipment.

This soil is suited to use as woodland, and potential productivity is high. Management problems are few. Machine planting is practical in the large areas.

This soil has limitations for homesites and most other nonfarm uses because of moderate and moderately slow permeability and the depth to bedrock. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal depth is less than 72 inches. Ground water can be contaminated through solution channels and bedrock caverns if the soil is used for onsite waste disposal. Sinkholes are a potential hazard to buildings and roads.

This soil is in capability subclass IIe and in woodland group 2o.

EdC—Edom silty clay loam, 8 to 15 percent slopes. This is a sloping, deep, well drained soil on ridgetops and side slopes and in karst limestone valleys. Individual areas are long and narrow or are irregular in shape and range from 5 to 25 acres.

Typically, the surface layer is dark yellowish brown silty clay loam 8 inches thick. The subsoil is 27 inches thick. In the upper part, to a depth of 28 inches, it is

yellowish brown and brown clay and shaly clay. In the lower part, to a depth of 35 inches, it is brown shaly silty clay. The substratum extends to a depth of 67 inches and is light yellowish brown and yellowish brown shaly silty clay loam. Grayish brown to black, calcareous shale bedrock is at a depth of 67 inches.

Included with this soil in mapping are areas of soils that are moderately deep or shallow and small areas of Hagerstown, Duffield, and Elliber soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately slow or moderate, and available water capacity is moderate. Runoff is rapid. This soil is strongly acid to mildly alkaline in the surface layer and subsoil.

In most areas this soil is used for cultivated crops or hay or as pasture. In a few areas it is used as woodland or homesites or for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Most crops respond well to fertilizer and good management. Contour stripcropping, grassed waterways, and diversions help reduce runoff and control erosion. Growing cover crops, returning crop residue, and including grasses in the cropping system help maintain the content of organic matter and improve soil tilth. Sinkholes are a potential hazard to the use of equipment.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility. Sinkholes are a potential hazard to the use of equipment.

This soil is suited to use as woodland, and potential productivity is high. Management problems are few. Machine planting is practical in the large areas.

This soil has limitations for homesites and other nonfarm uses because of slope, moderate and moderately slow permeability, and the depth to bedrock. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and on site waste disposal if the depth is less than 72 inches. Ground water can be contaminated through solution channels and bedrock caverns if the soil is used for onsite waste disposal. Sinkholes are a potential hazard to buildings and roads.

This soil is in capability subclass IIIe and in woodland group 2o.

EdD—Edom silty clay loam, 15 to 25 percent slopes. This is a moderately steep, deep, well drained soil on narrow ridgetops, on hillsides, and in karst limestone areas. Individual areas are long and narrow or are irregular in shape and range from 5 to 25 acres.

Typically, the surface layer is dark yellowish brown silty clay loam 8 inches thick. The subsoil is 27 inches thick. In the upper part, to a depth of 28 inches, it is yellowish brown and brown clay and shaly clay. In the lower part, to a depth of 35 inches, it is brown shaly silty clay. The substratum extends to a depth of 67 inches and is light yellowish brown and yellowish brown clay loam and shaly silty clay loam. Grayish brown to black, calcareous shale bedrock is at a depth of 67 inches.

Included with this soil in mapping are areas of soils that are moderately deep or shallow. Also included are areas of Edom soils that have limestone and shale outcrops and small areas of Hagerstown, Duffield, and Elliber soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately slow or moderate, and available water capacity is moderate. Runoff is very rapid. If the soil is not limed, it is strongly acid to mildly alkaline in the upper part of the subsoil.

In most areas this soil is used for hay or as woodland or pasture. In some areas it is used for cultivated crops. In a few areas it is used as homesites or for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a very severe hazard. Most crops respond well to fertilizer and good management. Contour stripcropping, crop rotation, diversions, and minimum tillage help reduce runoff and control erosion. Growing cover crops, returning crop residue, and including grasses and legumes in the cropping system help maintain the content of organic matter and soil tilth. Sinkholes are a potential hazard to the use of equipment.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility. Sinkholes are a potential hazard to the use of equipment.

This soil is suited to use as woodland, and in most areas it is in trees. Potential productivity is high. Slope restricts the use of machinery and is a management problem.

This soil has severe limitations for homesites, onsite waste disposal, and most other nonfarm uses because of moderately steep slopes, depth to bedrock, and moderate and moderately rapid permeability. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass IVe and in woodland group 2r.

EdE—Edom silty clay loam, 25 to 40 percent slopes. This is a steep, deep, well drained soil on narrow ridgetops and hillsides. Individual areas are long and narrow or are irregular in shape and range from 2 to 10 acres.

Typically, the surface layer is dark yellowish brown silty clay loam 8 inches thick. The subsoil is 27 inches thick. In the upper part, to a depth of 28 inches, it is yellowish brown and brown clay and shaly clay. In the lower part, to a depth of 35 inches, it is brown shaly silty clay. The substratum extends to a depth of 67 inches and is light yellowish brown and yellowish brown shaly

clay loam and shaly silty clay loam. Grayish brown to black, calcareous shale bedrock is at a depth of 67 inches.

Included with this soil in mapping are areas of moderately deep and shallow soils. Also included are areas of Edom soils that have limestone and shale outcrops and small areas of Hagerstown, Duffield, and Elliber soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately slow or moderate, and available water capacity is moderate. Runoff is very rapid. If the soil is not limed, it is strongly acid to mildly alkaline in the upper part of the subsoil.

In most areas this soil is used as pasture or woodland, or it is idle. In some areas it is in nonfarm uses.

Because of steep slopes and the severe hazard of erosion, this soil is not suited to cultivated crops or to use as improved pasture.

If this soil is used for pasture, seeding and pasture renovation is limited because of steep slopes and fine textured subsoil. Overgrazing can result in severe erosion.

This soil is suited to use as woodland, and potential productivity is high. Slope restricts the use of machinery for harvesting and seeding and is a management problem.

This soil has severe limitations for most nonfarm uses because of steep slopes, depth to bedrock, and moderately slow and moderate permeability. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass VIe and in woodland group 2r.

EeB—Elliber very cherty silt loam, 3 to 8 percent slopes. This is a gently sloping, deep, well drained soil on karst uplands, on ridgetops, and in valleys. Individual areas are irregular in shape or are long and narrow and range from 5 to 50 acres.

Typically, the surface layer is very dark brown very cherty silt loam 3 inches thick. The subsurface layer is light yellowish brown very cherty silt loam 11 inches thick. The subsoil is 56 inches thick. In the upper part, to a depth of 35 inches, it is brownish yellow and yellowish brown very cherty silt loam. In the lower part, to a depth of 70 inches, it is yellowish brown very cherty loam and very cherty clay loam.

Included with this soil in mapping are small areas of Edom, Hagerstown, Hazleton, and Kreamer soils. Also included are areas of soils that are less than 40 percent coarse fragments in the subsoil. Included areas make up 15 percent of the mapped acreage.

Permeabilty is moderate or moderately rapid, and available water capacity is low. Surface runoff is medium. If the soil is not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used for cultivated crops or hay or as pasture or woodland. In some areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Most crops respond well to fertilizer and good management. Contour stripcropping, terraces, and crop rotation help reduce runoff and control erosion. Growing cover crops and returning crop residue help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is high. The high content of coarse fragments on the surface and in the soil is a management problem. Machine planting is practical in the large areas.

This soil has few limitations for homesites and onsite waste disposal. Limitations for other nonfarm uses are the high content of coarse fragments and low available water capacity.

This soil is in capability subclass IIIs and in woodland group 2f.

EeC—Elliber very cherty silt loam, 8 to 15 percent slopes. This is a sloping, deep, well drained soil on karst uplands, on ridgetops, and in valleys. Individual areas are oval and irregular in shape or are long and narrow and range from 5 to 70 acres.

Typically, the surface layer is very dark brown very cherty silt loam 3 inches thick (fig. 14). The subsurface layer is light yellowish brown very cherty silt loam 11 inches thick. The subsoil is 56 inches thick. In the upper part, to a depth of 35 inches, it is brownish yellow and yellowish brown very cherty silt loam. In the lower part, to a depth of 70 inches, it is yellowish brown very cherty loam and very cherty clay loam.

Included with this soil in mapping are small areas of Edom, Hagerstown, Hazleton, and Kreamer soils. Also included are areas of soils that are less than 40 percent coarse fragments in the subsoil. Included areas make up 20 percent of the mapped acreage.

Permeability is moderate or moderately rapid, and available water capacity is low. Surface runoff is rapid. If the soil is not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used for cultivated crops or hay or as pasture or woodland. In some areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Most crops respond well to fertilizer and good management. Contour stripcropping, diversions, and crop rotation help reduce runoff and control erosion. Growing cover crops and returning crop residue help

Figure 14.—Chert fragments in the surface layer of Elliber very cherty silt loam, 8 to 15 percent slopes, tend to interfere with cultivating, seeding, and harvesting.

maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is high. Coarse fragments on the surface and in the soil are a management problem. Machine planting is practical in the large areas.

This soil has limitations for homesites and onsite waste disposal because of slope. For other nonfarm uses, the limitations include slope, high content of coarse fragments, and low available water capacity.

This soil is in capability subclass IVs and in woodland group 2f.

EeD—Elliber very cherty silt loam, 15 to 25 percent slopes. This is a moderately steep, deep, well drained soil on the upper part of side slopes on ridges and hillsides. Individual areas are oval or are long and narrow and range from 5 to 50 acres.

Typically, the surface layer is very dark brown very cherty silt loam 3 inches thick. The subsurface layer is light yellowish brown very cherty silt loam 8 inches thick. The subsoil is 56 inches thick. In the upper part, to a depth of 35 inches, it is brownish yellow and yellowish brown very cherty silt loam. In the lower part, to a depth of 70 inches, it is yellowish brown very cherty loam and very cherty clay loam.

Included with this soil in mapping are small areas of Edom, Hagerstown, Hazleton, and Morrison soils. Also included are areas of soils that are less than 40 percent

coarse fragments in the subsoil. Included areas make up as much as 15 percent of the mapped acreage.

Permeability is moderate or moderately rapid, and available water capacity is low. Surface runoff is very rapid. If the soil is not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used as pasture or woodland. In some areas it is used for cultivated crops, and in a few areas it is in nonfarm uses.

Because of high content of coarse fragments, slope, and the severe hazard of erosion, this soil is not suited to cultivated crops.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is well suited to use as woodland. Potential productivity is high. The high content of coarse fragments and moderately steep slopes, which limit the use of equipment, are management problems.

This soil has severe limitations for many nonfarm uses, especially homesites and onsite waste disposal, because of slope. Limitations for most other nonfarm uses include slope, the high content of coarse fragments, and low available water capacity.

This soil is in capability subclass VIs and in woodland group 2f.

EfB—Elliber very stony silt loam, 0 to 8 percent slopes. This is a nearly level and gently sloping, deep, well drained soil on karst uplands, ridgetops, and in the valleys. Stones and boulders 1 foot to 6 feet or more in diameter cover 3 to 15 percent of the surface area. Individual areas are irregular in shape and oval and range from 5 to 20 acres.

Typically, the surface layer is very dark brown very cherty silt loam about 3 inches thick. The subsurface layer is light yellowish brown very cherty silt loam 11 inches thick. The subsoil is 56 inches thick. In the upper part, to a depth of 35 inches, it is brownish yellow and yellowish brown very cherty silt loam. In the lower part, to a depth of 70 inches, it is yellowish brown very cherty loam and very cherty clay loam.

Included with this soil in mapping are areas of Edom, Hazleton, Kreamer, and Morrison soils. Also included are areas of bouldery Dystrochrepts. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate or moderately rapid, and available water capacity is low. Surface runoff is slow and medium. If the soil is not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used as woodland or pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is too stony to be suitable for cultivated crops or improved pasture. It is not economically feasible to remove the trees and surface stones to make the soil suitable for cultivated crops and pasture.

This soil is well suited to use as woodland, and in most areas it is in trees. Potential productivity is high. Large stones on the surface interfere with machine planting.

This soil has limitations for most nonfarm uses because of large stones on the surface and low available water capacity.

This soil is in capability subclass VIs and in woodland group 2f.

EfD—Elliber very stony silt loam, 8 to 25 percent slopes. This is a sloping and moderately steep, deep, well drained soil on karst uplands, ridgetops, and side slopes of ridges. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are irregular in shape or are long and narrow and range from 10 to 200 acres.

Typically, the surface layer is very dark brown very cherty silt loam about 3 inches thick. The surface layer is light yellowish brown very cherty silt loam 11 inches thick. The subsoil is 56 inches thick. In the upper part, to a depth of 35 inches, it is brownish yellow and yellowish brown very cherty silt loam. In the lower part, to a depth of 70 inches, it is yellowish brown very cherty loam and very cherty clay loam.

Included with this soil in mapping are areas of Edom, Hazleton, and Morrison soils. Also included are areas of bouldery Dystrochrepts and areas of soils that have a sandy subsoil. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate or moderately rapid, and available water capability is low. Surface runoff is rapid and very rapid. If the soil is not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used as woodland or pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is too stony to be suitable for cultivated crops or improved pasture. It is not economically feasible to remove the trees and surface stones to make the soil suitable for cultivated crops or pasture.

This soil is well suited to use as woodland, and in most areas it is wooded. Potential productivity is high. Large stones on the surface interfere with harvesting and tree planting, and moderately steep slopes limit the use of equipment.

This soil has severe limitations for most nonfarm uses because of slope, large stones on the surface, and low available water capacity.

This soil is in capability subclass VIs and in woodland group 2f.

EfF—Elliber very stony silt loam, 25 to 50 percent slopes. This is a steep and very steep, deep, well drained soil on side slopes of ridges. Stones and

boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are long and narrow and range from 5 to 70 acres.

Typically, the surface layer is very dark brown very cherty silt loam about 3 inches thick. The subsurface layer is light yellowish brown very cherty silt loam 11 inches thick. The subsoil is 56 inches thick. In the upper part, to a depth of 35 inches, it is brownish yellow and yellowish brown very cherty silt loam. In the lower part, to a depth of 70 inches, it is yellowish brown very cherty loam and very cherty clay loam.

Included with this soil in mapping are areas of Hazleton and Morrison soils and bouldery Dystrochrepts. Included areas make up 10 percent of the mapped acreage.

Permeability is moderate or moderately rapid, and available water capacity is low. Surface runoff is very rapid. If the soil is not limed, it is strongly acid to extremely acid throughout.

In nearly all of the areas this soil is used as woodland.

This soil is too steep and too stony to be suitable for cultivated crops or improved pasture.

This soil is well suited to use as woodland, and potential productivity is high. Steep slopes and large stones on the surface restrict the use of equipment. Steep slopes increase the hazard of erosion.

This soil has very severe limitations for most nonfarm uses because of steep and very steep slopes and large stones on the surface.

This soil is in capability subclass VIIs and in woodland group 2f.

EtB—Ernest silt loam, 3 to 8 percent slopes. This is a gently sloping, deep, moderately well drained soil on benches of ridges, along heads of drainageways, and on foot slopes. Individual areas are long and narrow or are irregular in shape and range from 2 to 30 acres.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil is 35 inches thick. In the upper part, to a depth of 23 inches, it is brownish yellow silty clay loam. In the lower part, to a depth of 44 inches, it is brownish yellow silty clay loam and channery silty clay loam and is mottled. The substratum to a depth of 60 inches is brownish yellow channery silt loam and is mottled.

Included with this soil in mapping are areas of Ernest soils that have a silty clay loam surface layer and areas of Brinkerton and Blairton soils. Included areas make up 10 percent of the mapped acreage.

Permeability is moderately slow or slow, and available water capacity is low. Surface runoff is medium. The seasonal high water table is at a depth of 1 1/2 to 3 feet. If the soil is not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used as woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Crops respond well to fertilizer and good management. Contour stripcropping, terraces, grassed waterways, and crop rotation help reduce runoff and control erosion. Surface or subsurface drains are needed in places. Growing cover crops and returning crop residue help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Pasture should not be grazed if the soil is wet because of the risk of compaction. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland. Potential productivity is high. The use of equipment is restricted during wet periods. Machine planting is practical in the large areas if the soil is not wet.

This soil has severe limitations for homesites and onsite waste disposal because of the seasonal high water table and moderately slow and slow permeability.

This soil is in capability subclass IIe and in woodland group 2w.

EtC—Ernest silt loam, 8 to 15 percent slopes. This is a sloping, deep, moderately well drained soil on benches of ridges, along heads of drainageways, and on foot slopes. Individual areas are generally long and narrow or are irregular in shape and range from 2 to 20 acres.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil is 35 inches thick. In the upper part, to a depth of 23 inches, it is brownish yellow silty clay loam. In the lower part, to a depth of 44 inches, it is a brownish yellow silty clay loam and channery silty clay loam fragipan that is mottled. The substratum to a depth of 60 inches is brownish yellow channery silt loam and is mottled.

Included with this soil are areas of Ernest soils that have a silty clay loam surface layer. Also included are areas of Brinkerton, Blairton, and Berks soils. Included areas make up 10 percent of the mapped acreage.

Permeability is moderately slow or slow, and available water capacity is low. The seasonal high water table is at a depth of 1 1/2 to 3 feet. If the soil is not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used as pasture or for hay or cultivated crops. In some areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Crops respond well to fertilizer and good management. Contour stripcropping, grassed waterways, diversions, and crop rotation help reduce runoff and control erosion. Surface or subsurface drains are needed in places. Growing cover crops and returning crop

residue help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Pasture should not be grazed if this soil is wet because of the risk of surface compaction. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland. Potential productivity is high. Wetness is a management problem. Machine planting is practical in the large areas.

This soil has severe limitations for homesites and onsite waste disposal because of the seasonal high water table, slope, and moderately slow and slow permeability.

This soil is in capability subclass IIIe and in woodland group 2w.

EvA—Evendale cherty silt loam, 0 to 3 percent slopes. This is a nearly level, deep, somewhat poorly drained soil along heads of drainageways and on middle and lower side slopes of secondary ridges. Individual areas, which are generally smooth and slightly concave, are irregular in shape and range from 2 to 10 acres.

Typically, the surface layer is grayish brown cherty silt loam about 8 inches thick. The subsurface layer is 4 inches thick and is pale brown cherty silt loam and is mottled. The subsoil is 63 inches thick. In the upper part, to a depth of 52 inches, it is strong brown and light yellowish brown cherty silty clay and is mottled. In the lower part, to a depth of 75 inches, it is strong brown and brownish yellow cherty clay and is mottled.

Included with this soil in mapping are areas of soils that are poorly drained or moderately well drained. Also included are areas of Evendale soils that are less than 15 percent coarse fragments throughout. Included areas make up about 10 percent of the mapped acreage.

Permeability is slow, and available water capacity is high. Surface runoff is slow. The seasonal high water table is at a depth of 1/2 foot to 1 1/2 feet. The surface and subsurface layers are neutral to very strongly acid, and the subsoil is strongly acid or very strongly acid.

In most areas this soil is used as pasture or for cultivated crops. In some areas it is used as woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a slight hazard. Because of the seasonal high water table and slow permeability, crops that can tolerate wetness should be grown. Returning crop residue and applying manure help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Grasses that can tolerate wetness should be planted, and pasture should be not grazed early in spring or during periods when the soil is wet. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is high for water-tolerant species. The seasonal high water table restricts the use of machinery. Windthrow losses and seedling mortality are severe problems in management.

This soil has severe limitations for homesites, onsite waste disposal, and most other nonfarm uses because of the seasonal high water table and slow permeability.

This soil is in capability subclass IIIw and in woodland group 2w.

EvB—Evendale cherty silt loam, 3 to 8 percent slopes. This is a gently sloping, deep, somewhat poorly drained soil along heads of drainageways and on middle and lower side slopes of secondary ridges. Individual areas are broad and irregular in shape and range from 2 to 10 acres.

Typically, the surface layer is grayish brown cherty silt loam about 8 inches thick. The subsurface layer is 4 inches thick and is pale brown cherty silt loam that is mottled. The subsoil is 63 inches thick. In the upper part, to a depth of 52 inches, it is strong brown and light yellowish brown cherty silty clay that is mottled. In the lower part, to a depth of 75 inches, it is strong brown and brownish yellow cherty clay that is mottled.

Included with this soil in mapping are areas of soils that are poorly drained or moderately well drained. Also included are areas of Evendale soils that are less than 15 percent coarse fragments throughout and a few areas of Kreamer soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is slow, and available water capacity is high. Surface runoff is medium. The seasonal high water table is at a depth of 1/2 foot to 1 1/2 feet. The surface and subsurface layers are neutral to very strongly acid, and the subsoil is strongly acid or very strongly acid.

In most areas this soil is used as pasture or for cultivated crops. In some areas it is used as woodland. In a few areas it is used as homesites or for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Because of the seasonal high water table and slow permeability, crops that can tolerate wetness should be grown. Contour stripcropping, terraces, and grassed waterways help reduce runoff and control erosion. Growing cover crops and returning crop residue help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Grasses that can tolerate wetness should be planted, and pasture should not be grazed early in spring or during periods when the soil is wet. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is high for water-tolerant species. The seasonal high water table restricts the use of machinery. Windthrow losses and seedling mortality are severe problems in management. Machine planting is practical in the large areas.

This soil has severe limitations for homesites, onsite waste disposal, and most other nonfarm uses because of the seasonal high water table and slow permeabilty.

This soil is in capability subclass IIIw and in woodland group 2w.

GnB—Glenville silt loam, 3 to 8 percent slopes. This is a gently sloping, deep, moderately well drained and somewhat poorly drained soil at the head of drainageways and on lower slopes of mountains. Individual areas are irregular in shape and oval and range from 2 to 15 acres.

Typically, the surface layer is dark grayish brown silt loam about 10 inches thick. The subsoil is 33 inches thick. In the upper part, to a depth of 21 inches, it is yellowish brown silt loam, and in the lower part, to a depth of 43 inches, it is a yellowish brown silt loam and channery silt loam fragipan that is mottled. The substratum to a depth of 60 inches is yellowish brown channery fine sandy loam.

Included with this soil in mapping are areas of Highfield, Catoctin, Atkins, and Buchanan soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately slow, and available water capacity is moderate. Surface runoff is medium. The seasonal high water table is at a depth of 1/2 foot to 3 feet. If the soil is not limed, it is medium acid to very strongly acid in the surface layer and subsoil and is strongly acid or very strongly acid in the substratum.

In most areas this soil is used for cultivated crops or hay or as pasture or woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. A seasonal high water table delays tillage and harvesting during wet seasons. Crops respond well to fertilizer and good management. Terraces, contour stripcropping, cover cropping, and crop rotation help reduce runoff and control erosion. Adding crop residue and manure help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is high. Wetness and a seasonal high water table that restricts the use of machinery during wet seasons are management problems.

This soil has severe limitations for homesites, onsite waste disposal, and many other nonfarm uses because of the seasonal high water table and moderately slow permeability.

This soil is in capability subclass IIe and in woodland group 2w.

GoB—Glenville very stony silt loam, 0 to 8 percent slopes. This is a nearly level and gently sloping, deep, moderately well drained and somewhat poorly drained soil at the head of drainageways and on lower slopes of mountains. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are irregular in shape and oval and range from 2 to 15 acres.

Typically, the surface layer is dark grayish brown silt loam about 10 inches thick. The subsoil is 33 inches thick. In the upper part, to a depth of 21 inches, it is yellowish brown silt loam, and in the lower part, to a depth of 43 inches, it is a yellowish brown silt loam and channery silt loam fragipan that is mottled. The substratum to a depth of 60 inches is yellowish brown channery fine sandy loam.

Included with this soil in mapping are areas of Highfield, Catoctin, Atkins, and Buchanan soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately slow, and available water capacity is moderate. Surface runoff is slow to medium. The seasonal high water table is at a depth of 1/2 foot to 3 feet. If the soil is not limed, it is medium acid to very strongly acid in the surface layer and subsoil and is strongly acid or very strongly acid in the substratum.

In most areas this soil is used as woodland or pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is too stony to be suitable for cultivated crops or improved pasture. It is not economically feasible to remove trees and surface stones to make the soil suitable for cultivated crops and pasture.

This soil is suited to use as woodland, and potential productivity is high. Large stones on the surface and the seasonal high water table that can restrict the use of machinery are management problems.

This soil has severe limitations for homesites, onsite waste disposal, and most other nonfarm uses because of stones on the surface, moderately slow permeability, and a seasonal high water table.

This soil is in capability subclass VI and in woodland group 2w.

HaA—Hagerstown silt loam, 0 to 3 percent slopes. This is a nearly level, deep, well drained soil on low hills and in karst limestone valleys. Individual areas are long and narrow or are broad and irregular in shape and range from 2 to 50 acres.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil is 43 inches thick and is yellowish red silty clay loam and clay. The substratum

extends to a depth of 60 inches and is yellowish red clay. Gray weathered limestone bedrock is at a depth of 60 inches.

Included with this soil in mapping are areas of Duffield, Huntington, Penlaw, Edom, Elliber, and Kreamer soils. Also included are areas of Hagerstown soils that have a silty clay loam surface layer. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is slow. If the soil is not limed, it is strongly acid or very strongly acid in the surface layer and strongly acid to neutral in the subsoil and in the substratum.

In most areas this soil is used for cultivated crops or hay or as pasture. In a few areas it is used as woodland. In some areas it is used as homesites and industrial sites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a slight hazard. Crops respond very well to fertilizer and good management (fig. 15). Cover crops, returning crop residue, and applying manure help maintain the content of organic matter and improve tilth. Sinkholes are a potential hazard to the use of equipment.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility. Sinkholes are a potential hazard to the use of equipment.

This soil is well suited to use as woodland, and potential productivity is very high. The use of equipment is restricted, especially during wet seasons, because of the clayey subsoil.

This soil has limitations for homesites and most other nonfarm uses because of shrink-swell potential, clayey subsoil, and depth to bedrock. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches. Ground water can be contaminated through solution channels and bedrock caverns if the soil is used for on-site waste disposal. Sinkholes are a potential hazard to buildings and roads.

This soil is in capability class I and in woodland group 1c.

Figure 15.—Small grain on Hagerstown silt loam, 0 to 3 percent slopes, one of the most productive soils in the survey area.

HaB—Hagerstown silt loam, 3 to 8 percent slopes. This is a gently sloping, deep, well drained soil on low hills in karst limestone valleys. Individual areas are broad, oval, or irregular in shape and range from 5 to 200 acres.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil is 43 inches thick and is yellowish red silty clay loam and clay. The substratum extends to a depth of 60 inches and is yellowish red clay. Gray weathered limestone bedrock is at a depth of 60 inches.

Included with this soil in mapping are areas of Duffield, Huntington, Penlaw, Edom, Elliber, and Kreamer soils and areas of Hagerstown soils that have a silty clay loam surface layer. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is medium. If the soil is not limed, it is strongly acid or very strongly acid in the surface layer and strongly acid to neutral in the subsoil and substratum.

In most areas this soil is used for cultivated crops or hay or as pasture. In a few areas it is used as woodland. In some areas it is used as homesites or industrial sites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Crops respond well to fertilizer and good management. Terraces, grassed waterways, contour stripcropping, and minimum tillage help reduce runoff and control erosion. Growing cover crops and returning crop residue help maintain the content of organic matter and improve tilth. Sinkholes are a potential hazard to the use of equipment.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility. Sinkholes are a potential hazard to the use of equipment.

This soil is well suited to use as woodland, and potential productivity is very high. However, the use of equipment is restricted, especially during wet seasons, because of the clayey subsoil.

This soil has limitations for homesites and most other nonfarm uses because of shrink-swell potential, clayey subsoil, and the depth to bedrock. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches. Ground water can be contaminated through solution channels and bedrock caverns if the soil is used for onsite waste disposal. Sinkholes are a potential hazard to buildings and roads.

This soil is in capability subclass IIe and in woodland group 1c.

HaC—Hagerstown silt loam, 8 to 15 percent slopes. This is a sloping, deep, well drained soil on hillsides and in karst limestone valleys (fig. 16). Individual areas are broad and irregular in shape or are long and narrow and range from 5 to 50 acres.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil is 43 inches thick and is yellowish red silty clay loam and clay. The substratum extends to a depth of 60 inches and is yellowish red clay. Gray weathered limestone bedrock is at a depth of 60 inches.

Included with this soil in mapping are areas of Edom, Duffield, and Elliber soils and areas of Hagerstown soils that have a silty clay loam surface layer. Some included areas have rock outcrops. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is rapid. If the soil is not limed, it is strongly acid or very strongly acid in the surface layer and strongly acid to neutral in the subsoil and substratum.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used as woodland. In some areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Crops respond well to fertilizer and good management. Contour stripcropping, diversions, grassed waterways, and minimum tillage help reduce runoff and control erosion. Growing cover crops and returning crop residue help maintain the content of organic matter and soil tilth. Sinkholes are a potential hazard to the use of equipment.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility. Sinkholes are a potential hazard to the use of equipment.

This soil is well suited to use as woodland, and potential productivity is very high. The use of equipment is restricted, especially during wet seasons, because of the clayey subsoil.

This soil has limitations for many nonfarm uses because of depth to bedrock, slope, and clayey subsoil. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches. Ground water can be contaminated through solution channels and bedrock caverns if the soil is used for onsite waste disposal. Sinkholes are a potential hazard to buildings and roads.

This soil is in capability subclass IIIe and in woodland group 1c.

HaD—Hagerstown silt loam, 15 to 25 percent slopes. This is a moderately steep, deep, well drained soil on side slopes of hills and in karst limestone valleys. Individual areas are long and narrow and range from 5 to 30 acres.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil is 43 inches thick and is yellowish red silty clay loam and clay. The substratum extends to a depth of 60 inches and is yellowish red

Figure 16.—Karst topography of Hagerstown silt loam, 8 to 15 percent slopes. The depressions in the background are generally caused by shallow cave-ins in cavernous limestone areas.

clay. Gray weathered limestone bedrock is at a depth of 60 inches.

Included with this soil in mapping are areas of Edom, Duffield, and Elliber soils and areas of Hagerstown soils that have a silty clay loam or clay loam surface layer. Also included are areas where slopes are more than 25 percent. Included areas make up about 25 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is very rapid. If the soil is not limed, it is strongly acid or very strongly acid in the surface layer and strongly acid to neutral in the subsoil and substratum.

In most areas this soil is used for cultivated crops or as pasture or woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a very severe hazard. Most crops respond well to fertilizer and good management. Contour stripcropping, diversions, and minimum tillage help reduce runoff and control erosion. Growing cover crops, returning crop residue, and adding manure help maintain the content of organic matter. Sinkholes are a potential hazard to the use of equipment.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility. Sinkholes are a potential hazard to the use of equipment.

This soil is suited to use as woodland, and potential productivity is very high. The use of equipment is restricted because of slope and the clayey subsoil. Erosion is a severe problem.

This soil has severe limitations for many nonfarm uses because of moderately steep slopes, depth to bedrock, and a clayey subsoil. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches. Ground water can be contaminated through solution channels and bedrock caverns if the soil is used for onsite waste disposal.

This soil is in capability subclass IVe and in woodland group 1c.

HcB—Hagerstown silt loam, rocky, 3 to 8 percent slopes. This is a gently sloping, deep, well drained soil on low hills and in karst limestone valleys. Exposed limestone outcrops cover 0.1 to 1.0 percent of the surface. Many of the outcrops are continuous ridges of exposed limestone; deep soil is between the ridges. Individual areas are long and narrow or are irregular in shape and range from 3 to 20 acres.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil is 43 inches thick and is yellowish red silty clay loam and clay. The substratum extends to a depth of 60 inches and is yellowish red clay. Gray weathered limestone bedrock is at a depth of 60 inches.

Included with this soil in mapping are areas of Duffield, Penlaw, and Edom soils. Also included are areas of Hagerstown soils that have slopes of less than 3 percent, areas that are nonrocky, and areas where the surface layer is silty clay loam or clay loam. Included areas make up about 15 percent of the mapped acreage in this survey.

Permeability is moderate, and available water capacity is high. Surface runoff is medium. If the soil is not limed, it is strongly acid or very strongly acid in the surface layer and strongly acid to neutral in the subsoil and substratum.

In most areas this soil is used for cultivated crops or as pasture or woodland. In some areas it is used as homesites and for nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Crops respond very well to fertilizer and good management. However, yields are decreased by the rock outcrops, which interfere with tillage operations. Crop rotation, cover crops, and grassed waterways help control erosion. Sinkholes are a potential hazard to the use of equipment.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species (fig. 17). Optimum production requires periodic applications of fertilizer to maintain soil fertility. Sinkholes are a potential hazard to the use of equipment.

This soil is well suited to use as woodland, and potential productivity is very high. The use of equipment is restricted, especially during wet seasons, because of clayey subsoil. Rock outcrops interfere with seeding and planting operations.

This soil has limitations for homesites and most other nonfarm uses because of rock outcrops, the clayey subsoil, and shrink-swell potential. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches. Ground water can be contaminated through solution channels and bedrock caverns if the soil is used for onsite waste disposal. Sinkholes are a potential hazard to buildings and roads.

This soil is in capability subclass IIIs and in woodland group 1c.

HcC—Hagerstown silt loam, rocky, 8 to 15 percent slopes. This is a sloping, deep, well drained soil on hillsides and in karst limestone valleys. Exposed limestone outcrops cover 0.1 to 1.0 percent of the surface. Many of the outcrops are continuous ridges of exposed limestone; deep soil is between the ridges. Individual areas are long and narrow or are irregular in shape and range from 3 to 20 acres.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil is 43 inches thick and is yellowish red silty clay loam and clay. The substratum extends to a depth of 60 inches and is yellowish red clay. Gray weathered limestone bedrock is at a depth of 60 inches.

Included with this soil in mapping are areas of Edom, Duffield, Elliber, and Neshaminy soils and areas of Hagerstown soils that have a silty clay loam surface layer. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is rapid. If the soil is not limed, it is strongly acid or very strongly acid in the surface layer and strongly acid to neutral in the subsoil and substratum.

In most areas this soil is used as pasture or woodland. In some areas it is used for cultivated crops. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Crops respond very well to fertilizer and good management. However, yields are decreased because of the rock outcrops, which interfere with tillage operations. Minimum tillage, grassed waterways, crop rotation, cover crops, and returning crop residue help control erosion and maintain tilth. Sinkholes are a potential hazard to the use of equipment.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility. Sinkholes are a potential hazard to the use of equipment.

This soil is well suited to use as woodland, and potential productivity is very high. The use of equipment is restricted, especially during wet seasons, because of clayey subsoil. Rock outcrops interfere with harvesting and planting operations.

This soil has severe limitations for homesites and most other nonfarm uses because of rock outcrops, the clayey subsoil, slope, and shrink-swell potential. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches. Ground water can be contaminated through solution channels and bedrock caverns if the soil is used for onsite waste disposal. Sinkholes are a potential hazard to buildings and roads.

This soil is in capability subclass IVs and in woodland group 1c.

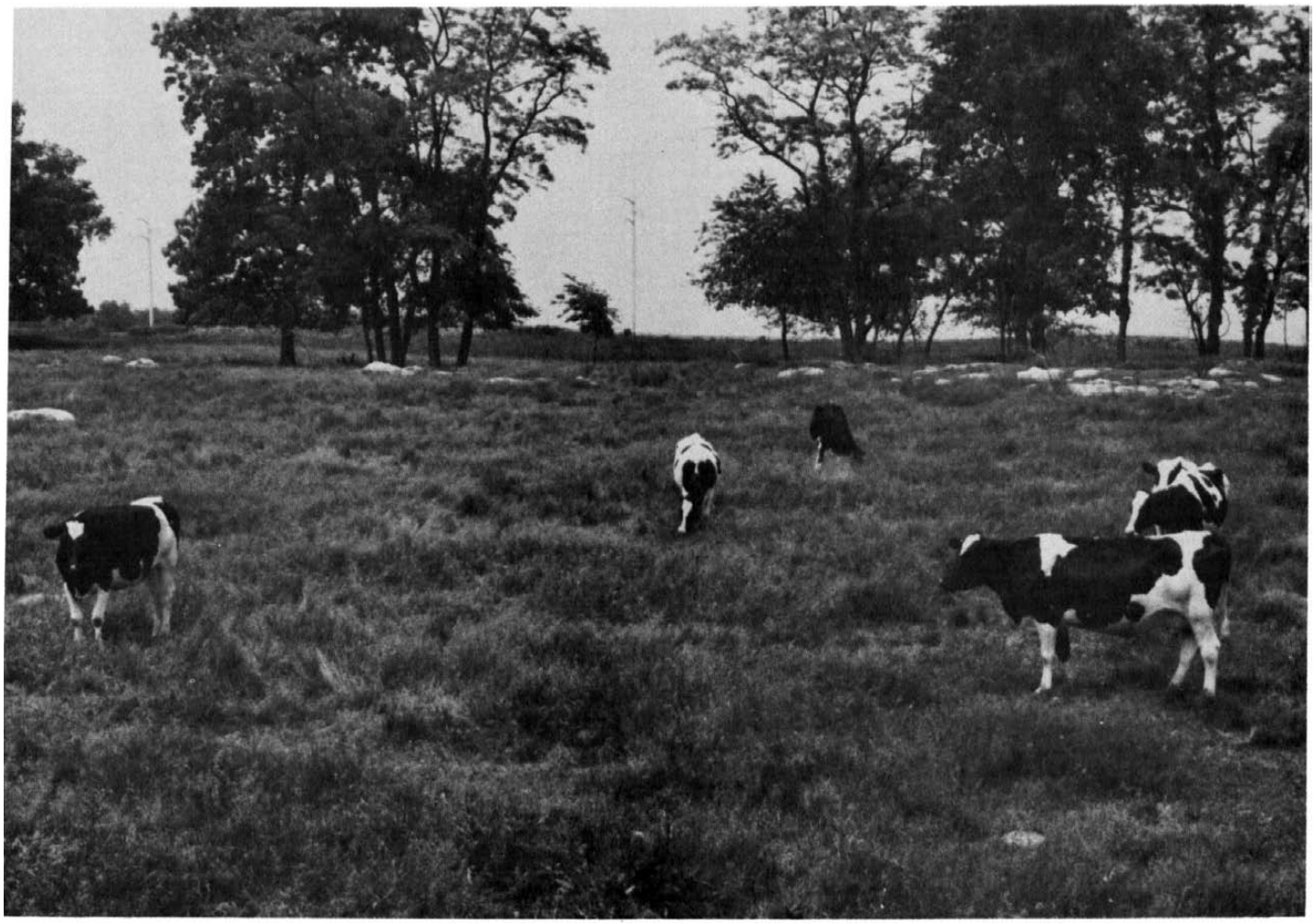


Figure 17.—Hagerstown silt loam, rocky, 3 to 8 percent slopes, is suited to use as pasture.

HcD—Hagerstown silt loam, rocky, 15 to 25 percent slopes. This is a moderately steep, deep, well drained soil on hillsides and in karst limestone valleys. Exposed limestone outcrops cover 0.1 to 1.0 percent of the surface. Many of the outcrops are continuous ridges of exposed limestone. Individual areas of this soil are long and narrow and range from 2 to 15 acres.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil is 43 inches thick and is yellowish red silty clay loam and clay. The substratum extends to a depth of 60 inches and is yellowish red clay. Gray weathered limestone bedrock is at a depth of 60 inches.

Included with this soil in mapping are areas of Edom, Duffield, Elliber, and Neshaminy soils. Also included are areas of Hagerstown soils that have slopes of more than 25 percent and areas where the surface layer is silty clay loam. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is very rapid. If the soil is not limed, it is strongly acid or very strongly acid in the surface layer and strongly acid to neutral in the subsoil and substratum.

In most areas this soil is used as pasture or woodland. In a few areas it is used as homesites and for other nonfarm uses.

Because this soil is moderately steep and rocky it is not suitable for cultivated crops or improved pasture. Erosion is a severe problem.

This soil is well suited to use as woodland, and potential productivity is very high. However, large rock outcrops, the clayey subsoil, and slope restrict the use of equipment during harvesting and planting operations.

This soil has severe limitations for homesites and most other nonfarm uses because of moderately steep slopes, rock outcrops, and clayey subsoil. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches. Ground water can be contaminated through solution channels and bedrock caverns if the soil is used for onsite waste disposal. Sinkholes are a potential hazard to buildings and roads.

This soil is in capability subclass VIs and in woodland group 1c.

HdB—Hagerstown-Rock outcrop complex, 0 to 8 percent slopes. This complex consists of a nearly level and gently sloping, deep, well drained soil and exposed limestone bedrock outcrops on low hills and in karst limestone valleys. Areas of the Hagerstown soil and Rock outcrop are so intermingled that it was not practical to map them separately. The Hagerstown soil makes up about 60 percent of the complex, Rock outcrop makes up about 25 percent, and other soils make up 15 percent. Individual areas are broad and irregular in shape or are long and narrow and range from 2 to 40 acres.

Typically, the surface layer of the Hagerstown soil is dark brown silt loam about 10 inches thick. The subsoil is 43 inches thick and is yellowish red silty clay loam and clay. The substratum extends to a depth of 60 inches and is yellowish red clay. Gray weathered limestone bedrock is at a depth of 60 inches.

Rock outcrop consists of exposures of bare limestone bedrock, in discontinuous ledges or groups of single rock exposures, generally separated by narrow strips of soil (fig. 18).

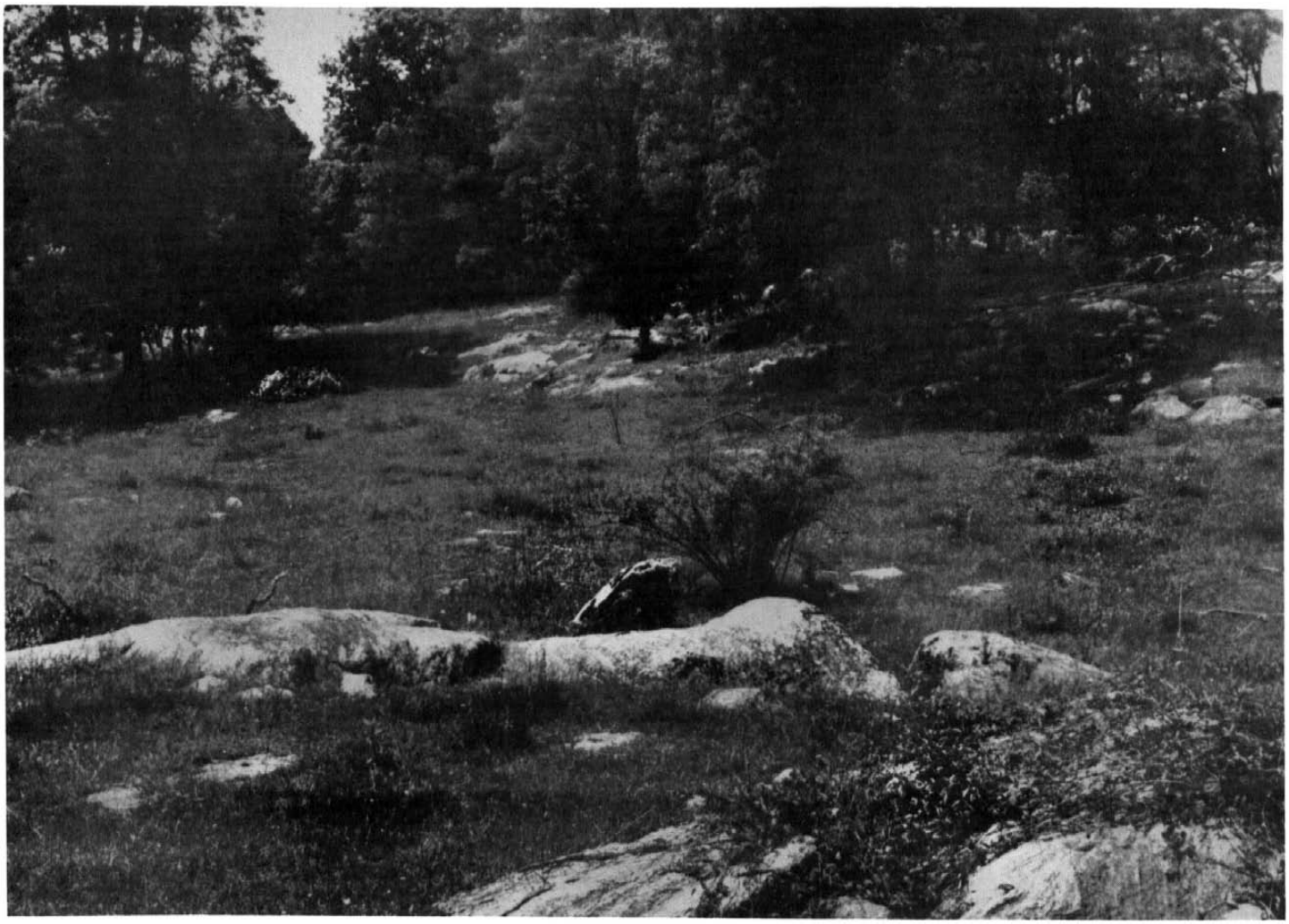


Figure 18.—Limestone bedrock is commonly vertically exposed in areas of Hagerstown-Rock outcrop complex, 0 to 8 percent slopes.

Included with this complex in mapping are areas of Hagerstown soils that have a silty clay loam surface layer and small areas of Edom and Duffield soils. Included areas make up about 15 percent of the mapped acreage.

Permeability of the Hagerstown soil is moderate, and available water capacity is high. Surface runoff is medium. If the soil is not limed, it is strongly acid or very strongly acid in the surface layer and strongly acid to neutral in the subsoil and substratum.

In most areas this complex is used as pasture or woodland, or it is idle. In some small scattered areas it is used for cultivated crops. In a few areas it is used as homesites and for other nonfarm uses.

This complex is not suitable for cultivated crops or improved pasture because of the numerous rock outcrops. If it is used as pasture, use of machinery for seeding and pasture improvement is limited by the numerous rock outcrops.

This complex is suited to use as woodland, and potential productivity for the Hagerstown soil is very high. Because of the fine textured subsoil and numerous rock outcrops, the use of machinery is limited.

This complex has severe limitations for most nonfarm uses, especially homesites, because of the fine textured subsoil and rock outcrops. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches. Ground water can be contaminated through solution channels and bedrock caverns if the soil is used for onsite waste disposal.

This complex is in capability subclass VIs. The Hagerstown soil is in woodland group 1c. Rock outcrop is not assigned to a woodland group.

HdD—Hagerstown-Rock outcrop complex, 8 to 25 percent slopes. This complex consists of a sloping and moderately steep, deep, well drained soil and exposed limestone bedrock outcrops on hillsides and in karst limestone valleys. Areas of the Hagerstown soil and Rock outcrop are so intermingled that it was not practical to map them separately. The Hagerstown soil makes up about 60 percent of this complex, Rock outcrops make up about 25 percent, and other soils make up 15 percent. Individual areas are long and narrow or are oval in shape and range from 5 to 75 acres.

Typically, the surface layer of the Hagerstown soil is dark brown silt loam about 10 inches thick. The subsoil is 43 inches thick and is yellowish red silty clay loam and clay. The substratum extends to a depth of 60 inches and is yellowish red clay. Gray weathered limestone bedrock is at a depth of 60 inches.

Rock outcrop consists of exposures of bare limestone bedrock, generally as discontinuous ledges which, in many places, are separated by narrow strips of soils.

Included with this complex in mapping are areas of Hagerstown soils that have a silty clay loam surface layer and small areas of Edom, Duffield, and Elliber soils. Included areas make up about 15 percent of the mapped acreage.

Permeability of the Hagerstown soil is moderate, and available water capacity is high. Surface runoff is rapid and very rapid. If the soil is not limed, it is strongly acid or very strongly acid in the surface layer and strongly acid to neutral in the subsoil and substratum.

In most areas this complex is used as pasture or woodland, or it is idle. In a few areas it is used as homesites and for other nonfarm uses.

This complex is not suitable for cultivated crops or improved pasture because of the numerous rock outcrops. If it is used as pasture, use of machinery for seeding and pasture improvement is limited by the numerous rock outcrops.

This complex is suited to use as woodland, and potential productivity for the Hagerstown soil is very high. However, harvesting and machine planting are limited because of the limestone rock outcrops and fine textured subsoil.

This complex has severe limitations for most nonfarm uses because of slope and rock outcrops. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches. Ground water can be contaminated through solution channels and bedrock caverns if the soil is used for onsite waste disposal.

This complex is in capability subclass VIs. The Hagerstown soil is in woodland group 1c; Rock outcrop is not assigned to a woodland group.

HdF—Hagerstown-Rock outcrop complex, 25 to 60 percent slopes. This complex consists of a steep and very steep, deep, well drained soil and exposed limestone bedrock on side slopes of ridges and on hillsides. Areas of the Hagerstown soil and Rock outcrop are so intermingled that it was not practical to map them separately. The Hagerstown soil makes up about 60 percent of this complex, Rock outcrop makes up 25 percent, and other soils make up 15 percent. Individual areas are long and narrow and range from 2 to 25 acres.

Typically, the surface layer of the Hagerstown soil is dark brown silt loam about 10 inches thick. The subsoil is 43 inches thick and is yellowish red silty clay loam and clay. The substratum extends to a depth fo 60 inches and is yellowish red clay. Gray weathered limestone bedrock is at a depth of 60 inches.

Rock outcrop consists of exposures of bare limestone bedrock, generally as discontinuous limestone ledges which, in many places, are separated by narrow strips of soil.

Included with this complex in mapping are areas of Hagerstown soils that have a silty clay loam surface layer and areas of Edom, Duffield, and Elliber soils.

Included areas make up about 15 percent of the mapped acreage.

Permeability of the Hagerstown soil is moderate, and available water capacity is high. Surface runoff is very rapid. If the soil is not limed, it is strongly acid or very strongly acid in the surface layer and strongly acid to neutral in the subsoil and substratum.

In most areas this complex is used as pasture or woodland, or it is idle. In a few areas it is in nonfarm uses.

Because of steep slopes and numerous rock outcrops, this complex is not suitable for cultivated crops or improved pasture.

This complex is suited to use as woodland, and potential productivity for the Hagerstown soil is very high. The use of equipment is limited because of slope and limestone rock outcrops.

This complex has very severe limitations for most nonfarm uses because of steep slopes and rock outcrops. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches. Ground water can be contaminated through solution channels and bedrock caverns if the soil is used for onsite waste disposal.

This complex is in capability subclass VIIs. The Hagerstown soil is in woodland group 1c; Rock outcrop is not assigned to a woodland group.

HeB—Hazleton channery sandy loam, 3 to 8 percent slopes. This is a gently sloping, deep, well drained soil on hills and ridgetops. Individual areas are irregular in shape or are long and narrow and range from 5 to 25 acres.

Typically, the surface layer is very dark brown channery sandy loam about 3 inches thick. The subsurface layer is gray channery sandy loam 3 inches thick. The subsoil is 36 inches thick. In the upper part, to a depth of 8 inches, it is dark reddish brown sandy loam. In the lower part, to a depth of 42 inches, it is dark yellowish brown and yellowish brown channery sandy loam. The substratum extends to a depth of 54 inches and is brownish yellow very channery loamy sand. Yellowish brown sandstone bedrock is at a depth of 54 inches.

Included with this soil in mapping are areas of Andover, Buchanan, Clymer, and Laidig soils. Included areas make up about 5 percent of the mapped acreage.

Permeability is moderately rapid and rapid, and available water capacity is moderate. Surface runoff is medium. If the soil is not limed, it is extremely acid to strongly acid throughout.

In most areas this soil is used for cultivated crops or as pasture or woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Crops respond well to fertilizer and good management. Contour stripcropping, terraces, and grassed waterways help reduce runoff and control erosion. Growing cover crops and returning crop residue help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. Machine planting is practical in the large areas.

This soil has limitations for most nonfarm uses because of moderately rapid and rapid permeability, the high content of coarse fragments, and depth to bedrock. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass IIe and in woodland group 3o.

HeC—Hazleton channery sandy loam, 8 to 15 percent slopes. This is a sloping, deep, well drained soil on ridgetops and on side slopes of ridges. Individual areas are long and narrow and range from 5 to 25 acres.

Typically, the surface layer is very dark brown channery sandy loam about 3 inches thick. The subsurface layer, to a depth of 6 inches, is gray channery sandy loam. The subsoil extends to a depth of 42 inches. In the upper part, to a depth of 8 inches, it is dark reddish brown sandy loam. In the lower part, to a depth of 42 inches, it is dark yellowish brown and yellowish brown channery sandy loam. The substratum extends to a depth of 54 inches and is brownish yellow very channery loamy sand. Yellowish brown sandstone bedrock is at a depth of 54 inches.

Included with this soil in mapping are areas of Buchanan, Clymer, and Laidig soils. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderately rapid and rapid, and available water capacity is moderate. Surface runoff is rapid. If the soil is not limed, it is extremely acid to strongly acid throughout.

In most areas this soil is used for cultivated crops or as pasture or woodland. In a few areas it is used as homesites or for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Crops respond well to fertilizer and good management. Contour stripcropping, diversions, and grassed waterways help reduce runoff and control erosion. Growing cover crops, returning crop residue, and adding manure help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. Machine planting is practical in the large areas.

This soil has limitations for most nonfarm uses because of slope, depth to bedrock, moderately rapid and rapid permeability, and high content of coarse fragments. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass IIIe and in woodland group 3o.

HeD—Hazleton channery sandy loam, 15 to 25 percent slopes. This is a moderately steep, deep, well drained soil on hillsides and on side slopes of ridges. Individual areas are long and narrow and range from 5 to 40 acres.

Typically, the surface layer is very dark brown channery sandy loam about 3 inches thick. The subsurface layer is gray channery sandy loam 3 inches thick. The subsoil extends to a depth of 42 inches. In the upper part, to a depth of 8 inches, it is dark reddish brown sandy loam. In the lower part, to a depth of 42 inches, it is dark yellowish brown and yellowish brown channery sandy loam. The substratum extends to a depth of 54 inches and is brownish yellow very channery loamy sand. Yellowish brown sandstone bedrock is at a depth of 54 inches.

Included with this soil in mapping are areas of Laidig, Clymer, and Buchanan soils. Also included are areas of Dystrochrepts and areas of Hazleton soils that have slopes of more than 25 percent. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately rapid and rapid, and available water capacity is moderate. Surface runoff is very rapid. If the soil is not limed, it is extremely acid to strongly acid throughout.

In most areas this soil is used as woodland or pasture or for cultivated crops. In a few areas it is used as homesites or for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a very severe hazard. Crops respond well to fertilizer and good management. Contour stripcropping, diversions, and minimum tillage help reduce runoff and control erosion. Growing cover crops and long-term hay helps maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Slope interferes with harvesting and tree planting.

This soil has severe limitations for most nonfarm uses because of slope, depth to bedrock, and the high content of coarse fragments. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass IVe and in woodland group 3r.

HfB—Hazleton extremely stony sandy loam, 0 to 8 percent slopes. This is a nearly level and gently sloping, deep, well drained soil on mountaintops and ridgetops. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 15 to 50 percent of the surface. Individual areas are irregular in shape or are long and narrow and range from 10 to 100 acres.

Typically, the surface layer is very dark brown channery sandy loam about 3 inches thick. The subsurface layer is gray channery sandy loam 3 inches thick. The subsoil is 36 inches thick. In the upper part, to a depth of 8 inches, it is dark reddish brown sandy loam. In the lower part, to a depth of 42 inches, it is dark yellowish brown and yellowish brown channery sandy loam. The substratum extends to a depth of 54 inches and is brownish yellow very channery loamy sand. Yellowish brown sandstone bedrock is at a depth of 54 inches.

Included with this soil in mapping are areas of Andover, Buchanan, Clymer, and Laidig soils and Dystrochrepts. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately rapid or rapid, and available water capacity is moderate. Surface runoff is slow or medium. If the soil is not limed, it is extremely acid to strongly acid throughout.

In most areas this soil is used as woodland. In a few areas it is used as pasture. In some areas it is used as homesites and for other nonfarm uses.

This soil is too stony to be suitable for cultivated crops or improved pasture. It is not economically feasible to remove the trees and surface stones to make the soil suitable for cultivated crops and pasture.

This soil is fairly suited to use as woodland, and in most areas it is in trees. Potential productivity is moderately high. Large stones on the surface restrict the use of machinery and interfere with harvesting and tree planting (fig. 19).

This soil has severe limitations for most nonfarm uses because of large stones on the surface, moderately rapid or rapid permeability, and depth to bedrock. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass VIIs and in woodland group 3x.

HfD—Hazleton extremely stony sandy loam, 8 to 25 percent slopes. This is a sloping and moderately steep, deep, well drained soil on mountains and side slopes of ridges. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 15 to 50 percent of the surface.

Figure 19.—Hazleton extremely stony sandy loam, 0 to 8 percent slopes, is fairly suited to use as woodland. Numerous large stones on the surface interfere with harvesting and seeding.

Individual areas are long and broad and range from 15 to 200 acres.

Typically, the surface layer is very dark brown channery sandy loam about 3 inches thick. The subsurface layer is gray channery sandy loam 3 inches thick. The subsoil is 36 inches thick. In the upper part, to a depth of 8 inches, it is dark reddish brown sandy loam. In the lower part, to a depth of 42 inches, it is dark yellowish brown and yellowish brown channery sandy loam. The substratum extends to a depth of 54 inches and is brownish yellow very channery loamy sand. Yellowish brown sandstone bedrock is at a depth of 54 inches.

Included with this soil in mapping are areas of Buchanan, Clymer, and Laidig soils and Dystrochrepts. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderately rapid or rapid, and available water capacity is moderate. Surface runoff is rapid and very rapid. If the soil is not limed, it is extremely acid to strongly acid throughout.

In most areas this soil in used as woodland. In a few areas it is used as pasture. In some areas it is used as homesites and for other nonfarm uses.

This soil is too stony to be suitable for cultivated crops or improved pasture. It is not economically feasible to remove the trees and surface stones to make the soil suitable for cultivated crops and pasture.

This soil is fairly suited to use as woodland, and in most areas it is in trees. Potential productivity is moderately high. Large stones on the surface and moderately steep slopes restrict the use of machinery and interfere with harvesting and tree planting.

This soil has severe limitations for most nonfarm uses because of large stones on the surface, slope, moderately rapid or rapid permeability, and depth to bedrock. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass VIIs and in woodland group 3x.

HfF—Hazleton extremely stony sandy loam, 25 to 60 percent slopes. This is a steep and very steep, deep, well drained soil on side slopes of mountain ridges. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 15 to 50 percent of the surface. Individual areas are long and broad and range from 25 to 300 acres.

Typically, the surface layer is very dark brown channery sandy loam about 3 inches thick. The subsurface layer is gray channery sandy loam 3 inches thick. The subsoil is 36 inches thick. In the upper part, to a depth of 8 inches, it is dark reddish brown sandy loam. In the lower part, to a depth of 42 inches, it is dark yellowish brown and yellowish brown channery sandy loam. The substratum extends to a depth of 54 inches and is brownish yellow very channery loamy sand. Yellowish brown sandstone bedrock at a depth of 54 inches.

Included with this soil in mapping are areas of Lehew soils and Dystrochrepts and areas where the depth to bedrock is less than 40 inches. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately rapid or rapid, and available water capability is moderate. Surface runoff is very rapid. If the soil is not limed, it is extremely acid to strongly acid throughout.

In nearly all of the areas this soil is used as woodland. In a few areas it is used as pasture and for nonfarm uses.

This soil is too steep and stony to be suitable for cultivated crops or improved pasture.

This soil is fairly suited to use as woodland, and in most areas it is in trees. Potential productivity is moderately high. Steep slopes severely restrict the use of equipment, and erosion is a hazard. Large stones on the surface and steep slopes interfere with mechanical harvesting and tree planting.

This soil has very severe limitations for most nonfarm uses because of large stones on the surface and steep slopes.

This soil is in capability subclass VIIs and in woodland group 3x.

HgB—Highfield channery silt loam, 3 to 8 percent slopes. This is a gently sloping, deep, well drained soil on uplands in valleys. Individual areas are broad and irregular in shape and range from 5 to 30 acres.

Typically, the surface layer is very dark grayish brown channery silt loam 3 inches thick. The subsurface layer is pale brown channery silt loam 7 inches thick. The subsoil extends to a depth of 34 inches and is light yellowish brown and yellowish brown channery silt loam. The substratum extends to a depth of 60 inches and is yellowish brown very channery silt loam. Bedrock is at a depth of 60 inches.

Included with this soil in mapping are areas of Catoctin, Clymer, Glenville, and Neshaminy soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate, and available water capacity is moderate. Surface runoff is medium. If the soil is not limed, it is very strongly acid or strongly acid in the surface and subsurface layers and subsoil and strongly acid or medium acid in the substratum.

In most areas this soil is used for cultivated crops or as pasture or woodland or for orchards. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard (fig. 20). Crops respond well to fertilizer and good management. Contour stripcropping, terraces, grassed waterways, and crop rotation help reduce runoff and control erosion. Returning crop residue, applying manure, and growing cover crops help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. Machine planting is practical in the large areas.

This soil has some limitations for homesites, onsite waste disposal, and other nonfarm uses. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass IIe and in woodland group 3o.

HgC—Highfield channery silt loam, 8 to 15 percent slopes. This is a sloping, deep, well drained soil on

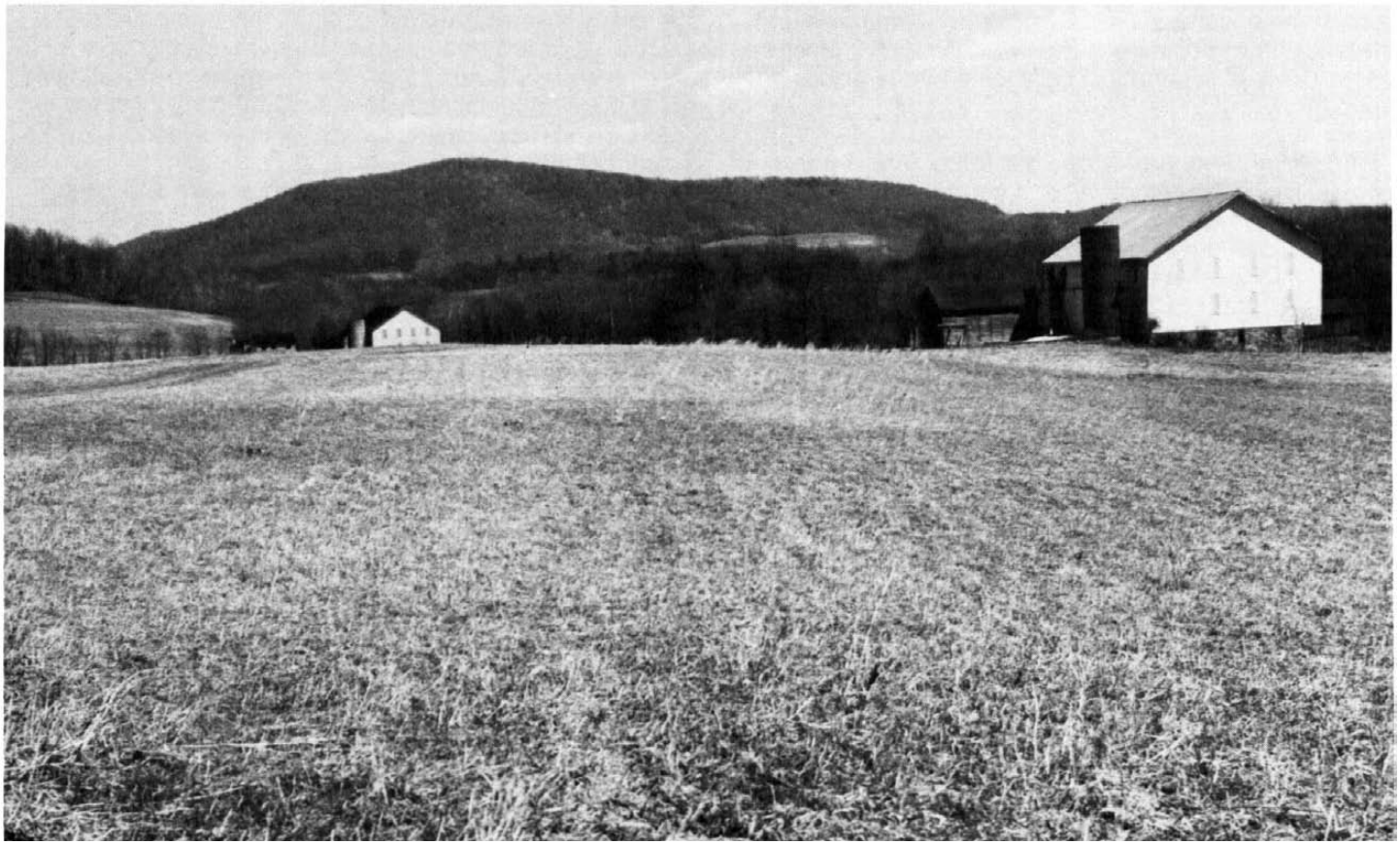


Figure 20.—Typical landscape of Highfield channery silt loam, 3 to 8 percent slopes. Erosion control practices are needed to protect the soil.

uplands in valleys. Individual areas are long and narrow or are irregular in shape and range from 10 to 30 acres.

Typically, the surface layer is very dark grayish brown channery silt loam 3 inches thick. The subsurface layer is pale brown channery silt loam 7 inches thick. The subsoil is light yellowish brown and yellowish brown channery silt loam 24 inches thick. The substratum extends to a depth of 60 inches and is yellowish brown very channery silt loam. Bedrock is at a depth of 60 inches.

Included with this soil in mapping are some areas of Catoctin, Clymer, Glenville, and Neshaminy soils and some areas of Highfield soils that are severely eroded and have slopes of more than 15 percent. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate, and available water capacity is moderate. Surface runoff is medium. If the soil is not limed, it is very strongly acid or strongly acid in the surface and subsurface layers and subsoil and strongly acid or medium acid in the substratum.

In most areas this soil is used for cultivated crops or as pasture or woodland or for orchards. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Most crops respond well to fertilizer and good management. Contour stripcropping, diversions, grassed waterways, and crop rotation help reduce runoff and control erosion. Returning crop residue, applying manure, and growing cover crops help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. Machine planting is practical in the large areas.

This soil has limitations for homesites, onsite waste disposal, and other nonfarm uses because of slope and depth to bedrock. Although bedrock is at a depth of

more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass IIIe and in woodland group 3o.

HhB—Highfield very stony silt loam, 0 to 8 percent slopes. This is a nearly level and gently sloping soil on mountains and in valleys. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are broad and irregular in shape and range from 5 to 30 acres.

Typically, the surface layer is very dark grayish brown channery silt loam 3 inches thick. The subsurface layer is pale brown channery silt loam 7 inches thick. The subsoil is 24 inches thick and is light yellowish brown and yellowish brown channery silt loam. The substratum extends to a depth of 60 inches and is yellowish brown very channery silt loam. Bedrock is at a depth of 60 inches.

Included with this soil in mapping are some areas of stony Catoctin, Clymer, Glenville, Hazleton, and Neshaminy soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate, and available water capacity is moderate. Surface runoff is slow and medium. If the soil is not limed, it is very strongly acid or strongly acid in the surface layer and subsoil and strongly acid or medium acid in the substratum.

In most areas this soil is used as woodland or pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is too stony to be suitable for cultivated crops or improved pasture. It is not economically feasible to remove the trees and surface stones to make the soil suitable for cultivated crops or pasture.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. Machine planting is restricted because of large stones on the surface.

This soil has some limitations for most nonfarm uses, especially for homesites and onsite waste disposal, because of large stones on the surface and depth to bedrock. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass VIs and in woodland group 3o.

HhD—Highfield very stony silt loam, 8 to 25 percent slopes. This is a sloping and moderately steep, deep, well drained soil on mountains, side slopes of ridges, and in valleys. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are long and narrow or are irregular in shape and range from 10 to 50 acres.

Typically, the surface layer is very dark grayish brown channery silt loam 3 inches thick. The subsurface layer is pale brown channery silt loam 7 inches thick. The subsoil extends to a depth of 34 inches and is light yellowish brown and yellowish brown channery silt loam. The substratum extends to a depth of 60 inches and is yellowish brown very channery silt loam. Bedrock is at a depth of 60 inches.

Included with this soil in mapping are areas of stony Catoctin, Clymer, Glenville, Hazleton, and Neshaminy soils. Included areas make up 10 percent of the mapped acreage.

Permeability is moderate, and available water capacity is moderate. Surface runoff is rapid and very rapid. If the soil is not limed, it is very strongly acid or strongly acid in the surface and subsurface layers and subsoil and strongly acid or medium acid in the substratum.

In most areas this soil is used as pasture or woodland. In a few areas it is used as homesites and for other nonfarm uses.

This soil is not suitable for cultivated crops and improved pasture because of stones on the surface and slope. It is not economically feasible to remove trees and stones to make the soil suitable for cultivated crops and pasture.

This soil is suited to use as woodland, and potential productivity is moderately high. Large stones on the surface and moderately steep slopes restrict the use of machinery and interfere with harvesting and tree planting.

This soil has severe limitations for most nonfarm uses because of large stones on the surface, depth to bedrock, and moderately steep slopes. Although bedrock is at a depth of more than 40 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass VIs and in woodland group 3r.

HhF—Highfield very stony silt loam, 25 to 50 percent slopes. This is a steep and very steep, deep, well drained soil on side slopes of mountains. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are long and narrow or are irregular in shape and range from 10 to 50 acres.

Typically, the surface layer is very dark grayish brown channery silt loam 3 inches thick. The subsurface layer is pale brown channery silt loam 7 inches thick. The subsoil extends to a depth of 34 inches and is light yellowish brown and yellowish brown channery silt loam. The substratum extends to a depth of 60 inches and is yellowish brown very channery silt loam. Bedrock is at a depth of 60 inches.

Included with this soil in mapping are areas of Catoctin, Clymer, and Hazleton soils. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderate, and available water capacity is moderate. Surface runoff is very rapid. If the soil is not

limed, it is very strongly acid or strongly acid in the surface and subsurface layers and subsoil and strongly acid or medium acid in the substratum.

In nearly all of the areas this soil is used as woodland.

This soil is too stony and steep to be suitable for farming, homesites, and most nonfarm uses.

This soil is suited to use as woodland, and potential productivity is moderately high. Steep and very steep slopes and large stones on the surface restrict harvesting and tree planting.

This soil has very severe limitations for most nonfarm uses because of very steep slopes and large stones.

This soil is in capability subclass VIIs and in woodland group 3r.

HuA—Huntington silt loam, 0 to 5 percent slopes. This is a nearly level and gently sloping, well drained soil in drainageways and karst limestone valleys. Individual areas are long and narrow or are irregular in shape and range from 2 to 10 acres.

Typically, the surface layer is very dark grayish brown silt loam 11 inches thick. The subsoil is dark brown and yellowish brown silt loam 33 inches thick. The substratum to a depth of 60 inches is yellowish brown sandy loam.

Included with this soil in mapping are areas of soils that have a silty clay loam surface layer. Also included are areas of Lindside, Duffield, Hagerstown, and Penlaw soils and areas of Huntington soils that have slopes of more than 5 percent. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is medium. During heavy rainfall, surface runoff from upland soils can cause occasional temporary flooding on this soil. If the soil is not limed, it is medium acid to mildly alkaline throughout.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used as woodland. In a few areas it is used as homesites and for other nonfarm uses.

This soil is well suited to cultivated crops. Erosion is a slight hazard. Most crops respond well to fertilizer and good management. Crop rotation, cover crops, minimum tillage, and returning crop residue help maintain the content of organic matter and improve soil tilth. Sinkholes are a potential hazard to the use of equipment.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility. Sinkholes are a potential hazard to the use of equipment.

This soil is well suited to use as woodland, and potential productivity is very high. Management problems are few. Machine planting is practical in the large areas.

This soil has limitations for homesites and many nonfarm uses because of the hazard of flooding. Ground water can be contaminated through solution channels and bedrock caverns if the soil is used for onsite waste disposal. Sinkholes are a potential hazard to buildings and roads.

This soil is in capability class I and in woodland group 1o.

KnB—Klinesville very shaly silt loam, 3 to 8 percent slopes. This is a gently sloping, shallow, well drained soil on ridgetops and in valleys. Individual areas are irregular in shape or are long and narrow and range from 2 to 10 acres.

Typically, the surface layer is reddish brown shaly silt loam about 5 inches thick. The subsoil is reddish brown very shaly silt loam 10 inches thick. Partly weathered dusky red shale bedrock is at a depth of 15 inches.

Included with this soil in mapping are small areas of Calvin, Berks, Weikert, and Edom soils. Also included are areas where the depth to bedrock is less than 10 inches and a few bedrock outcrops. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately rapid, and available water capacity is very low. Runoff is medium. If the soil is not limed, it is very strongly acid to medium acid throughout.

In most areas this soil is used as pasture or woodland or for cultivated crops. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Shallow depth to bedrock and very low available water capacity reduce yields, especially in drier years. Contour stripcropping, terraces, and grassed waterways help reduce runoff and control erosion. Growing cover crops, returning crop residue, and applying manure help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

If this soil is used as woodland, potential productivity is moderate. Because bedrock is at a depth of 10 to 20 inches and the soil is droughty, seedling mortality is a severe problem. Machine planting is practical in the large areas.

This soil has severe limitations for most nonfarm uses, especially homesites and onsite waste disposal, because of very low available water capacity, bedrock at a depth of 10 to 20 inches, and numerous coarse fragments on the surface.

This soil is in capability subclass IIIe and in woodland group 4d.

KnC—Klinesville very shaly silt loam, 8 to 15 percent slopes. This is a sloping, shallow, well drained soil on side slopes of ridges and in valleys. Individual areas are long and narrow and range from 5 to 20 acres.

Typically, the surface layer is reddish brown very shaly silt loam about 5 inches thick. The subsoil is reddish brown very shaly silt loam 10 inches thick. Partly weathered dusky red shale bedrock is at a depth of 15 inches.

Included with this soil in mapping are small areas of Calvin, Lehew, Berks, and Weikert soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately rapid, and available water capacity is very low. Runoff is rapid. If the soil is not limed, it is very strongly acid to medium acid throughout.

In most areas this soil is used as pasture or woodland or for cultivated crops or hay. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a very severe hazard. Shallow depth to bedrock and very low available water capacity reduce yields. Contour stripcropping, diversions, grassed waterways, minimum tillage, and crop rotation help reduce runoff and control erosion. Growing cover crops, returning crop residue, and applying manure help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

If this soil is used as woodland, potential productivity is moderate. Because of bedrock at a depth of 10 to 20 inches and very low available water capacity, seedling mortality is a severe problem. Machine planting is practical in the large areas.

This soil has severe limitations for most nonfarm uses, especially for homesites and onsite waste disposal, because of slope, bedrock at a depth of 10 to 20 inches, and numerous coarse fragments on the surface.

This soil is in capability subclass IVe and in woodland group 4d.

KnD—Klinesville very shaly silt loam, 15 to 25 percent slopes. This is a moderately steep, shallow, well drained soil on side slopes of ridges. Individual areas are long and narrow and range from 5 to 50 acres.

Typically, the surface layer is reddish brown very shaly silt loam about 5 inches thick. The subsoil is reddish brown very shaly silt loam 10 inches thick. Weathered dusky red shale bedrock is at a depth of 15 inches.

Included with this soil in mapping are areas of Calvin, Lehew, Berks, and Weikert soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately rapid, and available water capacity is very low. Surface runoff is very rapid. If the soil is not limed, it is very strongly acid to medium acid throughout.

In most areas this soil is used as woodland, pasture, or hayland. In a few areas it is used as homesites and for other nonfarm uses.

This soil is too shallow, steep, and droughty to be suitable for cultivated crops and improved pasture. Yields are so low that it is not economical to use this soil for these purposes.

If this soil is used as woodland, potential productivity is moderate. Seedling mortality is a severe problem because of droughtiness. The use of equipment is restricted because of moderately steep slopes.

This soil has very severe limitations for homesites and onsite waste disposal and most other nonfarm uses because of slope, bedrock at a depth of 10 to 20 inches, numerous coarse fragments on the surface, and very low available water capacity.

This soil is in capability subclass VIe and in woodland group 4d.

KrA—Kreamer cherty silt loam, 0 to 3 percent slopes. This is a nearly level, deep, moderately well drained soil on ridgetops and along drainageways. Individual areas are irregular in shape and oval or are long and narrow and range from 3 to 20 acres.

Typically, the surface layer is dark yellowish brown cherty silt loam about 9 inches thick. The subsoil is 51 inches thick. In the upper part, to a depth of 40 inches, it is yellowish brown cherty silty clay loam and cherty silty clay and is mottled below a depth of 21 inches. In the lower part, to a depth of 60 inches, it is strong brown cherty clay and is mottled. The substratum to a depth of 66 inches is strong brown cherty clay.

Included with this soil in mapping are areas of Elliber, Ernest, Evendale, Edom, and Hagerstown soils. Also included are areas of Kreamer soils that are less than 15 percent coarse fragments in the surface layer. Included areas make up about 15 percent of the mapped acreage.

Permeability is slow, and available water capacity is moderate. Surface runoff is slow. The seasonal high water table is at a depth of 1 1/2 to 3 feet. If the soil is not limed, it is neutral to very strongly acid in the surface layer and upper part of the subsoil and is strongly acid or very strongly acid in the lower part of the subsoil.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used as woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a slight hazard. Crops respond well to fertilizer and good management. Surface and subsurface drains are needed, in places, to permit timely tillage and improve crop yields. Crop rotation, minimum tillage, returning crop residue, growing cover crops, and applying manure help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. The use of equipment in planting and harvesting is restricted during wet periods because of the seasonal high water table.

This soil has severe limitations for most nonfarm uses, especially for homesites and onsite waste disposal, because of slow permeabilty, the seasonal high water table, and clayey subsoil.

This soil is in woodland capability subclass IIw and in woodland group 3w.

KrB—Kreamer cherty silt loam, 3 to 8 percent slopes. This is a gently sloping, deep, moderately well drained soil on ridgetops and along drainageways. Individual areas are long and narrow or are irregular in shape and range from 5 to 30 acres.

Typically, the surface layer is dark yellowish brown cherty silt loam about 9 inches thick. The subsoil is 51 inches thick. In the upper part, to a depth of 40 inches, it is yellowish brown cherty silty clay loam and cherty silty clay and is mottled below a depth of 21 inches. In the lower part, to a depth of 60 inches, it is strong brown cherty clay and is mottled. The substratum to a depth of 66 inches is strong brown cherty clay.

Included with this soil in mapping are areas of Elliber, Ernest, Evendale, and Edom soils. Also included are areas of Kreamer soils that are less than 15 percent coarse fragments in the surface layer and areas of Kreamer soils that have a stony surface. Included areas make up about 15 percent of the mapped acreage.

Permeability is slow, and available water capacity is moderate. Surface runoff is medium. The seasonal high water table is at a depth of 1 1/2 to 3 feet. If the soil is not limed, it is neutral to very strongly acid in the surface layer and upper part of the subsoil and is strongly acid or very strongly acid in the lower part of the subsoil.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used as woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Crops respond well to fertilizer and good management. Contour stripcropping, terraces, minimum tillage, and grassed waterways help reduce runoff and control erosion. Growing cover crops, returning crop residue, and applying manure help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. The use of equipment in planting and harvesting is restricted during wet periods because of a seasonal high water table.

This soil has severe limitations for most nonfarm uses, especially homesites and onsite waste disposal, because of slow permeability, the seasonal high water table, and the clayey subsoil.

This soil is in capability subclass IIe and in woodland group 3w.

KrC—Kreamer cherty silt loam, 8 to 15 percent slopes. This is a sloping, deep, moderately well drained soil on ridgetops, along drainageways, and on lower slopes of ridges. Individual areas are long and narrow or are irregular in shape and range from 5 to 30 acres.

Typically, the surface layer is dark yellowish brown cherty silt loam about 9 inches thick. The subsoil is 51 inches thick. In the upper part, to a depth of 40 inches, it is yellowish brown cherty silty clay loam and cherty silty clay and is mottled below a depth of 21 inches. In the lower part, to a depth of 60 inches, it is strong brown cherty clay and is mottled. The substratum to a depth of 66 inches is strong brown cherty clay.

Included with this soil in mapping are areas of Elliber, Ernest, and Edom soils and areas of Kreamer soils that are less than 15 percent coarse fragments in the surface layer. Also included are areas of Kreamer soils that have slopes of more than 15 percent. Included areas make up about 15 percent of the mapped acreage.

Permeability is slow, and available water capacity is moderate. Surface runoff is medium. The seasonal high water table is at a depth of 1 1/2 to 3 feet. If the soil is not limed, it is neutral to very strongly acid in the surface layer and upper part of the subsoil and is strongly acid or very strongly acid in the lower part of the subsoil.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used as woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Crops respond well to fertilizer and good management. Diversions, grassed waterways, contour stripcropping, and crop rotation help reduce runoff and control erosion. Returning crop residue, growing cover crops, and applying manure help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. The use of equipment in planting and harvesting is restricted because of a seasonal high water table. The hazard of erosion is a problem in harvesting.

This soil has severe limitations for most nonfarm uses, especially homesites and onsite waste disposal, because of slope, slow permeability, the seasonal high water table, and the clayey subsoil.

This soil is in capability subclass IIIe and in woodland group 3w.

LdB—Laidig channery loam, 3 to 8 percent slopes. This is a gently sloping, deep, well drained soil on benches of ridges and on lower slopes of mountains. Individual areas are long and narrow or are irregular in shape and range from 10 to 80 acres.

Typically, the surface layer is dark grayish brown channery loam 8 inches thick. The subsoil is 52 inches thick. In the upper part, to a depth of 32 inches, it is yellowish brown channery silt loam. In the lower part, to a depth of 60 inches, it is a yellowish brown, channery sandy clay loam and very channery sandy clay loam fragipan that is mottled.

Included with this soil in mapping are small areas of Hazleton, Buchanan, Murrill, and Meckesville soils and some areas of Laidig soils that have slopes of less than 3 percent. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately slow, and available water capacity is moderate. Surface runoff is medium. If the soil is not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used for cultivated crops or as pasture or woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Crops respond well to fertilizer and good management. Contour stripcropping, terraces, cover crops, and crop rotation help reduce runoff and control erosion. Returning crop residue and adding manure help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. Machine planting is practical in the large areas.

This soil has limitations for most nonfarm uses, especially homesites and onsite waste disposal. Limitations include moderately slow permeability and coarse fragments in the soil.

This soil is in capability subclass IIe and in woodland group 3o.

LdC—Laidig channery loam, 8 to 15 percent slopes. This is a sloping, deep, well drained soil on benches of ridges and on lower slopes of mountains. Individual areas are long and narrow or are irregular in shape and range from 10 to 100 acres.

Typically, the surface layer is dark grayish brown channery loam 8 inches thick. The subsoil is 52 inches thick. In the upper part, to a depth of 32 inches, it is yellowish brown channery silt loam. In the lower part, to a depth of 60 inches, it is a yellowish brown channery sandy clay loam and very channery sandy clay loam fragipan that is mottled.

Included with this soil in mapping are small areas of Hazleton, Morrison, Buchanan, Murrill, and Meckesville soils and areas of Laidig soils that have slopes of more than 15 percent. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately slow, and available water capacity is moderate. Runoff is rapid. If the soil is not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used for cultivated crops or as pasture or woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Crops respond well to fertilizer and good management. Diversions, grassed waterways, contour stripcropping, cover cropping, and crop rotation help reduce runoff and control erosion. Returning crop residue and adding manure help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. Machine planting is practical in the large areas.

This soil has limitations for most nonfarm uses, especially homesites and onsite waste disposal because of slope, moderately slow permeability, and coarse fragments in the surface layer.

This soil is in capability subclass IIIe and in woodland group 3o.

LgB—Laidig very stony loam, 0 to 8 percent slopes. This is a nearly level and gently sloping, deep, well drained soil on benches of ridges and on lower slopes of mountains. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are long and narrow or are irregular in shape and range from 10 to 50 acres.

Typically, the surface layer is dark grayish brown channery loam 8 inches thick. The subsoil is 52 inches thick. In the upper part, to a depth of 32 inches, it is yellowish brown channery silt loam. In the lower part, to a depth of 60 inches, it is a yellowish brown channery sandy clay loam and very channery sandy clay loam fragipan that is mottled.

Included with this soil in mapping are small areas of stony and extremely stony Laidig soils and small areas of stony Buchanan, Hazleton, Lehew, Morrison, and Meckesville soils and Dystrochrepts. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderately slow, and available water capacity is moderate. Runoff is slow or medium. If the soil is not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used as woodland or pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is too stony to be suitable for cultivated crops and improved pasture. It is not economically feasible to remove the trees and stones to make the soil suitable for cultivated crops or pasture.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. Machine planting is limited because of large stones on the surface.

This soil has limitations for most nonfarm uses, especially homesites and onsite waste disposal. Limitations include moderately slow permeability and large stones on the surface.

This soil is in capability subclass VIs and in woodland group 3o.

LgD—Laidig very stony loam, 8 to 25 percent slopes. This is a sloping and moderately steep, deep, well drained soil on benches of ridges and on upper and middle slopes of mountains. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are broad and long and range from 10 to 200 acres.

Typically, the surface layer is dark grayish brown channery loam 8 inches thick. The subsoil is 52 inches thick. In the upper part, to a depth of 32 inches, it is yellowish brown channery silt loam. In the lower part, to a depth of 60 inches, it is a yellowish brown channery sandy clay loam and very channery sandy clay loam fragipan that is mottled.

Included with this soil in mapping are small areas of stony and extremely stony Laidig soils and areas of stony Clymer, Buchanan, Hazleton, Lehew, Morrison, and Meckesville soils and Dystrochrepts. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately slow, and available water capacity is moderate. Runoff is rapid or very rapid. If the soil is not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used as woodland or pasture. In a few small areas it is used as homesites and for other nonfarm uses.

This soil is too stony and steep to be suitable for cultivated crops and improved pasture. It is not economically feasible to remove trees and stones in order to make the soil suitable for cultivated crops or pasture.

This soil is fairly suited to use as woodland, and in most areas it is in trees. Potential productivity is moderately high. Because of moderately steep slopes, the use of machinery for harvesting and tree planting is restricted.

This soil has severe limitations for homesites, onsite waste disposal, and other nonfarm uses because of large stones on the surface, moderately steep slopes, and moderately slow permeability.

This soil is in capability subclass VIs and in woodland group 3r.

LpB—Lehew very stony loam, 0 to 8 percent slopes. This is a nearly level and gently sloping, moderately deep, well drained soil on ridges and mountaintops. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are long and narrow or are oval and range from 5 to 50 acres.

Typically, the surface layer is dark brown channery loam 9 inches thick. The subsoil is reddish brown channery sandy loam and very channery sandy loam 21 inches thick. The substratum extends to a depth of 38 inches and is reddish brown very channery sandy loam. Partially weathered reddish brown sandstone bedrock is at a depth of 38 inches.

Included with this soil in mapping are areas of stony Hazleton, Meckesville, and Morrison soils and some areas of Dystrochrepts. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderately rapid and rapid, and available water capacity is moderate. Surface runoff is moderate. If the soil is not limed, it is strongly acid or very strongly acid throughout.

In most areas this soil is used as woodland or pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is too stony to be suitable for cultivated crops and improved pasture. It is not economically feasible to remove trees and stones in order to make the soil suitable for cultivated crops or pasture.

This soil is fairly suited to use as woodland, and potential productivity is moderate. Machine planting is restricted because of large stones on the surface.

This soil has severe limitations for homesites, onsite waste disposal, and other nonfarm uses because of moderate depth to bedrock and numerous large stones on the surface.

This soil is in capability subclass VIs and in woodland group 4o.

LpD—Lehew very stony loam, 8 to 25 percent slopes. This is a sloping and moderately steep, moderately deep, well drained soil on ridges and upper slopes of mountains. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are long and narrow and range from 5 to 50 acres.

Typically, the surface layer is dark brown channery loam 9 inches thick. The subsoil is reddish brown channery sandy loam and very channery sandy loam 21 inches thick. The substratum extends to a depth of 38 inches and is reddish brown very channery sandy loam.

Partially weathered reddish brown sandstone is at a depth of 38 inches.

Included with this soil in mapping are areas of stony Hazleton, Meckesville, and Morrison soils and some areas of Dystrochrepts. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately rapid and rapid, and available water capacity is moderate. Surface runoff is moderately rapid and rapid. If the soil is not limed, it is strongly acid or very strongly acid throughout.

In most areas this soil is used as woodland. In some areas it is in permanent pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is too stony to be suitable for cultivated crops and improved pasture. It is not economically feasible to remove trees and stones in order to make the soil suitable for cultivated crops or pasture.

This soil is suited to use as woodland, and potential productivity is moderately high. Slopes interfere with use of machinery. Large stones on the surface are a problem in machine planting.

This soil has severe limitations for homesites, onsite waste disposal, and other nonfarm uses because of bedrock at a depth of 20 to 40 inches, numerous large stones on the surface, and slope.

This soil is in capability subclass VI and in woodland group 3r.

Ls—Lindside silt loam. This is a nearly level, deep, moderately well drained soil on flood plains. Individual areas are long and narrow and range from 2 to 10 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil is 27 inches thick. In the upper part, it is brown silt loam. In the lower part, it is dark yellowish brown silty clay loam and is mottled. The substratum to a depth of 60 inches is dark yellowish brown, stratified silt loam and silty clay loam and is mottled.

Included with this soil in mapping are some areas of Huntington, Middlebury, and Melvin soils and some areas of soils that have a coarser textured surface layer. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderate and moderately slow, and available water capacity is high. Surface runoff is slow. The seasonal high water table is at a depth of 1 1/2 to 3 feet. This soil is flooded occasionally. If the soil is not limed, it is strongly acid to slightly acid in the surface layer and upper part of the subsoil and medium acid to neutral in the lower part of the subsoil and in the substratum.

In most areas this soil is used for cultivated crops or as pasture or woodland. In some areas it is used as homesites and for other nonfarm uses.

This soil is suited to cultivated crops, and in most areas it is farmed. Erosion is a slight hazard. Flooding following intensive rainfall can damage crops and reduce the crop yields. Keeping natural drainageways open and constructing surface and subsurface drains where needed help facilitate timely tillage and increase crop yields. Growing cover crops and returning crop residue help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and restricted grazing during wet periods help maintain key plant species. Grasses that can tolerate wetness should be grown. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is very high. Tree species that can tolerate wetness should be planted. The seasonal high water table interferes with harvesting and planting during wet periods.

This soil has severe limitations for homesites, onsite waste disposal, and other nonfarm uses because of flooding and the seasonal high water table.

This soil is in capability subclass IIw and in woodland group 1w.

McB—Meckesville silt loam, 3 to 8 percent slopes. This is a gently sloping, deep, well drained soil on benches of ridges and on lower slopes of mountains. Individual areas are long and narrow or are irregular in shape and range from 5 to 40 acres.

Typically, the surface layer is dark brown silt loam about 2 inches thick. The subsurface layer is brown silt loam 8 inches thick. The subsoil is 44 inches thick. In the upper part, to a depth of 31 inches, it is dark reddish brown and reddish brown silty clay loam and channery silty clay loam. In the lower part, to a depth of 54 inches, it is a reddish brown channery loam fragipan. The substratum to a depth of 60 inches is reddish brown very channery loam.

Included with this soil in mapping are areas of Albrights, Lehew, Calvin, Hazleton, and Laidig soils and areas of Meckesville soils that have a channery loam surface layer. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately slow, and available water capacity is moderate. Surface runoff is medium. If the soil is not limed, it is extremely acid to strongly acid throughout.

In most areas this soil is used for cultivated crops or as woodland or pasture. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Crops respond well to fertilizer and good management. Terraces, grassed waterways, contour stripcroping, cover cropping, and crop rotation help reduce runoff and control erosion. Returning crop residue and adding manure help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species.

Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is high. Management problems are few. Machine planting is practical in the large areas.

This soil has limitations for homesites, onsite waste disposal, and many nonfarm uses because of moderately slow permeability.

This soil is in capability subclass IIe and in woodland group 2o.

MdB—Meckesville very stony silt loam, 0 to 8 percent slopes. This is a nearly level and gently sloping, deep, well drained soil on benches of ridges and on lower slopes of mountains. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are long and narrow or are irregular in shape and range from 5 to 50 acres.

Typically, the surface layer is dark brown silt loam about 2 inches thick. The subsurface layer is brown silt loam 8 inches thick. The subsoil is 44 inches thick. In the upper part, to a depth of 31 inches, it is dark reddish brown and reddish brown silty clay loam and channery silty clay loam. In the lower part, to a depth of 54 inches, it is a reddish brown channery loam fragipan. The substratum to a depth of 60 inches is reddish brown very channery loam.

Included with this soil in mapping are areas of stony Albrights, Lehew, Hazleton, and Buchanan soils and areas of Meckesville soils that have more than 15 percent of the surface covered with stones and boulders. Included areas make up about 10 percent of the mapped acreage.

Permeabilty is moderately slow, and available water capacity is moderate. Surface runoff is slow or medium. If the soil is not limed, it is extremely acid to strongly acid throughout.

In most areas this soil is used as pasture and woodland. In a few areas it is used as homesites and for other nonfarm uses.

This soil is too stony to be suitable for cultivated crops or improved pasture. It is not economically feasible to remove the trees and stones to make the soil suitable for cultivated crops or pasture.

This soil is suited to use as woodland, and potential productivity is high. Management problems are few. Machine planting is restricted because of large stones on the surface.

This soil has limitations for most nonfarm uses, especially onsite waste disposal. Limitations include numerous stones on the surface and moderately slow permeability.

This soil is in capability subclass VIs and in woodland group 2o.

MdD—Meckesville very stony silt loam, 8 to 25 percent slopes. This is a sloping and moderately steep, deep, well drained soil on lower slopes of mountains. Stones and boulders, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are long and narrow or are irregular in shape and range from 5 to 75 acres.

Typically, the surface layer is dark brown silt loam about 2 inches thick. The subsurface layer is brown silt loam 8 inches thick. The subsoil is 44 inches thick. In the upper part, to a depth of 31 inches, it is dark reddish brown and reddish brown silty clay loam and channery silty clay loam. In the lower part, to a depth of 54 inches, it is a reddish brown channery loam fragipan. The substratum to a depth of 60 inches is reddish brown very channery loam.

Included with this soil in mapping are areas of stony Albrights, Lehew, Morrison, Hazleton, Buchanan, and Laidig soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately slow, and available water capacity is moderate. Surface runoff is moderately rapid to rapid. If the soil is not limed, it is extremely acid to strongly acid throughout.

In nearly all of the areas this soil is used as woodland and pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is too stony to be suitable for cultivated crops or improved pasture. It is not economically feasible to remove trees and stones to make the soil suitable for cultivated crops or pasture.

This soil is suited to use as woodland, and potential productivity is high. However, slope restricts the use of equipment and large stones on the surface and interferes with machine planting.

This soil has severe limitations for most nonfarm uses, especially onsite waste disposal, because of slope, moderately slow permeability, and numerous stones on the surface.

This soil is in capability subclass VIs and in woodland group 2r.

Me—Melvin silt loam. This is a nearly level, deep, poorly drained soil on flood plains. Individual areas are smooth and slightly concave or are long and narrow and range from 2 to 10 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is grayish brown silt loam 9 inches thick. The subsoil is mottled, grayish brown silt loam 17 inches thick. The substratum to a depth of 40 inches is mottled, dark gray light silty clay loam, and to a depth of 62 inches it is mottled, light gray sand.

Included with this soil in mapping are areas that have a coarser textured surface layer and areas of very poorly drained soils. Also included are small areas of Lindside and Warners soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is slow or ponded. The high water

table is at the surface or within 1 foot. This soil is occasionally flooded (fig. 21). If the soil is not limed, it is slightly acid to mildly alkaline throughout.

In most areas this soil is used as pasture or woodland. In some areas it is used for cultivated crops. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a slight hazard. Crops that are tolerant of wetness can be grown if the soil is drained. Flooding following intensive rainfall can damage crops and reduce crop yields. Returning crop residue and adding manure help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates, restricted grazing during wet seasons, and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is very high for water-tolerant species. Because of wetness, seedling mortality is a severe problem and the use of equipment is restricted.

This soil has severe limitations for homesites, onsite waste disposal, and nonfarm uses because of flooding and the high water table.

This soil is in capability subclass IIIw and in woodland group 1w.

Mf—Middlebury soils. These soils are nearly level, deep, moderately well drained and somewhat poorly drained soils on flood plains. Individual areas are long and narrow and range from 2 to 10 acres. Some areas consist mostly of Middlebury silt loam, some consist mostly of Middlebury loam or fine sandy loam, and in some areas the various surface textures are intermingled. These soils were mapped as a single unit because of similarity in use and manangement. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The subsoil is brown or dark

Figure 21.—Melvin silt loam is occasionally flooded.

brown silt loam 11 inches thick. The substratum to a depth of 34 inches is dark grayish brown silt loam and is mottled, and below that, it is dark grayish brown and grayish brown gravelly sandy loam.

Included with these soils in mapping are small areas of Lindside, Huntington, Melvin, Atkins, and Tioga soils and areas where the subsoil is very strongly acid. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is slow. The seasonal high water table is at a depth of 1/2 foot to 3 feet. These soils are frequently flooded. If these soils are not limed, they are strongly acid to slightly acid in the surface layer and medium acid to neutral in the subsoil and substratum.

In most areas these soils are used for cultivated crops or as pasture or woodland. In a few areas they are used as homesites and for other nonfarm uses.

If these soils are used for cultivated crops, erosion is a slight hazard. Crops respond well to fertilizer and good management. These soils are suitable for cultivation; however, frequent flooding can damage crops. Returning crop residue and applying manure help maintain the content of organic matter.

If these soils are used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

These soils are suited to use as woodland, and potential productivity is high. Management problems are few. Machine planting is practical in the large areas.

These soils have severe limitations for homesites, onsite waste disposal, and many nonfarm uses because of flooding and the seasonal high water table.

This soil is in capability subclass IIw and in woodland group 2o.

MnA—Monongahela silt loam, 0 to 3 percent slopes. This is a nearly level, deep, moderately well drained soil on stream terraces. Individual areas are oval or are broad and irregular in shape and range from 3 to 30 acres.

Typically, the surface layer is brown silt loam 9 inches thick. The subsoil is 37 inches thick. In the upper part, to a depth of 21 inches, it is light yellowish brown gravelly silty clay loam. In the lower part, to a depth of 46 inches, it is a strong brown and reddish yellow gravelly clay loam fragipan that is mottled. The substratum to a depth of 62 inches is light olive brown shaly loam.

Included with this soil in mapping are some areas of Allegheny, Raritan, Birdsboro, and Tyler soils and areas of soils, similar to Monongahela soils, that are medium acid to slightly acid in the subsoil. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderately slow or slow, and available water capacity is moderate. Surface runoff is slow. The seasonal high water table is at a depth of 1-1/2 to 3 feet. This soil is often ponded after a heavy rain. If the soil is not limed, it is strongly acid or very strongly acid throughout.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used as woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a slight hazard. The seasonal high water table delays tillage and harvesting during wet seasons. Crops respond well to fertilizer and good management. Surface and subsurface drains are needed to remove excess water and facilitate timely tillage. Growing cover crops, returning crop residue, and including hay in the cropping system help maintain the content of organic matter and good tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Grasses that tolerate wetness should be grown. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Wetness restricts the use of machinery. Machine planting is practical in the large areas.

This soil has severe limitations for homesites, onsite waste disposal, and many nonfarm uses because of the seasonal high water table and moderately slow or slow permeability.

This soil is in capability subclass IIw and in woodland group 3w.

MnB—Monongahela silt loam, 3 to 8 percent slopes. This is a gently sloping, deep, moderately well drained soil on stream terraces. Individual areas are oval or are broad and irregular in shape and range from 5 to 30 acres.

Typically, the surface layer is brown silt loam 9 inches thick. The subsoil is 37 inches thick. In the upper part, to a depth of 21 inches, it is light yellowish brown gravelly silty clay loam. In the lower part, to a depth of 46 inches, it is a strong brown and reddish yellow gravelly clay loam fragipan that is mottled. The substratum to a depth of 62 inches is light olive brown shaly loam.

Included with this soil in mapping are areas of Allegheny, Raritan, and Birdsboro soils and areas of soils, similar to Monongahela soils, that are medium acid to slightly acid in the subsoil. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderately slow or slow, and available water capacity is moderate. Surface runoff is medium. The seasonal high water table is at a depth of 1 1/2 to 3 feet. If the soil is not limed, it is strongly acid or very strongly acid throughout.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used as woodland.

In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. The seasonal high water table delays tillage and harvesting during wet seasons. Crops respond well to fertilizer and good management. Surface and subsurface drains are needed to remove excess water and facilitate timely tillage. Stripcropping, grassed waterways, and terraces help reduce runoff and control erosion. Returning crop residue and growing cover crops help maintain the content of organic matter and good tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Grasses that tolerate wetness should be grown. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Wetness restricts the use of machinery. Machine planting is practical in the large areas.

This soil has severe limitations for homesites, onsite waste disposal, and many nonfarm uses because of the seasonal high water table and moderately slow or slow permeability.

This soil is in capability subclass IIe and in woodland group 3w.

MnC—Monongahela silt loam, 8 to 15 percent slopes. This is a sloping, deep, moderately well drained soil on stream terraces. Individual areas are irregularly oval or are long and narrow and range from 5 to 15 acres.

Typically, the surface layer is brown silt loam 9 inches thick. The subsoil is 37 inches thick. In the upper part, to a depth of 21 inches, it is light yellowish brown gravelly silty clay loam. In the lower part, to a depth of 46 inches, it is a strong brown and reddish yellow gravelly clay loam fragipan that is mottled. The substratum to a depth of 62 inches is light olive brown shaly loam.

Included with this soil in mapping are small areas of Allegheny, Berks, and Weikert soils. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderately slow or slow, and available water capacity is moderate. Surface runoff is rapid. The seasonal high water table is at a depth of 1 1/2 to 3 feet. If the soil is not limed, it is strongly acid or very strongly acid throughout.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used as woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Crops respond well to fertilizer and good management. Contour stripcropping, diversions, cover cropping, and crop rotation help reduce runoff and control erosion. Returning crop residue and applying manure help maintain the content of organic matter. Drainage can be improved by installing subsurface drains.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Grasses that tolerate wetness should be grown. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Because of wetness and slope, erosion is a hazard, and the use of equipment is limited. Machine planting is practical in the large areas.

This soil has severe limitations for homesites, onsite waste disposal, and many nonfarm uses because of slope, seasonal high water table, and moderately slow or slow permeability.

This soil is in capability subclass IIIe and in woodland group 3r.

MoB—Morrison sandy loam, 3 to 8 percent slopes. This is a gently sloping, deep, well drained soil on benches and ridgetops. Individual areas are long and narrow and range from 3 to 30 acres.

Typically, the surface layer is light yellowish brown sandy loam about 8 inches thick. The subsoil is 45 inches thick. In the upper part, to a depth of 25 inches, it is light yellowish brown sandy loam. In the lower part, to a depth of 53 inches, it is strong brown and yellowish red channery sandy clay loam. The substratum to a depth of 60 inches is yellowish red channery sandy loam.

Included with this soil in mapping are areas of soils that have slopes of less than 3 percent and areas of Hazleton and Elliber soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate or moderately rapid, and available water capacity is moderate. Surface runoff is medium. If the soil is not limed, it is extremely acid to strongly acid in the surface layer and upper part of the subsoil and is strongly acid or medium acid in the lower part of the subsoil and substratum.

In most areas this soil is used as woodland. In some areas it is used for cultivated crops and as pasture. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Crops respond well to fertilizer and good management. Contour stripcropping, terraces, grassed waterways, crop rotation, and cover crops help control erosion. Returning crop residue and adding manure help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. Machine planting is practical in the large areas.

This soil has few limitations for homesites, onsite waste disposal, and many nonfarm uses.

This soil is in capability subclass IIe and in woodland group 3o.

MoC—Morrison sandy loam, 8 to 15 percent slopes. This is a sloping, deep, well drained soil on benches and side slopes of ridges. Individual areas are irregular in shape or long and narrow and range from 3 to 30 acres.

Typically, the surface layer is light yellowish brown sandy loam about 8 inches thick. The subsoil is 45 inches thick. In the upper part, to a depth of 25 inches, it is light yellowish brown sandy loam. In the lower part, to a depth fo 53 inches, it is strong brown and yellowish red channery sandy clay loam. The substratum to a depth of 60 inches is yellowish red channery sandy loam.

Included with this soil in mapping are areas of Elliber, Hazleton, Clymer, and Lehew soils. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderate or moderately rapid, and available water capacity is moderate. Surface runoff is rapid. If the soil is not limed, it is extremely acid to strongly acid in the surface layer and upper part of the subsoil and strongly acid to medium acid in the lower part of the subsoil and in the substratum.

In most areas this soil is used as woodland. In some areas it is used for cultivated crops and as pasture. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Crops respond fairly well to fertilizer and good management. Contour stripcropping, diversions, grassed waterways, crop rotation, and cover cropping help reduce runoff and control erosion. Returning crop residue and applying manure help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. Machine planting is practical in the large areas.

This soil has limitations for many nonfarm uses, especially homesites and onsite waste disposal, because of slope.

This soil is in capability subclass IIIe and in woodland group 3o.

MoD—Morrison sandy loam, 15 to 25 percent slopes. This is a moderately steep, deep, well drained soil on benches and side slopes of ridges. Individual areas are long and narrow and range from 3 to 30 acres.

Typically, the surface layer is light yellowish brown sandy loam about 8 inches thick. The subsoil is 45 inches thick. In the upper part, to a depth of 25 inches, it is light yellowish brown sandy loam. In the lower part, to a depth of 53 inches, it is strong brown and yellowish red channery sandy clay loam. The substratum to a depth of 60 inches is yellowish red channery sandy loam.

Included with this soil in mapping are areas of soils that have slopes of more than 25 percent and some areas of Elliber, Hazleton, and Lehew soils. Also included are areas where the soil is severely eroded. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderate or moderately rapid, and available water capacity is moderate. Surface runoff is very rapid. If the soil is not limed, it is extremely acid to strongly acid in the surface layer and upper part of the subsoil and is strongly acid or medium acid in the lower part of the subsoil and in the substratum.

In most areas this soil is used as woodland. In some areas it is used for cultivated crops or hay or as pasture. In a few small areas it is quarried for sand or is used for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a very severe hazard. Crops respond to fertilizer and good management. Contour stripcropping, diversions, and minimum tillage help reduce runoff and control erosion. Growing cover crops, returning crop residue, and adding manure help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. The use of equipment for harvesting and tree planting is restricted by moderately steep slopes.

This soil has severe limitations for many nonfarm uses, especially homesites and onsite waste disposal, because of moderately steep slopes.

This soil is in capability subclass IVe and in woodland group 3r.

MuA—Murrill channery loam, 0 to 3 percent slopes. This is a nearly level, deep, well drained soil on benches and lower slopes of mountains. Individual areas are broad and long and range from 5 to 40 acres.

Typically, the surface layer is dark yellowish brown channery loam about 9 inches thick. The subsoil is 53 inches thick. In the upper part, to a depth of 16 inches, it is strong brown channery loam. In the middle part, to a depth of 55 inches, it is strong brown and yellowish red channery silty clay loam. In the lower part, to a depth of 62 inches, it is reddish brown clay loam and is mottled.

Included with this soil in mapping are areas of Laidig, Buchanan, Meckesville, Edom, Hagerstown, and Duffield soils. Also included are small areas of poorly drained soils in depressions where surface water collects and remains for short periods after a heavy rain. Included soils make up about 15 percent of the mapped acreage.

Permeability is moderate or moderately slow, and available water capacity is moderate. Surface runoff is slow. If the soil is not limed, it is medium acid to very strongly acid throughout.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used for orchards or as woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a slight hazard. Crops respond very well to fertilizer and good management. Growing cover crops, returning crop residue, and including hay in the cropping system help maintain the content of organic matter and good tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. Machine planting is practical in the large areas.

This soil has limitations for some nonfarm uses because of moderate or moderately slow permeability and small stones on the surface. In some areas ground water can be contaminated through solution channels and bedrock caverns if the soil is used for onsite waste disposal. Sinkholes are a potential hazard to buildings and roads.

This soil is in capability class I and in woodland group 3o.

MuB—Murrill channery loam, 3 to 8 percent slopes. This is a gently sloping, deep, well drained soil on benches and lower slopes of mountains. Individual areas are broad and long and range from 10 to 100 acres.

Typically, the surface layer is dark yellowish brown channery loam about 9 inches thick. The subsoil is 53 inches thick. In the upper part, to a depth of 16 inches, it is strong brown channery loam. In the middle part, to a depth of 55 inches, it is strong brown and yellowish red channery silty clay loam. In the lower part, to a depth of 62 inches, it is reddish brown clay loam and is mottled.

Included with this soil in mapping are areas of Laidig, Buchanan, Meckesville, Edom, Hagerstown, and Duffield soils. Also included are areas of poorly drained to moderately well drained soils in depressions where surface water collects and remains for short periods after a heavy rain. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate or moderately slow, and available water capacity is moderate. Surface runoff is medium. If the soil is not limed, it is medium acid to very strongly acid throughout.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used for orchards or as woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Crops respond very well to fertilizer and good management. Contour stripcropping, minimum tillage, terraces, grassed waterways, and crop rotation help reduce runoff and control erosion. Growing cover crops and returning crop residue help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. Machine planting is practical in the large areas.

This soil has limitations for many nonfarm uses because of moderate or moderately slow permeability and small stones on the surface. In some areas ground water can be contaminated through solution channels and bedrock caverns if the soil is used for onsite waste disposal. Sinkholes are a potential hazard to buildings and roads.

This soil is in capability subclass IIe and in woodland group 3o.

MuC—Murrill channery loam, 8 to 15 percent slopes. This is a sloping, deep, well drained soil on benches and lower slopes of mountains. Individual areas are long and narrow or are irregular in shape and range from 10 to 50 acres.

Typically, the surface layer is dark yellowish brown channery loam about 9 inches thick. The subsoil is 53 inches thick. In the upper part, to a depth of 16 inches, it is strong brown channery loam. In the middle part, to a depth of 55 inches, it is strong brown and yellowish red channery silty clay loam. In the lower part, to a depth of 62 inches, it is reddish brown clay loam and is mottled.

Included with this soil in mapping are small areas of Laidig, Buchanan, Meckesville, Edom, Hagerstown, and Duffield soils and small areas of poorly drained to moderately well drained soils in depressions. Included soils make up about 10 percent of the mapped acreage.

Permeability is moderate or moderately slow, and available water capacity is moderate. Surface runoff is rapid. If the soil is not limed, it is medium acid to very strongly acid throughout.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used for orchards or as woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Crops respond very well to fertilizer and

good management. Diversions, contour stripcropping, grassed waterways, cover crops, and crop rotation help reduce runoff and control erosion. Growing cover crops and returning crop residue help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. Machine planting is practical in the large areas.

This soil has limitations for many nonfarm uses, especially homesites and onsite waste disposal, because of slope, moderate or moderately slow permeability, and small stones on the surface. In some areas ground water can be contaminated through solution channels and bedrock caverns if the soil is used for onsite waste disposal. Sinkholes are a potential hazard to buildings and roads.

This soil is in capability subclass IIIe and in woodland group 3o.

NeB—Neshaminy gravelly silt loam, 3 to 8 percent slopes. This is a gently sloping, deep, well drained soil on benches and hilltops. Individual areas are irregular in shape or are long and narrow and range from 2 to 30 acres.

Typically, the surface layer is dark brown gravelly silt loam 8 inches thick. The subsurface layer is brown gravelly silt loam 4 inches thick. The subsoil is 42 inches thick. In the upper part it is strong brown silty clay loam. In the lower part it is yellowish red clay loam, gravelly clay loam, and gravelly loam. The substratum to a depth of 73 inches is yellowish red very gravelly loam.

Included with this soil in mapping are areas of Hagerstown, Highfield, and Duffield soils. Also included are areas of Neshaminy soils that have slopes of less than 3 percent or are severely eroded. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderately slow, and available water capacity is high. Surface runoff is medium. If the soil is not limed, it is very strongly acid to medium acid in the surface and subsurface layers and upper part of the subsoil and is strongly acid or medium acid in the lower part of the subsoil and substratum.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used as woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Crops respond fairly well to fertilizer and good management. Contour stripcropping, minimum tillage, terraces, and crop rotation help reduce runoff and control erosion. Growing cover crops and returning crop residue help maintain the content of organic matter and improve tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is high. Management problems are few. Machine planting is practical in the large areas.

This soil has limitations for many nonfarm uses, especially homesites and onsite waste disposal, because of moderately slow permeability, depth to bedrock, and coarse fragments on the surface. Although bedrock is at a depth of more than 48 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass IIe and in woodland group 2o.

NeC—Neshaminy gravelly silt loam, 8 to 15 percent slopes. This is a sloping, deep, well drained soil on benches and side slopes of hills. Individual areas are irregular in shape or are long and narrow and range from 2 to 30 acres.

Typically, the surface layer is dark brown gravelly silt loam 8 inches thick. The subsurface layer is brown gravelly silt loam 4 inches thick. The subsoil is 42 inches thick. The upper part is strong brown silty clay loam. The lower part is yellowish red clay loam, gravelly clay loam, and gravelly loam. The substratum to a depth of 73 inches is yellowish red very gravelly loam.

Included with this soil in mapping are areas of Hagerstown, Highfield, and Duffield soils. Also included are areas of Neshaminy soils that have slopes of more than 15 percent or are severely eroded. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderately slow, and available water capacity is high. Surface runoff is rapid. If the soil is not limed, it is very strongly acid to medium acid in the surface and subsurface layers and upper part of the subsoil and strongly acid or medium acid in the lower part of the subsoil and substratum.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used as woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. Crops respond fairly well to fertilizer and good management. Diversions, contour stripcropping, cover crops, and crop rotation help reduce runoff and control erosion. Growing cover crops and returning crop residue help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is high. Management problems are few. Machine planting is practical in the large areas.

This soil has limitations for many nonfarm uses, especially homesites and onsite waste disposal, because of slope, moderately slow permeability, depth to bedrock, and coarse fragments on the surface. Although bedrock is at a depth of more than 48 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass IIIe and in woodland group 2o.

NhB—Neshaminy very stony silt loam, 0 to 8 percent slopes. This is a nearly level and gently sloping, deep, well drained soil on benches and hilltops. Large stones, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are irregular in shape or are long and narrow and range from 5 to 30 acres.

Typically, the surface layer is dark brown gravelly silt loam 8 inches thick. The subsurface layer is brown gravelly silt loam 4 inches thick. The subsoil is 42 inches thick. The upper part is strong brown silty clay loam. The lower part is yellowish red clay loam, gravelly clay loam, and gravelly loam. The substratum to a depth of 73 inches is yellowish red very gravelly loam.

Included with this soil in mapping are areas of Hazleton, Hagerstown, Highfield, and Duffield soils and areas of Neshaminy soils where less than 3 percent of the surface is covered by stones. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderately slow, and available water capacity is high. Surface runoff is slow to medium. If the soil is not limed, it is very strongly acid to medium acid in the surface and subsurface layers and upper part of the subsoil and strongly acid or medium acid in the lower part of the subsoil and substratum.

In nearly all of the areas this soil is used as woodland or pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is too stony to be suitable for cultivated crops or improved pasture. It is not economically feasible to remove the trees and stones to make the soil suitable for cultivated crops and pasture.

This soil is suited to use as woodland, and potential productivity is high. Management problems are few. Machine planting is restricted because of the large stones on the surface.

This soil has severe limitations for many nonfarm uses because of the large stones on the surface, moderately slow permeability, and depth to bedrock. Although bedrock is at a depth of more than 48 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass VIs and in woodland group 2o.

NhD—Neshaminy very stony silt loam, 8 to 25 percent slopes. This is a sloping and moderately steep, deep, well drained soil on rolling benches and side slopes of hills. Large stones, 1 foot to 6 feet or more in diameter, cover 3 to 15 percent of the surface. Individual areas are long and narrow and range from 5 to 50 acres.

Typically, the surface layer is dark brown gravelly silt loam 8 inches thick. The subsurface layer is brown gravelly silt loam 4 inches thick. The subsoil is 42 inches thick. The upper part is strong brown silty clay loam. The lower part is yellowish red clay loam, gravelly clay loam, and gravelly loam. The substratum to a depth of 73 inches is yellowish red very gravelly loam.

Included with this soil in mapping are areas of Hazleton, Hagerstown, Highfield, and Duffield soils. Also included are areas of Neshaminy soils that have slopes of more than 25 percent or that have less than 3 percent of the surface covered by stones. Included areas make up about 10 percent of the mapped acreage.

Permeability is moderately slow, and available water capacity is high. Surface runoff is rapid to very rapid. If the soil is not limed, it is very strongly acid to medium acid in the surface and subsurface layers and upper part of the subsoil and strongly acid or medium acid in the lower part of the subsoil and in the substratum.

In nearly all of the areas this soil is used as woodland or pasture. In a few areas it is used as homesites and for other nonfarm uses.

This soil is too stony to be suitable for cultivated crops or improved pasture. It is not economically feasible to remove the trees and stones to make the soil suitable for cultivated crops and pasture.

This soil is suited to use as woodland, and potential productivity is high. The use of equipment for harvesting and tree planting is restricted because of slope.

This soil has severe limitations for most nonfarm uses because of slope, large stones on the surface, moderately slow permeabilty, and depth to bedrock. Although bedrock is at a depth of more than 48 inches, it is a limitation for homesites and onsite waste disposal if the depth is less than 72 inches.

This soil is in capability subclass VIs and in woodland group 2r.

Pe—Penlaw silt loam. This is a nearly level, deep, somewhat poorly drained soil on upland flats, in depressions, and at the heads of drainageways. Individual areas are long and narrow or are irregular in shape and range from 2 to 20 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark brown silt loam 9 inches thick. The subsoil is 40 inches thick. In the upper part, to a depth of 21 inches, it is light yellowish brown silty clay loam and is mottled. In the lower part, to a depth of 49 inches, it is a light yellowish brown and yellowish brown silty clay loam fragipan that is mottled.

The substratum to a depth of 60 inches is strong brown silty clay loam and is mottled.

Included with this soil in mapping are areas of poorly drained and very poorly drained soils. Also included are areas of soils that have a gravelly loam and sandy loam surface layer and areas of Huntington and Kreamer soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is slow, and available water capacity is high. Surface runoff is slow. The seasonal high water table is at a depth of 1/2 foot to 1 1/2 feet. The soil is medium acid to neutral throughout.

In most areas this soil is used for cultivated crops or hay or as pasture. In some areas it is used as woodland. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a slight hazard. Crops respond well to fertilizer and good management. Because of the seasonal high water table and slow permeability, crops that tolerate wetness should be grown. Stripcropping, grassed waterways, crop rotation, and cover crops help control erosion. Returning crop residue and adding manure help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Grasses that tolerate wetness should be grown. Pasture should not be grazed during wet periods because of the risk of surface compaction. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is high for water-tolerant species. The seasonal high water table restricts the use of machinery. Windthrow losses and seedling mortality are severe problems.

This soil has very severe limitations for most nonfarm uses, especially homesites and onsite waste disposal, because of the seasonal high water table and slow permeability.

This soil is in capability subclass IIIw and in woodland ordination group 2w.

Pt—Pits and quarries. This miscellaneous land type consists of excavated areas that have been mined or are being mined for limestone, sand, shale, gravel, or clay. Areas of pits and quarries are scattered throughout the survey area. Limestone quarries are in the limestone valleys. Sand pits and clay pits are mostly in mountain areas. Shale pits are on shale ridges, mostly in valleys. Gravel pits are generally along major streams and rivers. Individual areas of this map unit are irregular in shape and range from 1 acre to 100 acres or more.

The bottom of the quarries consists of exposed bedrock. Little or no vegetation exists in these areas. High walls are common; in places the height exceeds 100 feet. The bottom of the pits consists mostly of sand and gravel and, in a few areas, clay. A few areas have intermittent standing water on the bottoms. Most areas are either devoid of vegetation or have sparse vegetation.

Many of the areas are being presently quarried or mined. After quarrying or mining is completed, the areas generally are idle. Some areas are being used as landfills. A few areas have been reclaimed; however, lack of soil material and difficulty of excavation make reclamation difficult and expensive. The areas are generally not suited to most uses because of exposed bedrock, poor material, steep high walls, or a high percentage of coarse fragments. However, onsite investigation is needed to determine suitability for a specific use.

This map unit is not assigned to a capability subclass or woodland group.

Pu—Purdy silt loam. This is a nearly level, deep, poorly drained and very poorly drained soil on terraces and flats and in depressions. Individual areas are long and narrow or are irregular in shape and oval and range from 2 to 15 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The subsoil is 37 inches thick. It is gray and dark gray silty clay loam and silty clay and is mottled. The substratum to a depth of 60 inches is dark gray silty clay.

Included with this soil in mapping are areas where the surface layer is silty clay loam and areas where the soil is medium acid throughout. Also included are areas of Tyler and Monongahela soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is slow or very slow, and available water capacity is high. Surface runoff is slow or ponded. The high water table is at the surface or within 1/2 foot during wet periods. If the soil is not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used as pasture or woodland. In some areas it is used for cultivated crops. In a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a slight hazard. The high water table reduces crop yields. Surface or subsurface drains are needed in places to facilitate timely tillage and increase the choice of suitable crops.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Grasses that can tolerate wetness should be grown. Pasture should not be grazed during wet periods because of the risk of surface compaction. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is very high for water-tolerant species. A high water table restricts the use of machinery for long

periods. Windthrow losses and seedling mortality are severe problems.

This soil has very severe limitations for homesites, onsite waste disposal, and most other nonfarm uses because of the high water table and slow or very slow permeability.

This soil is in capability subclass IVw and in woodland group 1W.

RaA—Raritan silt loam, 0 to 5 percent slopes. This is a nearly level and gently sloping, deep, moderately well drained and somewhat poorly drained soil on stream terraces. Individual areas are irregularly broad and oval or are long and narrow and range from 2 to 20 acres.

Typically, the surface layer is dark brown silt loam 10 inches thick. The subsoil is 38 inches thick. In the upper part, to a depth of 15 inches, it is yellowish red silt loam. In the middle part, to a depth of 29 inches, it is reddish brown and yellowish red clay loam and gravelly clay loam and is mottled. In the lower part, to a depth of 48 inches, it is a yellowish red gravelly clay loam fragipan that is mottled. The substratum to a depth of 65 inches is yellowish red, stratified sand, silt, and gravel and is mottled.

Included with this soil in mapping are areas where the surface layer is gravelly silt loam and areas where slopes are more than 5 percent. Also included are small areas of Monongahela and Birdsboro soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately slow, and available water capacity is moderate. Surface runoff is slow to medium. The seasonal high water table is at a depth of 1/2 foot to 3 feet. This soil is rarely flooded. If the soil is not limed, it is medium acid to very strongly acid throughout.

In most areas this soil is used for cultivated crops or as pasture. In some areas it is used as woodland or as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a slight or moderate hazard. The seasonal high water table delays tillage and harvesting during wet seasons. Crops respond well to fertilizer and good management. Stripcropping, grassed waterways, and terraces help control erosion. Returning crop residue and applying manure help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Grasses that tolerate wetness should be used. Pasture should not be grazed during wet periods because of the risk of surface compaction. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is moderately high. Management problems are few. The use of equipment is restricted during wet seasons. Machine planting is practical in the large areas.

This soil has severe limitations for homesites, onsite waste disposal, and other nonfarm uses because of the seasonal high water table, flooding, and slow permeability.

This soil is in capability subclass IIw and in woodland group 3w.

Tg—Tioga soils. These are nearly level, deep, well drained soils on flood plains. Individual areas are long and narrow and range from 3 to 10 acres. Some areas consist mostly of Tioga silt loam, some areas are mostly Tioga loam or fine sandy loam, and in some areas the various surface textures are intermingled. These soils were mapped as a single unit because of similarity in use and management. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil is yellowish brown silt loam about 27 inches thick. The substratum to a depth of 60 inches is yellowish brown fine sandy loam.

Included with these soils in mapping are areas that are very strongly acid in the substratum. Also included are areas of Middlebury, Chavies, and Atkins soils. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderate, and available water capacity is high. Surface runoff is slow. These soils are subject to occasional flooding early in spring; however, floodwater does not remain for long periods. If the soils are not limed, they are strongly acid or medium acid in the surface layer and subsoil and slightly acid to neutral in the substratum.

In most areas these soils are used for cultivated crops. In some areas they are used as woodland. In a few areas they are used as homesites and for other nonfarm uses.

If these soils are used for cultivated crops, erosion is a slight hazard. Crops respond well to fertilizer and good management. Returning crop residue and applying manure help maintain the content of organic matter and good soil tilth.

If these soils are used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

These soils are suited to use as woodland, and potential productivity is high. Management problems are few. Machine planting is practical in the large areas.

These soils have severe limitations for homesites, onsite waste disposal, and many nonfarm uses because of the hazard of flooding.

These soils are in capability class I and in woodland group 2o.

Ty—Tyler silt loam. This is a nearly level, deep, somewhat poorly drained soil on stream terraces. Individual areas are long and narrow or irregular in shape and oval and range from 2 to 15 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsurface layer is 4 inches thick. It is brown silt loam and is mottled. The subsoil is 49 inches thick. In the upper part, to a depth of 21 inches, it is light brownish gray silty clay loam and is mottled. In the lower part, to a depth of 62 inches, it is a yellowish brown silty clay loam fragipan that is mottled. The substratum to a depth of 68 inches is mottled, yellowish brown, stratified gravelly silt loam and silty clay loam.

Included with this soil in mapping are areas where the surface layer is silty clay loam and areas where the subsoil is slightly acid. Also included are small areas of Purdy and Monongahela soils. Included areas make up about 20 percent of the mapped acreage.

Permeability is slow or very slow, and available water capacity is moderate. Surface runoff is slow. The seasonal high water table is at a depth of 1/2 foot to 2 feet. If the soil is not limed, it is strongly acid to extremely acid throughout.

In most areas this soil is used as pasture or for cultivated crops or hay. In some areas it is used as woodland, and in a few areas it is used as homesites and for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a slight hazard. Because of the seasonal high water table, crops that tolerate wetness should be grown. Surface or subsurface drains improve drainage and thus facilitate timely tillage and a wider crop selection. Returning crop residue and applying manure help maintain the content of organic matter and improve soil tilth.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Grasses that tolerate wetness should be grown. Pasture should not be grazed during wet periods because of the risk of surface compaction. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

This soil is suited to use as woodland, and potential productivity is high for water-tolerant species. The seasonal high water table restricts the use of machinery. Seedling mortality and windthrow losses are severe problems. Machine planting is practical in the large areas.

This soil has severe limitations for many nonfarm uses, especially homesites and onsite waste disposal, because of the seasonal high water table and slow or very slow permeability.

This soil is in capability subclass IIIw and in woodland group 2d.

Ub—Urban land and Udorthents. This map unit consists of Urban land and nearly level to very steep, shallow to deep, well drained to somewhat poorly drained Udorthents on uplands and flood plains. Urban land and Udorthents were mapped as a single unit because of similar use. Urban land makes up about 55 percent of the map unit, Udorthents make up 35 percent, and included soils make up 10 percent. Some areas consist mostly of Urban land, some mostly of Udorthents, and some consist of both, intermingled. Individual areas are square, angular, or irregular in shape and range from 5 to more than 100 acres. Slopes range from 0 to 50 percent.

Urban land consists of areas covered with buildings, parking lots, and roads to such an extent that the soils cannot be observed.

Udorthents consist of mixed soil and rock material that has been altered by man. Typically, the soil, to a depth of 0 to 60 inches or more, is a mixture of rock and soil material derived from limestone, shale, or sandstone.

Included in mapping are small areas of Hagerstown, Berks, Duffield, and Weikert soils. Included areas make up about 10 percent of the mapped acreage.

Permeability of Udorthents is slow to rapid, and available water capacity is low to high. Surface runoff is slow to medium. The seasonal high water table is at a depth of 1/2 foot to 3 feet or more. The soil is extremely acid to mildly alkaline throughout.

In most areas this map unit has been developed for commercial, residential, or industrial uses. It is not suited to farm uses. Suitability for nonfarm uses varies according to thickness and kind of soil material, content of stone fragments, and slope. Onsite investigation is needed to determine suitability and limitations for a specific use.

This map unit was not assigned to a capability subclass or woodland group.

Wa—Warners silt loam. This is a nearly level, deep, very poorly drained soil on flood plains along streams that originate from limestone springs. Individual areas are long and narrow and range from 2 to 10 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is very dark gray silt loam about 12 inches thick. The upper part of the substratum is gray silt loam and is mottled. The lower part is gray marl and loam.

Included with this soil in mapping are areas of Melvin and Lindside soils and areas of poorly drained and moderately well drained soils. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderate or moderately slow, and available water capacity is high. Runoff is slow to ponded. The water table is at or near the surface much of the time, except where the soil has been drained. This soil is frequently flooded. The surface layer is slightly acid to moderately alkaline, and the substratum is mildly alkaline or moderately alkaline.

In most areas this soil is used as pasture. In some areas it is used for cultivated crops and in a few small areas, for watercress farms.

If this soil is drained, crops that tolerate wetness and periodic flooding can be grown. Artificial drainage increases the suitability for crops. Optimum production

requires returning crop residue to maintain the content of organic matter and soil fertility.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Grasses that can tolerate wetness should be grown. Pasture should not be grazed during wet periods because of the risk of surface compaction.

This soil is not suited to use as woodland, and potential productivity is low. The high water table and frequent flooding restrict the use of machinery. Seedling mortality and windthrow losses are severe problems.

This soil has severe limitations for most nonfarm uses because of the high water table and frequent flooding.

This soil is in capability subclass IIIw and in woodland group 5w.

WeB—Weikert very shaly silt loam, 3 to 8 percent slopes. This is a gently sloping, shallow, well drained soil on tops of hills and ridges. Individual areas are irregular in shape or are long and narrow and range from 3 to 30 acres.

Typically, the surface layer is dark brown very shaly silt loam about 6 inches thick. The subsoil is yellowish brown very shaly silt loam 8 inches thick. The substratum extends to a depth of 17 inches and is yellowish brown very shaly silt loam. Dark yellowish brown and yellowish brown shale bedrock is at a depth of 17 inches.

Included with this soil in mapping are areas of Berks, Blairton, Calvin, and Klinesville soils. Also included are areas where the subsoil is slightly acid and areas where the depth to bedrock is less than 10 inches. Included areas make up about 15 percent of the mapped acreage.

Permeability is moderately rapid, and available water capacity is very low. Surface runoff is medium. If the soil is not limed, it is medium acid to very strongly acid throughout.

In most areas this soil is used as pasture or for hay or cultivated crops or as woodland. In some areas it is used as homesites or for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a moderate hazard. Shallow depth to bedrock and very low available water capacity limit yields, especially in drier years. Contour stripcropping, terraces, and grassed waterways help reduce runoff and control erosion. Growing cover crops, returning crop residue, and applying manure help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Grasses that can tolerate droughtiness should be grown. Pasture should not be overgrazed, especially during drier periods. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

If this soil is used as woodland, potential productivity is moderate. Because bedrock is at a depth of 10 to 20 inches and the soil is droughty, seedling mortality is a severe problem. Machine planting is practical in the large areas.

This soil has severe limitations for most nonfarm uses, especially homesites and onsite waste disposal, because of very low available water capacity, bedrock at a depth of 10 to 20 inches, and coarse fragments on the surface.

This soil is in capability subclass IIIe and in woodland group 4d.

WeC—Weikert very shaly silt loam, 8 to 15 percent slopes. This is a sloping, shallow, well drained soil on side slopes of ridges and hills. Individual areas are irregular in shape or long and narrow and range from 5 to 30 acres.

Typically, the surface layer is dark brown very shaly silt loam about 6 inches thick. The subsoil extends to a depth of 14 inches and is yellowish brown very shaly silt loam. The substratum extends to a depth of 17 inches and is yellowish brown very shaly silt loam. Dark yellowish brown and yellowish brown shale bedrock is at a depth of 17 inches.

Included with this soil in mapping are areas of Berks, Blairton, Calvin, Lehew, and Klinesville soils. Also included are areas where the depth to bedrock is less than 10 inches and a few areas of bedrock outcrops. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderately rapid, and available water capacity is very low. Surface runoff is rapid. If the soil is not limed, it is medium acid to very strongly acid throughout.

In most areas this soil is used for hay or cultivated crops or as pasture or woodland. In a few areas it is used as homesites or for other nonfarm uses.

If this soil is used for cultivated crops, erosion is a severe hazard. The shallow depth to bedrock and the very low available water capacity are limitations. Contour stripcropping, diversions, grassed waterways, minimum tillage, crop rotation, and other conservation practices help reduce runoff and control erosion. Growing cover crops, returning crop residue, and applying manure help maintain the content of organic matter.

If this soil is used as pasture, proper stocking rates and rotational grazing help maintain key plant species. Grasses that can tolerate droughtiness should be selected. Pasture should not be overgrazed, especially during drier periods. Optimum production requires periodic applications of fertilizer to maintain soil fertility.

If this soil is used as woodland, potential productivity is moderate. Because bedrock is at a depth of 10 to 20 inches and the soil is droughty, seedling mortality is a severe problem. Windthrow loss is a problem because of shallow rooting depth. Machine planting is practical in the larger areas.

This soil has severe limitations for most nonfarm uses, especially for use as homesites and onsite waste

Figure 22.—Exposed shale bedrock in an area of Weikert and Klinesville very shaly silt loams, 25 to 75 percent slopes.

disposal, because of the very low available water capacity, slope, bedrock at a depth of 10 to 20 inches, and coarse fragments on the surface.

This soil is in capability subclass IVe and in woodland group 4d.

WeD—Weikert very shaly silt loam, 15 to 25 percent slopes. This is a moderately steep, shallow, well drained soil on side slopes of hills and ridges. Individual areas are long and narrow and range from 10 to 50 acres.

Typically, the surface layer is dark brown very shaly silt loam about 6 inches thick. The subsoil is yellowish brown very shaly silt loam 8 inches thick. The substratum extends to a depth of 17 inches and is yellowish brown very shaly silt loam. Dark yellowish brown and yellowish brown shale bedrock is at a depth of 17 inches.

Included with this soil in mapping are areas of Berks, Calvin, Lehew, and Klinesville soils. Also included are areas where the depth to bedrock is less than 10 inches and a few bedrock outcrops. Included areas make up about 15 percent of the mapped acreage.

Permeabilty is moderately rapid, and available water capacity is very low. Surface runoff is very rapid. If the soil is not limed, it is medium acid to very strongly acid throughout.

In most areas this soil is used as pasture or woodland, or it is idle. In a few areas it is used as homesites or for other nonfarm uses.

This soil is too shallow, steep, and droughty to be suitable for cultivated crops and improved pasture. Crops yields are so low that it is not economical to use the soil as cropland or pasture.

If this soil is used as woodland, potential productivity is moderate. Seedling mortality is a severe problem because of very low available water capacity. The use of equipment is restricted because of moderately steep slopes. Windthrow loss is a problem because of shallow rooting depth.

This soil has severe limitations for most nonfarm uses, especially homesites and onsite waste disposal, because of slope, bedrock at a depth of 10 to 20 inches, coarse fragments on the surface, and very low available water capacity.

This soil is in capability subclass VIe and in woodland group 4d.

WkF—Weikert and Klinesville very shaly silt loams, 25 to 75 percent slopes. This map unit consists of steep and very steep, shallow, well drained soils on side slopes of hills and ridges. The Weikert and Klinesville soils were mapped together because they have no major differences in use and management. Some areas consist mostly of the Weikert soil, some mostly of the Klinesville soil, and some areas consist of both, intermingled. The Weikert soil makes up about 45 percent of the unit, the Klinesville soil makes up 35 percent, and other soils make up 20 percent. Individual areas are long and narrow and range from 10 to 300 acres.

Typically, the surface layer of the Weikert soil is dark brown very shaly silt loam about 6 inches thick. The subsoil is 8 inches thick and is yellowish brown very shaly silt loam. The substratum extends to a depth of 17 inches and is yellowish brown very shaly silt loam. Dark yellowish brown and yellowish brown shale bedrock is at a depth of 17 inches (fig. 22).

Typically, the surface layer of the Klinesville soil is reddish brown very shaly silt loam about 5 inches thick. The subsoil is 10 inches thick and is reddish brown very shaly silt loam. Partly weathered dusky red shale bedrock is at a depth of 15 inches.

Included with this unit in mapping are areas of Berks, Calvin, Hazleton, and Lehew soils. Also included are areas where the depth to bedrock is less than 10 inches. Included areas make up about 20 percent of the mapped acreage.

Permeability is moderately rapid, and available water capacity is very low. Surface runoff is very rapid. The soil is very strongly acid to medium acid throughout.

In most areas these soils are used as woodland or pasture. In a few areas they are in nonfarm uses.

The soils in this unit are too shallow, steep, and droughty to be suitable for cultivated crops or improved pasture.

If these soils are used as woodland, potential productivity is moderate. Seedling mortality is a severe problem because of very available low water capacity. The use of equipment is severely limited because of steep slopes. Windthrow loss is a severe problem because of shallow rooting depth.

The soils in this unit have severe limitations for homesites and most nonfarm uses because of steep slopes, bedrock at a depth of 10 to 20 inches, and very low available water capacity.

These soils are in capability subclass VIIe and in woodland group 4d.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in providing for the Nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited and the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the use of our Nations' prime farmland with wisdom and foresight.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and water supply needed to economically produce a sustained high yield of crops when it is treated and managed using acceptable farming methods. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland may presently be cropland, pasture, woodland, or in other uses. It cannot be urban and built-up areas or water areas. It must either be used for producing food or fiber or be available for these uses.

Prime farmland generally has an adequate and dependable supply of water from precipitation or irrigation. It also has favorable temperature and growing season and an acceptable degree of acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods and is not flooded during the growing season. The slope ranges mainly from 0 to 8 percent. For more detailed information on the criteria for prime farmland, consult the local office of the Soil Conservation Service.

About 110,000 acres, or nearly 31 percent, of Cumberland County and 42,000 acres, or nearly 12 percent, of Perry County meet the soil requirements for prime farmland. Areas are scattered throughout the counties; most areas, however, are in the valleys and on secondary ridges. Most of this prime farmland is currently used for crops. The major crops are corn and alfalfa.

A recent trend in land use in some parts of Cumberland and Perry Counties has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and difficult to cultivate, and generally less productive.

Detailed map units that make up prime farmland in Cumberland and Perry Counties are listed in this section. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the soil maps in the back of this publication. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units."

The map units that meet the soil requirements for prime farmland in Cumberland County are:

AgA Allegheny silt loam, 0 to 3 percent slopes
AgB Allegheny silt loam, 3 to 8 percent slopes
AtB Athol gravelly loam, 3 to 8 percent slopes
BdB Bedington shaly silt loam, 3 to 8 percent slopes
BoA Birdsboro silt loam, 0 to 5 percent slopes
BuB Buchanan gravelly loam, 3 to 8 percent slopes
Ch Chavies fine sandy loam
DuA Duffield silt loam, 0 to 3 percent slopes
DuB Duffield silt loam, 3 to 8 percent slopes
DxA Duncannon very fine sandy loam, 0 to 3 percent slopes
DxB Duncannon very fine sandy loam, 3 to 8 percent slopes
EdB Edom silty clay loam, 3 to 8 percent slopes
GnB Glenville silt loam, 3 to 8 percent slopes
HaA Hagerstown silt loam, 0 to 3 percent slopes
HaB Hagerstown silt loam, 3 to 8 percent slopes
HeB Hazleton channery sandy loam, 3 to 8 percent slopes
HgB Highfield channery silt loam, 3 to 8 percent slopes
HuA Huntington silt loam, 0 to 5 percent slopes
LdB Laidig channery loam, 3 to 8 percent slopes
Ls Lindside silt loam
Mf Middlebury soils
MnA Monongahela silt loam, 0 to 3 percent slopes
MoB Morrison sandy loam, 3 to 8 percent slopes
MuA Murrill channery loam, 0 to 3 percent slopes
MuB Murrill channery loam, 3 to 8 percent slopes
NeB Neshaminy gravelly silt loam, 3 to 8 percent slopes
Tg Tioga soils

The map units that meet the soil requirements for prime farmland in Perry County are:

AbB Albrights silt loam, 3 to 8 percent slopes
AgA Allegheny silt loam, 0 to 3 percent slopes
AgB Allegheny silt loam, 3 to 8 percent slopes

Bb Barbour soils
Bc Basher soils
BdB Bedington shaly silt loam, 3 to 8 percent slopes
BoA Birdsboro silt loam, 0 to 5 percent slopes
BuB Buchanan gravelly loam, 3 to 8 percent slopes
Ch Chavies fine sandy loam
DuA Duffield silt loam, 0 to 3 percent slopes
DuB Duffield silt loam, 3 to 8 percent slopes
DxA Duncannon very fine sandy loam, 0 to 3 percent slopes
DxB Duncannon very fine sandy loam, 3 to 8 percent slopes
EdB Edom silty clay loam, 3 to 8 percent slopes
EeB Elliber very cherty silt loam, 3 to 8 percent slopes
HaA Hagerstown silt loam, 0 to 3 percent slopes
HaB Hagerstown silt loam, 3 to 8 percent slopes
HeB Hazleton channery sandy loam, 3 to 8 percent slopes
HuA Huntington silt loam, 0 to 5 percent slopes
KrA Kreamer cherty silt loam, 0 to 3 percent slopes
KrB Kreamer cherty silt loam, 3 to 8 percent slopes
LdB Laidig channery loam, 3 to 8 percent slopes
Ls Lindside silt loam
McB Meckesville silt loam, 3 to 8 percent slopes
Mf Middlebury soils
MnA Monongahela silt loam, 0 to 3 percent slopes
MoB Morrison sandy loam, 3 to 8 percent slopes
MuA Murrill channery loam, 0 to 3 percent slopes
MuB Murrill channery loam, 3 to 8 percent slopes
NeB Neshaminy gravelly silt loam, 3 to 8 percent slopes
RaA Raritan silt loam, 0 to 5 percent slopes
Tg Tioga soils

Use and Management of the Soils

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

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

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

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

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

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

Crops and Pasture

John C. Spitzer, conservation agronomist, Soil Conservation Service, helped 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 "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

In 1978 livestock and livestock products accounted for most of the income from agriculture for Cumberland and Perry Counties.

According to the 1975 Conservation Needs Inventory, 189,000 acres was used as cropland and pasture in Cumberland County. Of this total, 29,000 acres was used as permanent pasture; 51,000 acres for row crops, mainly corn for grain; 29,000 acres for small grains; 64,000 acres as permanent and rotation hayland; 7,000 acres as rotation pastureland; 1,500 acres for orchards; and 7,500 acres was used for specialty crops or for conservation or was temporarily idle.

In Perry County, 100,000 acres was used as cropland and pasture. Of this total, 16,000 acres was used as permanent pasture; 15,000 acres for row crops, mainly corn for grain; 22,000 acres for small grains; 25,000 as permanent and rotation hayland; 4,000 acres as rotation pastureland; 1,100 acres for orchards; and 16,900 acres was used for specialty crops or for conservation or were temporarily idle.

Many of the soils in the survey area are too stony to be used as cropland and have poor potential for increased production of food. However, the soils that have few or no stones on the surface have good potential. About 63,000 acres of potentially good cropland is currently being used as woodland and about 13,928 acres as pastureland. In addition to the reserve productive capacity represented by this land, food production can be increased considerably by extending the latest crop production technology to all of the cropland in the survey area. This soil survey can greatly facilitate the application of such technology.

Soil erosion is the major management problem on most of the cropland and pasture in Cumberland and Perry Counties. For example, Hagerstown, Duffield, and Kreamer soils are potentially productive soils for crops and pasture, but in areas where the slopes are more than 3 percent, erosion is a moderate to severe hazard.

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

In sloping fields on channery soils, such as Highfield and Hazleton soils, preparing a good seedbed and tilling are generally difficult because the original surface soil has been eroded away, and the surface is covered with coarse fragments. Practices that provide a protective surface cover, reduce surface water runoff, and increase infiltration help control erosion. A cropping system that keeps vegetative cover on the soil for extended periods helps keep soil losses to a minimum.

On livestock farms, which require pasture and hay, the legume and grass forage crops in the cropping system help reduce erosion on sloping land and also provide nutrients and improve soil tilth.

Contour farming and stripcropping are common erosion control practices in the survey area. They are best adapted to soils that have smooth, uniform slopes. In most areas the sloping Berks, Calvin, Elliber, Hagerstown, Kreamer, and Neshaminy soils are suited to these practices. However, in some areas these soils have irregular slopes, and contour tillage or terracing is impractical. In these areas, a cropping system that provides substantial vegetative cover is needed to control erosion. Conservation tillage provides additional soil protection. Minimizing tillage, cover cropping, and leaving crop residue on the surface help increase infiltration and reduce the hazard of erosion. These practices can be adapted to most soils in the survey area. No-tillage for corn is effective in reducing erosion on sloping land and can be adapted to most soils in the survey area, except the poorly drained and very poorly drained soils.

Diversions reduce the length of slope and thus reduce erosion. They are most practical on deep, well drained soils that have regular slopes. Athol and Bedington soils are suitable for diversions. The other soils are less suitable for diversions because of irregular slopes, excessive wetness in the diversion channels, or bedrock at a depth of less than 40 inches.

Information for the design of erosion practices for each kind of soil is at local offices of the Soil Conservation Service.

Soil drainage is the major management need on 56,081 acres of land used for crops and pasture in the survey area. The poorly drained and very poorly drained Atkins, Purdy, and Tyler soils are naturally so wet that production of crops or pasture common to the area is generally not successful without artificial drainage.

The design of both surface and subsurface drainage systems varies according to the kind of soil. A combination of surface drainage and tile drainage is needed in most areas of the poorly drained soils if they are used for intensive cropping. Drains have to be more closely spaced in the soils that have slow permeability than in the more permeable soils. Finding adequate outlets for drainage systems is often difficult in areas of Atkins soils.

Soil fertility is naturally low in some soils in the survey area. Many of the soils on uplands are naturally strongly acid and require application of ground limestone to supply calcium and to raise the Ph level sufficiently for good growth of alfalfa and other crops. Available phosphorus and magnesium levels are naturally low in most soils. Additions of lime and fertilizer should be based on the results of soil tests, on the need of the crop, and on the expected yields. The Cooperative Extension Service can help in determining the kinds and amounts of lime and fertilizer to apply.

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

In the survey area the Highfield and Murrill soils are best suited to growing fruits and vegetables. Middlebury and Lindside soils are also suited to growing vegetables; however, flooding can damage crops. Soils used for crops that produce a low amount of residue should be cover cropped or used in a rotation with crops that produce heavy residue in order to reduce erosion and maintain the content of organic matter.

Yields Per Acre

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

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

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop

residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

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

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

Land Capability Classification

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

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

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

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

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

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

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

Woodland Management and Productivity

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

Cumberland and Perry Counties have approximately 323,900 acres of woodland; 107,500 acres is in Cumberland County, and 216,400 acres is in Perry County (*14*). Forty-six percent of the total land area is woodland (30 percent of Cumberland County and 61 percent of Perry County). Farmers own 30 percent of the commercial woodland (21.8 percent in Cumberland County and 33.6 percent in Perry County), industry owns 1 percent (0.2 percent in Cumberland County and 1.4 percent in Perry County); private concerns own 44 percent (46 percent in Cumberland County and 44 percent in Perry County); and 25 percent (32 percent in Cumberland County and 21 percent in Perry County) is publicly owned. The Michaux State Forest covers 33,600 acres, or 9.5 percent of the total land area, in Cumberland County, and the Tuscarora State Forest covers 40,500 acres, or 11.5 percent of the total land area, in Perry County.

The woodland is made up of stands of second- and third-growth trees. The principal forest cover types that make up the present woodland and the extent of each, as given by the Forest Service, are as follows (*12*):

Oak-Hickory makes up 80 percent of the total woodland in the counties. This cover type consists mainly of white oak, red oak, and hickory, although black oak and chestnut oak are predominant in places. The principal associated species are yellow-poplar, shagbark hickory, white ash, red maple, and beech.

Elm-ash-red maple makes up 7 percent of the total woodland. White ash, American elm, and red maple are

the dominant species. Associated species are slippery elm, yellow birch, sycamore, and hemlock.

Maple-beech-birch makes up 7 percent of the woodland in the survey area. Sugar maple, beech, and yellow birch are the dominant species in this cover type. Associated species are basswood, red maple, hemlock, red oak, white ash, white pine, black birch, black cherry, yellow-poplar, and cucumbertree.

Chestnut oak makes up 3 percent of the total woodland. Chestnut oak grows in pure stands or is the predominant species. Common associated species are red oak, white oak, black oak, scarlet oak, pitch pine, blackgum, and red maple.

Aspen-birch makes up 1 percent of the woodland. Quaking aspen, bigtooth aspen, and gray birch predominate. The principal associated species are pin cherry, red maple, yellow birch, white pine, ash, and sugar maple.

White pine cover type makes up 1 percent of the woodland in the survey area. White pine is in pure stands or is the predominant species. The principal associated species are Virginia pine and pitch pine; ash; sugar maple and red maple; hemlock; red oak and white oak; quaking aspen and bigtooth aspen; and gray, yellow, and black birch.

Virginia pine-pitch pine makes up the remaining 1 percent of the total woodland. Virginia pine and pitch pine predominate. The principal associated species are red oak, black oak, scarlet oak, chestnut oak, and hickory.

Eighty-seven percent of the woodland in the survey area is on soils that have very high, high, and moderately high productivity, 12 percent on soils that have moderate productivity, and 1 percent on soils that have poor productivity.

Sawtimber makes up approximately 55 percent of the acreage in commerical woodland (52 percent in Cumberland County and 57 percent in Perry County); poletimber makes up 35 percent of the woodland (35 percent in Cumberland County and 35 percent in Perry County); and seedlings and saplings make up 9 percent (10 percent in Cumberland County and 7.6 percent in Perry County). The remaining 1 percent (3 percent in Cumberland County and 0.4 percent in Perry County) consists of areas that are classified as less than 10 percent growing stock trees.

In general, the soils in the survey area are capable of supporting good stands of red oak, sugar maple, yellow-poplar, and white pine. Trees grow better on the deeper, well drained soils than on the soils that are shallow to bedrock and poorly drained.

A woodland owner can encourage the growth of desirable trees by using good woodland management practices in the areas where soils are rated very high, high, and moderately high for potential productivity. The site index for such soils is more than 66; site index is a measure for site quality based on the average height in feet of the dominant and codominant commercial species at 50 years of age. A professional forester can assist in planning a woodland improvement program.

Soils that are rated poor for potential productivity and have a site index of less than 55 generally will not justify management practices to increase yields of wood crops. Soils that are rated moderate in potential productivity and have a site index between 55 and 65 are the most difficult to appraise. A thorough inventory of the growing stock and the site quality is needed. If market potentials for the species is high or areas of the soils rated moderate are mixed with larger areas of more productive soils, woodland management might be economically feasible.

The woodland in Cumberland and Perry Counties has recreational, wildlife, and aesthetic value, helps reduce erosion, and is a source of income. The better sites can return a substantial profit to the owner if the woodland is properly managed and protected from fire, disease, insects, and livestock grazing.

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

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, d, c, f, and r.

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

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

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

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

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that few trees may be blown down by strong winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in 50 years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production. Tree species that commonly grow on the soil are also listed, regardless of the potential value.

Recreation

Richard D. Heaslip, biologist, Soil Conservation Service, helped prepare this section.

More than 100,000 acres in the survey area are available to the public for various types of outdoor recreation. Most of this land is in state parks, state forests, state game lands, private campgrounds, and community parks. Recreational facilities for hunting, fishing, camping, swimming, boating, picnicking, nature study, and hiking are available. Several communities also have public and private facilities for tennis, golf, baseball, basketball, and swimming.

Five state parks are in the survey area. Cumberland County has Colonel Denning State Park, covering 50 acres, and Pine Grove Furnace State Park, covering 585 acres. Facilities for camping, fishing, hiking, picnicking, and swimming are available. Boating is also available at Pine Grove Furnace State Park. Perry County has Big Springs State Park, covering about 45 acres, Fowlers Hollow, covering 30 acres, and Little Buffalo State Park, covering 830 acres. Fishing, hiking, and picnicking areas are available in each of these parks. Fowlers Hollow offers camping and snowmobiling. Boating and swimming facilities are available at Little Buffalo State Park. Undeveloped areas of local, state, and national importance are also available for the naturalist to enjoy.

State game lands, totaling more than 20,000 acres, offer an abundance and variety of wildlife. Deer, turkey, pheasants, grouse, quail, rabbits, and squirrels are some of the species available for hunting. Approximately 75,000 acres of State Forest land are open to sportsmen.

The Pennsylvania Fish Commission maintains two state trout hatcheries, one at Huntsdale and one at Newville. They provide fish for stocking throughout south-central Pennsylvania, as well as for local streams and ponds. Local trout hatcheries also provide fish for public fishing areas. The Susquehanna and Juniata Rivers provide excellent warm-water fishing.

Throughout the survey area, and especially in the mountains, many scenic observation areas are maintained for public use. The famous Appalachian Trail, which extends from Maine to Georgia, traverses Perry and Cumberland Counties.

Increasing demands are being made by the public for outdoor recreational facilities. A thorough knowledge of the soil properties is essential in selecting a site and constructing recreational facilities. Soil properties, such as depth to bedrock, wetness, slope, texture, stoniness, and frequency of flooding, affect the installation, maintenance, and operation of recreational facilities.

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

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and

interpretations for dwellings without basements and for local roads and streets in table 10.

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

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

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

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

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

Wildlife Habitat

Richard D. Heaslip, biologist, Soil Conservation Service, helped prepare this section.

The occurrence and abundance of different kinds of wildlife in Cumberland and Perry Counties are related, to some degree, to the different kinds of soils. The principal game species include white-tailed deer, gray squirrel, cottontail rabbit, turkey, ruffed grouse, ringneck pheasant, woodcock, mourning dove, and various kinds of waterfowl. Some important furbearers are red and gray fox, mink, muskrat, raccoon, weasel, opossum, and beaver. The nongame wildlife includes songbirds, frogs, turtles, poisonous and nonpoisonous reptiles, and small mammals. Both game and nongame species of wildlife are important; they provide food and enjoyment and contribute to the economy of the survey area.

White-tailed deer, squirrel, ruffed grouse, and turkey generally seek the protection of the forests but prefer to feed on farm crops. Areas that meet these varied needs are in the Hazleton-Laidig-Buchanan association of the general soil map. Ringneck pheasant and mourning dove generally prefer the agricultural areas in the Hagerstown-Duffield association where corn is grown in abundance. Cottontail rabbit and red fox also prefer the farmland areas and are plentiful in areas of the Berks-Weikert-Bedington association, although they also inhabit agricultural areas in other associations.

Raccoon, muskrat, mink, and beaver are along rivers, streams, lakes, and ponds throughout the survey area. Beaver, however, are generally only in the more remote areas. Areas that support this type of habitat are common in the Monongahela-Atkins-Middlebury association. Earthworms are the principal food for the woodcock and are generally bountiful where soil moisture, temperature, texture, and content of organic matter are favorable. Soils that have the proper characteristics, such as Brinkerton soils, and that support vegetation including alder, aspen, dogwood, hawthorn, and honeysuckle generally support woodcock populations.

Cumberland and Perry Counties have many species of waterfowl along major streams and along the Juniata and Susquehanna Rivers. The most common species include mallard, Canada geese, teal, and wood ducks. These waterfowl frequently use major streams and ponds as resting places during migration and sometimes stay to nest in the survey area.

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

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

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satis-

factory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

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

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

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

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are quackgrass, goldenrod, beggarweed, wheatgrass, and grama.

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

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

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

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

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

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and black bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

John J. Mank, conservation engineer, helped prepare this section.

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

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

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

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

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

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

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter,

and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed

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

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

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

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

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

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

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

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

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

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

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

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

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

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

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

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

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

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

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

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

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

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

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

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

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

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Some soils in table 16 are assigned to two hydrologic soil groups. These soils are less than 20 inches deep to bedrock. The first hydrologic group listed applies to areas where the bedrock is cracked and pervious; the second letter applies to areas where the bedrock is impervious or where exposed bedrock makes up more than 25 percent of the surface of the soil.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An *artesian* water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or mas-

sive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

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

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

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

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*15*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is 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 development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning deposited by water, plus *aquent*, the suborder of the Entisols that have an aquic moisture regime).

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

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, nonacid, mesic Typic Fluvaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*13*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*15*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Albrights Series

Soils of the Albrights series are fine-loamy, mixed, mesic Aquic Fragiudalfs. They are deep, moderately well drained and somewhat poorly drained soils on lower slopes of mountains and at the heads of and along drainageways. They formed in colluvium weathered from acid, red sandstone, siltstone, and shale. Slopes range from 3 to 15 percent.

Albrights soils are closely associated on the landscape with Andover, Buchanan, Calvin, Klinesville, Lehew, and Meckesville soils. Albrights soils are not as well drained as Meckesville, Calvin, Klinesville, and Lehew soils. They

are redder throughout than the Buchanan and Andover soils.

Typical pedon of Albrights silt loam, 8 to 15 percent slopes, in Rye Township, Perry County; one mile northeast of intersection of Route T305 and Route PA 34, in woodland, on east roadbank of Route T305:

O1—1/2 inch to 0; partially decayed leaves, twigs, and mosses.
A1—0 to 3 inches; brown (7.5YR 5/2) silt loam; weak fine granular structure; very friable, nonsticky and nonplastic; many roots; 10 percent coarse fragments; very strongly acid; abrupt smooth boundary.
A2—3 to 5 inches; dark reddish gray (5YR 4/2) silt loam; weak fine granular structure; very friable, nonsticky and nonplastic; many roots; 10 percent coarse fragments; very strongly acid; clear wavy boundary.
B1—5 to 12 inches; reddish brown (5YR 4/4) silt loam; weak fine granular and weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; many roots; 10 percent coarse fragments; very strongly acid; clear wavy boundary.
B2t—12 to 24 inches; reddish brown (2.5YR 4/4) silty clay loam; many coarse distinct weak red (2.5YR 4/2) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common roots; common thin continuous clay films on ped faces and in pores; 10 percent coarse fragments; very strongly acid; clear wavy boundary.
Bx1—24 to 36 inches; reddish brown (5YR 5/3) silty clay loam; many medium distinct weak red (2.5YR 4/2) mottles; moderate, very coarse prismatic structure parting to moderate medium subangular blocky and medium platy; firm, brittle, sticky and plastic; few thick clay films on ped faces; 10 percent coarse fragments; very strongly acid; clear wavy boundary.
Bx2—36 to 45 inches; reddish brown (5YR 4/4) channery silty clay loam; many medium distinct brown (7.5YR 5/4) mottles; moderate, very coarse prismatic structure parting to moderate medium subangular blocky; firm, brittle, sticky and slightly plastic; few thin continuous clay films on ped faces; few black concretions; 30 percent coarse fragments; strongly acid; clear wavy boundary.
C—45 to 62 inches; reddish brown (2.5YR 4/4) channery silt loam; many medium distinct brown (7.5YR 5/4) mottles; massive; firm in place; nonsticky and slightly plastic; many black concretions; 40 percent coarse fragments; strongly acid.

The solum is 40 to 60 inches thick. Depth to bedrock is 60 inches or more. Depth to the fragipan is 18 to 32 inches. Coarse fragments make up 5 to 25 percent above the fragipan, 10 to 50 percent in the fragipan, and 20 to 70 percent in the C horizon. If the soil is not limed, it is extremely acid to strongly acid in the upper part of the solum and very strongly acid to slightly acid in the lower part of the solum and the C horizon.

The A horizon has hue of 5YR to 7.5YR, value of 3 to 5, and chroma of 2 to 4. Fine earth is silt loam or loam.

The B horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 3 to 6. Mottles of low chroma are in the upper 10 inches of the B horizon. Fine earth is loam to silty clay loam.

The Bx horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 2 to 6. Fine earth is loam to silty clay loam.

The C horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 3 to 6. Fine earth is loam to silty clay loam.

Allegheny Series

Soils of the Allegheny series are fine-loamy, mixed, mesic Typic Hapludults. They are deep, well drained soils on stream terraces. These soils formed in old alluvial sediment washed from areas of acid sandstone, siltstone, and shale. Slopes range from 0 to 8 percent.

The Allegheny soils are associated on the landscape with Middlebury, Monongahela, Tioga, and Tyler soils. Allegheny soils are better drained than Monongahela and Tyler soils. They have an argillic horizon, unlike Middlebury and Tioga soils.

Typical pedon of Allegheny silt loam, 0 to 3 percent slopes, in North Middleton Township, Cumberland County; 8/10 mile southwest along Conodoguinet Creek from bridge on Route PA 74, 75 feet north of creek, in cropland:

Ap—0 to 10 inches; brown (7.5YR 4/2) silt loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; 5 percent coarse fragments; medium acid; clear smooth boundary.
B1—10 to 17 inches; brown (7.5YR 4/4) silt loam; weak fine subangular blocky structure; friable, nonsticky and nonplastic; many roots; 5 percent coarse fragments; strongly acid; gradual smooth boundary.
B21t—17 to 25 inches; strong brown (7.5YR 5/6) clay loam; moderate fine and medium subangular blocky structure; firm, nonsticky and slightly plastic; common roots; thin discontinuous clay films on faces of peds; 5 percent coarse fragments; strongly acid; gradual wavy boundary.
B22t—25 to 34 inches; strong brown (7.5YR 5/6) clay loam; strong fine and medium angular blocky structure; firm, slightly sticky and slightly plastic; common thin discontinuous clay films on ped faces; few black concretions; 10 percent coarse fragments; very strongly acid; gradual wavy boundary.
C—34 to 60 inches; strong brown (7.5YR 5/6) gravelly loam; few coarse faint brown (7.5YR 5/4) mottles; massive and weak medium and coarse subangular blocky structure; firm, nonsticky and slightly plastic, few black concretions; 20 percent coarse fragments; very strongly acid.

The solum is 30 to 45 inches thick. Depth to bedrock is more than 60 inches. Coarse fragments make up 0 to 10 percent of the upper part of the solum and 0 to 35 percent of the lower part of the solum and the C horizon. If the soil is not limed, it is strongly acid to extremely acid throughout.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. Fine earth is silt loam or loam.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. Fine earth is silt loam, sandy clay loam, clay loam, or silty clay loam. In some pedons mottles of high chroma are in the lower part of the B horizon.

The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. Fine earth is sandy loam to clay loam. Some pedons have a IIC horizon below a depth of 40 inches that is 30 to 80 percent gravel; fine earth ranges from sand to loam.

Andover Series

Soils of the Andover series are fine-loamy, mixed, mesic Typic Fragiaquults. They are deep, poorly drained soils on lower slopes of mountains and at the heads of and along drainageways. These soils formed in colluvium weathered from acid, gray sandstone, siltstone, shale, and quartzite. Slopes range from 0 to 8 percent.

Andover soils are closely associated on the landscape with Buchanan, Laidig, Hazleton, and Clymer soils. They are not as well drained as these associated soils.

Typical pedon of Andover gravelly loam, in an area of Andover very stony loam, 0 to 8 percent slopes, in Cooke Township, Cumberland County; 3/4 mile south of Pine Grove Furnace State Park office, 150 feet west of Route T340, in woodland:

O1—2 inches to 1; hardwood leaf litter.

O2—1 inch to 0; partially decomposed hardwood leaf litter; matted roots, mosses, and twigs.

A1—0 to 3 inches; very dark gray (10YR 3/1) gravelly loam; weak medium granular structure; friable, nonsticky and nonplastic; many roots; 15 percent coarse fragments; very strongly acid; abrupt smooth boundary.

A2—3 to 9 inches; grayish brown (10YR 5/2) gravelly loam; common fine distinct yellowish brown (10YR 5/4) and strong brown (7.5YR 5/6) mottles; weak medium platy structure parting to weak medium granular; friable, nonsticky and nonplastic; many roots; 15 percent coarse fragments; very strongly acid; clear wavy boundary.

B2tg—9 to 18 inches; grayish brown (10YR 5/2) gravelly clay loam; many medium distinct yellowish brown (10YR 5/4), gray (10YR 6/1), and strong brown (7.5YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable, slightly sticky and slightly plastic; common roots; common continuous clay films on ped faces and in pores; 20 percent coarse fragments; very strongly acid; clear wavy boundary.

Bxlg—18 to 32 inches; dark grayish brown (10YR 4/2) gravelly clay loam; many coarse distinct grayish brown (10YR 5/2) and strong brown (7.5YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm, brittle, sticky and plastic; few thin continuous clay films on ped faces and accumulations of clay in pores; 20 percent coarse fragments; strongly acid; clear wavy boundary.

Bx2g—32 to 42 inches; dark grayish brown (10YR 4/2) gravelly clay loam; many coarse distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; weak medium and coarse prismatic structure parting to moderate medium subangular blocky; firm, brittle, sticky and plastic; common thin discontinuous clay films on ped faces and prism faces and in pores; 25 percent coarse fragments; strongly acid; clear wavy boundary.

C—42 to 60 inches; brown (10YR 5/3) gravelly sandy clay loam; common medium distinct light brownish gray (2.5Y 6/2) mottles; weak coarse prismatic structure parting to weak thick platy and massive; firm, slightly sticky and slightly plastic; 45 percent coarse fragments; strongly acid.

The solum is 40 to 55 inches thick. Depth to bedrock is more than 60 inches. Depth to the fragipan is 16 to 28 inches. Coarse fragments make up 10 to 35 percent of the surface layer, 15 to 40 percent of the B horizon, and 15 to 50 percent of the C horizon. If the soil is not limed, it is very strongly acid or strongly acid throughout.

The A horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 to 4. Fine earth is dominantly loam or silt loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2 and is mottled. Fine earth is loam, clay loam, or sandy clay loam.

The Bx horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 or 2 and is mottled. Fine earth is loam, clay loam, or sandy clay loam.

The C horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 1 to 4 and is mottled. Fine earth is sandy clay loam, loam, or sandy loam.

Athol Series

Soils of the Athol series are fine-loamy, mixed, mesic Ultic Hapludalfs. They are deep, well drained soils on rolling uplands. Athol soils formed in residuum of calcareous conglomerate and limestone breccias. Slopes range from 3 to 25 percent.

Athol soils are closely associated on the landscape with Neshaminy soils, which formed in diabase.

Typical pedon of Athol gravelly loam, 15 to 25 percent slopes, in Upper Allen Township, Cumberland County; 2 miles northwest of Lisburn to intersection of Legislative Routes 21100 and 21093; south 1/4 mile on Legislative Route 21100 to Hertzler Road; 100 yards west along Hertzler Road, 25 feet north of road, in woodland:

Ap—0 to 9 inches; dark reddish brown (5YR 3/2) gravelly loam; weak medium and fine granular structure; friable, nonsticky and nonplastic; many roots; 20 percent coarse fragments; neutral; abrupt smooth boundary.

B21t—9 to 18 inches; reddish brown (5YR 4/4) gravelly silt loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; many roots; few thin discontinuous clay films on ped faces and in pores; 25 percent coarse fragments; neutral; clear wavy boundary.

B22t—18 to 30 inches; dark reddish brown (2.5YR 3/4) gravelly silty clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common roots; common patchy pockets of thick clay and few thin continuous clay films on ped faces and coarse fragments; 35 percent coarse fragments; medium acid; clear irregular boundary.

B23t—30 to 49 inches; dark reddish brown (2.5YR 3/4) gravelly silty clay loam; coarse medium subangular blocky structure; friable, sticky and slightly plastic; few roots; few thin discontinuous clay films on ped faces and in pores; 35 percent coarse fragments; strongly acid; clear wavy boundary.

B3—49 to 55 inches; reddish brown (5YR 4/4) gravelly loam; weak medium and coarse subangular blocky structure; friable, slightly sticky and slightly plastic; 35 percent coarse fragments; medium acid; gradual wavy boundary.

C—55 to 80 inches; reddish brown (5YR 4/4) very gravelly loam; massive; friable, nonsticky and nonplastic; 50 percent coarse fragments; medium acid.

The solum is 40 to 55 inches thick. Depth to bedrock is more than 40 inches. Coarse fragments make up 0 to 20 percent of the A horizon, 10 to 35 percent of the B horizon, and 15 to 50 percent of the C horizon. If the soil is not limed, it is very strongly acid or strongly acid in the upper part of the solum and strongly acid or medium acid in the lower part of the solum and the C horizon.

The A horizon has hue of 2.5YR to 7.5YR, value of 3 or 4, and chroma of 2 to 4. Fine earth is loam or silt loam.

The B horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 2 to 4. Fine earth is silt loam, silty clay loam, loam, or clay loam.

The C horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 4. Fine earth is silt loam, loam, or silty clay loam.

Atkins Series

Soils of the Atkins series are fine-loamy, mixed, acid, mesic Typic Fluvaquents. They are deep, poorly drained soils on flood plains. The Atkins soils formed in recent alluvial material washed from acid, gray shale and sandstone. Slopes range from 0 to 3 percent.

Atkins soils are closely associated on the landscape with Barbour, Basher, Middlebury, Monongahela, Purdy, Tioga, and Tyler soils. Atkins soils do not have the well developed profile of the Monongahela, Purdy, and Tyler soils; they have a water table nearer to the surface than Middlebury, Basher, Barbour, and Tioga soils.

Typical pedon of Atkins silt loam in North Newtown Township, Cumberland County; 1/2 mile north of Newville on Route PA 233 to intersection of Route T402; 1-1/2 miles west of Route T402 and 1,000 feet northwest along fence row, 10 feet east of fence row, in pasture:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; very strongly acid; clear smooth boundary.

B1g—9 to 20 inches; dark gray (10YR 4/1) silt loam; common fine distinct strong brown (7.5YR 5/8) and reddish brown (5YR 4/4) mottles; weak fine granular structure; friable, nonsticky and nonplastic; common roots; very strongly acid; gradual wavy boundary.

B2g—20 to 42 inches; gray (10YR 5/1) silty clay loam; common medium distinct yellowish red (5YR 4/6) and strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; friable, nonsticky and nonplastic; few roots; strongly acid; abrupt wavy boundary.

IIC—42 to 60 inches; mixed gray (10YR 6/1) and strong brown (7.5YR 5/6) stratified sand and gravel; strongly acid.

The solum is 30 to 50 inches thick. Depth to bedrock is more than 60 inches. Coarse fragments make up 0 to 15 percent of the solum and 0 to 40 percent of the C horizon. If the soil is not limed, it is strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2 and is mottled in some pedons. Fine earth is silt loam, loam, or fine sandy loam.

The B horizon is neutral or has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 0 to 2. It is mottled. Fine earth is silt loam, loam, silty clay loam, or sandy loam.

The C horizon is neutral or has hue of 10YR to 5Y, value of 5 or 6, and chroma of 0 to 8. Fine earth is silty clay loam, loam, or sandy loam, or a IIC horizon that is sand and gravel is below a depth of 3 feet.

Barbour Series

Soils of the Barbour series are coarse-loamy over sandy or sandy-skeletal, mixed, mesic Fluventic Dystrochrepts. They are deep, well drained soils on flood plains. These soils formed in recent alluvium washed from soils that formed in acid, red sandstone and shale. Slopes range from 0 to 3 percent.

Barbour soils are closely associated on the landscape with Atkins, Basher, Birdsboro, Monongahela, Purdy, and Tyler soils. Barbour soils are on flood plains and have a less well developed profile than Birdsboro soils.

Typical pedon of Barbour fine sandy loam, in an area of Barbour soils; at the west end of Marysville Borough, Perry County, 4/10 mile west of Marysville Lions Club building at Routes U.S. 11 and 15 and Park Drive to intersection of Kings Highway; 1/10 mile north of Kings Highway to concrete bridge across Fishing Creek; 50 yards west of bridge and 25 feet north of creek, in woodland:

O1—2 inches to 1; hardwood twigs and undecomposed leaves.
O2—1 inch to 0; partially decomposed hardwood leaves, grasses, and root mat.
A1—0 to 8 inches; dark reddish gray (5YR 4/2) fine sandy loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; medium acid; abrupt smooth boundary.
B1—8 to 12 inches; reddish brown (5YR 4/4) sandy loam; weak coarse prismatic structure parting to fine and medium subangular blocky; friable, nonsticky and nonplastic; many roots; strongly acid; clear wavy boundary.
B2—12 to 24 inches; reddish brown (5YR 4/4) loam; weak coarse prismatic structure parting to weak medium subangular blocky; friable, nonsticky and nonplastic; many roots; strongly acid; clear wavy boundary.
IIC—24 to 60 inches; reddish brown (5YR 4/4) very gravelly loamy sand; single grain; loose; 50 percent coarse fragments; strongly acid.

The solum is 18 to 40 inches thick. Depth to strongly contrasting layers is 20 to 36 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 0 to 40 percent of the solum and 0 to 60 percent of the substratum. If the soil is not limed, it is very strongly acid to medium acid in the solum and strongly acid to slightly acid in the substratum.

The A horizon has hue of 5YR to 2.5Y, value of 3 or 4, and chroma of 2 to 4. Fine earth is sandy loam to silt loam.

The B horizon has hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 3 to 6. Fine earth is silt loam to sandy loam.

Most pedons in which the IIC horizon is at a depth of more than 30 inches have a C horizon that has hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 3 to 8. Fine earth is silt loam to sandy loam. The IIC horizon varies in color; fine earth is loamy fine sand or coarser.

Basher Series

Soils of the Basher series are coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts. They are deep, moderately well drained and somewhat poorly drained soils on flood plains. Basher soils formed in recent alluvial material washed from acid, red sandstone and shale. Slopes range from 0 to 3 percent.

Basher soils are closely associated on the landscape with Albrights, Atkins, Barbour, Chavies, and Middlebury soils. Basher soils are redder than Atkins and Middlebury soils. They are not as well drained as Barbour and Chavies soils. Basher soils do not have an argillic horizon, unlike Albrights soils.

Typical pedon of Basher silt loam, in an area of Basher soils, in Rye Township, Perry County; 1 4/10 miles east of intersection of Route PA 850 and Route T307; 75 feet north of Route T307 and 30 feet south of Fishing Creek, in woodland:

Ap—0 to 10 inches; dark reddish gray (5YR 4/2) silt loam; weak fine and medium subangular blocky structure; friable, nonsticky and nonplastic; roots; medium acid; abrupt smooth boundary.
B21—10 to 19 inches; reddish brown (5YR 5/4) silt loam; common fine distinct brown (7.5YR 5/2) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable, nonsticky and nonplastic; many roots; strongly acid; gradual wavy boundary.
B22—19 to 26 inches; reddish brown (5YR 5/4) silt loam; many medium distinct strong brown (7.5YR 5/6) and grayish brown (10YR 5/2) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; friable, nonsticky and nonplastic; common roots; strongly acid; gradual wavy boundary.
B3—26 to 38 inches; reddish brown (5YR 5/4) silt loam; many coarse distinct strong brown (7.5YR 5/6) and grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable, nonsticky and nonplastic; few roots; strongly acid; gradual wavy boundary.
IIC1—38 to 52 inches; reddish brown (5YR 4/3) gravelly loam; many medium distinct strong brown (7.5YR 5/6) mottles; massive; firm in place, nonsticky and nonplastic; 40 percent coarse fragments; very strongly acid; abrupt smooth boundary.
IIC2—52 to 60 inches; gray (5YR 5/1) sand and gravel; strong brown (7.5YR 5/6) streaks; loose; 60 percent coarse fragments; very strongly acid.

The solum is 16 to 40 inches thick. Depth to strongly contrasting layers is more than 40 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 0 to 20 percent of the individual horizons above a depth of 40 inches and 0 to 60 percent of the individual horizons below a depth of 40 inches. If the soil is not limed, it is extremely acid to medium acid in the solum and very strongly acid to slightly acid in the C horizon.

The Ap horizon has hue of 2.5YR to 10YR, value of 3 or 4, and chroma of 2 to 4. Fine earth ranges from silt loam to fine sandy loam.

The B horizon has hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 3 to 6. Mottles have chroma of 2 or less within a depth of 24 inches. Fine earth ranges from silt loam to fine sandy loam.

The C horizon has hue of 5YR to 2.5Y, value of 3 to 5, and chroma of 1 to 4. Fine earth is silt loam, loam, or fine sandy loam above a depth of 40 inches and ranges from silt loam to sand below a depth of 40 inches.

Bedington Series

Soils of the Bedington series are fine-loamy, mixed, mesic Typic Hapludults. They are deep, well drained soils on uplands. These soils formed in material weathered from shale, siltstone, and fine grained sandstone. Slopes range from 3 to 25 percent.

Bedington soils are closely associated on the landscape with Berks, Blairton, Brinkerton, and Weikert soils. They are deeper to bedrock than Berks and Weikert soils and are better drained than Blairton and Brinkerton soils.

Typical pedon of Bedington shaly silt loam, 3 to 8 percent slopes, in Silver Springs Township, Cumberland County; 1/2 mile north of Route U.S. 11, along east roadbank of Legislative Route 21019, in hayland:

Ap—0 to 9 inches; dark brown (10YR 4/3) shaly silt loam; weak fine granular structure; very friable, nonsticky and nonplastic; many roots; 15 percent coarse fragments; medium acid; abrupt smooth boundary.

B1—9 to 14 inches; yellowish brown (10YR 5/6) shaly loam; weak fine subangular blocky structure; friable, slightly sticky and nonplastic; many roots; 20 percent coarse fragments; medium acid; clear wavy boundary.

B21t—14 to 20 inches; strong brown (7.5YR 5/6) shaly clay loam; moderate medium subangular blocky structure; friable, sticky and slightly plastic; common roots; common thin patchy clay films on ped faces; 20 percent coarse fragments; medium acid; clear wavy boundary.

B22t—20 to 35 inches; yellowish red (5YR 5/6) shaly silty clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few roots; common thin discontinuous clay films on ped faces; few black concretions; 35 percent coarse fragments; strongly acid; gradual wavy boundary.

B23t—35 to 48 inches; yellowish red (5YR 5/8) very shaly loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common thin discontinuous clay films on ped faces; few black concretions; 55 percent coarse fragments; very strongly acid; gradual wavy boundary.

C—48 to 56 inches; yellowish red (5YR 5/6) very shaly silt loam; massive; friable, slightly sticky and nonplastic; few thin discontinuous clay films on coarse fragments and in pores; few black concretions; 80 percent coarse fragments; very strongly acid; clear wavy boundary.

R—56 inches; olive (5Y 5/3) shale bedrock.

The solum is 40 to 70 inches thick. Depth to bedrock is more than 40 inches. Coarse fragments make up 10 to 40 percent of the individual horizons in the upper part of the solum, 20 to 80 percent in the lower part of the solum, and 30 to 90 percent in the C horizon. If the soil is not limed, it is very strongly acid to neutral in the upper part of the solum and very strongly acid or strongly acid in the lower part of the solum and in the C horizon.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. Fine earth is silt loam or loam.

The B horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 6 to 8. Fine earth is loam, silt loam, silty clay loam, or clay loam.

The C horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. Fine earth is silt loam or silty clay loam.

Berks Series

Soils of the Berks series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. These soils are moderately deep and well drained and are on uplands. They formed in material weathered from shale, siltstone, and fine grained sandstone. Slopes range from 3 to 25 percent.

Berks soils are closely associated on the landscape with Bedington, Blairton, Brinkerton, Calvin, Edom, Ernest, and Weikert soils. Berks soils are better drained than Blairton, Brinkerton, and Ernest soils. They are deeper to bedrock than Weikert soils and not as deep as Bedington soils. Berks soils have less clay, and their subsoil is lower in reaction than that of the Edom soils. Berks soils are brownish throughout; Calvin soils are reddish.

Typical pedon of Berks shaly silt loam, 3 to 8 percent slopes, in Lower Frankford Township, Cumberland County; about 8 miles northeast of Carlisle to the intersection of Legislative Route 21004 and Route T449, 50 feet east of Legislative Route 21004, on the east roadbank, in cropland:

Ap—0 to 7 inches; dark brown (10YR 4/3) shaly silt loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; 20 percent coarse fragments; slightly acid; abrupt smooth boundary.
B21—7 to 15 inches; yellowish brown (10YR 5/6) shaly silt loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common roots; few patchy clay films in pores; 25 percent coarse fragments; strongly acid; clear wavy boundary.
B22—15 to 28 inches; yellowish brown (10YR 5/6) shaly silt loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few roots; few thin discontinuous clay films on some ped faces and in pores; 35 percent coarse fragments; strongly acid; clear wavy boundary.
C—28 to 36 inches; yellowish brown (10YR 5/6) very shaly silt loam; structure obscured by coarse fragments; friable, slightly sticky and slightly plastic; many black coatings on coarse fragments; few thin discontinuous clay films on coarse fragments; 60 percent coarse fragments; very strongly acid; abrupt wavy boundary.
R—36 inches; gray (10YR 5/1) shale bedrock.

The solum is 18 to 36 inches thick. Depth to bedrock is 20 to 40 inches. Coarse fragments make up 15 to 50 percent of the Ap horizon, 25 to 75 percent of the B horizon, and 60 to 80 percent of the C horizon. If lime has not been added, the solum is very strongly acid or strongly acid, and the C horizon is very strongly acid to medium acid.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Fine earth is silt loam or loam.

The B horizon has hue of 10YR to 5YR, value of 4 to 6, and chroma of 3 to 8. Only in the lower part of the B horizon does the hue range to 5YR. Fine earth is silt loam, loam, or silty clay loam.

The C horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 6. Fine earth is silt loam or loam.

Birdsboro Series

Soils of the Birdsboro series are fine-loamy, mixed, mesic Typic Hapludults. They are deep and well drained soils on stream terraces. These soils formed in loamy sediment weathered and washed from upland soils that are underlain by acid, red sandstone and shale. Slopes range from 0 to 5 percent.

Birdsboro soils are closely associated on the landscape with Barbour, Basher, and Raritan soils. They have an argillic horizon, unlike Barbour and Basher soils, and are better drained than Raritan soils.

Typical pedon of Birdsboro silt loam, 0 to 5 percent slopes, in lower Allen Township, Cumberland County; 1/2 mile west of York County line in Lisburn along Route PA 114, 25 feet south of road, in an idle field:

Ap—0 to 9 inches; reddish brown (2.5YR 4/4) silt loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; strongly acid; clear smooth boundary.
B1—9 to 15 inches; reddish brown (2.5YR 4/4) silt loam; weak fine subangular blocky structure; friable, nonsticky and nonplastic; many roots; strongly acid; clear smooth boundary.
B21t—15 to 25 inches; yellowish red (5YR 4/6) silty clay loam; moderate fine subangular blocky structure; friable, slightly sticky and slightly plastic; common roots; thin discontinuous clay films on ped faces and in pores; 5 percent coarse fragments; strongly acid; gradual wavy boundary.
B22t—25 to 38 inches; yellowish red (5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; few roots; common thin discontinuous clay films on ped faces and in pores; 5 percent coarse fragments; very strongly acid; gradual wavy boundary.
B3t—38 to 44 inches; reddish brown (5YR 4/4) sandy clay loam; weak medium and coarse subangular blocky structure; friable, slightly sticky and slightly plastic; common thin films on ped faces and in pores; 10 percent coarse fragments; very strongly acid; abrupt smooth boundary.
IIC—44 to 62 inches; reddish brown (5YR 4/4) gravelly loam; massive; friable; 35 percent gravel; very strongly acid.

The solum is 30 to 50 inches thick. Depth to strongly contrasting layers is more than 40 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 0 to 20 percent of the solum and 10 to 60 percent of the C horizon. If the soil is not limed, it is strongly acid to extremely acid throughout.

The A horizon has hue of 10YR to 2.5YR, value of 3 or 4, and chroma of 3 or 4. Fine earth is silt loam or loam.

The B horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 3 to 6 in the upper part and hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 3 to 6 in the lower part. Fine earth is loam, silt loam, sandy clay loam, silty clay loam, or clay loam.

The IIC horizon has hue of 2.5YR to 10YR, value of 3 to 5, and chroma of 4 to 6. Fine earth is clay loam to sand; in some pedons it is stratified sand, silt, and gravel.

Blairton Series

Soils of the Blairton series are fine-loamy, mixed, mesic Aquic Hapludults. They are moderately deep, somewhat poorly drained and moderately well drained soils at the heads of drainageways and in depressions on upland flats. These soils formed in material weath-

ered from acid, gray shale, siltstone, and sandstone. Slopes range from 3 to 8 percent.

Blairton soils are closely associated on the landscape with Berks, Brinkerton, and Weikert soils. Blairton soils are not as well drained as Berks and Weikert soils and are better drained than Brinkerton soils.

Typical pedon of Blairton silt loam, 3 to 8 percent slopes, in Upper Mifflin Township, Cumberland County; about 4 miles northwest of Newville; 1/2 mile southeast of Route PA 997 along Route T402, 75 feet west of road, in hayfield:

Ap—0 to 9 inches; dark brown (10YR 3/3) silt loam; weak fine granular structure; friable, slightly sticky and slightly plastic; common fine roots; 10 percent coarse fragments; strongly acid; abrupt smooth boundary.

B1—9 to 12 inches; yellowish brown (10YR 5/6) silt loam; weak to moderate fine subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few thin discontinuous clay films in pores; 10 percent coarse fragments; strongly acid; clear wavy boundary.

B2t—12 to 22 inches; yellowish brown (10YR 5/6) shaly silty clay loam; common fine distinct light gray (10YR 7/2) mottles; weak fine and medium subangular blocky structure; friable, slightly sticky and plastic; few roots; common clay films on ped faces, on stones, and in pores; 30 percent coarse fragments; strongly acid; clear irregular boundary.

C—22 to 26 inches; light yellowish brown (10YR 6/4) very shaly silt loam; common fine distinct light gray (10YR 7/2) and strong brown (7.5YR 5/6) mottles; moderate thin platy structure and massive; friable, slightly sticky and slightly plastic; many thin black concretions; 80 percent coarse fragments; strongly acid; clear irregular boundary.

R—26 inches; strong brown (7.5YR 5/8) and brown (7.5YR 5/4) vertically bedded shale bedrock.

Solum thickness and depth to bedrock are 20 to 40 inches. Coarse fragments make up 0 to 20 percent of the Ap horizon, 5 to 35 percent of the B horizon, and 30 to 90 percent of the C horizon. If the soil is not limed, it is extremely acid to strongly acid throughout.

The Ap horizon has hue of 2.5Y to 7.5YR, value of 3 or 4, and chroma of 2 to 4. Fine earth is silt loam or loam.

The B horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 2 to 8. Fine earth is loam to silty clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 2 to 8. Fine earth is silt loam or loam. Some pedons do not have a C horizon.

Blairton soils in this survey area are taxadjuncts to the Blairton series because they have more coarse fragments in the particle-size control section than is defined for the series. This difference does not affect the use and management of the soils.

Brinkerton Series

Soils of the Brinkerton series are fine-silty, mixed, mesic Typic Fragiaqualfs. They are deep, poorly drained soils in drainageways and depressions and at the base of lower slopes. These soils formed in colluvium weathered from acid, gray sandstone, siltstone, and shale. Slopes range from 0 to 8 percent.

Brinkerton soils are closely associated on the landscape with Berks, Blairton, Ernest, and Weikert soils. They are not as well drained as these associated soils.

Typical profile of Brinkerton silt loam, 0 to 3 percent slopes, in Lower Mifflin Township, Cumberland County; about 1 mile northwest of McCrea to intersection of Routes T412 and T413, 1,200 feet south along T412, 75 feet east of road, in pasture:

Ap—0 to 12 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; medium acid; abrupt smooth boundary.

B2tg—12 to 16 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine distinct reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common roots; common thin continuous clay films on ped faces; medium acid; gradual wavy boundary.

Bx1g—16 to 28 inches; grayish brown (10YR 5/2) silty clay loam; moderate medium distinct strong brown (7.5YR 5/6) and yellowish red (5YR 5/8) mottles; very coarse prismatic structure parting to moderate medium subangular blocky; firm, brittle, sticky and plastic; common thick continuous clay films on ped faces and on prism faces; many black concretions; 5 percent coarse fragments; medium acid; clear wavy boundary.

Bx2g—28 to 44 inches; gray (10YR 5/1) silty clay loam; many medium distinct strong brown (7.5YR 5/6) and yellowish red (5YR 4/8) mottles; very coarse prismatic structure parting to fine and medium subangular blocky; firm, brittle, sticky and plastic; common thick continuous clay films on ped faces and prism faces; many black concretions; 5 percent coarse fragments; medium acid; clear wavy boundary.

Cg—44 to 62 inches; dark gray (N 4/0) silty clay loam; many medium distinct strong brown (7.5YR 5/6) and grayish brown (10YR 5/2) mottles; very coarse prismatic structure and massive; firm, slightly sticky and slightly plastic; 10 percent coarse fragments; medium acid.

The solum is 40 to 50 inches thick. Depth to bedrock is more than 60 inches. Depth to the fragipan is 15 to 28

inches. Coarse fragments make up 0 to 10 percent of the upper part of the solum, 2 to 20 percent of the fragipan, and 10 to 90 percent of the C horizon. If the soil is not limed, it is strongly acid to medium acid in the solum and strongly acid to slightly acid in the C horizon.

The Ap horizon is neutral or has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 0 to 4. Fine earth is silt loam, loam, or silty clay loam.

The B horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. Fine earth is silt loam or silty clay loam.

The Bx horizon is neutral or has hue of 10YR to 5YR, value of 4 to 6, and chroma of 0 or 2. Fine earth is silt loam, loam, or silty clay loam.

The C horizon is neutral or has hue of 2.5Y to 7.5YR, value of 4 or 5, and chroma of 0 to 5. Fine earth is silt loam, silty clay loam, or loam.

Buchanan Series

Soils of the Buchanan series are fine-loamy, mixed, mesic Aquic Fragiudults. They are deep, moderately well drained and somewhat poorly drained soils on lower slopes of mountains and along drainageways. These soils formed in colluvium weathered from acid, gray sandstone, shale, and quartzite. Slopes range from 0 to 25 percent.

Buchanan soils are closely associated on the landscape with Albrights, Andover, Hazleton, and Laidig soils. Buchanan soils are browner throughout than Albrights soils and are better drained than Andover soils. They are not as well drained as Hazleton and Laidig soils.

Typical profile of Buchanan gravelly loam, in an area of Buchanan very stony loam, 8 to 25 percent slopes, in Lower Mifflin Township, Cumberland County; at Colonel Denning State Park, 1 2/10 miles northeast of lake along east side of State Forest Road, in woodland:

O1—2 inches to 1; matted dried leaves and twigs, mostly oak.

O2—1 inch to 0; partially decomposed leaves, twigs, and moss.

A1—0 to 4 inches; dark gray (10YR 4/1) gravelly loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; 35 percent coarse fragments; very strongly acid; abrupt wavy boundary.

A2—4 to 11 inches; brown (10YR 5/3) gravelly loam; weak medium granular structure; friable, nonsticky and nonplastic; many roots; 40 percent coarse fragments; strongly acid; clear wavy boundary.

B1—11 to 23 inches; yellowish brown (10YR 5/4) gravelly silt loam; weak, medium subangular blocky structure; friable, slightly sticky and slightly plastic; common roots; 30 percent coarse fragments; strongly acid; clear wavy boundary.

B2t—23 to 27 inches; yellowish brown (10YR 5/6) gravelly clay loam; few medium distinct strong brown (7.5YR 5/6) and light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable, sticky and plastic; common roots; common thin continuous clay films on ped faces; 25 percent coarse fragments; strongly acid; clear wavy boundary.

Bx1—27 to 35 inches; dark brown (7.5YR 4/4) gravelly clay loam; many coarse distinct light brown (7.5YR 6/4) and light brownish gray (10YR 6/2) mottles; very coarse prismatic structure parting to moderate medium subangular blocky; firm, brittle, slightly sticky and slightly plastic; few thin continuous clay films on ped faces; many black concretions; 25 percent coarse fragments; strongly acid; clear wavy boundary.

Bx2—35 to 44 inches; reddish brown (5YR 5/4) gravelly clay loam; many coarse distinct light brown (7.5YR 6/4) and pale brown (10YR 6/3) mottles; very coarse prismatic structure parting to moderate medium subangular blocky; firm, brittle, slightly sticky and slightly plastic; few thin discontinuous clay films on ped faces; 30 percent coarse fragments; strongly acid; clear wavy boundary.

C—44 to 60 inches; strong brown (7.5YR 5/6) gravelly clay loam; many coarse distinct light gray (2.5Y 7/2), brownish yellow (10YR 6/6), and light brown (7.5YR 6/4) mottles; weak medium platy structure and massive; firm, slightly sticky and slightly plastic; 30 percent coarse fragments; strongly acid.

The solum is 40 to 60 inches thick. Depth to bedrock is more than 60 inches. Depth to the fragipan is 20 to 36 inches. Coarse fragments make up 15 to 40 percent above the fragipan and 10 to 60 percent in the fragipan and C horizon. If the soil is not limed, it is extremely acid to strongly acid throughout.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 6, and chroma of 1 to 4. Fine earth is loam or silt loam.

The B horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 6. Fine earth is silt loam, loam, clay loam, or sandy clay loam.

The Bx horizon has hue of 10YR to 5YR, value of 4 to 6, and chroma of 3 to 6 and is mottled. Fine earth is silt loam, loam, clay loam, or sandy clay loam.

The C horizon has hue of 10YR to 5YR, value of 4 to 6, and chroma of 1 to 6 and is mottled. Fine earth is silt loam, loam, clay loam, or sandy clay loam.

Calvin Series

Soils of the Calvin series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. They are moderately deep, well drained soils on rolling uplands. These soils formed in material weathered from red shale, siltstone, and sandstone. Slopes range from 3 to 25 percent.

Calvin soils are closely associated on the landscape with Albrights, Berks, Klinesville, and Weikert soils.

Calvin soils are not as deep as Albrights soils and do not have a fragipan. They have a thicker solum than Klinesville and Weikert soils. Calvin soils are redder throughout than Berks soils.

Typical pedon of Calvin shaly silt loam, 8 to 15 percent slopes, in Carroll Township, Perry County; 1/2 mile south of Shermans Dale on Route PA 34 to Route T323, 2/10 mile west of Route R323 to intersection with Route T417, south 2/10 mile on Route T417 along east side of road, in cropland:

Ap—0 to 10 inches; dark reddish brown (5YR 3/4) shaly silt loam; weak medium granular structure; friable, nonsticky and nonplastic; many roots; 15 percent coarse fragments; strongly acid; clear wavy boundary.
B1—10 to 16 inches; dark reddish brown (5YR 3/3) shaly silt loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; common roots; 25 percent coarse fragments; strongly acid; clear wavy boundary.
B2—16 to 28 inches; reddish brown (5YR 4/3) shaly silty clay loam; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; common roots; few thin discontinuous clay films on ped faces and in pores; 35 percent coarse fragments; strongly acid; clear wavy boundary.
C—28 to 38 inches; dusky red (10YR 3/4) very shaly silt loam; massive; firm, slightly sticky and slightly plastic; few roots; 65 percent coarse fragments; strongly acid.
R—38 inches; dusky red (10YR 3/3) interbedded sandstone and shale bedrock.

The solum is 20 to 35 inches thick. Depth to bedrock is 20 to 30 inches. Coarse fragments make up 5 to 25 percent of the A horizon, 25 to 55 percent of the B horizon, and 40 to 80 percent of the C horizon. If the soil is not limed, it is medium acid to very strongly acid throughout.

The Ap horizon has hue of 7.5YR or 5YR, value of 3 or 4, and chroma of 4 or 5. Fine earth is silt loam or loam.

The B horizon has hue of 5YR to 10YR, value of 2 to 5, and chroma of 3 to 8. Fine earth is silt loam, loam, clay loam, or silty clay loam.

The C horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Fine earth is silt loam or loam.

Catoctin Series

Soils of the Catoctin series are loamy-skeletal, mixed, mesic Ruptic-Alfic Dystrochrepts. They are moderately deep, well drained to excessively drained soils on uplands and in valleys. These soils formed in material weathered from schist and rhyolite. Slopes range from 8 to 15 percent.

Catocin soils are closely associated on the landscape with Glenville and Highfield soils, which are deep.

Typical pedon of Catoctin channery silt loam, 8 to 15 percent slopes, in Dickinson Township, Cumberland County; about 1/2 mile north of Starners Station, along east roadbank of T530:

Ap—0 to 8 inches; dark brown (10YR 4/3) channery silt loam; weak medium to fine granular structure; friable, nonsticky and slightly plastic; many roots; 25 percent coarse fragments; strongly acid; abrupt smooth boundary.
A2—8 to 14 inches; yellowish brown (10YR 5/4) channery silt loam; weak medium to fine subangular blocky structure; friable, nonsticky and nonplastic; common roots; 35 percent coarse fragments; medium acid; clear wavy boundary.
B2—14 to 20 inches; yellowish brown (10YR 5/4) very channery silt loam; coarse to medium subangular blocky structure; friable, nonsticky and nonplastic; common roots; few thin discontinuous clay films on ped faces and in pores in less than half the horizon; 50 percent coarse fragments; medium acid; abrupt wavy boundary.
C—20 to 24 inches; yellowish brown (10YR 5/6) and olive brown (2.5Y 4/4) very channery silt loam; massive; friable, nonsticky and nonplastic; few roots; few thin clay films in pores; 80 percent coarse fragments; medium acid; abrupt wavy boundary.
R—24 inches; light reddish brown (2.5YR 6/4) schist and rhyolite bedrock.

The solum is 12 to 24 inches thick. Depth to bedrock is 20 to 40 inches. Coarse fragments make up 10 to 35 percent of the A horizon, 35 to 50 percent of the B horizon, and 35 to 80 percent of the C horizon. If the soil is not limed, it is strongly acid or medium acid in the solum and strongly acid to slightly acid in the C horizon.

The Ap and A1 horizons have hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. The A2 horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 3 to 8. Fine earth is silt loam or loam.

The B horizon has hue of 5YR to 2.5Y, value of 4 or 5, and chroma of 4 to 8. Fine earth is silt loam, loam, silty clay loam, or clay loam.

The C horizon is multicolored, loamy material that has hue of 5YR to 2.5Y, value of 3 to 6, and chroma of 4 to 8.

Chavies Series

Soils of the Chavies series are coarse-loamy, mixed, mesic Ultic Hapludalfs. They are deep, well drained soils. These soils are on stream terraces and formed in sediment weathered and washed from areas of acid red sandstone, siltstone, and shale. Slopes range from 0 to 3 percent.

Chavies soils are closely associated on the landscape with Barbour, Basher, Middlebury, and Tioga soils. Chavies soils have an argillic horizon, unlike Barbour, Basher, Middlebury, and Tioga soils.

Typical pedon of Chavies fine sandy loam, in Wheatfield Township, Perry County; from the intersection of Routes T456 and T305 at Dellville, one-half mile west on Route T305; in cropland on south side of road, along Shermans Creek:

Ap—0 to 9 inches; dark brown (7.5YR 4/4) fine sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; many roots; medium acid; abrupt smooth boundary.

B1—9 to 18 inches; reddish brown (5YR 4/4) fine sandy loam; weak fine subangular blocky structure; friable, nonsticky and nonplastic; common roots; medium acid; clear wavy boundary.

B21t—18 to 28 inches; reddish brown (5YR 5/4) fine sandy loam; weak fine and medium subangular blocky structure; friable, slightly sticky and plastic; few roots; common thin continuous clay films in pores and on ped faces; medium acid; clear wavy boundary.

B22t—28 to 42 inches; reddish brown (5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable, sticky and plastic; few roots; common thin continuous clay films in pores and on ped faces; strongly acid; clear wavy boundary.

C—42 to 60 inches; reddish brown (5YR 4/4) sandy loam; massive; friable; 5 percent coarse fragments; strongly acid.

The solum is from 30 to 50 inches thick. Depth to bedrock is more than 60 inches. Coarse fragments make up 0 to 15 percent of the solum and 0 to 30 percent of the substratum. The soil is very strongly acid to neutral in the upper part of the solum and very strongly acid to medium acid in the lower part of the solum and in the C horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. Fine earth is fine sandy loam, loam, or silt loam.

The B horizon has hue of 10YR to 5YR, value of 4 to 6, and chroma of 4 to 6. Fine earth is fine sandy loam, silt loam, or loam.

The C horizon has hue of 10YR to 5YR, value of 4 to 6, and chroma of 4 to 6. Some pedons are mottled. Fine earth is fine sandy loam, silt loam, loamy sand, or sandy loam. It is stratified in some pedons.

Clymer Series

Soils of the Clymer series are fine-loamy, mixed, mesic Typic Hapludults. They are deep, well drained soils on hills and ridges. These soils formed in material weathered from quartzite, sandstone, and conglomerates. Slopes range from 0 to 25 percent.

The Clymer soils are closely associated on the landscape with Andover, Buchanan, Hazleton, and Laidig soils. Clymer soils do not have a fragipan, unlike Andover, Buchanan, and Laidig soils. They have an argillic horizon, unlike Hazleton soils.

Typical pedon of Clymer channery loam, in an area of Clymer very stony loam, 8 to 25 percent slopes, in Cooke Township, Cumberland County; 2 miles southwest of Pine Grove Furnace State Park, along north roadbank of Route PA 233, in woodland:

O1—1/2 inch to 0; loose partially decomposed leaf litter, matted roots, and mosses.

A1—0 to 3 inches; very dark gray (10YR 3/1) channery loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; 15 percent coarse fragments; very strongly acid; abrupt smooth boundary.

A2—3 to 12 inches; yellowish brown (10YR 5/4) channery loam; weak fine and medium granular structure; friable, slightly sticky and slightly plastic; many roots; 15 percent coarse fragments; very strongly acid; clear wavy boundary.

B21t—12 to 25 inches; yellowish brown (10YR 5/8) channery sandy loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few roots; common thin discontinuous clay films on ped faces and on upper faces of fragments; 30 percent coarse fragments; very strongly acid; clear wavy boundary.

B22t—25 to 40 inches; yellowish brown (10YR 5/6) channery sandy loam; moderate medium subangular blocky structure; friable to firm, slightly sticky and slightly plastic; common thin discontinuous clay films on ped faces and on faces of fragments; 30 percent coarse fragments; very strongly acid; clear wavy boundary.

C—40 to 60 inches; strong brown (7.5YR 5/6) very channery sandy loam; massive; firm, nonsticky and nonplastic; many black concretions; 70 percent coarse fragments; very strongly acid.

The solum is 24 to 40 inches thick. Depth to bedrock is more than 40 inches. Coarse fragments make up 10 to 35 percent of the solum and 20 to 85 percent of the C horizon. If the soil is not limed, it is strongly acid to extremely acid throughout.

The A1 or Ap horizon has hue of 10YR, value of 2 to 5, and chroma of 1 to 4. The A2 horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 1 to 8. Fine earth is loam, sandy loam, or silt loam.

The B horizon has hue of 2.5Y to 7.5YR, value of 4 to 6, and chroma of 4 to 8. Fine earth is loam, sandy loam, sandy clay loam, or clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 6. Fine earth is sandy loam, loam, or clay loam.

Duffield Series

Soils of the Duffield series are fine-loamy, mixed, mesic Ultic Hapludalfs. They are deep, well drained soils on rolling and undulating uplands and in limestone valleys. These soils formed in material weathered from limestone. Slopes range from 0 to 15 percent.

Duffield soils are closely associated on the landscape with Edom, Hagerstown, Huntington, and Kreamer soils. Duffield soils have less clay in the subsoil than Edom and Hagerstown soils. Duffield soils have an argillic horizon, unlike Huntington soils, and are better drained than Kreamer soils.

Typical pedon of Duffield silt loam, 3 to 8 percent slopes, in South Middleton Township, Cumberland County; 1/4 mile north of intersection of Route PA 174 and Route T546; 200 feet west of Route T546, in an idle field:

Ap—0 to 10 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium granular structure; friable, nonsticky and nonplastic; many roots; less than 5 percent coarse fragments; medium acid; abrupt wavy boundary.

B21t—10 to 14 inches; strong brown (7.5YR 5/8) silt loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; many roots; common thin clay films on ped faces and in pores; less than 5 percent coarse fragments; neutral; clear wavy boundary.

B22t—14 to 30 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few roots; common thin clay films in pores and on ped faces; less than 5 percent coarse fragments; neutral; clear wavy boundary.

B23t—30 to 34 inches; yellowish red (5YR 5/6) silty clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common thin discontinuous clay films on ped faces; less than 5 percent coarse fragments; neutral; clear wavy boundary.

B24t—34 to 42 inches; yellowish brown (10YR 5/8) silty clay loam; weak thick platy structure parting to weak fine subangular blocky; friable, slightly sticky and slightly plastic; many black coatings on ped faces; thin discontinuous clay films on ped faces; 10 percent coarse fragments; neutral; clear wavy boundary.

C—42 to 78 inches; brownish yellow (10YR 6/8) shaly silt loam; few fine faint to dark yellowish brown (10YR 4/4) and brownish yellow (10YR 6/6) mottles; weak thick platy structure parting to weak fine subangular blocky; friable, nonsticky and nonplastic; many black coatings on ped faces; 20 percent coarse fragments; slightly acid.

The solum is 40 to 70 inches thick. The argillic horizon terminates below a depth of 40 inches. Depth to bedrock is more than 48 inches. Coarse fragments make up 0 to 20 percent of the upper part of the solum and 5 to 40 percent of the lower part. The soil is strongly acid to neutral above a depth of 50 inches and strongly acid to slightly acid below that depth.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4. Fine earth is silt loam, loam, or silty clay loam.

The B horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8 in the upper part and hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8 in the lower part. Fine earth is silt loam, silty clay loam, or clay loam.

The C horizon has hue of 2.5Y to 5YR, value of 4 to 6, and chroma of 4 to 8. Fine earth is loam to clay.

Duncannon Series

Soils of the Duncannon series are coarse-silty, mixed, mesic Ultic Hapludalfs. They are deep, well drained soils on uplands and terraces, mostly in the larger valleys near rivers and large streams. These soils formed in windblown deposits of silt and very fine sand over residuum of shale, sandstone, and limestone. Slopes range from 0 to 8 percent.

Duncannon soils are closely associated on the landscape with Berks, Birdsboro, Monongahela, Raritan, and Weikert soils. Duncannon soils are deeper and have fewer coarse fragments than Berks and Weikert soils. They are better drained than Monongahela and Raritan soils and have a higher base saturation than Birdsboro soils.

Typical profile of Duncannon very fine sandy loam, 3 to 8 percent slopes, in Watts Township, Perry County; 1 mile north of Amity Hall to intersection of Routes U.S. 11 and 15 and T522, 150 feet northwest of intersection, in an idle field:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) very fine sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; many roots; strongly acid; abrupt smooth boundary.

B1—6 to 16 inches; dark brown (10YR 4/3) very fine sandy loam; weak medium subangular blocky structure; very friable, nonsticky and nonplastic; many roots; strongly acid; clear wavy boundary.

B21t—16 to 22 inches; yellowish brown (10YR 5/4) very fine sandy loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; many roots; common thin discontinuous clay films on ped faces; strongly acid; clear wavy boundary.

B22t—22 to 33 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; many roots;

common thin discontinuous clay films on ped faces; strongly acid; gradual wavy boundary.
B23t—33 to 40 inches; dark yellowish brown (10YR 4/4) very fine sandy loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; abundant roots; common thin discontinuous clay films on ped faces and in pores; strongly acid; gradual wavy boundary.
B3—40 to 58 inches; brown (7.5YR 5/4) very fine sandy loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common roots; few thin clay films in pores; strongly acid; gradual wavy boundary.
IIC1—58 to 64 inches; reddish brown (5YR 4/4) sandy loam; weak thin platy structure; friable, slightly sticky and slightly plastic; few clay films on ped faces; 15 percent coarse fragments; strongly acid; abrupt wavy boundary.
IIC2—64 to 99 inches; reddish brown (5YR 4/3) gravelly sandy loam; weak thin platy structure; friable, nonsticky and nonplastic; 35 percent coarse fragments; strongly acid.

The solum is 40 to 60 inches thick. The argillic horizon terminates within a depth of 40 inches. Depth to bedrock is more than 60 inches. Depth to the lithologic discontinuity is 40 to 70 inches. Coarse fragments make up 0 to 10 percent above the lithologic discontinuity and 15 to 50 percent below. If the soil is not limed, it is strongly acid or medium acid in the solum and slightly acid to strongly acid in the C horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. Fine earth is very fine sandy loam, loam, or silt loam.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8. Fine earth is silt loam, loam, or very fine sandy loam.

The IIC horizon has hue of 10YR to 10R, value of 3 to 5, and chroma of 2 to 8. Some pedons have mottles. Fine earth is silt loam, loam, or sandy loam.

Dystrochrepts

Dystrochrepts are very shallow to deep, well drained and somewhat excessively drained soils. They formed in material weathered from sandstone, shale, and quartzite. Boulders and stones cover 50 to 90 percent of the surface. Slopes range from 0 to 80 percent.

Dystrochrepts are closely associated on the landscape with Hazleton, Laidig, Buchanan, Clymer, and Meckesville soils. Dystrochrepts have more coarse fragments throughout than these associated soils.

Because the composition of these soils varies considerably, a typical pedon is not given.

Solum thickness and depth to bedrock range from 10 to 60 inches or more. Coarse fragments make up 15 to 80 percent of the individual horizons. The soil is extremely acid to strongly acid throughout.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4. Fine earth is silt loam, sandy loam, or loam. Some pedons do not have an A horizon.

The B horizon has hue of 10YR, 7.5YR, or 5YR, value of 3 to 5, and chroma of 3 to 5. Fine earth is sandy loam, silt loam, or loam.

The C horizon has hue of 5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8. Fine earth is sandy loam, silt loam, loam, or loamy sand.

Edom Series

Soils of the Edom series are fine, illitic, mesic Typic Hapludalfs. They are deep, well drained soils on ridges and in valleys. These soils formed in material weathered from limestone, calcareous shale, and platy limestone. Slopes range from 3 to 40 percent.

The Edom soils are closely associated on the landscape with Bedington, Berks, Duffield, and Hagerstown soils. Edom soils have a thinner solum than Bedington, Duffield, and Hagerstown soils. They have a finer textured subsoil than Berks soils.

Typical profile on Edom silty clay loam, 8 to 15 percent slopes, in Spring Township, Perry County; 4/10 mile south of intersection of Routes PA 74 and 274, along PA 74, 25 feet east of road, in hayland:

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine subangular blocky structure; friable, slightly sticky and plastic; many roots; 3 percent coarse fragments; neutral; abrupt smooth boundary.
B21t—8 to 16 inches; strong brown (7.5YR 5/6) clay; moderate coarse prismatic structure parting to moderate medium blocky; firm, sticky and very plastic; common roots; common thin continuous yellowish brown (10YR 5/4) clay films on ped faces; 5 percent coarse fragments; neutral; clear smooth boundary.
B22t—16 to 23 inches; strong brown (7.5YR 5/6) clay; moderate medium and coarse blocky structure; firm, sticky and very plastic; common roots; common thin continuous common light yellowish brown (2.5Y 6/4) weathered shale fragments; clay films on ped faces; 10 percent coarse fragments; common light yellowish brown (2.5Y 6/4) weathered shale fragments; neutral; clear wavy boundary.
B23t—23 to 28 inches; strong brown (7.5YR 5/6) shaly clay; weak coarse subangular blocky structure; firm, sticky and very plastic; few roots; common thin continuous brown (7.5YR 5/4) clay films on ped faces; 15 percent coarse fragments; many light yellowish brown (2.5Y 6/4) weathered shale fragments; neutral; clear wavy boundary.
B24t—28 to 35 inches; brown (7.5YR 5/4) shaly silty clay; weak coarse subangular blocky structure; firm, sticky and very plastic; few roots; few patchy brown (7.5YR 5/4) clay films in pores and on shale frag-

ments; 20 percent coarse fragments; many light yellowish brown (2.5Y 6/4) weathered shale fragments; neutral; clear wavy boundary.
C1—35 to 46 inches; light yellowish brown (10YR 6/4) shaly silty clay loam; massive; firm, sticky and plastic; few roots; few thin patchy clay films on shale fragments and in pores; 20 percent coarse fragments; neutral; gradual wavy boundary.
C2—46 to 54 inches; yellowish brown (10YR 5/4) shaly silty clay loam; massive; firm, sticky and plastic; few roots; few thin patchy clay films on shale fragments and in pores; 35 percent coarse fragments; neutral; gradual wavy boundary.
C3—54 to 67 inches; yellowish brown (10YR 5/4) very shaly silty clay loam; massive; firm, sticky, and plastic; few roots; few thin patchy clay films on shale fragments and in pores; 50 percent coarse fragments; neutral; abrupt wavy boundary.
R—67 inches; thin bedded calcareous grayish brown to black shale bedrock standing on end and strongly folded.

The solum is 20 to 40 inches thick. Depth to bedrock is more than 40 inches. Coarse fragments make up 2 to 30 percent of the solum and 20 to 80 percent of the C horizon. The soil is strongly acid to mildly alkaline in the upper part of the solum and medium acid to mildly alkaline in the lower part of the solum and in the C horizon.

The Ap horizon has hue of 2.5Y to 7.5YR, value of 3 or 4, and chroma of 2 to 4. Some pedons in undisturbed areas have an A2 horizon. Fine earth is silty clay loam or silt loam.

The B horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 3 to 6. Fine earth is silty clay loam, silty clay, or clay in the upper part and silty clay or clay in the lower part.

The C horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 6. Fine earth is silty clay loam, silty clay, or clay.

Elliber Series

Soils of the Elliber series are loamy-skeletal, mixed, mesic Typic Hapludults. They are deep, well drained soils on uplands, on steep hillsides, and in valleys. These soils formed in material weathered from cherty limestone. Slopes range from 0 to 50 percent.

Elliber soils are closely associated on the landscape with Edom, Evendale, Hagerstown, and Kreamer soils. Elliber soils have a lower base saturation than Edom and Hagerstown soils. They are better drained than Evendale and Kreamer soils.

Typical pedon of Elliber very cherty silt loam, 3 to 8 percent slopes, in Saville Township, Perry County; 1.5 miles north of Loysville; 530 feet south of intersection of Legislative Routes 50010 and 50011 and 100 feet east, in woodland:

O2—2 inches to 0; forest litter in various stages of decomposition.
A1—0 to 3 inches; very dark brown (10YR 2/2) very cherty silt loam; weak very fine granular structure; very friable, nonsticky and nonplastic; many roots; 75 percent coarse fragments; extremely acid; abrupt smooth boundary.
A2—3 to 14 inches; light yellowish brown (10YR 6/4) very cherty silt loam; weak fine subangular blocky structure; very friable, nonsticky and slightly plastic; many roots; 50 percent coarse fragments; very strongly acid; clear wavy boundary.
B1—14 to 28 inches; brownish yellow (10YR 6/6) very cherty silt loam; weak medium subangular blocky structure; friable, nonsticky and slightly plastic; common roots; 70 percent coarse fragments; very strongly acid; clear wavy boundary.
B21—28 to 35 inches; yellowish brown (10YR 5/6) very cherty silt loam; weak medium subangular blocky structure; friable, nonsticky and slightly plastic; few roots; few black coatings on ped faces and on chert fragments; 70 percent coarse fragments; extremely acid; clear wavy boundary.
B22t—35 to 47 inches; yellowish brown (10YR 5/6) very cherty loam; weak coarse subangular blocky structure; friable, slightly sticky and slightly plastic; few roots; common moderately thick clay films in pores and on chert fragments; many black coatings on ped faces and fragments; 75 percent coarse fragments; extremely acid; gradual wavy boundary.
B23t—47 to 59 inches; yellowish brown (10YR 5/8) very cherty clay loam; weak coarse subangular blocky structure; friable, slightly sticky and slightly plastic; few roots; common moderately thick clay films in pores and on coarse fragments; many black coatings; 80 percent coarse fragments; very strongly acid; gradual wavy boundary.
B24t—59 to 70 inches; yellowish brown (10YR 5/8) very cherty clay loam; weak coarse subangular blocky structure; firm, slightly sticky and plastic; few roots; common moderately thick clay films in pores and on coarse fragments; many black coatings; 60 percent coarse fragments; very strongly acid.

The solum is 40 to 80 inches thick. The argillic horizon begins 15 to 40 inches below the surface. Depth to bedrock is more than 60 inches. Coarse fragments make up 40 to 80 percent throughout; they average more than 50 percent in the upper 20 inches of the Bt horizon. If the soil is not limed, it is extremely acid to strongly acid throughout.

The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The A2 horizon, where present, has hue of 10YR, value of 6 or 7, and chroma of 3 or 4. Some pedons have an Ap horizon that has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. Fine earth is silt loam, loam, or sandy loam.

The B horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. Fine earth is loam or silt loam; individual horizons range to silty clay loam, clay loam, or sandy loam.

Some pedons have a C horizon that has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 6. Fine earth is silt loam, loam, clay loam, or sandy loam.

Ernest Series

Soils of the Ernest series are fine-loamy, mixed, mesic Aquic Fragiudults. They are deep, moderately well drained soils on benches, at the heads of drainageways, and on lower foot slopes. These soils formed in colluvium from acid brown sandstone, siltstone, and shale. Slopes range from 3 to 15 percent.

Ernest soils are closely associated on the landscape with Bedington, Berks, Blairton, and Brinkerton soils. Ernest soils are moderately well drained. Bedington and Berks soils are well drained, and Brinkerton soils are poorly drained. Ernest soils are deeper than the Blairton soils.

Typical pedon of Ernest silt loam, 3 to 8 percent slopes, in Centre Township, Perry County; 2 1/2 miles northwest of New Bloomfield to intersection of Legislative Routes 50005 and 50048, 300 feet west along Legislative Route 50048 and 25 feet north, in cropland:

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; 5 percent coarse fragments; medium acid; abrupt smooth boundary.

B1—9 to 16 inches; brownish yellow (10YR 6/6) silty clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common roots; 5 percent coarse fragments; strongly acid; clear wavy boundary.

B2t—16 to 23 inches; brownish yellow (10YR 6/6) silty clay loam; few fine faint light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; slightly firm, slightly sticky and slightly plastic; few roots; prominent clay films on ped faces; 10 percent coarse fragments; strongly acid; clear wavy boundary.

Bx1—23 to 30 inches; brownish yellow (10YR 6/6) silty clay loam; common medium distinct gray (10YR 6/1) and strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm, brittle, slightly sticky and slightly plastic; prominent clay films on ped faces and in pores; 10 percent coarse fragments; strongly acid; clear wavy boundary.

Bx2—30 to 44 inches; brownish yellow (10YR 6/6) channery silty clay loam; common medium distinct pale brown (10YR 6/3) and strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm, brittle, slightly sticky and slightly plastic; patchy clay films on ped faces; 15 percent coarse fragments; strongly acid; gradual wavy boundary.

C—44 to 60 inches; brownish yellow (10YR 6/6) channery silt loam; many medium distinct pale brown (10YR 6/3), gray (10YR 6/1), and strong brown (7.5YR 5/6) mottles; massive; firm, slightly sticky and slightly plastic; few clay films on channery faces; 20 percent coarse fragments; very strongly acid.

The solum is 36 to 48 inches thick. Depth to the top of the fragipan is 20 to 36 inches. Depth to bedrock is more than 60 inches. Coarse fragments are 5 to 25 percent in the solum above the fragipan and 5 to 40 percent in the fragipan and the C horizon. If the soil is not limed, it is strongly acid to extremely acid throughout.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. Fine earth is silt loam or loam.

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

The Bx horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 8. Fine earth is loam to silty clay loam.

The C horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 6. Fine earth is silt loam or silty clay loam.

Evendale Series

Soils of the Evendale series are clayey, mixed, mesic Aeric Ochraquults. They are deep, somewhat poorly drained soils on middle and lower side slopes of secondary ridges. These soils formed in colluvium from cherty limestone and shale. Slopes are 0 to 8 percent.

Evendale soils are closely associated on the landscape with Elliber and Kreamer soils. They have more clay in the control section than these soils and are wetter.

Typical pedon of Evendale cherty silt loam, 3 to 8 percent slopes, in Liverpool Township, Perry County; 1/10 mile south of intersection of Legislative Route 50022 and Route T555 along Legislative Route 50022 to fence corner, 200 feet southwest, in pasture:

Ap—0 to 8 inches; gray brown (10YR 5/2) cherty silt loam; moderate fine and medium granular structure; very friable, slightly sticky and plastic; many roots; 15 percent coarse fragments; neutral; abrupt smooth boundary.

A2—8 to 12 inches; pale brown (10YR 6/3) cherty silt loam; many medium distinct light brownish gray (2.5Y 6/2) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and plastic; common roots; 15 percent coarse fragments; neutral; clear wavy boundary.

B21t—12 to 22 inches; strong brown (7.5YR 5/6) cherty silty clay loam; many medium distinct light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; firm, sticky and plastic; common roots; gray (10YR 6/2) ped faces; many moderately thick clay films in pores; 20 percent coarse fragments; slightly acid; clear wavy boundary.

B22t—22 to 35 inches; strong brown (7.5YR 5/6) cherty silty clay; many medium distinct light brownish gray (10YR 6/2) mottles; moderate very coarse prismatic structure parting to weak fine and medium angular blocky; firm, sticky and plastic; few roots; gray (N 6/0) prism faces; many moderately thick clay films in pores; few black coatings; 20 percent coarse fragments; medium acid; gradual wavy boundary.

B23t—35 to 44 inches; light yellowish brown (10YR 6/4) cherty silty clay; many medium distinct light brownish gray (10YR 6/2) mottles; moderate very coarse prismatic structure parting to weak fine and medium angular blocky; firm, sticky and plastic; few roots; gray (N 6/0) prism faces; many moderately thick clay films in pores; few black coatings; 20 percent coarse fragments; strongly acid; clear wavy boundary.

B24t—44 to 52 inches; strong brown (7.5YR 5/6) cherty silty clay; many medium and coarse distinct light brownish gray (10YR 6/2) mottles; moderate very coarse prismatic structure parting to weak fine and medium angular blocky; firm, sticky and plastic; gray (N 6/0) prism faces and yellowish red (5YR 5/6) bordering interior of prism faces; continuous moderately thick clay films in pores; few black coatings; 20 percent coarse fragments; strongly acid; clear wavy boundary.

B25t—52 to 62 inches; strong brown (7.5YR 5/6) cherty clay; many medium and coarse distinct light brownish gray (10YR 6/2) mottles; moderate very coarse prismatic structure; firm, sticky and plastic; gray (N 6/0) prism faces and yellowish red (5YR 5/6) bordering interior of prism faces; continuous moderately thick clay films in pores; few black coatings; 20 percent coarse fragments; strongly acid; clear wavy boundary.

B26t—62 to 75 inches; brownish yellow (10YR 6/6) cherty clay; many medium and coarse distinct light brownish gray (10YR 6/2) mottles; moderate very coarse prismatic structure; firm, sticky and plastic; gray (N 6/0) prism faces and strong brown (7.5YR 5/8) bordering interior of prism faces; continuous moderately thick clay films in pores; 20 percent coarse fragments; strongly acid.

The solum is 40 to 80 inches thick. Depth to bedrock is more than 40 inches. Coarse fragments make up 10 to 40 percent of the upper part of the solum and 20 to 70 percent of the lower part of the solum and the C horizon. The soil is neutral to very strongly acid in the upper part of the solum and very strongly acid and strongly acid below a depth of about 40 inches.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 or 3. Fine earth is silt loam or silty clay loam. Some pedons do not have an A2 horizon.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 2 to 6. Mottles range from few to many throughout. Fine earth is silty clay loam, silty clay, clay, or clay loam.

Some pedons have a C horizon that has hue of 5YR to 10YR, value of 3 to 5, and chroma of 3 to 6. Fine earth ranges from loam to clay.

Glenville Series

Soils of the Glenville series are fine-loamy, mixed, mesic Aquic Fragiudults. They are deep, moderately well drained and somewhat poorly drained soils at the head of drainageways and on lower slopes of mountains and ridges. These soils formed in material weathered from schist and rhyolite. Slopes range from 0 to 8 percent.

Glenville soils are closely associated on the landscape with Catoctin and Highfield soils. Glenville soils are moderately well drained and somewhat poorly drained; Catoctin and Highfield soils are well drained.

Typical pedon of Glenville silt loam, 3 to 8 percent slopes, in Dickinson Township, Cumberland County; one mile south of Hunters Run along Route T522 to Dickinson Elementary School, 800 feet west of the school, in pasture at the edge of the forest:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable, slightly sticky and slightly plastic; many roots; medium acid; abrupt smooth boundary.

B2t—10 to 21 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; many roots; few thin continuous clay films on ped faces and in pores; 10 percent coarse fragments; medium acid; clear wavy boundary.

Bx1—21 to 32 inches; yellowish brown (10YR 5/6) silt loam; many medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky and moderate medium platy structure; firm, brittle, slightly sticky and slightly plastic; common roots; few common discontinuous clay films on ped faces; 10 percent coarse fragments; strongly acid; gradual irregular boundary.

Bx2—32 to 43 inches; yellowish brown (10YR 5/6) channery silt loam; many medium and coarse distinct grayish brown (10YR 5/2) and light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky and moderate medium platy structure; firm, brittle, slightly sticky and nonplastic; few roots; few common discontinuous clay films on ped faces; 20

percent coarse fragments; strongly acid; clear wavy boundary.
C—43 to 60 inches; yellowish brown (10YR 5/6) channery fine sandy loam; massive; friable, nonsticky and nonplastic; 35 percent coarse fragments; very strongly acid.

The solum is 30 to 48 inches thick. Depth to bedrock is more than 48 inches. Depth to fragipan is 15 to 30 inches. Coarse fragments make up 0 to 30 percent of the solum and 15 to 80 percent of the C horizon. If the soil is not limed, it is medium acid to very strongly acid in the solum and strongly acid or very strongly acid in the C horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 6.

The B horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 3 to 8. Fine earth is silt loam or silty clay loam.

The Bx horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 3 to 8. Fine earth is silt loam or silty clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8. Fine earth is fine sandy loam to silt loam.

The Glenville soils in this survey area are taxadjuncts to the Glenville series because they do not have mottles of low chroma in the upper 10 inches of the argillic horizon. This difference does not affect the use and management of the soils.

Hagerstown Series

Soils of the Hagerstown series are fine, mixed, mesic Typic Hapludalfs. They are deep, well drained soils in valleys and on adjacent hills. These soils formed in material weathered from limestone. Slopes range from 0 to 60 percent.

Hagerstown soils are closely associated on the landscape with Duffield, Edom, Elliber, Huntington, and Kreamer soils. They are better drained than Kreamer soils. They have a thicker solum than Edom soils and have fewer coarse fragments throughout than Elliber soils. They have more clay in the control section than Duffield and Huntington soils.

Typical pedon of Hagerstown silt loam, 3 to 8 percent slopes, in Upper Allen Township, Cumberland County; 200 feet north of intersection of Legislative Route 21098 and Route 114, in an idle field:

Ap—0 to 10 inches; dark brown (10YR 4/3) silt loam; weak medium granular structure; friable, slightly sticky and slightly plastic; many roots; neutral; abrupt smooth boundary.
B1—10 to 19 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; slightly firm, sticky and plastic; common roots; neutral; gradual wavy boundary.
B21t—19 to 30 inches; yellowish red (5YR 4/6) clay; moderate coarse and medium subangular blocky structure; firm, sticky and plastic; common to few roots; common thick continuous clay films on ped faces and in pores; few black concretions; neutral; gradual wavy boundary.
B22t—30 to 44 inches; yellowish red (5YR 4/6) clay; moderate coarse and medium subangular blocky structure; firm, sticky and plastic; few roots; common thick continuous clay films on ped faces and in pores; many black concretions; neutral; gradual wavy boundary.
B23t—44 to 53 inches; yellowish red (5YR 4/6) clay; moderate medium subangular blocky structure; firm, sticky and plastic; common thick continuous clay films on ped faces and in pores; neutral; gradual wavy boundary.
C—53 to 60 inches; yellowish red (5YR 4/6) clay; massive; firm, sticky and plastic; neutral.
R—60 inches; gray (7.5YR 6/0) weathered limestone bedrock.

The solum is 40 to 70 inches thick. Depth to bedrock is more than 40 inches (fig. 23). Coarse fragments make up 0 to 15 percent throughout. If the soil is not limed, it is strongly acid or very strongly acid in the upper part of the solum and strongly acid to neutral in the lower part.

The A horizon has hue of 10YR to 5YR, value of 3 to 5, and chroma of 2 to 4. Fine earth is silt loam, loam, clay loam, or silty clay loam.

The B1 horizon has hue of 7.5YR to 5YR, value of 4 or 5, and chroma of 4 to 8. Fine earth ranges from loam to silty clay. The Bt horizon has hue of 5YR to 2.5YR, value of 4 or 5, and chroma of 4 to 8. Some pedons have subhorizons that have hue of 7.5YR. Fine earth is silty clay, clay, or silty clay loam.

The C horizon has hue of 10YR to 2.5YR, value of 3 to 6, and chroma of 4 to 8. Fine earth ranges from loam or silt loam to clay.

Hazleton Series

Soils of the Hazleton series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. They are deep, well drained soils on hills, mountaintops, and ridges. These soils formed in material weathered from sandstone, quartzite, and conglomerate. Slopes range from 0 to 60 percent.

Hazleton soils are closely associated on the landscape with Andover, Buchanan, Clymer, and Laidig soils. They are better drained than Andover, Buchanan, and Laidig soils and do not have a fragipan. Hazleton soils do not have an argillic horizon, unlike Clymer soils.

Typical pedon of Hazleton channery sandy loam, in an area of Hazleton extremely stony sandy loam, 8 to 25 percent slopes, in Toyboyne Township, Perry County; 2 1/2 miles west of Shoacker Ranger Station, 200 feet south of intersection of Blain-McCrea Road and Wolf

Figure 23.—An area of what was once Hagerstown silt loam. Most of the surface layer and subsoil has been removed, exposing the pinnacle nature of the bedrock.

Road to Mobil pipeline, 50 feet north of pipeline on east roadbank, in Bureau of Forestry woodland:

O1—3 inches to 2; loose hardwood leaf litter and twigs.

O2—2 inches to 0; partially decomposed leaf litter and mosses.

A1—0 to 3 inches; very dark brown (10YR 2/2) channery sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; many roots; 15 percent coarse fragments; very strongly acid; abrupt wavy boundary.

A2—3 to 6 inches; gray (10YR 5/1) channery sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; many roots; 15 percent coarse fragments; very strongly acid; abrupt wavy boundary.

B21hir—6 to 8 inches; dark reddish brown (5YR 3/4) sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; common roots; 10 percent coarse fragments; very strongly acid; clear smooth boundary.

B22—8 to 21 inches; dark yellowish brown (10YR 4/4) channery sandy loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common roots; 35 percent coarse fragments; very strongly acid; gradual wavy boundary.

B23—21 to 42 inches; yellowish brown (10YR 5/6) channery sandy loam; weak fine and medium blocky structure; friable, nonsticky and nonplastic; 45 percent coarse fragments; very strongly acid; gradual wavy boundary.

C—42 to 54 inches; brownish yellow (10YR 6/6) very channery loamy sand; massive; friable, nonsticky and nonplastic; 55 percent coarse fragments; very strongly acid; diffuse wavy boundary.
R—54 inches; yellowish brown (10YR 5/8) weathered sandstone.

The solum is 25 to 50 inches thick. Depth to bedrock is more than 40 inches. Coarse fragments make up 5 to 70 percent of the individual horizons of the solum and 35 to 80 percent of the C horizon. If the soil is not limed it is strongly acid to extremely acid throughout.

The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The A2 horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 4. Some pedons have an Ap horizon that has hue of 10YR, value of 3 or 4, and chroma of 2 or 3.

The B horizon has hue of 10YR to 5YR, value of 3 to 6, and chroma of 3 to 8. Hue of 5YR is only in the incipient Bhir or Bir horizon. Fine earth is loam or sandy loam. Some pedons have a B3 horizon that is loam, sandy loam, or loamy sand.

The C horizon has hue of 5YR to 2.5Y, value of 5 to 7, and chroma of 4 to 8. Fine earth is loam to loamy sand.

Highfield Series

Soils of the Highfield series are coarse-loamy, mixed, mesic Ultic Hapludalfs. They are deep, well drained soils on mountains and in valleys. These soils formed in material weathered from schist and rhyolites. Slopes range from 0 to 50 percent.

Highfield soils are closely associated on the landscape with Atkins, Catoctin, Clymer, Glenville, and Hazleton soils. They are better drained than Atkins and Glenville soils and deeper to bedrock than Catoctin soils. They have less clay and sand in the profile than Clymer soils and have an argillic horizon in the subsoil, unlike Hazleton soils.

Typical pedon of Highfield channery silt loam, 8 to 15 percent slopes, in South Middleton Township, Cumberland County; 2.5 miles south of Mount Holly Springs along Route PA 94, 1/2 mile north of Route T533, 1/2 mile east of Route PA 94 along south roadbank of private road, in woodland:

O1—1 inch to 0; mat of leaves in various stages of decomposition.
A1—0 to 3 inches; very dark grayish brown (10YR 3/2) channery silt loam; weak fine granular structure; very friable, nonsticky and nonplastic; 15 percent coarse fragments; strongly acid; abrupt wavy boundary.
A2—3 to 10 inches; pale brown (10YR 6/3) channery silt loam; weak fine granular structure; very friable, nonsticky and nonplastic; common roots; 20 percent coarse fragments; strongly acid; clear wavy boundary.
B21t—10 to 20 inches; light yellowish brown (10YR 6/4) channery silt loam; weak medium subangular blocky structure; friable, nonsticky and slightly plastic; few roots; few thin discontinuous clay films on ped faces; 30 percent coarse fragments; strongly acid; clear wavy boundary.
B22t—20 to 34 inches; yellowish brown (10YR 5/6) channery silt loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few thin discontinuous clay films on ped faces and in pores; 30 percent coarse fragments; strongly acid; clear wavy boundary.
C—34 to 60 inches; yellowish brown (10YR 5/4) very channery silt loam; thin streaks of light gray (2.5Y 6/1) and strong brown (7.5YR 5/6) in lower part; weak fine subangular blocky structure and massive; friable, nonsticky and nonplastic; 60 percent coarse fragments; strongly acid; clear wavy boundary.
R—60 inches; light reddish brown (2.5YR 6/4) rhyolite and schist bedrock.

The solum is 20 to 40 inches thick. Depth to bedrock is more than 40 inches. Coarse fragments make up 10 to 25 percent of the A horizon, 15 to 40 percent of subhorizons of the B horizon, and 20 to 80 percent of the C horizon. If the soil is not limed, it is very strongly acid or strongly acid in the solum and strongly acid or medium acid in the C horizon.

The A1 horizon has hue of 10YR to 2.5Y, value of 2 to 4, and chroma of 1 or 2. The A2 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4.

The B horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 6. Some pedons have a B3 horizon. Fine earth is silt loam or loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 6; inherited variegated colors are common. Fine earth is silt loam or loam.

Huntington Series

Soils of the Huntington series are fine-silty, mixed, mesic Fluventic Hapludolls. They are deep, well drained soils in drainageways and on level or concave areas. These soils formed in limestone material washed from higher areas. Slopes range from 0 to 5 percent.

Huntington soils are closely associated on the landscape with Duffield, Hagerstown, Lindside, and Penlaw soils. They are not as red in the subsoil as Hagerstown soils and, unlike Penlaw and Lindside soils, are not mottled.

Typical pedon of Huntington silt loam, 0 to 5 percent slopes, in Dickinson Township, Cumberland County; 1/2 mile south of Mooredale to intersection of Legislative Route 21009 and Route T462, west 1/4 mile on T462 to Stuart Road; 1/4 mile north along Stuart Road, 10 feet west of road, in hayfield:

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; friable, nonsticky and slightly plastic; many roots; slightly acid; abrupt smooth boundary.
B1—11 to 22 inches; dark brown (10YR 3/3) silt loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; common roots; neutral; gradual wavy boundary.
B2—22 to 44 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few roots; neutral; gradual wavy boundary.
IIC—44 to 60 inches; yellowish brown (10YR 5/8) sandy loam; weak medium subangular blocky structure; friable, slightly sticky and plastic; neutral.

The solum is more than 40 inches thick. The mollic epipedon is 10 to 24 inches thick. The soil is medium acid to mildly alkaline throughout.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 to 3. Some pedons have an A3 horizon.

The B1 horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 or 3. In some pedons, faces of peds are darker and have colors similar to the A horizon. Fine earth is silt loam or loam.

The B2 horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8. Fine earth is loam or sandy loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8. Fine earth is loam or sandy loam.

Klinesville Series

Soils of the Klinesville series are loamy-skeletal, mixed, mesic Lithic Dystrochrepts. They are shallow, well drained soils on ridges and hillsides. These soils formed in material weathered from red shale, siltstone, and sandstone. Slopes range from 3 to 75 percent.

Klinesville soils are closely associated on the landscape with Albrights, Calvin, Lehew, Meckesville, and Weikert soils. Klinesville soils are shallow to bedrock; Albrights, Calvin, Lehew, and Meckesville soils are deeper than 20 inches to bedrock. Klinesville soils formed in red material and do not have the yellowish colors of Weikert soils.

Typical pedon of Klinesville very shaly silt loam, 8 to 15 percent slopes, in Carroll Township, Perry County; 1 3/10 miles east of intersection of Routes PA 34 and 850 to high tension power lines crossing Route PA 850; 100 feet north, in idle field:

Ap—0 to 5 inches; reddish brown (5YR 4/4) very shaly silt loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; 50 percent coarse fragments; strongly acid; clear wavy boundary.
B2—5 to 15 inches; reddish brown (2.5YR 4/4) very shaly silt loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; common roots; 60 percent coarse fragments; strongly acid; clear wavy boundary.
R—15 inches; dusky red (2.5YR 3/2) partly weathered, highly fractured shale bedrock.

Solum thickness and depth to bedrock are 10 to 20 inches. Coarse fragments make up 40 to 70 percent of the solum and 45 to 90 percent of the C horizon. If the soil is not limed, it is very strongly acid to medium acid throughout.

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

The B horizon has hue of 5YR to 10YR, value of 3 or 4, and chroma of 3 to 6. Fine earth is silt loam or loam.

Some pedons have a C horizon that has hue of 7.5YR to 10YR, value of 3 to 6, and chroma of 3 to 6. Fine earth is silt loam or loam.

Kreamer Series

Soils of the Kreamer series are clayey, illitic, mesic Aquic Hapludults. They are deep, moderately well drained soils on middle and lower side slopes of secondary ridges and along drainageways. These soils formed in colluvium from cherty limestone. Slopes range from 0 to 15 percent.

Kreamer soils are closely associated on the landscape with Elliber, Evendale, Hagerstown, and Morrison soils. Kreamer soils are moderately well drained; Elliber, Hagerstown, and Morrison soils are well drained; and Evendale soils are somewhat poorly drained.

Typical pedon of Kreamer cherty silt loam, 3 to 8 percent slopes, in Greenwood Township, Perry County; in Millerstown, east end of town, 50 feet east of Greenwood High School athletic field, in cropland:

Ap—0 to 9 inches; dark yellowish brown (10YR 4/4) cherty silty loam; weak fine subangular blocky structure; friable, slightly sticky and plastic; many roots; 20 percent coarse fragments; slightly acid; abrupt wavy boundary.
B1—9 to 12 inches; yellowish brown (10YR 5/6) cherty silty clay loam; moderate medium subangular blocky structure; firm, slightly sticky and plastic; many roots; few thin clay films in pores; 40 percent coarse fragments; slightly acid; clear wavy boundary.
B21t—12 to 21 inches; yellowish brown (10YR 5/8) cherty silty clay; moderate coarse subangular blocky structure; firm, sticky and plastic; common roots; common thick clay films in pores; few black coatings on ped faces; 30 percent coarse fragments; medium acid; clear wavy boundary.
B22t—21 to 40 inches; yellowish brown (10YR 5/6) cherty silty clay; common medium distinct light gray

(10YR 7/2) mottles; moderate coarse blocky structure; firm, sticky and plastic; few roots; many thin clay films on ped faces; common coarse black coatings on ped faces; 15 percent coarse fragments; medium acid; gradual wavy boundary.

B23t—40 to 60 inches; strong brown (7.5YR 5/6) cherty clay; common medium distinct light gray (10YR 7/2) mottles; weak very coarse prismatic structure parting to weak thick platy; firm, sticky and plastic; light gray (10YR 7/2) prism faces; many thin clay films on plates; common coarse black coatings on plates; 15 percent coarse fragments; strongly acid; clear wavy boundary.

C—60 to 66 inches; strong brown (7.5YR 5/6) cherty clay; massive; firm, sticky and plastic; few thin clay films on coarse fragments; 25 percent coarse fragments; strongly acid.

The solum is 40 to 80 inches thick. Depth to bedrock is more than 60 inches. Coarse fragments make up 15 to 50 percent throughout. If the soil is not limed, it is neutral to very strongly acid in the upper part of the solum and strongly acid or very strongly acid in the lower part and in the substratum.

The Ap horizon has hue of 7.5YR to 10YR, value of 4 or 5, and chroma of 3 or 4. Fine earth is silt loam or silty clay loam.

The B horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8; however, some pedons have hue of 5YR in the lower part. The middle and lower parts of the B horizon have prism faces that are gray, light gray, grayish brown, or light brownish gray. Some pedons have individual B horizons that have matrix color that has chroma of 2 or less. Fine earth is silty clay loam, silty clay, clay loam, or clay.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. Fine earth is silty clay loam to clay.

Laidig Series

Soils of the Laidig series are fine-loamy, mixed, mesic Typic Fragiudults. They are deep, well drained soils on mountain slopes, benches, and side slopes around large basins. These soils formed in colluvium weathered from acid, gray sandstone, shale, and quartzite. Slopes range from 0 to 25 percent.

Laidig soils are closely associated on the landscape with Albrights, Andover, Buchanan, Hazleton, Lehew, and Meckesville soils. They are better drained than Albrights, Andover, and Buchanan soils and, unlike Lehew and Meckesville soils, are not reddish in the upper part of the profile. Laidig soils have a finer textured subsoil than Hazleton soils.

Typical pedon of Laidig channery loam, 3 to 8 percent slopes, in Upper Mifflin Township, Cumberland County; about 4 miles west of McCrea to intersection of Route T383 and Route T402, 200 feet north along T402, 25 feet east of road, in woodland:

O1—1 inch to 1/2; mixed hardwood leaf litter and twigs.

O2—1/2 inch to 0; partially decomposed leaves, mosses, and matted roots.

A1—0 to 8 inches; dark grayish brown (10YR 4/2) channery loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; 20 percent coarse fragments; very strongly acid; abrupt smooth boundary.

B1—8 to 18 inches; yellowish brown (10YR 5/6) channery silt loam; weak fine subangular blocky structure; friable, nonsticky and nonplastic; common roots; 30 percent coarse fragments; very strongly acid; clear wavy boundary.

B2t—18 to 32 inches; yellowish brown (10YR 5/6) channery silt loam; weak medium subangular blocky structure; friable, nonsticky and slightly plastic; few roots; 30 percent coarse fragments; very strongly acid; clear wavy boundary.

Bx1—32 to 45 inches; yellowish brown (10YR 5/6) channery sandy clay loam; many medium distinct reddish brown (5YR 4/4) mottles; weak thick platy and moderate medium subangular blocky structure; firm, brittle, slightly sticky and slightly plastic; 35 percent coarse fragments; very strongly acid; few thin discontinuous clay films on peds; clear wavy boundary.

Bx2—45 to 60 inches; yellowish brown (10YR 5/6) very channery sandy clay loam; many medium distinct reddish yellow (7.5YR 6/6) mottles; moderate medium subangular blocky structure; firm, brittle, slightly sticky and slightly plastic; few thin discontinuous clay films on ped faces; 60 percent coarse fragments; very strongly acid.

The solum is 60 to 80 inches thick or more. Depth to the fragipan is 30 to 50 inches. Depth to bedrock is more than 60 inches. Coarse fragments range from 15 to 35 percent above the fragipan and 15 to 60 percent in the fragipan (fig. 24). If the soil is not limed, it is strongly acid to extremely acid throughout.

A1 horizon has hue of 10YR, value of 2 to 5, and chroma of 1 to 4. Some pedons have an Ap horizon that has hue of 10YR, value of 2 to 5, and chroma of 2 to 8. Some pedons have an A2 horizon that has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 1 to 6. Fine earth is loam, sandy loam, fine sandy loam, or silt loam.

The B2 horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 6 to 8. Mottles that have chroma of 2 or higher are below a depth of 30 inches in some pedons. Fine earth is sandy clay loam, loam, silt loam, or sandy loam.

The Bx horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 3 to 8 and is mottled. Fine earth is sandy clay loam, sandy loam, loam, or silt loam.

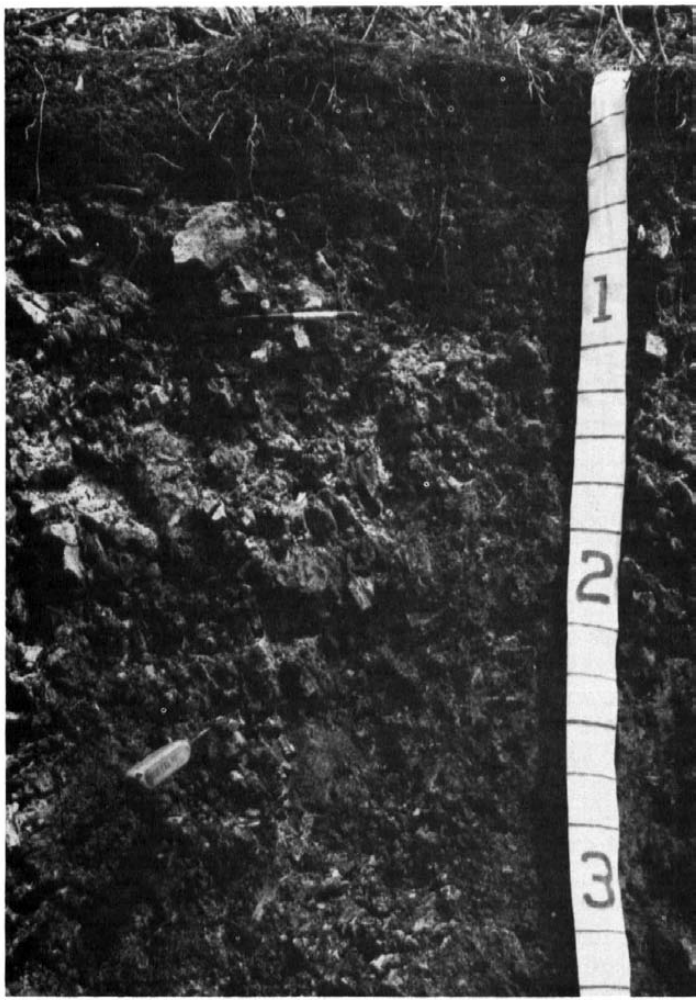


Figure 24.—Profile of Laidig channery loam. This soil formed in colluvium and is 15 to 35 percent coarse fragments in the upper part of the solum.

Lehew Series

Soils of the Lehew series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. They are moderately deep, well drained soils on ridges and mountains. These soils formed in material weathered from acid, red sandstone and shale. Slopes range from 0 to 25 percent.

Lehew soils are closely associated on the landscape with Albrights, Berks, Calvin, Hazleton, Klinesville, Laidig, and Weikert soils. Lehew soils are not as deep as Albrights, Hazleton, and Laidig soils. They have a redder subsoil than Berks soils, are deeper than Klinesville and Weikert soils, and are coarser textured than Calvin soils.

Typical pedon of Lehew channery loam, in an area of Lehew very stony loam, 8 to 25 percent slopes, in North Middleton Township, Cumberland County; 7/10 mile south of Wagners Gap on east roadbank of Route PA 74, in woodland:

O1—2 inches to 1; loose leaf litter and twigs.
O2—1 inch to 0; partially decayed leaves, mosses, and roots.
A1—0 to 9 inches; dark brown (7.5YR 3/2) channery loam; weak fine granular structure; very friable, nonsticky and nonplastic; many roots; 20 percent coarse fragments; very strongly acid; clear wavy boundary.
B1—9 to 18 inches; reddish brown (2.5YR 4/4) channery sandy loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; few roots; 30 percent coarse fragments; very strongly acid; gradual wavy boundary.
B2—18 to 25 inches; reddish brown (2.5YR 4/4) channery sandy loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; few roots; 35 percent coarse fragments; very strongly acid; gradual wavy boundary.
B3—25 to 30 inches; reddish brown (2.5YR 4/4) very channery sandy loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; 60 percent coarse fragments; very strongly acid; gradual wavy boundary.
C—30 to 38 inches; reddish brown (5YR 4/3) very channery sandy loam; massive to weak coarse subangular blocky structure; friable, nonsticky and nonplastic; 80 percent coarse fragments; very strongly acid.
R—38 inches; reddish brown (5YR 4/3) partially weathered sandstone bedrock.

The solum is 15 to 30 inches thick. Depth to bedrock is 20 to 40 inches. Coarse fragments make up 20 to 60 percent of the solum and 30 to 90 percent of the C horizon. If the soil is not limed, it is very strongly acid or strongly acid throughout.

The A1 horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 1 or 2. Fine earth is sandy loam, fine sandy loam, or loam.

The B horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. Fine earth is sandy loam, fine sandy loam, or loam.

The C horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 2 to 4. Fine earth is loamy sand, sandy loam, or fine sandy loam.

Lindside Series

Soils of the Lindside series are fine-silty, mixed, mesic Fluvaquentic Eutrochrepts. They are deep, moderately well drained soils on flood plains. These soils formed in recent alluvial material washed primarily from soils of limestone origin. Slopes range from 0 to 3 percent.

Lindside soils are closely associated on the landscape with Atkins, Melvin, and Warners soils. Lindside soils

have higher reaction in the lower part of the profile than Atkins soils and are better drained than Melvin soils. They are not as wet as Warners soils and do not have marl.

Typical pedon of Lindside silt loam, in Monroe Township, Cumberland County; 3/4 mile west of Williams Grove racetrack to intersection of Legislative Route 21017 and 21012, 300 feet south, in pasture:

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; slightly acid; clear smooth boundary.

B1—9 to 22 inches; brown (10YR 5/3) silt loam; moderate fine granular structure; friable, nonsticky and nonplastic; many roots; slightly acid; gradual smooth boundary.

B2—22 to 36 inches; dark yellowish brown (10YR 4/4) silty clay loam; many fine distinct light gray (10YR 7/2) and yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; firm, slightly sticky and slightly plastic; hard when dry; few roots; slightly acid; clear wavy boundary.

C—36 to 60 inches; dark yellowish brown (10YR 4/4) weakly stratified silt loam and silty clay loam; common medium light gray (10YR 7/2) and strong brown (7.5YR 5/6) mottles; massive; firm, slightly sticky and slightly plastic; slightly acid.

The solum is 25 to 50 inches thick. Coarse fragments make up 0 to 5 percent above a depth of 40 inches and 0 to 30 percent below that. If the soil is not limed, it is strongly acid to slightly acid in the upper part of the solum and medium acid to neutral in the lower part and in the C horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 or 3. Some pedons have an A1 horizon that has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 to 3. Fine earth is silt loam or loam.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 to 6 above a depth of 20 inches and 1 to 4 below that. Fine earth is silt loam or silty clay loam to a depth of at least 40 inches. In some pedons thin strata of very fine sandy loam, fine sandy loam, or loam are below a depth of 40 inches.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 1 to 4. Fine earth is silty clay loam, silt loam, loam, or fine sandy loam.

Meckesville Series

Soils of the Meckesville series are fine-loamy, mixed, mesic Typic Fragiudults. They are deep, well drained soils on benches and lower mountain slopes. These soils formed in colluvium from red sandstone and shale. Slopes range from 0 to 25 percent.

Meckesville soils are closely associated on the landscape with Albrights, Buchanan, Calvin, Klinesville, and Laidig soils. Meckesville soils are better drained than Albrights and Buchanan soils. They are deeper to bedrock than Calvin and Klinesville soils and are redder in the upper part of the solum than Laidig soils.

Typical pedon of Meckesville silt loam, 3 to 8 percent slopes, in Toboyne Township, Perry County; off Route PA 274, 6/10 mile east of Big Springs State Park entrance, along Hemlock Road 1 mile east of Hemlocks Natural Area, 10 feet north of road, in woodland:

O1—1 inch to 1/2; hardwood leaf litter and twigs.

O2—1/2 inch to 0; mosses, matted roots, and decomposed leaf litter.

A1—0 to 2 inches; dark brown (7.5YR 3/2) silt loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; 10 percent coarse fragments; very strongly acid; abrupt smooth boundary.

A2—2 to 10 inches; brown (7.5YR 4/4) silt loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; 10 percent coarse fragments; very strongly acid; clear wavy boundary.

B21t—10 to 17 inches; dark reddish brown (5YR 3/3) silty clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; many roots; few thin discontinuous clay films on ped faces; 10 percent coarse fragments; very strongly acid; clear wavy boundary.

B22t—17 to 31 inches; reddish brown (2.5YR 4/4) channery silty clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common to few roots; few thin discontinuous clay films on ped faces and in pores; 20 percent coarse fragments; very strongly acid; gradual wavy boundary.

Bx1—31 to 54 inches; reddish brown (2.5YR 4/4) channery loam; weak very coarse prismatic structure parting to weak medium platy; firm, brittle, slightly sticky and slightly plastic; few thin clay coats on ped faces; 35 percent coarse fragments; very strongly acid; gradual wavy boundary.

C—54 to 60 inches; reddish brown (2.5YR 4/4) very channery loam; massive; firm, slightly sticky and slightly plastic; 60 percent coarse fragments; very strongly acid.

The solum is 40 to 80 inches thick. Depth to bedrock is more than 60 inches. Depth to the fragipan ranges from 25 to 48 inches. Coarse fragments make up 5 to 30 percent in the upper part of the solum, 10 to 50 percent in the lower part, and 30 to 80 percent in the C horizon. If the soil is not limed, it is extremely acid to strongly acid throughout.

The A horizon has hue of 5YR or 7.5YR, value of 2 to 5, and chroma of 2 to 4. Fine earth is silt loam or loam.

The Bt horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 3 to 6. Fine earth is loam, silt loam, silty clay loam, or clay loam.

The Bx horizon has hue of 10YR to 5YR, value of 3 or 4, and chroma of 4. Fine earth is loam, silt loam, silty clay loam, or clay loam. Some pedons have gray, pinkish gray, and strong brown mottles below a depth of 50 inches.

The C horizon has hue of 10R to 5YR, value of 3 to 5, and chroma of 2 to 6. Fine earth is sandy loam to loam.

Melvin Series

Soils of the Melvin series are fine-silty, mixed, nonacid, mesic Typic Fluvaquents. They are deep, poorly drained soils on flood plains. These soils formed in alluvial material that originated in limestone areas. Slopes range from 0 to 3 percent.

Melvin soils are closely associated on the landscape with Atkins, Lindside, and Warners soils. Melvin soils formed in limestone material; Atkins soils formed in acid material. Melvin soils are wetter than Lindside soils and, unlike Warners soils, they do not have marl.

Typical pedon of Melvin silt loam, in Monroe Township, Cumberland County; 1/2 mile west of Williams Grove racetrack and 150 feet south along the south bank of Yellow Breeches Creek, about 20 feet south of creek, in pasture:

Ap—0 to 9 inches; grayish brown (10YR 5/2) silt loam; moderate fine granular structure; friable, nonsticky and nonplastic; many roots; slightly acid; abrupt smooth boundary.

Bg—9 to 26 inches; grayish brown (10YR 5/2) silt loam; common medium distinct yellowish brown (10YR 5/6) and gray (5YR 5/1) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; common roots; neutral; gradual wavy boundary.

C1g—26 to 40 inches; dark gray (N 4/0) silty clay loam; many medium prominent yellowish red (5YR 4/6) and strong brown (7.5YR 5/6) mottles: weak fine subangular blocky structure; firm, slightly sticky and slightly plastic; few roots; slightly acid; gradual wavy boundary.

C2g—40 to 62 inches; light gray (10YR 7/2) stratified sand; many medium prominent yellowish red (5YR 4/6) and strong brown (7.5YR 5/6) mottles; massive; firm, nonsticky and nonplastic; slightly acid.

The solum is 20 to 40 inches thick. Depth to bedrock is more than 60 inches. Coarse fragments make up 0 to 5 percent to a depth of 30 inches and make up 0 to 20 percent of individual horizons below a depth of 30 inches. If the soil is not limed, it is slightly acid to mildly alkaline throughout.

The Ap horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 to 3. In uncultivated areas, the A1 horizon is 1 or 2 inches thick and has hue of 10YR or 2.5Y, value of 3, and chroma of 1 or 2. Fine earth is silt loam or loam.

The B horizon is neutral or has hue of 10YR to 5Y, value of 4 to 7, and chroma of 0 to 2. Fine earth is silt loam or silty clay loam.

The C horizon is neutral or has hue of 10YR, value of 4 to 7, and chroma of 0 to 2. Fine earth is silt loam or silty clay loam. Below a depth of 40 inches, some pedons have stratified layers of loam, clay, and sand or of sand and gravel.

Middlebury Series

Soils of the Middlebury series are coarse-loamy, mixed, mesic Fluvaquentic Eutrochrepts. They are deep, moderately well drained and somewhat poorly drained soils on flood plains. These soils formed in young material washed primarily from gray shale and sandstone. Slopes range from 0 to 3 percent.

Middlebury soils are closely associated on the landscape with Atkins, Monongahela, Purdy, Tioga, and Tyler soils. They are better drained than Atkins and Purdy soils. They are not as well drained as Tioga soils and have less silt in the subsoil than Tyler soils. Middlebury soils have a less developed profile than Monongahela soils.

Typical pedon of Middlebury silt loam, in an area of Middlebury soils, in Lower Frankford Township, Cumberland County; 300 feet north of Opossum Lake bridge along Route T455, 150 feet east along Opossum Creek, in an idle field:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; friable, nonsticky and nonplastic; many roots; medium acid; clear wavy boundary.

B—9 to 20 inches; brown or dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; common roots; slightly acid; clear wavy boundary.

C1—20 to 34 inches; dark grayish brown (2.5Y 4/2) silt loam; many medium distinct strong brown (7.5YR 5/6) and gray (5Y 5/1) mottles; massive; friable, nonsticky and nonplastic; slightly acid; clear wavy boundary.

IIC2—34 to 36 inches; dark grayish brown (2.5Y 4/2) gravelly sandy loam; many medium distinct strong brown (7.5YR 5/6) and gray (5Y 5/1) mottles; massive; very friable, nonsticky and nonplastic; 20 percent coarse fragments; slightly acid; clear wavy boundary.

IIIC3—36 to 60 inches; grayish brown (2.5Y 5/2) and yellowish brown (10YR 5/4) gravelly sandy loam; massive; very friable, nonsticky and nonplastic; 20 percent coarse fragments; slightly acid.

The solum is 15 to 30 inches thick. Strongly contrasting gravelly or sandy material, if present, is at a depth of more than 34 inches. Coarse fragments make up 0 to 20

percent of the individual horizons of the solum. If the soil is not limed, it is strongly acid to slightly acid in the A horizon and medium acid to neutral in the B and C horizons.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. Fine earth is silt loam, loam, or fine sandy loam.

The B horizon has hue of 7.5YR to 5Y, value of 3 to 5, and chroma of 2 or 3. Some pedons have mottles that have chroma of 2 or less below a depth of 24 inches. Fine earth is fine sandy loam to silt loam.

The C horizon has hue of 7.5YR to 5Y, value of 4 or 5, and chroma of 1 to 4. Fine earth is sandy loam, loam, or silt loam.

Monongahela Series

Soils of the Monongahela series are fine-loamy, mixed, mesic Typic Fragiudults. They are deep, moderately well drained soils on stream terraces. These soils formed in old alluvium washed from uplands underlain by acid sandstone and shale. Slopes range from 0 to 15 percent.

Monongahela soils are closely associated on the landscape with Allegheny, Purdy, and Tyler soils. They are not as well drained as Allegheny soils. Monongahela soils are not as wet as and have less clay than Purdy soils and less silt than Tyler soils.

Typical pedon of Monongahela silt loam, 3 to 8 percent slopes, in Lower Mifflin Township, Cumberland County; from intersection of Route PA 233 and Legislative Route 21036, 3/10 mile east along Legislative Route 21036, 75 feet south of road, in cropland:

Ap—0 to 9 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; 10 percent coarse fragments; strongly acid; clear wavy boundary.

B2t—9 to 21 inches; light yellowish brown (10YR 6/4) gravelly silty clay loam; moderate medium subangular blocky structure; friable, sticky and plastic; common roots; few thin discontinuous clay coatings on ped faces; 15 percent coarse fragments; very strongly acid; clear wavy boundary.

Bx1—21 to 31 inches; strong brown (7.5YR 5/6) gravelly clay loam; many medium distinct yellowish red (5YR 4/8) and grayish brown (10YR 5/2) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, brittle, sticky and plastic; few thick continuous clay coatings on ped faces and in pores; 20 percent coarse fragments; very strongly acid; clear wavy boundary.

Bx2—31 to 46 inches; reddish yellow (7.5YR 6/6) gravelly clay loam; many medium distinct yellowish red (5YR 4/6) mottles; weak very coarse prismatic structure parting to moderate medium platy and subangular blocky; very firm, brittle, sticky and plastic; few thin discontinuous clay coatings on faces of fragments; 20 percent coarse fragments; very strongly acid; clear wavy boundary.

IIC—46 to 62 inches; light olive brown (2.5Y 5/4) shaly loam; massive; friable, nonsticky and nonplastic; 40 percent coarse fragments; very strongly acid.

The solum is 40 to 72 inches thick. Depth to the fragipan is 18 to 30 inches. Coarse fragments make up 0 to 15 percent above the fragipan, 0 to 25 percent in the fragipan, and 10 to 40 percent in the C horizon. If the soil is not limed, it is strongly acid or very strongly acid throughout.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Fine earth is silt loam, fine sandy loam, or loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. Fine earth is silt loam, loam, silty clay loam, clay loam, or sandy clay loam.

The Bx horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 2 to 6. Fine earth is silt loam to sandy clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 2 to 8. Fine earth is sandy loam to clay loam.

Morrison Series

Soils of the Morrison series are fine-loamy, mixed, mesic Ultic Hapludalfs. They are deep, well drained soils on ridges and benches. These soils formed in material weathered from acid, red sandstone. Slopes range from 3 to 25 percent.

Morrison soils are closely associated on the landscape with Buchanan, Hazleton, Elliber, and Laidig soils. Morrison soils do not have a fragipan, unlike Buchanan and Laidig soils. They are not as acid in the lower part of the solum as Hazleton soils and have fewer coarse fragments in the control section than Elliber soils.

Typical pedon of Morrison sandy loam, 8 to 15 percent slopes, in South Newton Township, Cumberland County; 1 1/2 miles south of Lees Cross Roads to intersection of Routes T324 and T317, west 3/4 mile along T317, 200 feet south of road, in woodland:

O1—2 inches to 1; hardwood leaves and twigs.

O2—1 inch to 0; black (10YR 2/1) strongly acid; partially decomposed leaf litter and matted roots.

A1—0 to 8 inches; light yellowish brown (10YR 6/4) sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; many roots; 10 percent coarse fragments; strongly acid; clear smooth boundary.

B21t—8 to 25 inches; light yellowish brown (10YR 6/4) sandy loam; weak fine subangular blocky structure; very friable, nonsticky and slightly plastic; many roots; few clay films on ped faces; 10 percent

coarse fragments; very strongly acid; abrupt smooth boundary.

B22t—25 to 32 inches; strong brown (7.5YR 5/6) channery sandy clay loam; weak fine subangular blocky structure; friable, nonsticky and slightly plastic; common roots; few thin discontinuous clay films in pores and on ped faces; 15 percent coarse fragments; very strongly acid; abrupt smooth boundary.

B23t—32 to 53 inches; yellowish red (5YR 4/8) channery sandy clay loam; weak fine subangular blocky structure; friable, nonsticky and slightly plastic; few roots; few thin discontinuous clay films in pores and on ped faces; 30 percent coarse fragments; strongly acid; clear wavy boundary.

C—53 to 60 inches; yellowish red (5YR 5/8) channery sandy loam; massive; very friable, nonsticky and nonplastic; 40 percent coarse fragments; medium acid.

The solum is 40 to 70 inches thick. Depth to bedrock is more than 60 inches. Coarse fragments make up 2 to 20 percent of the upper part of the solum, and 5 to 40 percent of the lower part of the solum and of the C horizon. If the soil is not limed, it is extremely acid to strongly acid in the upper part of the solum and strongly acid or medium acid in the lower part of the solum and in the C horizon.

The A horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 6.

The B horizon has hue of 10YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It has hue of 5YR in subhorizons of some pedons. Fine earth is sandy loam, loam, sandy clay loam, or clay loam.

The C horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 6 to 8. Fine earth is sandy loam or loamy sand.

Murrill Series

Soils of the Murrill series are fine-loamy, mixed, mesic Typic Hapludults. They are deep, well drained upland soils on fans and benches at the base of hills and mountains. These soils formed in colluvium from material weathered from acid sandstone and shale and are underlain by limestone. Slopes range from 0 to 15 percent.

Murrill soils are closely associated on the landscape with Buchanan, Duffield, and Elliber soils. They do not have a fragipan and mottles, unlike Buchanan soils. Murrill soils have fewer coarse fragments throughout than Elliber soils. Murrill soils have a lower base saturation in the subsoil than Duffield soils.

Typical pedon of Murrill channery loam, 3 to 8 percent slopes, in Penn Township, Cumberland County; 2 miles west of Huntsdale to Legislative Route 21008 and Route T348, 1/2 mile south along T348, 25 feet west of road, in orchard:

Ap—0 to 9 inches; dark yellowish brown (10YR 4/4) channery loam; moderate fine granular structure; very friable, slightly sticky and slightly plastic; many roots; 15 percent coarse fragments; strongly acid; clear smooth boundary.

B1—9 to 16 inches; strong brown (7.5YR 5/6) channery loam; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; common roots; 20 percent coarse fragments; strongly acid; clear wavy boundary.

B21t—16 to 25 inches; strong brown (7.5YR 5/6) channery silty clay loam; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; few roots; 20 percent coarse fragments; strongly acid; gradual wavy boundary.

B22t—25 to 36 inches; yellowish red (5YR 5/6) channery silty clay loam; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; few roots; few thin discontinuous clay films on ped faces; 25 percent coarse fragments; strongly acid; gradual wavy boundary.

B23t—36 to 55 inches; yellowish red (5YR 4/6) channery silty clay loam; moderate medium and coarse subangular blocky structure; firm, slightly sticky and slightly plastic; few thin continuous clay films on ped faces; 20 percent coarse fragments; strongly acid; gradual wavy boundary.

IIB24—55 to 62 inches; reddish brown (5YR 4/4), dark red (2.5YR 3/6), and grayish brown (10YR 5/2) clay loam; strong medium subangular blocky structure; firm, sticky and plastic; strongly acid.

The solum is 60 to 80 inches or more thick. Depth to limestone bedrock is more than 60 inches. Coarse fragments make up 10 to 30 percent of the upper part of the solum and 0 to 40 percent of the lower part above the IIB horizon. The IIB horizon has no coarse fragments. If the soil is not limed, it is medium acid to very strongly acid throughout.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. Fine earth is loam, sandy loam, or silt loam.

The B horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 6. Fine earth is silty clay loam, sandy clay loam, clay loam, silt loam, or loam.

The IIB horizon has hue of 2.5YR to 10YR, value of 3 to 6, and chroma of 2 to 6. Fine earth is silty clay loam, silty clay, clay loam, or clay.

Neshaminy Series

Soils of the Neshaminy series are fine-loamy, mixed, mesic Ultic Hapludalfs. They are deep, well drained soils on benches and hills. These soils formed in material weathered from diabase and related igneous material. Slopes range from 0 to 25 percent.

Neshaminy soils are closely associated on the landscape with Duffield, Edom, Hagerstown, and Highfield soils. Neshaminy soils have a redder subsoil than Duffield, Edom, and Highfield soils and have less clay in the subsoil than Hagerstown soils.

Typical pedon of Neshaminy gravelly silt loam, in an area of Neshaminy very stony silt loam, 8 to 25 percent slopes, in Middlesex Township, Cumberland County; 150 feet east of intersection of Routes PA 641 and T404, 300 feet north along road to Jay Ridge Manor, west side of road, in woodland:

A1—0 to 8 inches; dark brown (10YR 4/3) gravelly silt loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; 15 percent coarse fragments; medium acid; abrupt smooth boundary.

A2—8 to 12 inches; brown (7.5YR 4/4) gravelly silt loam; weak fine granular and very weak fine subangular blocky structure; friable, nonsticky and nonplastic; common roots; 15 percent coarse fragments; medium acid; clear wavy boundary.

B1—12 to 20 inches; strong brown (7.5YR 5/8) silty clay loam; moderate medium and fine subangular blocky structure; friable, sticky and slightly plastic; few roots; few thin discontinuous clay films on ped faces and in pores; 10 percent coarse fragments; medium acid; gradual wavy boundary.

B21t—20 to 38 inches; yellowish red (5YR 4/8) clay loam; moderate medium and fine blocky structure; slightly firm, sticky and plastic; few roots; common thick continuous clay films on ped faces and in pores; 10 percent coarse fragments; medium acid; gradual wavy boundary.

B22t—38 to 49 inches; yellowish red (5YR 4/8) gravelly clay loam; moderate medium and fine blocky structure; slightly firm, sticky and plastic; common thick continuous clay films on ped faces and in pores; common black concretions; 30 percent coarse fragments; medium acid; gradual wavy boundary.

B3—49 to 54 inches; yellowish red (5YR 4/8) gravelly loam; moderate medium and fine subangular blocky structure; slightly firm, slightly sticky and slightly plastic; few thin continuous clay films on ped faces and in pores; many black concretions; 45 percent coarse fragments; medium acid; gradual irregular boundary.

C—54 to 73 inches; yellowish red (5YR 5/6) very gravelly loam; massive; slightly firm, nonsticky and nonplastic; 60 percent coarse fragments; medium acid.

The solum is 40 to 54 inches thick. Depth to bedrock is more than 48 inches. Coarse fragments make up 0 to 40 percent of the individual horizons in the upper part of the solum and 0 to 60 percent of the lower part of the solum and the C horizon. If the soil is not limed, it is very strongly acid to medium acid in the upper part of the solum and strongly acid or medium acid in the lower part of the solum and in the C horizon.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4. Fine earth is silt loam or loam.

The B horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 to 8. Fine earth is silt loam, loam, clay loam, sandy clay loam, or silty clay loam.

The C horizon has hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 4 to 6. Fine earth is sandy loam, loam, or silt loam.

Penlaw Series

Soils of the Penlaw series are fine-silty, mixed, mesic Aquic Fragiudalfs. They are deep, somewhat poorly drained soils on upland flats, in depressions, and along the base of low ridges. These soils formed in material weathered from limestone. Slopes range from 0 to 3 percent.

Penlaw soils are closely associated on the landscape with Duffield, Edom, Elliber, and Hagerstown soils, which are well drained.

Typical pedon of Penlaw silt loam, in Jackson Township, Perry County; 1/2 mile north of Blain on Route PA 17 to Route T306; 3/10 mile west of T306; 300 feet north of road, in cropland:

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam; weak fine to medium granular structure; friable, nonsticky and nonplastic; many roots; neutral; abrupt smooth boundary.

B21t—9 to 16 inches; light yellowish brown (10YR 6/4) silty clay loam; few fine faint grayish brown (10YR 5/2) and brownish yellow (10YR 6/6) mottles; weak coarse prismatic and moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common roots; clay films in pores; neutral; gradual wavy boundary.

B22t—16 to 21 inches; light yellowish brown (10YR 6/4) silty clay loam; many medium distinct brownish yellow (10YR 6/8) and light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; slightly firm, sticky and slightly plastic; common continuous clay films in pores and on ped faces; neutral; gradual wavy boundary.

Bx1—21 to 27 inches; light yellowish brown (10YR 6/4) silty clay loam; many medium to coarse distinct brownish yellow (10YR 6/8) and light gray (2.5Y 7/2) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, brittle, sticky and plastic; few continuous clay films in pores and on ped faces; neutral; gradual wavy boundary.

Bx2—27 to 49 inches; yellowish brown (10YR 5/4) silty clay loam; many medium and coarse distinct light brownish gray (10YR 6/2) and light gray (10YR 7/2) mottles; weak coarse prismatic structure parting to

moderate medium subangular blocky; slightly firm, brittle, sticky and plastic; few continuous clay films in pores and on ped faces; neutral; gradual wavy boundary.

C—49 to 60 inches; strong brown (7.5YR 5/8) silty clay loam; many medium to coarse distinct light gray (10YR 7/2) mottles; massive; firm in place, slightly sticky and slightly plastic; neutral.

The solum is 40 to 60 inches thick. Depth to bedrock is more than 40 inches. Depth to the fragipan is 15 to 30 inches. Coarse fragments make up 0 to 10 percent throughout the solum. The soil is medium acid to neutral throughout.

The Ap horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 2 or 3. Fine earth is silt loam or silty clay loam.

The B horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. Fine earth is silt loam or silty clay loam.

The C horizon has hue of 10YR to 5YR, value of 3 to 6, and chroma of 2 to 8. Fine earth is loam, clay, clay loam, silty clay, and silty clay loam. Some pedons have a IIC horizon that has calcareous shale.

Purdy Series

Soils of the Purdy series are clayey, mixed, mesic Typic Ochraquults. They are deep, poorly drained and very poorly drained soils on terraces and flats and in depressions. These soils formed in slack water and alluvial deposits. Slopes range from 0 to 8 percent.

Purdy soils are closely associated on the landscape with Atkins, Middlebury, Monongahela, Tioga, and Tyler soils. Purdy soils, unlike Middlebury, Monongahela, and Tioga soils, have mottles within 12 inches of the surface and have a finer textured subsoil. They have a finer textured subsoil than Atkins soils. Purdy soils are wetter and have mottles nearer the surface than Tyler soils.

Typical pedon of Purdy silt loam, in lower Mifflin Township, Cumberland County; one mile north of Newville on Routes PA 233 to Legislative Route 21036, east 3/4 mile to Route T410; 200 feet south of intersection, in cropland:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; weak fine subangular blocky structure; firm, slightly sticky and slightly plastic; many roots; very strongly acid; gradual smooth boundary.

B1g—9 to 22 inches; gray (10YR 5/1) silty clay loam; common medium prominent dark brown (7.5YR 4/4) and strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, slightly sticky and plastic; common roots; very strongly acid; gradual smooth boundary.

B2tg—22 to 46 inches; dark gray (10YR 4/1) silty clay; common medium prominent strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, sticky and plastic; few roots; thin continuous clay films on ped faces; very strongly acid; gradual smooth boundary.

C—46 to 60 inches; dark gray (10YR 4/1) silty clay; massive; firm, sticky and plastic; very strongly acid.

The solum is 28 to 50 inches thick. Depth to bedrock is more than 60 inches. If the soil is not limed, it is strongly acid to extremely acid throughout. Coarse fragments make up 0 to 10 percent of the C horizon.

The Ap horizon is neutral or has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 0. Fine earth is silt loam, loam, or silty clay loam.

The B horizon is neutral or has hue of 10YR to 5Y, value of 4 or 5, and chroma of 0. It is mottled. Fine earth is silty clay, clay loam, clay, or silty clay loam.

The C horizon is neutral or has hue of 10YR, value of 4 to 6, and chroma of 0 to 3. Fine earth is silty clay, clay loam, or clay.

Raritan Series

Soils of the Raritan series are fine-loamy, mixed, mesic Aquic Fragiudults. They are deep, moderately well drained and somewhat poorly drained soils on alluvial terraces. These soils formed in deposits from red shale and sandstone. Slopes range from 0 to 5 percent.

Raritan soils are closely associated on the landscape with Birdsboro, Calvin, and Klinesville soils, which are well drained, and Monongahela soils, which are moderately well drained. They have a redder subsoil than Monongahela soils.

Typical pedon of Raritan silt loam, 0 to 5 percent slopes, in Oliver Township, Perry County; in Newport, about 75 feet northwest of Newport Junior High School, 15 feet west of road, in a vacant lot:

Ap—0 to 10 inches; dark brown (7.5YR 4/2) silt loam; weak fine granular structure; friable, nonsticky and nonplastic; many roots; 10 percent coarse fragments; medium acid; abrupt smooth boundary.

B1—10 to 15 inches; yellowish red (5YR 4/6) silt loam; weak fine to medium subangular blocky structure; friable, slightly sticky and slightly plastic; common roots; 10 percent coarse fragments; medium acid; clear wavy boundary.

B21t—15 to 23 inches; reddish brown (5YR 4/4) clay loam; few medium distinct dark reddish gray (5YR 4/2) mottles; weak medium subangular blocky structure; friable, sticky and plastic; common roots; 10 percent coarse fragments; few thin discontinuous clay films on ped faces; medium acid; clear wavy boundary.

B22t—23 to 29 inches; yellowish red (5YR 5/6) gravelly clay loam; moderate medium distinct red (2.5YR

4/6) and reddish gray (5YR 5/2) mottles; moderate thick platy and moderate medium subangular blocky structure; friable, sticky and plastic; few roots; few thin discontinuous clay films on ped faces; 15 percent coarse fragments; medium acid; clear wavy boundary.

Bx—29 to 48 inches; yellowish red (5YR 5/6) gravelly clay loam; moderate medium distinct reddish gray (5YR 5/2), strong brown (7.5YR 5/6), and yellowish red (5YR 4/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, slightly sticky and slightly plastic; 15 percent coarse fragments; strongly acid; clear wavy boundary.

IIC—48 to 65 inches; yellowish red (5YR 5/6) stratified sand, silt, and gravel; common medium distinct reddish brown (2.5YR 5/4) and strong brown (7.5YR 5/6) mottles; massive; loose, nonsticky and nonplastic; 15 percent coarse fragments; strongly acid.

The solum is 42 to 56 inches thick. Depth to bedrock is more than 60 inches. Depth to the fragipan is 20 to 30 inches. Coarse fragments make up 5 to 15 percent of the solum. If the soil is not limed, it ranges from medium acid to very strongly acid in the solum and C horizon.

The Ap horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 4. Fine earth is silt loam, loam, or fine sandy loam.

The B horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 to 6. Fine earth is clay loam or loam.

The Bx horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 2 to 6. Fine earth is clay loam or loam.

The C horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 to 6. The stratified sediment ranges from silty clay loam to gravel.

Tioga Series

Soils of the Tioga series are coarse-loamy, mixed, mesic Dystric Fluventic Eutrochrepts. They are deep, well drained soils on flood plains. These soils formed in recent alluvial material washed primarily from acid shale and sandstone. Slopes range from 0 to 3 percent.

Tioga soils are closely associated on the landscape with Atkins, Basher, Barbour, and Middlebury soils. Tioga soils are better drained than Atkins, Middlebury, and Basher soils and are not as red in the subsoil as Barbour soils.

Typical pedon of Tioga silt loam, in an area of Tioga soils, in Upper Mifflin Township, Cumberland County; 3 1/2 miles west of Newville on Route PA 641 to Route T393, 3/10 mile west of T393, north side of Conodoguinet Creek, about 50 feet west of covered bridge, in an idle field:

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable, nonsticky and nonplastic; common roots; strongly acid; gradual wavy boundary.

B1—9 to 24 inches; yellowish brown (10YR 5/4) silt loam; moderate fine granular structure; friable, nonsticky and nonplastic; common roots; strongly acid; gradual wavy boundary.

B2—24 to 36 inches; yellowish brown (10YR 5/4) silt loam; few faint brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; friable, nonsticky and nonplastic; few roots; slightly acid; gradual wavy boundary.

IIC—36 to 60 inches; yellowish brown (10YR 5/4) fine sandy loam; thin layers of loamy sand; massive; very friable, nonsticky and nonplastic; slightly acid.

The solum is 18 to 40 inches thick. Coarse fragments make up 0 to 10 percent of the solum and 0 to 40 percent of the C horizon. If the soil is not limed, it is strongly acid to slightly acid in the solum and slightly acid or neutral in the substratum.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 or 3. Fine earth is silt loam, loam, or fine sandy loam.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. Fine earth is silt loam, fine sandy loam, or loam; some individual subhorizons are loamy sand.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. Fine earth ranges from silt loam to loamy sand.

Tyler Series

Soils of the Tyler series are fine-silty, mixed, mesic Aeric Fragiaquults. They are deep, somewhat poorly drained soils on stream terraces. These soils formed in material washed from weathered, gray shale, siltstone, and sandstone. Slopes range from 0 to 3 percent.

Tyler soils are closely associated on the landscape with Allegheny soils, which are well drained, and Monongahela soils, which are moderately well drained.

Typical pedon of Tyler silt loam, in Wheatfield Township, Perry County; 1/2 mile north of aqueduct to intersection of Routes T440 and T443, 3/10 mile east, 50 feet north of road, in cropland:

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam; moderate medium granular and weak medium platy structure; friable, slightly sticky and slightly plastic; many roots; few black concretions; strongly acid; clear wavy boundary.

A2—9 to 13 inches; brown (10YR 5/3) silt loam; common fine distinct light brownish gray (10YR 6/2) and brownish yellow (10YR 6/6) mottles; moderate medium granular and weak medium platy structure;

friable, slightly sticky and slightly plastic; many roots; few black concretions; strongly acid; clear wavy boundary.

B1t—13 to 21 inches; light brownish gray (10YR 6/2) silty clay loam; many medium distinct grayish brown (2.5Y 5/2) and brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; firm, sticky and plastic; common roots; few thin continuous clay films on ped faces and in pores; many small black concretions; strongly acid; clear wavy boundary.

Bx1—21 to 32 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct yellowish brown (10YR 5/4) and light brownish gray (10YR 6/2) mottles; moderate very coarse prismatic structure parting to strong coarse and medium subangular blocky; very firm, brittle, sticky and plastic; few thin continuous clay films on ped faces and in pores; many black concretions; very strongly acid; gradual wavy boundary.

Bx2—32 to 62 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct grayish brown (10YR 5/2) and brownish yellow (10YR 6/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; very firm, brittle, sticky and plastic; few thin continuous grayish brown (10YR 5/2) clay films on ped faces; many black concretions; very strongly acid; gradual smooth boundary.

IIC—62 to 68 inches; yellowish brown (10YR 5/4), light yellowish brown (2.5Y 6/4), and grayish brown (10YR 5/2) stratified gravelly silt loam and silty clay loam; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; very strongly acid.

The solum is 40 to 80 inches thick. Depth to the top of the fragipan is 15 to 24 inches. Depth to bedrock is more than 60 inches. If the soil is not limed, it is strongly acid to extremely acid throughout.

The Ap horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 3. Fine earth is silt loam or silty clay loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 6 and is mottled. Fine earth is silt loam or silty clay loam.

The Bx horizon has hue of 10YR to 5Y, value of 5 or 6, and chroma of 2 to 8. Fine earth is silt loam or silty clay loam in the upper part and silty clay loam in the lower part.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. Fine earth is stratified silt loam, loam, and silty clay loam; strata of loamy sand or silty clay are in some pedons.

Udorthents

Udorthents are very shallow to deep, well drained to somewhat poorly drained soils on uplands and flood plains. They formed in material altered as a result of construction for industrial and urban development and other uses. Slopes range from 0 to 50 percent.

Udorthents are associated on the landscape with Hagerstown, Duffield, Berks, and Weikert soils. The profile of Udorthents generally is not as developed as that of the associated soils and is more variable.

Because of the variability of these soils, a typical pedon is not given.

Depth to bedrock is more than 6 inches. Coarse fragments make up 0 to 80 percent of individual layers. The soil is extremely acid to mildly alkaline throughout.

The A horizon is neutral or has hue of 5YR to 2.5Y, value of 2 to 4, and chroma of 0 to 6. Fine earth is sandy loam to silty clay loam. Some pedons do not have an A horizon.

The C horizon has hue of 5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8. Fine earth is sandy loam to clay.

Warners Series

Soils of the Warners series are fine-silty, carbonatic, mesic Fluvaquentic Haplaquolls. They are deep, very poorly drained soils on flood plains along streams that originated from limestone springs. These soils formed in recent alluvial material washed primarily from soils of limestone origin and contain marl. Slopes range from 0 to 3 percent.

Warners soils are closely associated on the landscape with Atkins, Lindside, Melvin, and Middlebury soils. Warners soils contain marl; Atkins, Lindside, Melvin, and Middlebury soils do not.

Typical pedon of Warners silt loam in West Pennsboro Township, Cumberland County; along Route T891, about 1 3/10 miles south of Newville, 3/10 mile south of Route T353, 100 feet west of road, in an idle field along Big Spring Creek:

Ap—0 to 12 inches; very dark gray (10YR 3/1) silt loam; moderate fine granular structure; very friable, nonsticky and nonplastic; many roots; neutral; abrupt smooth boundary.

C1g—12 to 33 inches; gray (10YR 5/1) silt loam; common fine distinct dark gray (10YR 4/1) and yellowish brown (10YR 5/4) mottles; moderate medium granular structure and massive; friable, nonsticky and nonplastic; few roots; many marl concretions; mildly alkaline; abrupt wavy boundary.

IIC2g—33 to 64 inches; gray (10YR 5/1) marl and loam; massive; friable; mildly alkaline.

Depth to marl or to free carbonates ranges from 6 to 20 inches. Depth to bedrock is more than 60 inches.

Subhorizons in some pedons are as much as 20 percent coarse fragments. The soil is slightly acid to mildly alkaline in the A horizon and mildly alkaline or moderately alkaline in the C horizon.

The Ap and A1 horizons are neutral or have hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 0 to 2.

The C1 horizon has hue of 10YR to 2.5Y, value of 3 to 5, and chroma of 1 or 2. Fine earth is loam, silt loam, or silty clay loam.

The IIC horizon has hue of 10YR to 5Y, value of 4 to 8, and chroma of 1 or 2. Fine earth is loam, silt loam, or silty clay loam.

Weikert Series

Soils of the Weikert series are loamy-skeletal, mixed, mesic Lithic Dystrochrepts. These soils are shallow and well drained and are on hills and ridges. They formed in material weathered from interbedded gray and brown shale, siltstone, and sandstone. Slopes range from 3 to 75 percent.

Weikert soils are closely associated on the landscape with Berks, Calvin, Ernest, and Klinesville soils. Weikert soils are shallow, Berks and Calvin soils are moderately deep, and Ernest soils are deep. Weikert soils are not as red in the subsoil and substratum as the Klinesville soils.

Typical pedon of Weikert very shaly silt loam, 8 to 15 percent slopes, in Middlesex Township, Cumberland County; 2 miles north of Middlesex to intersection of Legislative Route 21011 and Route T503, 3/10 mile west of Route T503, on south roadbank, in wooded area:

O1—1 inch to 0; hardwood leaf litter, twigs, and mosses.

A1—0 to 6 inches; dark brown (10YR 4/3) very shaly silt loam; weak fine granular structure; friable, nonsticky and nonplastic; abundant roots; 50 percent coarse fragments; very strongly acid; clear wavy boundary.

B2—6 to 14 inches; yellowish brown (10YR 5/4) very shaly silt loam; weak fine subangular blocky structure; friable, nonsticky and slightly plastic; few roots; 60 percent coarse fragments; very strongly acid; clear wavy boundary.

C—14 to 17 inches; yellowish brown (10YR 5/4) very shaly silt loam; massive; friable; 70 percent coarse fragments; very strongly acid; clear wavy boundary.

R—17 inches; dark yellowish brown and yellowish brown fractured shale bedrock.

The solum is 10 to 20 inches thick. Depth to bedrock is 10 to 20 inches. Coarse fragments make up 40 to 60 percent of the A horizon, 30 to 65 percent of the B horizon, and 60 to 85 percent of the C horizon. The soil, if it is not limed, is medium acid to very strongly acid throughout.

The A horizon has hue of 10YR to 7.5YR, value of 2 to 5, and chroma of 2 to 4. Fine earth is silt loam or loam.

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

The C horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 6. Fine earth is silt loam or loam. Some pedons do not have a C horizon.

Formation of the Soils

This section discusses the factors of soil formation.

The characteristics of a soil at any given place are determined by the physical and mineralogical composition of the parent material, the climate under which the soil material has accumulated and developed, the plant and animal life on and in the soil, the relief or lay of the land, and the length of time the forces of soil development have acted on the soil material.

Climate and plant and animal life are the active forces that reduce the parent material into a soil that has genetically related horizons. The effects of climate and plant and animal life are influenced by relief and by the nature of the parent material. The parent material also affects the kind of profile that is formed and, in some cases, determines it almost entirely. Finally, time is needed to change the parent material into a soil. Generally, a long time is required for distinct horizons to develop.

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

Factors of Soil Formation

Parent Material

Parent material is the unconsolidated mass in which soils form. It is made up of varying amounts of sand, silt, and clay and has various kinds and amounts of chemicals. Each of the other soil-forming factors has an effect on the parent material; however, it is the parent material that determines the basic chemical and mineralogical composition of the soil.

In Cumberland and Perry Counties, most of the soils on uplands formed in material weathered from interbedded shale, siltstone, sandstone, limestone, and chert. Such soils as Bedington, Berks, and Calvin soils formed in material derived from shale. Calvin soils are reddish, evidence of the red shale in which they formed. The channery and sandy substratum of Hazleton soils shows the dominance of sandstone in the parent material, whereas the cherty subsoil of Elliber and Kreamer soils shows the dominance of chert in their parent material. Hagerstown and Duffield soils formed in residual limestone. The soils on flood plains, such as Atkins, Middlebury, Melvin, and Basher soils, exhibit the stratification typical of soils that formed in alluvium.

Climate

The climate of Cumberland and Perry Counties is humid-temperate and continental, characteristic of the Middle Atlantic States. Precipitation, totaling about 40 inches and including 1 to 3 months of snow cover, temperature, humidity, and wind have been important factors in the formation of the soils. Abundant precipitation, wet-weather springs, and a dense or clayey substratum have resulted in a high water table in many of the soils. This high water table accounts for the grayish colors of the wetter soils, such as Andover, Brinkerton, and Warners soils. Climate has also affected the soils through its influence on vegetation.

Plant and Animal Life

Trees, vegetative cover, micro-organisms, earthworms, burrowing animals, and other forms of life contribute to soil formation. The kind and quantity of vegetation are important, and these depend on the type of parent material and the climate.

The climate of Cumberland and Perry Counties is favorable to the growth of hardwood trees, and many of the soils formed under forest conditions. Fallen trees, leaves, twigs, roots, and ground vegetation accumulate on the forest floor. Partial and total decay of this ground cover through the action of micro-organisms, earthworms, and other forms of life causes organic matter to be added to the soil. The uprooting of trees also influences soil formation by mixing the soil and loosening the underlying material.

Man has influenced the direction and rate of soil formation. He has altered the soils by draining them, changing the vegetation, tilling, compacting, and changing the amount of organic matter.

Relief

Relief affects both surface runoff and internal drainage. Surface runoff determines the degree of erosion, which in turn affects soil depth and the amount of available topsoil. Internal drainage affects the weathering of soil material and bedrock. Steep soils commonly have restricted depth because of rapid runoff and accelerated erosion. The steep and very steep Weikert and Klines-

ville soils, for example, lose soil material almost as fast as it forms, whereas the Ernest and Brinkerton soils on foot slopes increase in depth because of accumulation of soil material at the base of steeper slopes, by washing, creeping, slippage, or gravity.

Time

The length of time the other factors of soil formation have operated is indicated, to an extent, by the degree of development in the soil profile. Some soils have a weakly defined profile, especially those that formed in alluvium, because the soil material has not been in place long enough for distinct horizons to form. Tioga, Middlebury, and Atkins soils formed in alluvium and are considered young, or recent, soils. Soil material is continually being deposited on the surface of those soils.

The profile of Weikert, Berks, and Calvin soils shows evidence of some changes that have taken place in the parent material; however, the process of weathering and the formation of horizons have been slowed because of the effects of relief and the kind of parent material. Bedington, Laidig, Hagerstown, and Duffield soils have a well defined profile. The parent material has been in place long enough for distinct horizons to form.

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Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

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

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

	Inches
Very low	0 to 2.4
Low	2.4 to 3.2
Moderate	3.2 to 5.2
High	More than 5.2
Very high	more than 12

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

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

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

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

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

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

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

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. No-tillage, strip tillage, stubble mulching, or any other form of noninversion tillage that retains a protective amount of residue mulch on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Deferred grazing. Postponing grazing or resting grazingland for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.
Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

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

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

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when

light, moisture, temperature, tilth, and other growth factors are favorable.

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

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

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

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

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

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon 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 Arabic numeral 2 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.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

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

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

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

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

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

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

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

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

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

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

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

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

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

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

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

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

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

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 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

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

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

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

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.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

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

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

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called 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.

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

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

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

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

Sinkhole. A depression in the landscape where limestone has been dissolved.

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

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.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

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

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

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

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

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

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

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

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

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

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

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-74 at Carlisle, Pennsylvania]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	37.7	22.2	30.0	62	-2	21	2.62	1.49	3.54	6	7.6
February---	40.6	23.6	32.2	64	1	26	2.83	1.56	3.86	6	8.8
March------	50.6	31.0	40.8	78	13	119	3.56	2.37	4.63	8	6.9
April------	64.2	41.4	52.8	88	24	389	3.67	2.03	5.01	8	.5
May--------	74.2	50.1	62.2	93	33	688	3.71	1.84	5.24	8	.0
June-------	83.2	59.7	71.4	99	44	942	3.98	1.74	5.80	7	.0
July-------	87.5	64.1	75.9	100	49	1,113	3.35	1.33	4.97	7	.0
August-----	85.5	62.6	74.1	98	47	1,057	3.41	1.71	4.80	6	.0
September--	78.9	55.9	67.4	96	35	822	3.38	2.02	4.58	6	.0
October----	67.2	44.3	55.8	87	26	490	2.63	1.04	3.91	5	.0
November---	52.6	35.1	43.9	75	16	142	3.41	2.05	4.62	7	2.3
December---	40.7	26.1	33.4	65	4	54	3.23	1.51	4.63	7	7.5
Yearly:											
Average--	63.6	43.0	53.3	---	---	---	---	---	---	---	---
Extreme--	---	---	---	101	-6	---	---	---	---	---	---
Total----	---	---	---	---	---	5,863	39.78	34.14	45.20	81	33.6

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1951-74 at Carlisle, Pennsylvania]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 7	April 19	May 5
2 years in 10 later than--	April 2	April 14	April 30
5 years in 10 later than--	March 25	April 4	April 18
First freezing temperature in fall:			
1 year in 10 earlier than--	October 30	October 16	October 3
2 years in 10 earlier than--	November 5	October 22	October 8
5 years in 10 earlier than--	November 16	November 2	October 19

TABLE 3.--GROWING SEASON

[Recorded in the period 1951-74 at Carlisle, Pennsylvania]

Probability	Length of growing season if daily minimum temperature is--		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	213	189	154
8 years in 10	221	197	164
5 years in 10	235	210	183
2 years in 10	250	224	203
1 year in 10	258	232	213

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

Map symbol	Soil name	Cumberland County	Perry County	Total--	
				Area	Extent
		Acres	Acres	Acres	Pct
AbB	Albrights silt loam, 3 to 8 percent slopes	0	5,978	5,978	0.8
AbC	Albrights silt loam, 8 to 15 percent slopes	0	2,031	2,031	0.3
AgA	Allegheny silt loam, 0 to 3 percent slopes	501	216	717	0.1
AgB	Allegheny silt loam, 3 to 8 percent slopes	391	517	908	0.1
AnB	Andover gravelly loam, 0 to 8 percent slopes	1,048	249	1,297	0.2
AoB	Andover very stony loam, 0 to 8 percent slopes	3,273	2,995	6,268	0.9
AtB	Athol gravelly loam, 3 to 8 percent slopes	768	0	768	0.1
AtC	Athol gravelly loam, 8 to 15 percent slopes	636	0	636	0.1
AtD	Athol gravelly loam, 15 to 25 percent slopes	309	0	309	*
Aw	Atkins silt loam	4,814	3,020	7,834	1.1
Bb	Barbour soils	0	1,137	1,137	0.2
Bc	Basher soils	0	1,914	1,914	0.3
BdB	Bedington shaly silt loam, 3 to 8 percent slopes	4,736	178	4,914	0.7
BdC	Bedington shaly silt loam, 8 to 15 percent slopes	2,612	170	2,782	0.4
BdD	Bedington shaly silt loam, 15 to 25 percent slopes	761	9	770	0.1
BeB	Berks shaly silt loam, 3 to 8 percent slopes	23,122	7,309	30,431	4.3
BeC	Berks shaly silt loam, 8 to 15 percent slopes	20,098	14,874	34,972	4.9
BeD	Berks shaly silt loam, 15 to 25 percent slopes	1,656	5,200	6,856	1.0
BhB	Berks stony silt loam, 3 to 8 percent slopes	1,999	741	2,740	0.4
BhD	Berks stony silt loam, 8 to 25 percent slopes	2,331	5,323	7,654	1.1
BoA	Birdsboro silt loam, 0 to 5 percent slopes	178	1,733	1,911	0.3
BpB	Blairton silt loam, 3 to 8 percent slopes	4,258	332	4,590	0.6
BrA	Brinkerton silt loam, 0 to 3 percent slopes	2,743	1,489	4,232	0.6
BrB	Brinkerton silt loam, 3 to 8 percent slopes	2,694	2,129	4,823	0.7
BuB	Buchanan gravelly loam, 3 to 8 percent slopes	3,895	1,561	5,456	0.8
BuC	Buchanan gravelly loam, 8 to 15 percent slopes	378	843	1,221	0.2
BxB	Buchanan very stony loam, 0 to 8 percent slopes	5,052	7,320	12,372	1.7
BxC	Buchanan very stony loam, 8 to 25 percent slopes	1,473	6,409	7,882	1.1
CaB	Calvin shaly silt loam, 3 to 8 percent slopes	0	9,240	9,240	1.3
CaC	Calvin shaly silt loam, 8 to 15 percent slopes	0	17,773	17,773	2.5
CaD	Calvin shaly silt loam, 15 to 25 percent slopes	0	3,823	3,823	0.5
CbB	Calvin-Berks shaly silt loams, 3 to 8 percent slopes	0	3,861	3,861	0.5
CbC	Calvin-Berks shaly silt loams, 8 to 15 percent slopes	0	6,231	6,231	0.9
CbD	Calvin-Berks shaly silt loams, 15 to 25 percent slopes	0	1,886	1,886	0.3
CcC	Catoctin channery silt loam, 8 to 15 percent slopes	698	0	698	0.1
Ch	Chavies fine sandy loam	317	559	876	0.1
CmB	Clymer very stony loam, 0 to 8 percent slopes	2,306	0	2,306	0.3
CmD	Clymer very stony loam, 8 to 25 percent slopes	8,806	0	8,806	1.2
DuA	Duffield silt loam, 0 to 3 percent slopes	2,431	368	2,799	0.4
DuB	Duffield silt loam, 3 to 8 percent slopes	16,192	1,098	17,290	2.4
DuC	Duffield silt loam, 8 to 15 percent slopes	4,786	303	5,089	0.7
DxA	Duncannon very fine sandy loam, 0 to 3 percent slopes	130	199	329	*
DxB	Duncannon very fine sandy loam, 3 to 8 percent slopes	30	300	330	*
Dy	Dystrochrepts, bouldery	2,141	9,814	11,955	1.7
EdB	Edom silty clay loam, 3 to 8 percent slopes	3,260	2,352	5,612	0.8
EdC	Edom silty clay loam, 8 to 15 percent slopes	2,417	1,771	4,188	0.6
EdD	Edom silty clay loam, 15 to 25 percent slopes	1,003	1,134	2,137	0.3
EdE	Edom silty clay loam, 25 to 40 percent slopes	234	544	778	0.1
EeB	Elliber very cherty silt loam, 3 to 8 percent slopes	0	4,511	4,511	0.6
EeC	Elliber very cherty silt loam, 8 to 15 percent slopes	0	7,012	7,012	1.0
EeD	Elliber very cherty silt loam, 15 to 25 percent slopes	0	2,064	2,064	0.3
EfB	Elliber very stony silt loam, 0 to 8 percent slopes	0	1,273	1,273	0.2
EfD	Elliber very stony silt loam, 8 to 25 percent slopes	0	4,022	4,022	0.6
EfF	Elliber very stony silt loam, 25 to 50 percent slopes	0	2,111	2,111	0.3
EtB	Ernest silt loam, 3 to 8 percent slopes	659	3,465	4,124	0.6
EtC	Ernest silt loam, 8 to 15 percent slopes	0	1,901	1,901	0.3
EvA	Evendale cherty silt loam, 0 to 3 percent slopes	0	588	588	0.1
EvB	Evendale cherty silt loam, 3 to 8 percent slopes	0	246	246	*
GnB	Glenville silt loam, 3 to 8 percent slopes	1,439	0	1,439	0.2
GoB	Glenville very stony silt loam, 0 to 8 percent slopes	3,114	0	3,114	0.4
HaA	Hagerstown silt loam, 0 to 3 percent slopes	5,686	274	5,960	0.8
HaB	Hagerstown silt loam, 3 to 8 percent slopes	33,088	586	33,674	4.7
HaC	Hagerstown silt loam, 8 to 15 percent slopes	4,252	583	4,835	0.7
HaD	Hagerstown silt loam, 15 to 25 percent slopes	118	526	644	0.1
HcB	Hagerstown silt loam, rocky, 3 to 8 percent slopes	14,104	7	14,111	2.0
HcC	Hagerstown silt loam, rocky, 8 to 15 percent slopes	8,564	22	8,586	1.2
HcD	Hagerstown silt loam, rocky, 15 to 25 percent slopes	392	118	510	0.1
HdB	Hagerstown-Rock outcrop complex, 0 to 8 percent slopes	2,675	12	2,687	0.4
HdD	Hagerstown-Rock outcrop complex, 8 to 25 percent slopes	4,391	45	4,436	0.6
HdF	Hagerstown-Rock outcrop complex, 25 to 60 percent slopes	566	467	1,033	0.1

See footnote at end of table.

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

Map symbol	Soil name	Cumberland County	Perry County	Total--	
				Area	Extent
		Acres	Acres	Acres	Pct
HeB	Hazleton channery sandy loam, 3 to 8 percent slopes	88	856	944	0.1
HeC	Hazleton channery sandy loam, 8 to 15 percent slopes	0	1,139	1,139	0.2
HeD	Hazleton channery sandy loam, 15 to 25 percent slopes	0	1,269	1,269	0.2
HfB	Hazleton extremely stony sandy loam, 0 to 8 percent slopes	4,500	9,021	13,521	1.9
HfD	Hazleton extremely stony sandy loam, 8 to 25 percent slopes	12,115	20,373	32,488	4.6
HfF	Hazleton extremely stony sandy loam, 25 to 60 percent slopes	19,244	44,060	63,304	9.0
HgB	Highfield channery silt loam, 3 to 8 percent slopes	2,541	0	2,541	0.4
HgC	Highfield channery silt loam, 8 to 15 percent slopes	2,655	0	2,655	0.4
HhB	Highfield very stony silt loam, 0 to 8 percent slopes	1,404	0	1,404	0.2
HhD	Highfield very stony silt loam, 8 to 25 percent slopes	4,116	0	4,116	0.6
HhF	Highfield very stony silt loam, 25 to 50 percent slopes	1,998	0	1,998	0.3
HuA	Huntington silt loam, 0 to 5 percent slopes	11,976	1,798	13,774	1.9
KnB	Klinesville very shaly silt loam, 3 to 8 percent slopes	0	577	577	0.1
KnC	Klinesville very shaly silt loam, 8 to 15 percent slopes	0	1,111	1,111	0.2
KnD	Klinesville very shaly silt loam, 15 to 25 percent slopes	0	5,548	5,548	0.8
KrA	Kreamer cherty silt loam, 0 to 3 percent slopes	0	668	668	0.1
KrB	Kreamer cherty silt loam, 3 to 8 percent slopes	0	4,477	4,477	0.6
KrC	Kreamer cherty silt loam, 8 to 15 percent slopes	0	694	694	0.1
LdB	Laidig channery loam, 3 to 8 percent slopes	3,453	930	4,383	0.6
LdC	Laidig channery loam, 8 to 15 percent slopes	2,455	3,515	5,970	0.8
LgB	Laidig very stony loam, 0 to 8 percent slopes	662	1,386	2,048	0.3
LgD	Laidig very stony loam, 8 to 25 percent slopes	11,354	22,676	34,030	4.9
LpB	Lehew very stony loam, 0 to 8 percent slopes	8	880	888	0.1
LpD	Lehew very stony loam, 8 to 25 percent slopes	148	2,747	2,895	0.4
Ls	Lindside silt loam	1,212	776	1,988	0.3
McB	Meckesville silt loam, 3 to 8 percent slopes	0	692	692	0.1
MdB	Meckesville very stony silt loam, 0 to 8 percent slopes	0	266	266	*
MdD	Meckesville very stony silt loam, 8 to 25 percent slopes	0	5,733	5,733	0.8
Me	Melvin silt loam	3,105	1,008	4,113	0.6
Mf	Middlebury soils	1,306	3,337	4,643	0.7
MnA	Monongahela silt loam, 0 to 3 percent slopes	2,646	1,024	3,670	0.5
MnB	Monongahela silt loam, 3 to 8 percent slopes	3,538	1,474	5,012	0.7
MnC	Monongahela silt loam, 8 to 15 percent slopes	563	320	883	0.1
MoB	Morrison sandy loam, 3 to 8 percent slopes	160	339	499	0.1
MoC	Morrison sandy loam, 8 to 15 percent slopes	245	502	747	0.1
MoD	Morrison sandy loam, 15 to 25 percent slopes	0	430	430	0.1
MuA	Murrill channery loam, 0 to 3 percent slopes	1,967	220	2,187	0.3
MuB	Murrill channery loam, 3 to 8 percent slopes	10,353	815	11,168	1.6
MuC	Murrill channery loam, 8 to 15 percent slopes	2,341	317	2,658	0.4
NeB	Neshaminy gravelly silt loam, 3 to 8 percent slopes	886	26	912	0.1
NeC	Neshaminy gravelly silt loam, 8 to 15 percent slopes	803	0	803	0.1
NhB	Neshaminy very stony silt loam, 0 to 8 percent slopes	269	28	297	*
NhD	Neshaminy very stony silt loam, 8 to 25 percent slopes	329	0	329	*
Pe	Penlaw silt loam	1,728	401	2,129	0.3
Pt	Pits and quarries	798	34	832	0.1
Pu	Purdy silt loam	2,156	672	2,828	0.4
RaA	Raritan silt loam, 0 to 5 percent slopes	0	925	925	0.1
Tg	Tioga soils	85	558	643	0.1
Ty	Tyler silt loam	823	927	1,750	0.2
Ub	Urban land and Udorthents	3,290	317	3,607	0.5
Wa	Warners silt loam	653	0	653	0.1
WeB	Weikert very shaly silt loam, 3 to 8 percent slopes	2,357	2,025	4,382	0.6
WeC	Weikert very shaly silt loam, 8 to 15 percent slopes	7,832	4,063	11,895	1.7
WeD	Weikert very shaly silt loam, 15 to 25 percent slopes	7,013	8,495	15,508	2.2
WkF	Weikert and Klinesville very shaly silt loams, 25 to 75 percent slopes	5,420	28,785	34,205	4.9
	Water	1,000	1,000	2,000	0.3
	Total	355,120	354,000	709,120	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 generally is not grown on the soil]

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
AbB---- Albrights	100	20	70	40	3.5	3.0	5.5
AbC---- Albrights	90	18	65	40	3.5	3.0	5.5
AgA---- Allegheny	125	25	75	45	5.0	3.5	6.5
AgB---- Allegheny	115	23	75	45	5.0	3.5	6.5
AnB---- Andover	85	17	60	---	---	2.5	5.0
AoB---- Andover	---	---	---	---	---	---	---
AtB---- Athol	135	27	80	50	5.5	3.5	6.5
AtC---- Athol	125	25	75	45	5.0	3.5	6.5
AtD---- Athol	110	22	65	40	4.5	3.0	5.5
Aw---- Atkins	100	20	60	---	---	3.0	5.5
Bb---- Barbour	120	24	80	45	4.5	3.5	6.5
Bc---- Basher	120	24	80	45	4.5	3.5	6.5
BdB---- Bedington	130	26	75	50	5.0	3.5	6.5
BdC---- Bedington	120	24	70	45	4.5	3.5	6.5
BdD---- Bedington	105	21	60	40	4.0	3.0	5.5
BeB---- Berks	80	16	60	35	3.5	3.0	5.5
BeC---- Berks	75	15	55	35	3.0	2.5	5.0
BeD---- Berks	70	14	50	30	3.0	2.5	5.0
BhB---- Berks	---	---	---	---	---	---	5.0
BhD---- Berks	---	---	---	---	---	---	4.5
BoA---- Birdsboro	140	28	80	50	5.0	3.5	6.5

See footnote 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*
BpB---------- Blairton	75	15	60	35	3.0	2.5	5.0
BrA---------- Brinkerton	90	18	60	---	---	2.5	5.0
BrB---------- Brinkerton	90	18	60	---	---	2.5	5.0
BuB---------- Buchanan	100	20	65	40	3.5	3.0	3.5
BuC---------- Buchanan	90	18	60	35	3.5	3.0	5.5
BxB, BxC---------- Buchanan	---	---	---	---	---	---	---
CaB---------- Calvin	80	16	60	35	3.5	3.0	5.5
CaC---------- Calvin	75	15	35	35	3.0	2.5	5.0
CaD---------- Calvin	70	14	50	30	3.0	2.0	4.0
CbB---------- Calvin-Berks	80	16	60	35	3.5	3.0	5.5
CbC---------- Calvin-Berks	75	15	44	35	3.0	2.5	5.0
CbD---------- Calvin-Berks	70	14	51	30	3.0	2.2	4.0
CcC---------- Catoctin	75	15	55	35	3.0	2.5	5.0
Ch---------- Chavies	120	24	75	45	5.0	3.5	6.5
CmB, CmD---------- Clymer	---	---	---	---	---	---	---
DuA---------- Duffield	130	26	80	50	5.0	3.5	6.5
DuB---------- Duffield	130	26	80	50	5.0	3.5	6.5
DuC---------- Duffield	125	25	75	45	4.5	3.0	5.5
DxA---------- Duncannon	110	22	70	40	4.5	3.5	6.5
DxB---------- Duncannon	110	22	70	40	4.5	3.5	6.5
Dy**. Dystrochrepts							
EdB---------- Edom	100	20	70	40	4.0	3.0	5.5
EdC---------- Edom	90	18	65	35	3.5	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*
EdD---------- Edom	80	16	60	35	3.0	2.5	5.0
EdE---------- Edom	---	---	---	---	---	---	---
EeB---------- Elliber	100	20	65	35	3.5	2.5	5.0
EeC---------- Elliber	95	19	60	35	3.5	2.5	5.0
EeD, EfB---------- Elliber	---	---	---	---	---	---	---
EfD---------- Elliber	---	---	---	---	---	---	---
EfF---------- Elliber	---	---	---	---	---	---	---
EtB---------- Ernest	100	20	65	40	3.5	3.0	5.5
EtC---------- Ernest	95	19	60	35	3.5	3.0	5.5
EvA---------- Evendale	85	17	65	35	---	3.0	5.5
EvB---------- Evendale	85	17	65	35	---	3.0	5.5
GnB---------- Glenville	100	20	65	40	3.5	3.0	5.5
GoB---------- Glenville	---	---	---	---	---	---	---
HaA---------- Hagerstown	135	27	80	50	5.5	3.5	6.5
HaB---------- Hagerstown	135	27	80	50	5.5	3.5	6.5
HaC---------- Hagerstown	125	25	75	45	5.0	3.5	6.5
HaD---------- Hagerstown	110	22	65	35	4.0	3.0	5.5
HcB---------- Hagerstown	115	23	65	40	4.5	3.0	5.5
HcC---------- Hagerstown	105	21	60	35	4.0	3.0	5.5
HcD---------- Hagerstown	---	---	---	---	---	---	5.5
HdB---------- Hagerstown-Rock outcrop	---	---	---	---	---	---	---
HdD---------- Hagerstown-Rock outcrop	---	---	---	---	---	---	---
HdF---------- Hagerstown-Rock outcrop	---	---	---	---	---	---	---

See footnote 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*
HeB---------- Hazleton	125	25	75	45	4.5	3.5	6.5
HeC---------- Hazleton	115	23	70	40	4.5	3.5	6.5
HeD---------- Hazleton	110	22	60	35	4.0	3.0	5.5
HfB, HfD---------- Hazleton	---	---	---	---	---	---	---
HfF---------- Hazleton	---	---	---	---	---	---	---
HgB---------- Highfield	115	23	75	45	45	3.5	6.5
HgC---------- Highfield	110	22	70	40	4.0	3.0	5.5
HhB, HhD---------- Highfield	---	---	---	---	---	---	---
HhF---------- Highfield	---	---	---	---	---	---	---
HuA---------- Huntington	130	26	80	50	5.0	3.5	6.5
KnB---------- Klinesville	60	12	55	25	2.5	2.0	4.0
KnC---------- Klinesville	55	11	50	20	2.5	2.0	4.0
KnD---------- Klinesville	---	---	---	---	---	---	---
KrA---------- Kreamer	90	18	65	40	3.5	3.0	5.5
KrB---------- Kreamer	90	18	65	40	3.5	3.0	5.5
KrC---------- Kreamer	80	16	60	35	3.5	3.0	5.5
LdB---------- Laidig	100	20	70	40	4.0	3.0	5.5
LdC---------- Laidig	95	19	65	35	4.0	3.0	5.5
LgB---------- Laidig	---	---	---	---	---	---	---
LgD---------- Laidig	---	---	---	---	---	---	---
LpB---------- Lehew	---	---	---	---	---	---	---
LpD---------- Lehew	---	---	---	---	---	---	---
Ls---------- Lindside	125	25	80	45	4.0	3.5	6.5

See footnote 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*
McB---------- Meckesville	100	20	70	40	4.0	4.0	7.5
MdB, MdD---------- Meckesville	---	---	---	---	---	---	---
Me---------- Melvin	80	16	55	---	---	3.5	6.5
Mf---------- Middlebury	120	24	80	45	4.5	3.5	6.5
MnA---------- Monongahela	110	22	65	40	3.5	3.0	5.5
MnB---------- Monongahela	110	22	65	40	3.5	3.0	5.5
MnC---------- Monongahela	90	18	60	35	3.0	3.0	5.5
MoB---------- Morrison	100	20	60	40	4.0	3.5	6.5
MoC---------- Morrison	95	19	55	35	3.5	3.5	6.5
MoD---------- Morrison	90	18	50	30	3.5	3.0	5.5
MuA---------- Murrill	120	24	75	45	4.5	3.5	6.5
MuB---------- Murrill	120	24	75	45	4.5	3.5	6.5
MuC---------- Murrill	110	22	70	40	4.0	3.0	5.5
NeB---------- Neshaminy	135	27	80	50	5.5	3.5	6.5
NeC---------- Neshaminy	125	25	75	45	5.0	3.5	6.5
NhB, NhD---------- Neshaminy	---	---	---	---	---	---	---
Pe---------- Penlaw	95	19	60	40	---	3.0	5.5
Pt**. Pits and quarries							
Pu---------- Purdy	80	16	55	---	---	2.5	5.0
RaA---------- Raritan	105	21	65	40	4.0	3.0	5.5
Tg---------- Tioga	120	24	80	45	4.5	3.5	6.5
Ty---------- Tyler	95	19	60	35	---	3.0	5.5
Ub---------- Urban land and 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*
Wa---------- Warners	100	20	80	---	4.0	3.0	5.5
WeB---------- Weikert	60	12	50	25	2.0	2.0	4.0
WeC---------- Weikert	55	11	45	20	2.0	2.0	4.0
WeD---------- Weikert	---	---	---	---	---	---	---
WkF---------- Weikert and Klinesville	---	---	---	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

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

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Dashes indicate no acreage]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I:				
Cumberland County	23,271	---	---	---
Perry County	7,062	---	---	---
II:				
Cumberland County	113,763	108,599	5,164	---
Perry County	54,698	46,054	8,644	---
III:				
Cumberland County	76,781	47,296	15,381	14,104
Perry County	66,609	55,569	6,522	4,518
IV:				
Cumberland County	28,884	11,679	8,641	8,564
Perry County	31,024	19,451	4,539	7,034
V:				
Cumberland County	---	---	---	---
Perry County	---	---	---	---
VI:				
Cumberland County	58,076	7,247	---	50,829
Perry County	75,630	14,587	---	61,043
VII:				
Cumberland County	47,116	5,420	---	41,696
Perry County	107,812	28,785	---	79,027
VIII:				
Cumberland County	---	---	---	---
Perry County	---	---	---	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
AbB---------- Albrights	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Red pine, eastern white pine, Japanese larch, Norway spruce, white spruce.
						Yellow-poplar-------	75	
						White ash----------	---	
						Red maple----------	---	
AbC---------- Albrights	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Red pine, eastern white pine, Japanese larch, Norway spruce, white spruce.
						Yellow-poplar-------	75	
						White ash----------	---	
						Red maple----------	---	
AgA, AgB---------- Allegheny	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Eastern white pine, Austrian pine, yellow-poplar, black walnut, Japanese larch, red pine, Norway spruce.
						Yellow-poplar-------	90	
						Virginia pine-------	75	
						Eastern white pine--	90	
						Shortleaf pine------	75	
AnB---------- Andover	3w	Slight	Severe	Severe	Moderate	Northern red oak----	70	Eastern white pine, Norway spruce, Japanese larch.
						Yellow-poplar-------	75	
AoB---------- Andover	3w	Slight	Severe	Severe	Moderate	Northern red oak----	70	Eastern white pine, Norway spruce, Japanese larch.
						Yellow-poplar-------	75	
AtB, AtC---------- Athol	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Yellow-poplar, black walnut, eastern white pine, Japanese larch, Norway spruce.
						Yellow-poplar-------	90	
						Virginia pine-------	80	
						Shortleaf pine------	80	
AtD---------- Athol	2r	Moderate	Moderate	Slight	Slight	Northern red oak----	80	Yellow-poplar, black walnut, eastern white pine, Japanese larch, Norway spruce.
						Yellow-poplar-------	90	
						Virginia pine-------	80	
						Shortleaf pine------	80	
Aw---------- Atkins	1w	Slight	Severe	Severe	Moderate	Pin oak------------	100	Eastern white pine, white spruce, Japanese larch, European black alder.
						Red maple----------	---	
						American sycamore---	---	
Bb*---------- Barbour	2o	Slight	Slight	Slight	Slight	Sugar maple---------	70	Eastern white pine, Norway spruce, black walnut.
						Northern red oak----	80	
Bc*---------- Basher	2o	Slight	Slight	Slight	Slight	Sugar maple---------	70	Eastern white pine, black walnut, Norway spruce, Japanese larch.
						Northern red oak----	80	
						American basswood---	85	
BdB, BdC---------- Bedington	2o	Slight	Slight	Slight	Slight	Northern red oak----	75	Black walnut, yellow-poplar, eastern white pine, Japanese larch, Norway spruce, Virginia pine.
						Yellow-poplar-------	85	
BdD---------- Bedington	2r	Moderate	Moderate	Slight	Slight	Northern red oak----	75	Black walnut, yellow-poplar, eastern white pine, Japanese larch, Norway spruce, Virginia pine.
						Yellow-poplar-------	85	

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	
BeB, BeC, BeD, BhB, BhD---------- Berks	3f	Slight	Slight	Moderate	Slight	Northern red oak----	70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak----------	70	
						Virginia pine-------	70	
BoA---------- Birdsboro	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Eastern white pine, Japanese larch, yellow-poplar, Norway spruce, Virginia pine.
						Yellow-poplar-------	90	
						Virginia pine-------	80	
						Shortleaf pine------	80	
BpB---------- Blairton	3w	Slight	Moderate	Slight	Slight	Northern red oak----	70	Yellow-poplar, Japanese larch, eastern white pine, Norway spruce.
						White ash----------	70	
						Sugar maple---------	70	
						Yellow-poplar-------	80	
BrA, BrB---------- Brinkerton	2w	Slight	Severe	Severe	Moderate	Northern red oak----	75	Eastern white pine, white spruce, red maple, yellow-poplar.
BuB, BuC---------- Buchanan	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Northern red oak, yellow-poplar, eastern white pine, Japanese larch, white spruce.
						Yellow-poplar-------	---	
BxB---------- Buchanan	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Northern red oak, yellow-poplar, eastern white pine, Japanese larch, white spruce.
						Yellow-poplar-------	90	
BxC---------- Buchanan	3r	Slight	Moderate	Slight	Slight	Northern red oak----	70	Northern red oak, yellow-poplar, eastern white pine, Japanese larch, white spruce.
						Yellow-poplar-------	90	
CaB, CaC---------- Calvin	3f	Slight	Slight	Moderate	Slight	Yellow-poplar-------	70	Eastern white pine, red pine, Virginia pine.
						Northern red oak----	70	
CaD---------- Calvin	3f	Slight	Moderate	Moderate	Slight	Yellow-poplar-------	70	Eastern white pine, red pine, Virginia pine.
						Northern red oak----	70	
CbB*, CbC*: Calvin----------	3f	Slight	Slight	Moderate	Slight	Yellow-poplar-------	70	Eastern white pine, red pine, Virginia pine.
						Northern red oak----	70	
Berks----------	3f	Slight	Slight	Moderate	Slight	Northern red oak----	70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak----------	70	
						Virginia pine-------	70	
CbD*: Calvin----------	3f	Slight	Moderate	Moderate	Slight	Yellow-poplar-------	70	Eastern white pine, red pine, Virginia pine.
						Northern red oak----	70	
Berks----------	3f	Slight	Moderate	Moderate	Slight	Yellow-poplar-------	70	Virginia pine, eastern white pine, Japanese larch.
						Northern red oak----	70	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
CcC---------- Catoctin	4f	Slight	Slight	Moderate	Slight	Virginia pine------- Shortleaf pine------ Northern red oak----	60 60 60	Virginia pine, eastern white pine.
Ch---------- Chavies	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar------- Black walnut-------- Black cherry-------- Sugar maple---------	80 90 --- --- ---	Eastern white pine, yellow-poplar, black walnut.
CmB---------- Clymer	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar------- Eastern white pine--	80 90 90	Eastern white pine, red pine, black cherry, yellow-poplar.
CmD---------- Clymer	2r	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- Eastern white pine--	88 90 90	Eastern white pine, black cherry, yellow-poplar, red pine.
DuA, DuB, DuC------ Duffield	1o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	85 95	Yellow-poplar, black walnut, Norway spruce, Japanese larch, eastern white pine.
DxA, DxB---------- Duncannon	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Yellow-poplar, black walnut, Japanese larch, Norway spruce, eastern white pine.
EdB, EdC---------- Edom	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, yellow-poplar, Norway spruce, Virginia pine.
EdD, EdE---------- Edom	2r	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, yellow-poplar, Norway spruce, Virginia pine.
EeB, EeC, EeD------ Elliber	2f	Slight	Slight	Moderate	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, Japanese larch, Norway spruce, black walnut, yellow-poplar, black locust.
EfB---------- Elliber	2f	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, Japanese larch, Norway spruce, yellow-poplar, black walnut, black locust.
EfD---------- Elliber	2f	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, Japanese larch, Norway spruce, yellow-poplar, black walnut, black locust.
EfF---------- Elliber	2f	Moderate	Severe	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, Japanese larch, Norway spruce, yellow-poplar, black walnut, black locust.
EtB---------- Ernest	2w	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- White ash---------- Black walnut-------- Sugar maple--------- Black cherry--------	80 90 80 --- 80 80	Eastern white pine, Norway spruce, Japanese larch.

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	
EtC---------- Ernest	2w	Moderate	Moderate	Slight	Slight	Northern red oak----	80	Eastern white pine, Norway spruce, Japanese larch.
						Yellow-poplar-------	90	
						White ash----------	80	
						Black walnut--------	---	
						Sugar maple---------	80	
						Black cherry--------	80	
EvA, EvB---------- Evendale	2w	Slight	Moderate	Moderate	Moderate	Northern red oak----	80	Eastern white pine, yellow-poplar, white spruce.
						Yellow-poplar-------	90	
GnB, GoB---------- Glenville	2w	Slight	Moderate	Moderate	Moderate	Northern red oak----	80	Yellow-poplar, Japanese larch, eastern white pine, Norway spruce.
						White ash----------	80	
						Sugar maple---------	80	
						Yellow-poplar-------	90	
HaA, HaB, HaC------ Hagerstown	1c	Slight	Moderate	Slight	Slight	Northern red oak----	85	Black walnut, yellow-poplar, eastern white pine, Norway spruce.
						Yellow-poplar-------	95	
HaD---------- Hagerstown	1c	Moderate	Severe	Slight	Slight	Northern red oak----	85	Black walnut, yellow-poplar, eastern white pine, Norway spruce.
						Yellow-poplar-------	95	
HcB, HcC---------- Hagerstown	1c	Slight	Moderate	Slight	Slight	Northern red oak----	85	Black walnut, yellow-poplar, eastern white pine, Norway spruce.
						Yellow-poplar-------	95	
HcD---------- Hagerstown	1c	Moderate	Severe	Slight	Slight	Northern red oak----	85	Black walnut, yellow-poplar, eastern white pine, Norway spruce.
						Yellow-poplar-------	95	
HdB*: Hagerstown--------	1c	Slight	Moderate	Slight	Slight	Northern red oak----	85	Black walnut, yellow-poplar, eastern white pine, Norway spruce.
						Yellow-poplar-------	95	
Rock outcrop.								
HdD*: Hagerstown--------	1c	Moderate	Severe	Slight	Slight	Northern red oak----	85	Black walnut, yellow-poplar, eastern white pine, Norway spruce.
						Yellow-poplar-------	95	
Rock outcrop.								
HdF*: Hagerstown--------	1c	Severe	Severe	Slight	Slight	Northern red oak----	85	Black walnut, yellow-poplar, eastern white pine, Norway spruce.
						Yellow-poplar-------	95	
Rock outcrop.								
HeB, HeC---------- Hazleton	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
						White oak----------	75	
HeD---------- Hazleton	3r	Slight	Moderate	Slight	Slight	Northern red oak----	70	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
						White oak----------	75	
						Black cherry--------	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	
HfB, HfD---------- Hazleton	3x	Slight	Moderate	Slight	Slight	Northern red oak----	70	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
						White oak----------	75	
						Black cherry--------	80	
HfF---------- Hazleton	3x	Moderate	Severe	Slight	Slight	Northern red oak----	70	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
						White oak----------	75	
						Black cherry--------	80	
HgB, HgC, HhB------ Highfield	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Eastern white pine, yellow-poplar, Virginia pine, Norway spruce, Japanese larch.
						Yellow-poplar-------	80	
HhD---------- Highfield	3r	Slight	Moderate	Slight	Slight	Northern red oak----	70	Eastern white pine, yellow-poplar, Virginia pine, Norway spruce, Japanese larch.
						Yellow-poplar-------	80	
HhF---------- Highfield	3r	Moderate	Severe	Slight	Slight	Northern red oak----	70	Eastern white pine, yellow-poplar, Virginia pine, Norway spruce, Japanese larch.
						Yellow-poplar-------	80	
HuA---------- Huntington	1o	Slight	Slight	Slight	Slight	Yellow-poplar-------	95	Yellow-poplar, black walnut, black locust, eastern white pine.
						Northern red oak----	85	
KnB, KnC---------- Klinesville	4d	Slight	Slight	Moderate	Slight	Northern red oak----	60	Virginia pine, eastern white pine, red pine, pitch pine.
						Virginia pine-------	60	
KnD---------- Klinesville	4d	Slight	Moderate	Moderate	Slight	Northern red oak----	60	Virginia pine, eastern white pine, red pine, pitch pine.
						Virginia pine-------	60	
KrA, KrB, KrC------ Kreamer	3w	Slight	Moderate	Slight	Slight	Northern red oak----	70	Eastern white pine, yellow-poplar, Norway spruce, Japanese larch.
						Yellow-poplar-------	80	
LdB, LdC, LgB------ Laidig	3o	Slight	Slight	Slight	Slight	Northern red oak----	69	Eastern white pine, yellow-poplar, black walnut, Virginia pine, Japanese larch.
						Yellow-poplar-------	85	
						Eastern white pine--	80	
						Virginia pine-------	70	
LgD---------- Laidig	3r	Slight	Moderate	Slight	Slight	Northern red oak----	69	Eastern white pine, yellow-poplar, black walnut, Virginia pine, Japanese larch.
						Yellow-poplar-------	85	
						Eastern white pine--	80	
						Virginia pine-------	70	
LpB---------- Lehew	4o	Slight	Slight	Slight	Slight	Northern red oak----	60	Eastern white pine, Virginia pine, Japanese larch.
						Virginia pine-------	60	
						Eastern white pine--	---	
LpD---------- Lehew	3r	Slight	Moderate	Slight	Slight	Northern red oak----	60	Eastern white pine, Virginia pine, Japanese larch.
						Virginia pine-------	60	
						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	
Ls---------- Lindside	1w	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- Black walnut-------- White ash---------- White oak---------- Red maple----------	85 95 --- 85 85 ---	Eastern white pine, yellow-poplar, Norway spruce, Japanese larch.
McB, MdB---------- Meckesville	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, Japanese larch, yellow-poplar, black cherry, Norway spruce.
MdD---------- Meckesville	2r	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, Japanese larch, yellow-poplar, black cherry, Norway spruce.
Me---------- Melvin	1w	Slight	Severe	Severe	Slight	Pin oak---------- Red maple----------	100 ---	Eastern white pine, white spruce, European black alder.
Mf*---------- Middlebury	2o	Slight	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- Yellow-poplar-------	80 70 85	Eastern white pine, yellow-poplar, Norway spruce, Japanese larch, black cherry.
MnA, MnB---------- Monongahela	3w	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- Eastern white pine-- Virginia pine------- White ash---------- Black walnut--------	70 85 70 65 --- ---	Eastern white pine, Norway spruce, Japanese larch.
MnC---------- Monongahela	3r	Moderate	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- Eastern white pine-- Virginia pine------- White ash---------- Black walnut--------	70 85 70 65 --- ---	Eastern white pine, Norway spruce, Japanese larch.
MoB, MoC---------- Morrison	3o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	70 85	Eastern white pine, yellow-poplar, Norway spruce, red pine, Virginia pine, Japanese larch.
MoD---------- Morrison	3r	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar-------	70 85	Eastern white pine, yellow-poplar, Norway spruce, Japanese larch.
MuA, MuB, MuC------ Murrill	3o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar------- White ash---------- Eastern white pine-- Black walnut--------	70 95 70 80 ---	Eastern white pine, yellow-poplar, black walnut, Norway spruce, Japanese larch.
NeB, NeC, NhB------ Neshaminy	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, yellow-poplar, black walnut, Virginia pine, Norway spruce, Japanese larch.

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	
NhD---------- Neshaminy	2r	Slight	Moderate	Slight	Slight	Northern red oak----	80	Eastern white pine, yellow-poplar, black walnut, Virginia pine, Norway spruce, Japanese larch.
						Yellow-poplar-------	90	
Pe---------- Penlaw	2w	Slight	Moderate	Moderate	Moderate	Northern red oak----	80	Yellow-poplar, Japanese larch, white spruce, eastern white pine.
						White ash----------	80	
						Sugar maple---------	80	
						Red maple----------	80	
						Yellow-poplar-------	90	
Pu---------- Purdy	1w	Slight	Severe	Severe	Severe	Pin oak------------	85	Virginia pine, eastern white pine, Japanese larch.
						Shortleaf pine------	75	
						Virginia pine-------	75	
						Yellow-poplar-------	90	
RaA---------- Raritan	3w	Slight	Moderate	Slight	Slight	Northern red oak----	70	Eastern white pine, yellow-poplar, Virginia pine, Norway spruce, Japanese larch.
						Yellow-poplar-------	80	
						Virginia pine-------	75	
						Shortleaf pine------	75	
Tg*---------- Tioga	2o	Slight	Slight	Slight	Slight	Northern red oak----	75	Eastern white pine, yellow-poplar, Norway spruce, black walnut, Japanese larch.
						Yellow-poplar-------	85	
						Sugar maple---------	65	
Ty---------- Tyler	2d	Slight	Moderate	Moderate	Moderate	Northern red oak----	80	Yellow-poplar, red pine, Virginia pine.
						White oak----------	---	
						American beech------	---	
						White ash----------	---	
						Sugar maple---------	---	
						American sycamore---	---	
Wa---------- Warners	5w	Slight	Severe	Severe	Severe	Red maple----------	55	Japanese larch, white spruce.
WeB, WeC---------- Weikert	4d	Slight	Slight	Severe	Moderate	Northern red oak----	60	Virginia pine, red pine, eastern white pine.
						Virginia pine-------	60	
WeD---------- Weikert	4d	Slight	Moderate	Severe	Moderate	Northern red oak----	60	Eastern white pine, Austrian pine, Virginia pine.
						Virginia pine-------	60	
WkF*: Weikert----------	4d	Moderate	Severe	Severe	Moderate	Northern red oak----	60	Eastern white pine, Austrian pine, Virginia pine.
						Virginia pine-------	60	
Klinesville-------	4d	Moderate	Severe	Moderate	Slight	Northern red oak----	60	Virginia pine, eastern white pine, red pine, pitch pine.
						Virginia pine-------	60	

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

TABLE 8.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AbB---------- Albrights	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
AbC---------- Albrights	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.
AgA---------- Allegheny	Slight----------	Slight----------	Moderate: small stones.	Slight----------	Slight.
AgB---------- Allegheny	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
AnB---------- Andover	Severe: wetness.	Severe: wetness.	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness.
AoB---------- Andover	Severe: wetness.	Severe: wetness.	Severe: large stones, small stones.	Severe: wetness.	Severe: wetness.
AtB---------- Athol	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
AtC---------- Athol	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
AtD---------- Athol	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Aw---------- Atkins	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Bb*---------- Barbour	Severe: flooding.	Slight----------	Slight----------	Slight----------	Slight.
Bc*---------- Basher	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
BdB---------- Bedington	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones.
BdC---------- Bedington	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, slope.
BdD---------- Bedington	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
BeB---------- Berks	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Severe: small stones.
BeC---------- Berks	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: small stones, slope.	Slight----------	Severe: small stones.
BeD---------- Berks	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope.	Severe: slope, small stones.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BhB---------- Berks	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight----------	Severe: small stones.
BhD---------- Berks	Severe: slope, small stones.	Severe: small stones, slope.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
BoA---------- Birdsboro	Slight----------	Slight----------	Slight----------	Severe: erodes easily.	Slight.
BpB---------- Blairton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
BrA, BrB---------- Brinkerton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
BuB---------- Buchanan	Severe: wetness.	Severe: wetness.	Severe: small stones, wetness.	Severe: wetness.	Severe: small stones, wetness.
BuC---------- Buchanan	Severe: wetness.	Severe: wetness.	Severe: slope, small stones, wetness.	Severe: wetness.	Severe: small stones, wetness.
BxB---------- Buchanan	Severe: wetness.	Severe: wetness.	Severe: large stones, small stones.	Severe: wetness.	Severe: small stones, wetness.
BxC---------- Buchanan	Severe: wetness.	Severe: wetness.	Severe: large stones, slope, small stones.	Severe: wetness.	Severe: small stones, wetness.
CaB---------- Calvin	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: large stones, thin layer.
CaC---------- Calvin	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: large stones, slope, thin layer.
CaD---------- Calvin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
CbB*:					
Calvin----------	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: large stones, thin layer.
Berks----------	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Severe: small stones.
CbC*:					
Calvin----------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: large stones, slope, thin layer.
Berks----------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: small stones, slope.	Slight----------	Severe: small stones.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CbD*: Calvin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Berks	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope.	Severe: slope, small stones.
CcC Catoctin	Moderate: small stones, slope.	Moderate: small stones, slope.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
Ch Chavies	Severe: flooding.	Slight	Slight	Slight	Slight.
CmB Clymer	Moderate: large stones.	Moderate: large stones.	Severe: large stones, small stones.	Moderate: large stones.	Moderate: droughty, large stones.
CmD Clymer	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.	Severe: slope.
DuA Duffield	Slight	Slight	Moderate: small stones.	Slight	Slight.
DuB Duffield	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
DuC Duffield	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
DxA Duncannon	Slight	Slight	Slight	Severe: erodes easily.	Slight.
DxB Duncannon	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
Dy*. Dystrochrepts					
EdB Edom	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly, slope.	Slight	Slight.
EdC Edom	Moderate: percs slowly, slope.	Moderate: percs slowly, slope.	Severe: slope.	Slight	Moderate: slope.
EdD Edom	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
EdE Edom	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
EeB Elliber	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones, droughty.
EeC Elliber	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, droughty.
EeD Elliber	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, droughty, slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
EfB---------- Elliber	Severe: small stones.	Severe: small stones.	Severe: large stones, small stones.	Severe: small stones.	Severe: small stones, droughty.
EfD---------- Elliber	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: small stones.	Severe: small stones, droughty, slope.
EfF---------- Elliber	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope, small stones.	Severe: small stones, droughty, slope.
EtB---------- Ernest	Moderate: percs slowly, wetness.	Moderate: wetness, percs slowly.	Moderate: slope, small stones.	Severe: erodes easily.	Moderate: large stones, small stones.
EtC---------- Ernest	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: large stones, small stones, slope.
EvA, EvB---------- Evendale	Severe: wetness.	Severe: wetness.	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness.
GnB---------- Glenville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
GoB---------- Glenville	Severe: wetness.	Severe: wetness.	Severe: large stones, small stones.	Severe: wetness.	Severe: wetness.
HaA---------- Hagerstown	Slight----------	Slight----------	Moderate: small stones.	Slight----------	Moderate: large stones.
HaB---------- Hagerstown	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Moderate: large stones.
HaC---------- Hagerstown	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: large stones, slope.
HaD---------- Hagerstown	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
HcB---------- Hagerstown	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Moderate: large stones.
HcC---------- Hagerstown	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: large stones, slope.
HcD---------- Hagerstown	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
HdB*: Hagerstown----------	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Moderate: large stones.
Rock outcrop.					

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HdD*: Hagerstown	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Rock outcrop.					
HdF*: Hagerstown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
HeB---- Hazleton	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----	Moderate: small stones, droughty.
HeC---- Hazleton	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: small stones, slope.	Slight----	Moderate: slope, small stones.
HeD---- Hazleton	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope.	Severe: slope.
HfB---- Hazleton	Severe: large stones.	Severe: large stones.	Severe: small stones, large stones.	Moderate: large stones.	Severe: large stones.
HfD---- Hazleton	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, small stones, large stones.	Moderate: slope, large stones.	Severe: slope, large stones.
HfF---- Hazleton	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, small stones, large stones.	Severe: slope.	Severe: slope, large stones.
HgB---- Highfield	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----	Moderate: small stones.
HgC---- Highfield	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----	Moderate: small stones, slope.
HhB---- Highfield	Moderate: large stones.	Moderate: large stones.	Severe: large stones, small stones.	Slight----	Moderate: small stones, large stones.
HhD---- Highfield	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope.
HhF---- Highfield	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
HuA---- Huntington	Severe: flooding.	Slight----	Moderate: slope, flooding.	Slight----	Moderate: flooding.
KnB---- Klinesville	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: small stones.	Severe: small stones, thin layer.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
KnC---------- Klinesville	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: small stones.	Severe: small stones, thin layer.
KnD---------- Klinesville	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: small stones.	Severe: small stones, slope, thin layer.
KrA, KrB---------- Kreamer	Moderate: small stones, wetness.	Moderate: small stones, wetness.	Severe: small stones.	Moderate: wetness.	Moderate: small stones, wetness.
KrC---------- Kreamer	Moderate: slope, small stones, wetness.	Moderate: slope, small stones, wetness.	Severe: slope, small stones.	Moderate: wetness.	Moderate: small stones, wetness.
LdB---------- Laidig	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones.
LdC---------- Laidig	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, slope.
LgB---------- Laidig	Moderate: large stones, small stones.	Moderate: small stones, large stones.	Severe: large stones, small stones.	Slight----------	Moderate: large stones, small stones.
LgD---------- Laidig	Severe: slope.	Severe: slope.	Severe: slope, large stones, small stones.	Moderate: slope.	Severe: slope.
LpB---------- Lehew	Moderate: large stones, small stones.	Moderate: small stones, large stones.	Severe: small stones, large stones.	Moderate: large stones.	Moderate: droughty, large stones, thin layer.
LpD---------- Lehew	Severe: slope.	Severe: slope.	Severe: slope, small stones, large stones.	Moderate: slope, large stones.	Severe: slope.
Ls---------- Lindside	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Slight----------	Moderate: flooding.
McB---------- Meckesville	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Slight----------	Slight.
MdB---------- Meckesville	Moderate: large stones, percs slowly.	Moderate: large stones, percs slowly.	Severe: large stones, small stones.	Slight----------	Moderate: small stones, large stones.
MdD---------- Meckesville	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope.
Me---------- Melvin	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Mf*---------- Middlebury	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
MnA---------- Monongahela	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Severe: erodes easily.	Slight.
MnB---------- Monongahela	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness.	Severe: erodes easily.	Slight.
MnC---------- Monongahela	Moderate: wetness, slope.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
MoB---------- Morrison	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
MoC---------- Morrison	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
MoD---------- Morrison	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
MuA, MuB---------- Murrill	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones.
MuC---------- Murrill	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: slope, small stones.
NeB---------- Neshaminy	Moderate: percs slowly.	Moderate: percs slowly.	Severe: small stones.	Slight----------	Moderate: large stones.
NeC---------- Neshaminy	Moderate: percs slowly, slope.	Moderate: percs slowly, slope.	Severe: slope, small stones.	Slight----------	Moderate: large stones, slope.
NhB---------- Neshaminy	Moderate: large stones, percs slowly.	Moderate: large stones, percs slowly.	Severe: large stones, small stones.	Slight----------	Moderate: small stones, large stones.
NhD---------- Neshaminy	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope.
PeA---------- Penlaw	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
Pt*. Pits and quarries					
Pu---------- Purdy	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, erodes easily.	Severe: wetness.
RaA---------- Raritan	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
Tg*---------- Tioga	Severe: flooding.	Slight----------	Moderate: flooding.	Slight----------	Moderate: flooding.
Ty---------- Tyler	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, erodes easily.	Severe: wetness.
Ub*: Urban land.					

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ub*: Udorthents.					
Wa---------- Warners	Severe: wetness, flooding, excess humus.	Severe: wetness, excess humus.	Severe: wetness, flooding, excess humus.	Severe: wetness, excess humus, erodes easily.	Severe: wetness, flooding.
WeB---------- Weikert	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: depth to rock, small stones.	Slight----------	Severe: thin layer, small stones.
WeC---------- Weikert	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, depth to rock, small stones.	Slight----------	Severe: thin layer, small stones.
WeD---------- Weikert	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, depth to rock, small stones.	Moderate: slope.	Severe: slope, thin layer, small stones.
WkF*: Weikert----------	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, depth to rock, small stones.	Severe: slope.	Severe: slope, thin layer, small stones.
Klinesville----------	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: small stones, slope, thin layer.

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

TABLE 9.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
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.
AgA---- Allegheny	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AgB---- Allegheny	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AnB---- Andover	Poor	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	Good.
AoB---- Andover	Very poor.	Poor	Good	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
AtB---- Athol	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AtC---- Athol	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AtD---- Athol	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Aw---- Atkins	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Bb*---- Barbour	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Bc*---- Basher	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
BdB---- Bedington	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BdC---- Bedington	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BdD---- Bedington	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BeB---- Berks	Poor	Fair	Fair	Poor	Poor	Very 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.
BhB---- Berks	Poor	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
BhD---- Berks	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
BoA---- Birdsboro	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
BpB---- Blairton	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
BrA---- Brinkerton	Poor	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	Good.
BrB---- Brinkerton	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
BuB---- Buchanan	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BuC---- Buchanan	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BxB---- Buchanan	Very poor.	Poor	Good	Good	Good	Fair	Very poor.	Poor	Good	Poor.
BxC---- Buchanan	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
CaB---- Calvin	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
CaC---- Calvin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
CaD---- Calvin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CbB*:										
Calvin----	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
Berks.										
CbC*:										
Calvin----	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Berks----	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
CbD*:										
Calvin----	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Berks----	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
CcC---- Catoctin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Ch---- Chavies	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CmB---- Clymer	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
CmD---- Clymer	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
DuA---- Duffield	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
DuB---------- Duffield	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DuC---------- Duffield	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DxA---------- Duncannon	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DxB---------- Duncannon	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Dy*. Dystrochrepts										
EdB---------- Edom	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EdC---------- Edom	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EdD---------- Edom	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
EdE---------- Edom	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
EeB---------- Elliber	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EeC---------- Elliber	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EeD---------- Elliber	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
EfB---------- Elliber	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
EfD, EfF---------- Elliber	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
EtB---------- Ernest	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EtC---------- Ernest	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EvA---------- Evendale	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
EvB---------- Evendale	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GnB---------- Glenville	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GoB---------- Glenville	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
HaA, HaB---------- Hagerstown	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
HaC---------- Hagerstown	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
HaD---------- Hagerstown	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
HcB---------- Hagerstown	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
HcC---------- Hagerstown	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HcD---------- Hagerstown	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
HdB*: Hagerstown--------	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Rock outcrop.										
HdD*: Hagerstown--------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
HdF*: Hagerstown--------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Rock outcrop.										
HeB---------- Hazleton	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HeC---------- Hazleton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HeD---------- Hazleton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
HfB---------- Hazleton	Very poor.	Very poor.	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
HfD, HfF---------- Hazleton	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
HgB---------- Highfield	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HgC---------- Highfield	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HhB---------- Highfield	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
HhD, HhF---------- Highfield	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
HuA---------- Huntington	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
KnB, KnC, KnD------ Klinesville	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
KrA---------- Kreamer	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
KrB---- Kreamer	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
KrC---- Kreamer	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LdB---- Laidig	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
LdC---- Laidig	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
LgB---- Laidig	Very poor.	Poor	Good	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
LgD---- Laidig	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
LpB---- Lehew	Very poor.	Poor	Good	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
LpD---- Lehew	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Ls---- Lindside	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
McB---- Meckesville	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MdB---- Meckesville	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
MdD---- Meckesville	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Me---- Melvin	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Mf*---- Middlebury	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
MnA---- Monongahela	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
MnB---- Monongahela	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MnC---- Monongahela	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MoB---- Morrison	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MoC---- Morrison	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MoD---- Morrison	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MuA---- Murrill	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MuB---- Murrill	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
MuC---------- Murrill	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NeB---------- Neshaminy	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NeC---------- Neshaminy	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NhB---------- Neshaminy	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
NhD---------- Neshaminy	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Pe---------- Penlaw	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Pt*. Pits and quarries										
Pu---------- Purdy	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
RaA---------- Raritan	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Tg*---------- Tioga	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ty---------- Tyler	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Ub*: Urban land.										
Udorthents.										
Wa---------- Warners	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
WeB, WeC, WeD------ Weikert	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
WkF*: Weikert----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Klinesville-------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.

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

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AbB---- Albrights	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
AbC---- Albrights	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness.	Severe: wetness.
AgA---- Allegheny	Slight----	Slight----	Slight----	Slight----	Slight----	Slight.
AgB---- Allegheny	Slight----	Slight----	Slight----	Moderate: slope.	Slight----	Slight.
AnB, AoB---- Andover	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
AtB---- Athol	Moderate: depth to rock.	Slight----	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Slight.
AtC---- Athol	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
AtD---- Athol	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Aw---- Atkins	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, frost action.	Severe: wetness, flooding.
Bb*---- Barbour	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.	Slight.
Bc*---- Basher	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action, wetness.	Severe: wetness.
BdB---- Bedington	Slight----	Slight----	Slight----	Moderate: slope.	Moderate: frost action.	Moderate: small stones.
BdC---- Bedington	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope.
BdD---- Bedington	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
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, small stones.
BhB---- Berks	Moderate: depth to rock.	Slight----	Moderate: depth to rock.	Moderate: slope.	Slight----	Severe: small stones.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BhD---------- Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
BoA---------- Birdsboro	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Moderate: frost action.	Slight.
BpB---------- Blairton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
BrA, BrB---------- Brinkerton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action, low strength.	Severe: wetness.
BuB---------- Buchanan	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: small stones, wetness.
BuC---------- Buchanan	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness.	Severe: small stones, wetness.
BxB---------- Buchanan	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: small stones, wetness.
BxC---------- Buchanan	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness.	Severe: small stones, wetness.
CaB---------- Calvin	Moderate: depth to rock.	Slight---------	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Moderate: large stones, thin layer.
CaC---------- Calvin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope, thin layer.
CaD---------- Calvin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CbB*: Calvin----------	Moderate: depth to rock.	Slight---------	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Moderate: large stones, thin layer.
Berks----------	Moderate: depth to rock.	Slight---------	Moderate: depth to rock.	Moderate: slope.	Slight---------	Severe: small stones.
CbC*: Calvin----------	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope, thin layer.
Berks----------	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.	Severe: small stones.
CbD*: Calvin----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Berks----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CcC---------- Catoctin	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Severe: small stones.
Ch---------- Chavies	Slight---------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
CmB---------- Clymer	Moderate: depth to rock.	Slight---------	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Moderate: droughty, large stones.
CmD---------- Clymer	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
DuA---------- Duffield	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
DuB---------- Duffield	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
DuC---------- Duffield	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
DxA---------- Duncannon	Slight---------	Slight---------	Slight---------	Slight---------	Severe: frost action.	Slight.
DxB---------- Duncannon	Slight---------	Slight---------	Slight---------	Moderate: slope.	Severe: frost action.	Slight.
Dy*. Dystrochrepts						
EdB---------- Edom	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
EdC---------- Edom	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
EdD, EdE---------- Edom	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
EeB---------- Elliber	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: frost action, large stones.	Severe: small stones, droughty.
EeC---------- Elliber	Moderate: large stones, slope.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, frost action, large stones.	Severe: small stones, droughty.
EeD---------- Elliber	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, droughty, slope.
EfB---------- Elliber	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: frost action, large stones.	Severe: small stones, droughty.
EfD, EfF---------- Elliber	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, droughty, slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
EtB---------- Ernest	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Moderate: large stones, small stones.
EtC---------- Ernest	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: large stones, small stones, slope.
EvA, EvB---------- Evendale	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
GnB, GoB---------- Glenville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
HaA---------- Hagerstown	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Moderate: large stones.
HaB---------- Hagerstown	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: large stones.
HaC---------- Hagerstown	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: large stones, slope.
HaD---------- Hagerstown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
HcB---------- Hagerstown	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: large stones.
HcC---------- Hagerstown	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: large stones, slope.
HcD---------- Hagerstown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
HdB*: Hagerstown-------	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: large stones.
Rock outcrop.						
HdD*, HdF*: Hagerstown-------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Rock outcrop.						
HeB---------- Hazleton	Moderate: depth to rock, large stones.	Moderate: large stones.	Moderate: large stones, depth to rock.	Moderate: slope, large stones.	Moderate: frost action, large stones.	Moderate: small stones, droughty.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
HeC---------- Hazleton	Moderate: depth to rock, slope, large stones.	Moderate: slope, large stones.	Moderate: slope, large stones, depth to rock.	Severe: slope.	Moderate: slope, frost action, large stones.	Moderate: slope, small stones.
HeD---------- Hazleton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
HfB---------- Hazleton	Moderate: depth to rock, large stones.	Moderate: large stones.	Moderate: large stones, depth to rock.	Moderate: slope, large stones.	Moderate: frost action, large stones.	Severe: large stones.
HfD, HfF---------- Hazleton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, large stones.
HgB---------- Highfield	Moderate: depth to rock.	Slight---------	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Moderate: small stones.
HgC---------- Highfield	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope.
HhB---------- Highfield	Moderate: depth to rock.	Slight---------	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Moderate: small stones, large stones.
HhD, HhF---------- Highfield	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
HuA---------- Huntington	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.	Moderate: flooding.
KnB---------- Klinesville	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	Severe: small stones, thin layer.
KnC---------- Klinesville	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Severe: small stones, thin layer.
KnD---------- Klinesville	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope, thin layer.
KrA---------- Kreamer	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: frost action, low strength.	Moderate: small stones, wetness.
KrB---------- Kreamer	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: frost action, low strength.	Moderate: small stones, wetness.
KrC---------- Kreamer	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: frost action, low strength.	Moderate: small stones, wetness.
LdB---------- Laidig	Moderate: wetness.	Slight---------	Moderate: wetness.	Moderate: slope.	Moderate: frost action, low strength.	Moderate: small stones.
LdC---------- Laidig	Moderate: wetness, slope.	Moderate: slope.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action, low strength.	Moderate: small stones, slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
LgB---- Laidig	Moderate: wetness.	Slight----	Moderate: wetness.	Moderate: slope.	Moderate: low strength, frost action.	Moderate: large stones, small stones.
LgD---- Laidig	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LpB---- Lehew	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, large stones.	Moderate: droughty, large stones, thin layer.
LpD---- Lehew	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
Ls---- Lindside	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action.	Moderate: flooding.
McB---- Meckesville	Moderate: wetness.	Slight----	Moderate: wetness.	Moderate: slope.	Moderate: frost action.	Slight.
MdB---- Meckesville	Moderate: wetness.	Slight----	Moderate: wetness.	Moderate: slope.	Moderate: frost action.	Moderate: small stones, large stones.
MdD---- Meckesville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Me---- Melvin	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
Mf*---- Middlebury	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness, flooding.
MnA---- Monongahela	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness, frost action.	Moderate: wetness.
MnB---- Monongahela	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness, frost action.	Moderate: wetness.
MnC---- Monongahela	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: slope, low strength, wetness.	Moderate: slope, wetness.
MoB---- Morrison	Severe: cutbanks cave.	Slight----	Slight----	Moderate: slope.	Moderate: frost action.	Slight.
MoC---- Morrison	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
MoD---- Morrison	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MuA---- Murrill	Slight----	Slight----	Moderate: shrink-swell.	Slight----	Moderate: frost action, low strength.	Moderate: small stones.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MuB---- Murrill	Slight----	Slight----	Moderate: shrink-swell.	Moderate: slope.	Moderate: frost action, low strength.	Moderate: small stones.
MuC---- Murrill	Moderate: slope.	Moderate: slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: slope, frost action, low strength.	Moderate: slope, small stones.
NeB---- Neshaminy	Moderate: depth to rock.	Slight----	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Moderate: large stones.
NeC---- Neshaminy	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope.
NhB---- Neshaminy	Moderate: depth to rock.	Slight----	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Moderate: small stones, large stones.
NhD---- Neshaminy	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pe---- Penlaw	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
Pt*. Pits and quarries						
Pu---- Purdy	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength, frost action.	Severe: wetness.
RaA---- Raritan	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, frost action.	Severe: wetness.
Tg*---- Tioga	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Ty---- Tyler	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
Ub*: Urban land. Udorthents.						
Wa---- Warners	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, low strength.	Severe: wetness, flooding.
WeB---- Weikert	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	Severe: thin layer, small stones.
WeC---- Weikert	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Severe: thin layer, small stones.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
WeD---------- Weikert	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, thin layer, small stones.
WkF*: Weikert----------	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, thin layer, small stones.
Klinesville------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope, thin layer.

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

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AbB---------- Albrights	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
AbC---------- Albrights	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
AgA---------- Allegheny	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight----------	Fair: too clayey.
AgB---------- Allegheny	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
AnB, AoB---------- Andover	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
AtB---------- Athol	Moderate: depth to rock, percs slowly.	Moderate: slope, seepage, depth to rock.	Severe: depth to rock.	Moderate: depth to rock.	Fair: area reclaim, small stones.
AtC---------- Athol	Moderate: slope, depth to rock, percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: slope, depth to rock.	Fair: area reclaim, small stones, slope.
AtD---------- Athol	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
Aw---------- Atkins	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Poor: wetness.
Bb*---------- Barbour	Severe: poor filter.	Severe: flooding, seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Bc*---------- Basher	Severe: flooding, wetness.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Poor: wetness.
BdB---------- Bedington	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: small stones.
BdC---------- Bedington	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: small stones.
BdD---------- Bedington	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BeB---------- Berks	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.
BeC---------- Berks	Severe: depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.
BeD---------- Berks	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, area reclaim.
BhB---------- Berks	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.
BhD---------- Berks	Severe: slope, depth to rock.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones, area reclaim.
BoA---------- Birdsboro	Severe: poor filter.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Fair: too clayey, small stones.
BpB---------- Blairton	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: area reclaim, 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.
BuB---------- Buchanan	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
BuC---------- Buchanan	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
BxB---------- Buchanan	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
BxC---------- Buchanan	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
CaB---------- Calvin	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones.
CaC---------- Calvin	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CaD---------- Calvin	Severe: depth to rock, slope.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
CbB*: Calvin----------	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones.
Berks----------	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.
CbC*: Calvin----------	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones.
Berks----------	Severe: depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.
CbD*: Calvin----------	Severe: depth to rock, slope.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Berks----------	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, area reclaim.
CcC---------- Catoctin	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: area reclaim, small stones.
Ch---------- Chavies	Moderate: flooding.	Severe: seepage, flooding.	Severe: seepage.	Severe: seepage.	Good.
CmB---------- Clymer	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Severe: seepage.	Poor: small stones.
CmD---------- Clymer	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope, seepage.	Poor: small stones, slope.
DuA---------- Duffield	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock.	Severe: depth to rock.	Moderate: depth to rock.	Poor: hard to pack.
DuB---------- Duffield	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: hard to pack.
DuC---------- Duffield	Moderate: depth to rock, slope, percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
DxA---------- Duncannon	Moderate: percs slowly.	Moderate: seepage.	Slight----------	Slight----------	Fair: area reclaim.
DxB---------- Duncannon	Moderate: percs slowly.	Moderate: seepage, slope.	Slight----------	Slight----------	Fair: area reclaim.
Dy*. Dystrochrepts					
EdB---------- Edom	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
EdC---------- Edom	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
EdD, EdE---------- Edom	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
EeB---------- Elliber	Moderate: percs slowly, large stones.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
EeC---------- Elliber	Moderate: percs slowly, slope, large stones.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
EeD---------- Elliber	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, small stones, slope.
EfB---------- Elliber	Moderate: percs slowly, large stones.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
EfD, EfF---------- Elliber	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, small stones, slope.
EtB---------- Ernest	Severe: percs slowly, wetness.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Poor: small stones.
EtC---------- Ernest	Severe: percs slowly, wetness.	Severe: slope.	Moderate: slope, wetness.	Moderate: slope, wetness.	Poor: small stones.
EvA, EvB---------- Evendale	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey, depth to rock.	Severe: wetness.	Poor: too clayey, hard to pack.
GnB---------- Glenville	Severe: wetness, percs slowly.	Moderate: slope.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: wetness, thin layer.
GoB---------- Glenville	Severe: wetness, percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: wetness, thin layer.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HaA---------- Hagerstown	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
HaB---------- Hagerstown	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
HaC---------- Hagerstown	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
HaD---------- Hagerstown	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
HcB---------- Hagerstown	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
HcC---------- Hagerstown	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
HcD---------- Hagerstown	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
HdB*: Hagerstown---------	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
Rock outcrop.					
HdD*, HdF*: Hagerstown---------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Rock outcrop.					
HeB---------- Hazleton	Severe: poor filter.	Severe: seepage.	Severe: seepage, depth to rock.	Severe: seepage.	Poor: small stones.
HeC---------- Hazleton	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, depth to rock.	Severe: seepage.	Poor: small stones.
HeD---------- Hazleton	Severe: poor filter, slope.	Severe: slope, seepage.	Severe: slope, seepage, depth to rock.	Severe: slope, seepage.	Poor: slope, small stones.
HfB---------- Hazleton	Severe: poor filter.	Severe: seepage, large stones.	Severe: seepage, depth to rock.	Severe: seepage.	Poor: small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HfD, HfF---------- Hazleton	Severe: poor filter, slope.	Severe: slope, seepage, large stones.	Severe: slope, seepage, depth to rock.	Severe: slope, seepage.	Poor: slope, small stones.
HgB---------- Highfield	Moderate: percs slowly, depth to rock.	Moderate: depth to rock, seepage, slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: small stones.
HgC---------- Highfield	Moderate: percs slowly, depth to rock, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: small stones.
HhB---------- Highfield	Moderate: percs slowly, depth to rock.	Moderate: depth to rock, seepage, slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: small stones.
HhD, HhF---------- Highfield	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
HuA---------- Huntington	Severe: flooding.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Good.
KnB---------- Klinesville	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, seepage, small stones.
KnC---------- Klinesville	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, seepage, small stones.
KnD---------- Klinesville	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, small stones.
KrA, KrB---------- Kreamer	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, small stones.
KrC---------- Kreamer	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Moderate: wetness, slope.	Poor: too clayey, small stones.
LdB---------- Laidig	Severe: percs slowly, wetness.	Severe: seepage, wetness.	Moderate: wetness.	Severe: seepage.	Fair: small stones, wetness.
LdC---------- Laidig	Severe: percs slowly, wetness.	Severe: seepage, slope, wetness.	Moderate: slope, wetness.	Severe: seepage.	Fair: slope, small stones, wetness.
LgB---------- Laidig	Severe: percs slowly, wetness.	Severe: seepage, wetness.	Moderate: wetness.	Severe: seepage.	Fair: small stones, wetness.
LgD---------- Laidig	Severe: slope, percs slowly, wetness.	Severe: seepage, slope, wetness.	Severe: slope.	Severe: slope, seepage.	Poor: slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
LpB---------- Lehew	Severe: depth to rock, poor filter.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.
LpD---------- Lehew	Severe: slope, depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones, area reclaim.
Ls---------- Lindside	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
McB, MdB---------- Meckesville	Severe: wetness, percs slowly.	Moderate: slope, seepage.	Moderate: wetness, too clayey.	Moderate: wetness.	Poor: small stones, thin layer.
MdD---------- Meckesville	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope, thin layer.
Me---------- Melvin	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Mf*---------- Middlebury	Severe: flooding, wetness, poor filter.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness.	Poor: wetness.
MnA, MnB---------- Monongahela	Severe: percs slowly, wetness.	Moderate: slope, seepage.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
MnC---------- Monongahela	Severe: percs slowly, wetness.	Severe: slope.	Moderate: slope, wetness.	Moderate: slope, wetness.	Fair: small stones, wetness, slope.
MoB---------- Morrison	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
MoC---------- Morrison	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
MoD---------- Morrison	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
MuA---------- Murrill	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight----------	Fair: too clayey, small stones, thin layer.
MuB---------- Murrill	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight----------	Fair: too clayey, small stones, thin layer.
MuC---------- Murrill	Moderate: slope, percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, small stones.
NeB---------- Neshaminy	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: hard to pack, small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
NeC---------- Neshaminy	Severe: percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: hard to pack, small stones.
NhB---------- Neshaminy	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: hard to pack, small stones.
NhD---------- Neshaminy	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: hard to pack, small stones, slope.
Pe---------- Penlaw	Severe: wetness, percs slowly.	Moderate: seepage, depth to rock.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: small stones, wetness, thin layer.
Pt*. Pits and quarries					
Pu---------- Purdy	Severe: wetness, percs slowly.	Slight----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey, hard to pack.
RaA---------- Raritan	Severe: wetness, percs slowly.	Severe: seepage, flooding.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness, thin layer.
T~*---------- Tioga	Severe: flooding, wetness, poor filter.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness, small stones.
Ty---------- Tyler	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ub*: Urban land. Udorthents.					
Wa---------- Warners	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: flooding, wetness.	Poor: wetness.
WeB---------- Weikert	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: area reclaim, seepage, small stones.
WeC---------- Weikert	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: area reclaim, seepage, small stones.
WeD---------- Weikert	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, area reclaim, seepage.
WkF*: Weikert----------	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, area reclaim, seepage.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WkF*: Klinesville	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, small stones.

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

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AbB, AbC---------- Albrights	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
AgA, AgB---------- Allegheny	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
AnB, AoB---------- Andover	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
AtB, AtC---------- Athol	Fair: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
AtD---------- Athol	Fair: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Aw---------- Atkins	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Bb*---------- Barbour	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
Bc*---------- Basher	Poor: wetness.	Probable----------	Probable----------	Poor: small stones, area reclaim, wetness.
BdB, BdC---------- Bedington	Fair: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
BdD---------- Bedington	Fair: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
BeB, BeC---------- Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
BeD---------- Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
BhB---------- Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
BhD---------- Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
BoA---------- Birdsboro	Fair: wetness.	Probable----------	Probable----------	Poor: small stones, area reclaim.
BpB---------- Blairton	Poor: area reclaim, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BrA, BrB---------- Brinkerton	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
BuB, BuC, BxB, BxC---- Buchanan	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
CaB, CaC---------- Calvin	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CaD---------- Calvin	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CbB*, CbC*: Calvin----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Berks----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CbD*: Calvin----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Berks----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CcC---------- Catoctin	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Ch---------- Chavies	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
CmB---------- Clymer	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
CmD---------- Clymer	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
DuA, DuB---------- Duffield	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
DuC---------- Duffield	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim, slope.
DxA, DxB---------- Duncannon	Fair: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Good.
Dy*. Dystrochrepts				
EdB, EdC---------- Edom	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
EdD---------- Edom	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
EdE---------- Edom	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
EeB, EeC---------- Elliber	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
EeD---------- Elliber	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
EfB---------- Elliber	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
EfD---------- Elliber	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
EfF---------- Elliber	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
EtB, EtC---------- Ernest	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
EvA, EvB---------- Evendale	Poor: wetness, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
GnB, GoB---------- Glenville	Poor: wetness, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
HaA, HaB, HaC---------- Hagerstown	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
HaD---------- Hagerstown	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
HcB, HcC---------- Hagerstown	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
HcD---------- Hagerstown	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
HdB*: Hagerstown---------- Rock outcrop.	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
HdD*: Hagerstown	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop.				
HdF*: Hagerstown	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop.				
HeB, HeC---------- Hazleton	Fair: area reclaim, thin layer, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
HeD---------- Hazleton	Fair: slope, area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
HfB---------- Hazleton	Fair: area reclaim, thin layer, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
HfD---------- Hazleton	Fair: slope, area reclaim, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
HfF---------- Hazleton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
HgB, HgC, HhB--------- Highfield	Fair: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
HhD---------- Highfield	Fair: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
HhF---------- Highfield	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
HuA---------- Huntington	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
KnB, KnC---------- Klinesville	Poor: area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones.
KnD---------- Klinesville	Poor: area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones, slope.
KrA, KrB, KrC--------- Kreamer	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
LdB, LdC, LgB--------- Laidig	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
LgD--------- Laidig	Fair: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
LpB--------- Lehew	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
LpD--------- Lehew	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones.
Ls--------- Lindside	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
McB, MdB--------- Meckesville	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
MdD--------- Meckesville	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Me--------- Melvin	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Mf*--------- Middlebury	Poor: wetness.	Probable----------	Probable----------	Poor: small stones, area reclaim, wetness.
MnA, MnB--------- Monongahela	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
MnC--------- Monongahela	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones.
MoB, MoC--------- Morrison	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
MoD--------- Morrison	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
MuA, MuB, MuC--------- Murrill	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
NeB, NeC, NhB--------- Neshaminy	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
NhD--------- Neshaminy	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
PeA---------- Penlaw	Poor: low strength, wetness, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
Pt*, Pits and quarries				
Pu---------- Purdy	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, too clayey.
RaA---------- Raritan	Poor: wetness, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Tg*---------- Tioga	Good----------	Probable----------	Probable----------	Good.
Ty---------- Tyler	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, wetness.
Ub*: Urban land.				
Udorthents.				
Wa---------- Warners	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
WeB, WeC---------- Weikert	Poor: area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones, area reclaim.
WeD---------- Weikert	Poor: area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: slope, small stones, area reclaim.
WkF*: Weikert----------	Poor: slope, area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: slope, small stones, area reclaim.
Klinesville----------	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones, slope.

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

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
AbB---- Albrights	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Slope----	Wetness, rooting depth.	Wetness, droughty, rooting depth.
AbC---- Albrights	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Slope----	Slope, wetness, rooting depth.	Wetness, slope, droughty.
AgA, AgB---- Allegheny	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable----	Favorable.
AnB---- Andover	Slight----	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Large stones, rooting depth, wetness.	Wetness, rooting depth, percs slowly.
AoB---- Andover	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Large stones, erodes easily, rooting depth.	Large stones, wetness, rooting depth.
AtB---- Athol	Moderate: seepage, depth to rock, slope.	Severe: piping.	Severe: no water.	Deep to water	Favorable----	Favorable.
AtC, AtD---- Athol	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----	Slope.
Aw---- Atkins	Severe: seepage.	Severe: piping, wetness.	Severe: slow refill.	Flooding, frost action, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Bb*---- Barbour	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Too sandy----	Favorable.
Bc*---- Basher	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Flooding, frost action.	Wetness----	Wetness.
BdB---- Bedington	Moderate: seepage, depth to rock, slope.	Severe: piping.	Severe: no water.	Deep to water	Large stones---	Large stones.
BdC, BdD---- Bedington	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope.
BeB---- Berks	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, large stones.	Droughty, depth to rock, large stones.
BeC, BeD---- Berks	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
BhB---- Berks	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, large stones.	Droughty, depth to rock, large stones.
BhD---- Berks	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
BoA---------- Birdsboro	Severe: seepage.	Severe: piping.	Severe: cutbanks cave.	Favorable------	Wetness--------	Favorable.
BpB---------- Blairton	Moderate: seepage, depth to rock, slope.	Severe: piping, wetness.	Severe: no water.	Depth to rock, frost action, slope.	Depth to rock, wetness, erodes easily.	Wetness, droughty, erodes easily.
BrA---------- Brinkerton	Slight---------	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Percs slowly, wetness, rooting depth.	Percs slowly, wetness, rooting depth.
BrB---------- Brinkerton	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Percs slowly, wetness, rooting depth.	Percs slowly, wetness, rooting depth.
BuB---------- Buchanan	Moderate: seepage, slope.	Severe: piping wetness.	Severe: no water.	Percs slowly, slope.	Large stones, wetness.	Large stones, wetness.
BuC---------- Buchanan	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, slope.	Slope, large stones, wetness.	Large stones, wetness, slope.
BxB---------- Buchanan	Moderate: seepage, slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, slope.	Large stones, wetness.	Large stones, wetness.
BxC---------- Buchanan	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, slope.	Slope, large stones, wetness.	Large stones, wetness, slope.
CaB---------- Calvin	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Large stones, depth to rock.	Large stones, droughty.
CaC, CaD---------- Calvin	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
CbB*:						
Calvin----------	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Large stones, depth to rock.	Large stones, droughty.
Berks----------	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, large stones.	Droughty, depth to rock, large stones.
CbC*, CbD*:						
Calvin----------	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Berks----------	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
CcC---------- Catoctin	Severe: seepage, slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Ch---------- Chavies	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
CmB---------- Clymer	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Large stones---	Large stones.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
CmD---------- Clymer	Severe: slope, seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope.
DuA---------- Duffield	Moderate: seepage, depth to rock.	Severe: piping, hard to pack.	Severe: no water.	Deep to water	Favorable------	Favorable.
DuB---------- Duffield	Moderate: seepage, depth to rock, slope.	Severe: piping, hard to pack.	Severe: no water.	Deep to water	Favorable------	Favorable.
DuC---------- Duffield	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
DxA---------- Duncannon	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water, frost action.	Erodes easily	Erodes easily.
DxB---------- Duncannon	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water, frost action.	Erodes easily	Erodes easily.
Dy*. Dystrochrepts						
EdB---------- Edom	Moderate: seepage, depth to rock, slope.	Moderate: hard to pack, thin layer.	Severe: no water.	Deep to water	Favorable------	Favorable.
EdC, EdD, EdE----- Edom	Severe: slope.	Moderate: hard to pack, thin layer.	Severe: no water.	Deep to water	Slope----------	Slope.
EeB---------- Elliber	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones---	Large stones, droughty.
EeC, EeD---------- Elliber	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
EfB---------- Elliber	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones---	Large stones, droughty.
EfD, EfF---------- Elliber	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
EtB---------- Ernest	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Erodes easily, rooting depth, percs slowly.	Erodes easily, rooting depth.
EtC---------- Ernest	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, erodes easily, rooting depth.	Rooting depth, slope, erodes easily.
EvA---------- Evendale	Slight---------	Severe: hard to pack, wetness.	Severe: no water.	Percs slowly, frost action.	Percs slowly, wetness.	Percs slowly, wetness.
EvB---------- Evendale	Moderate: slope.	Severe: hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Percs slowly, wetness.	Percs slowly, wetness.
GnB, GoB---------- Glenville	Moderate: depth to rock, slope.	Severe: piping, wetness.	Severe: no water.	Frost action, slope.	Wetness, rooting depth.	Wetness, rooting depth.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
HaA---------- Hagerstown	Moderate: seepage, depth to rock.	Severe: hard to pack.	Severe: no water.	Deep to water	Favorable------	Favorable.
HaB---------- Hagerstown	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Favorable------	Favorable.
HaC, HaD---------- Hagerstown	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
HcB---------- Hagerstown	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Favorable------	Favorable.
HcC, HcD---------- Hagerstown	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
HdB*: Hagerstown-------	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Favorable------	Favorable.
Rock outcrop.						
HdD*, HdF*: Hagerstown-------	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
Rock outcrop.						
HeB---------- Hazleton	Severe: seepage.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, too sandy.	Large stones, droughty.
HeC, HeD---------- Hazleton	Severe: seepage, slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Large stones, slope, droughty.
HfB---------- Hazleton	Severe: seepage.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, too sandy.	Large stones, droughty.
HfD, HfF---------- Hazleton	Severe: seepage, slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, slope, too sandy.	Large stones, slope, droughty.
HgB---------- Highfield	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
HgC---------- Highfield	Severe: slope.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Slope----------	Slope.
HhB---------- Highfield	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
HhD, HhF---------- Highfield	Severe: slope.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Slope----------	Slope.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
HuA---------- Huntington	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water, frost action.	Favorable------	Favorable.
KnB---------- Klinesville	Severe: depth to rock.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Depth to rock	Droughty, depth to rock.
KnC, KnD---------- Klinesville	Severe: depth to rock, slope.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
KrA---------- Kreamer	Slight---------	Severe: piping.	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly.	Percs slowly.
KrB---------- Kreamer	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly.	Percs slowly.
KrC---------- Kreamer	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Slope, percs slowly.
LdB---------- Laidig	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Rooting depth	Rooting depth.
LdC---------- Laidig	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, rooting depth.	Slope, rooting depth.
LgB---------- Laidig	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Large stones, rooting depth.	Large stones, droughty.
LgD---------- Laidig	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, rooting depth.	Slope, large stones, droughty.
LpB---------- Lehew	Severe: seepage.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, depth to rock.	Large stones, droughty, depth to rock.
LpD---------- Lehew	Severe: seepage, slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, droughty.
Ls---------- Lindside	Moderate: seepage.	Severe: piping.	Severe: slow refill.	Flooding, frost action.	Wetness, erodes easily.	Erodes easily.
McB---------- Meckesville	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Slope----------	Wetness, rooting depth.	Rooting depth.
MdB---------- Meckesville	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Slope----------	Large stones, wetness, rooting depth.	Large stones, rooting depth.
MdD---------- Meckesville	Severe: slope.	Severe: piping.	Severe: no water.	Slope----------	Slope, large stones, wetness.	Large stones, slope, rooting depth.
Me---------- Melvin	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
Mf*---------- Middlebury	Moderate: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Flooding, frost action, cutbanks cave.	Wetness--------	Wetness.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
MnA---------- Monongahela	Moderate: seepage.	Severe: piping.	Severe: no water.	Percs slowly---	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth, percs slowly.
MnB---------- Monongahela	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth, percs slowly.
MnC---------- Monongahela	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
MoB---------- Morrison	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
MoC, MoD---------- Morrison	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
MuA---------- Murrill	Moderate: seepage.	Moderate: piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
MuB---------- Murrill	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
MuC---------- Murrill	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
NeB---------- Neshaminy	Moderate: depth to rock, slope.	Severe: piping, hard to pack.	Severe: no water.	Deep to water	Large stones---	Large stones.
NeC---------- Neshaminy	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope.
NhB---------- Neshaminy	Moderate: depth to rock, slope.	Severe: piping, hard to pack.	Severe: no water.	Deep to water	Favorable------	Favorable.
NhD---------- Neshaminy	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
Pe---------- Penlaw	Moderate: seepage, depth to rock.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Erodes easily, rooting depth.	Wetness, erodes easily, rooting depth.
Pt*. Pits and quarries						
Pu---------- Purdy	Slight---------	Severe: piping, hard to pack, wetness.	Severe: slow refill.	Percs slowly, frost action.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
RaA---------- Raritan	Moderate: seepage.	Severe: wetness.	Severe: no water.	Frost action---	Erodes easily, wetness, rooting depth.	Wetness, erodes easily.
Tg*---------- Tioga	Severe: seepage.	Severe: piping.	Severe: cutbanks cave.	Deep to water	Erodes easily	Erodes easily.
Ty---------- Tyler	Slight---------	Severe: wetness.	Severe: no water.	Percs slowly, frost action.	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
Ub*: Urban land. Udorthents.						
Wa---------- Warners	Severe: seepage.	Severe: wetness.	Severe: slow refill.	Flooding, frost action.	Wetness, erodes easily.	Wetness, erodes easily.
WeB---------- Weikert	Severe: depth to rock, seepage.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Depth to rock	Droughty, depth to rock.
WeC, WeD---------- Weikert	Severe: depth to rock, slope, seepage.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
WkF*: Weikert----------	Severe: depth to rock, slope, seepage.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
Klinesville------	Severe: depth to rock, slope.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.

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

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AbB, AbC--------- Albrights	0-12	Silt loam---------	ML, CL	A-4	0-10	80-100	80-95	70-90	55-80	---	---
	12-24	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
	24-62	Silt loam, gravelly silty clay loam, channery clay loam.	CL, ML, SC, SM-SC	A-4, A-2, A-6	0-15	65-100	45-95	40-90	25-80	20-40	3-15
AgA, AgB--------- Allegheny	0-10	Silt loam---------	ML, CL, CL-ML	A-4	0	90-100	80-100	65-100	55-95	<35	NP-10
	10-34	Clay loam, loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0	90-100	80-100	65-95	35-80	<35	NP-15
	34-60	Clay loam, sandy loam, gravelly sandy loam.	SM, GC, ML, CL	A-4, A-6, A-2, A-1	0-5	65-100	55-100	35-95	20-75	<35	NP-15
AnB-------------- Andover	0-9	Gravelly loam----	SM, ML, CL-ML, SC	A-4, A-2	0-5	65-75	65-75	60-70	30-60	20-35	NP-10
	9-18	Loam, gravelly clay loam, cobbly sandy clay loam.	SM, ML, CL-ML, SC	A-4, A-2	0-20	80-95	65-85	60-85	30-60	20-35	4-10
	18-42	Loam, gravelly clay loam, cobbly sandy clay loam.	SM, ML, CL-ML, SC	A-2, A-4	0-20	80-95	65-85	60-85	30-60	20-35	2-10
	42-60	Gravelly sandy clay loam, cobbly loam, cobbly sandy loam.	SM, ML, CL-ML, CL	A-2, A-4	5-30	70-95	55-90	50-75	25-60	20-35	2-10
AoB-------------- Andover	0-9	Very stony loam	ML, CL, SM, SC	A-4, A-2	3-10	70-100	65-95	60-90	30-85	20-35	NP-10
	9-18	Loam, gravelly clay loam, cobbly sandy clay loam.	SM, SC, ML, CL	A-4, A-2	0-25	80-95	65-85	60-80	30-60	20-35	2-10
	18-42	Loam, gravelly clay loam, cobbly sandy clay loam.	SM, ML, CL CL-ML	A-4, A-2	0-25	80-95	65-85	60-85	30-60	20-35	2-9
	42-60	Gravelly sandy clay loam, cobbly loam, cobbly sandy loam.	SM, ML, CL CL-ML	A-2, A-4	5-30	70-95	55-90	50-75	25-60	20-35	2-9
AtB, AtC, AtD---- Athol	0-9	Gravelly loam----	ML, CL-ML	A-4	0-5	90-100	75-95	65-90	50-75	20-35	1-10
	9-55	Silt loam, gravelly silty clay loam, gravelly clay loam.	ML	A-4	0-5	80-100	60-95	55-90	50-75	25-40	2-10
	55-80	Loam, gravelly silt loam, gravelly silty clay loam.	ML, SM	A-2, A-4	0-15	90-100	50-85	40-80	30-65	20-40	NP-10

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Aw---------- Atkins	0-9	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	90-100	85-100	75-100	60-95	20-40	3-20
	9-42	Silty clay loam, silt loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-5	90-100	85-100	65-100	45-85	20-40	3-20
	42-60	Stratified silty clay loam to gravelly sandy loam.	SM, CL, GM, ML	A-2, A-4, A-6	0-15	60-100	60-100	50-95	30-85	20-40	1-15
Bb*---------- Barbour	0-8	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4, A-2	0	80-100	75-100	50-95	30-90	15-25	2-7
	8-24	Silt loam, sandy loam, gravelly loam.	ML, SM, CL-ML, SM-SC	A-4, A-2, A-1	0-10	60-100	55-95	30-95	15-85	15-25	2-7
	24-60	Loamy sand, very gravelly sand, gravelly loamy fine sand.	SM, SP, GM, GP	A-1, A-2, A-3, A-4	0-5	35-95	30-95	20-80	2-40	15-25	NP-5
Bc*---------- Basher	0-10	Silt loam--------	ML, CL-ML, SM, SM-SC	A-4, A-2, A-1	0-5	80-100	75-100	45-100	20-90	15-25	2-7
	10-38	Silt loam, loam, gravelly sandy loam.	SM, ML, CL-ML, SM-SC	A-4, A-2, A-1	0-5	75-100	70-100	40-100	20-90	15-25	2-7
	38-52	Silt loam, gravelly loam, sandy loam.	SM, ML, CL-ML, SM-SC	A-4, A-2, A-1	0-5	75-100	70-100	40-100	20-90	15-25	2-7
	52-60	Fine sandy loam, gravelly loamy sand, very gravelly sand.	GP, SW, SM, ML	A-1, A-2, A-4, A-3	0-5	30-100	25-100	10-85	1-55	15-25	NP-5
BdB, BdC, BdD---- Bedington	0-9	Shaly silt loam	GM, SM, ML, CL	A-2, A-4	0-5	50-85	50-80	40-75	30-65	20-35	2-10
	9-35	Silt loam, channery silty clay loam, very shaly loam.	GM, SM, ML, SM-SC	A-4, A-2, A-6, A-7	0-30	40-90	30-90	25-75	20-65	25-45	5-15
	35-56	Channery loam, very shaly silt loam, very channery silty clay loam.	SM, GM	A-4, A-2, A-1, A-7	0-30	40-85	20-80	15-75	15-45	20-45	1-15
	56	Weathered bedrock	---	---	---	---	---	---	---	---	---
BeB, BeC, BeD---- Berks	0-7	Shaly silt loam	GM, ML, GC, SC	A-2, A-4	0-20	50-80	45-70	40-60	30-55	25-36	5-10
	7-28	Shaly loam, very shaly loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	28-36	Shaly loam, very shaly loam, shaly silt loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	36	Weathered bedrock	---	---	---	---	---	---	---	---	---
BhB, BhD---------- Berks	0-7	Stony silt loam.	GM, ML, GC, SC	A-2, A-4	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	7-28	Channery loam, very channery loam, channery silt loam.	GM, SM, GC, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	28-36	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
	36	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BoA---------- Birdsboro	0-15	Silt loam--------	ML, CL-ML	A-4	0	95-100	85-100	80-100	65-90	20-35	2-10
	15-44	Silt loam, sandy clay loam, gravelly clay loam.	ML, CL, SM, GM	A-4, A-6	0-5	70-100	65-100	60-100	45-95	25-35	3-11
	44-62	Loam, very gravelly clay loam, stratified sand.	GM, SM, ML, GW-GM	A-2, A-4, A-1	0-20	40-100	20-95	15-70	10-55	25-35	NP-7
BpB---------- Blairton	0-9	Silt loam--------	ML, CL-ML	A-4	0	80-100	75-100	65-90	50-80	20-35	2-10
	9-22	Silt loam, channery silty clay loam, very shaly loam.	ML, CL, GM	A-4, A-6, A-7, A-2	0-5	50-90	35-90	30-85	25-70	25-42	2-20
	22-26	Very shaly loam, channery loam, very shaly silt loam.	GM, SM, ML	A-4, A-2, A-6, A-1	0-10	15-65	15-65	15-65	10-60	25-40	2-12
	26	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
BrA, BrB---------- Brinkerton	0-12	Silt loam--------	ML	A-4, A-6	0-10	90-100	85-100	85-100	75-100	---	---
	12-16	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
	16-44	Silt loam, shaly loam, channery silty clay loam.	ML	A-4, A-6, A-7	0-10	75-100	70-100	65-100	55-100	30-45	5-15
	44-62	Silt loam, shaly loam, channery silt loam.	ML, SM, SC, CL	A-4, A-6, A-2	0-50	70-90	35-85	30-85	25-75	30-40	5-15
BuB, BuC---------- Buchanan	0-11	Gravelly loam----	GM, ML, CL, CL-ML	A-4, A-2	0-10	50-100	45-75	40-75	30-65	20-35	2-11
	11-27	Gravelly loam, silt loam, gravelly sandy clay loam.	GM, ML, CL, SM	A-4, A-2, A-1, A-6	0-20	50-100	45-90	40-90	20-80	20-35	2-15
	27-60	Gravelly loam, silt loam, channery clay loam.	GM, ML, CL, SM	A-4, A-2, A-6, A-1	0-20	50-100	30-80	30-75	20-60	20-35	2-15
BxB, BxC---------- Buchanan	0-11	Very stony loam	GM, ML, CL, CL-ML	A-2, A-4	3-20	50-90	45-75	40-75	30-65	20-35	2-11
	11-27	Gravelly loam, silt loam, gravelly sandy clay loam.	GM, ML, CL, SM	A-2, A-4, A-1, A-6	0-20	50-100	45-90	40-90	20-80	20-35	2-15
	27-60	Gravelly loam, loam, channery clay loam.	GM, ML, CL, SM	A-2, A-4, A-6, A-1	0-20	50-100	30-80	30-75	20-60	20-35	2-15
CaB, CaC, CaD---- Calvin	0-10	Shaly silt loam	ML, CL	A-4	0-15	70-95	70-90	65-90	55-75	---	---
	10-28	Shaly silt loam, channery loam, very shaly clay loam.	ML, SM, GM	A-2, A-4	0-15	70-95	55-90	40-90	30-75	22-38	NP-11
	28-38	Shaly silt loam, very shaly silt loam, very channery loam.	GM, SM, SC, GC	A-2, A-1, A-4, A-6	0-20	35-75	30-65	15-60	15-40	23-39	3-13
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CbB*, CbC*, CbD*:											
Calvin----------	0-10	Shaly silt loam	ML, CL	A-4	0-15	70-95	70-90	65-90	55-75	---	---
	10-28	Shaly silt loam, channery loam, very shaly clay loam.	ML, SM, GM	A-2, A-4	0-15	70-95	55-90	40-90	30-75	22-38	NP-11
	28-38	Shaly silt loam, very shaly silt loam, very channery loam.	GM, SM, SC, GC	A-2, A-1, A-4, A-6	0-20	35-75	30-65	15-60	15-40	23-39	3-13
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Berks----------	0-7	Shaly silt loam	GM, ML, GC, SC	A-2, A-4	0-20	50-80	45-70	40-60	30-55	25-36	5-10
	7-28	Shaly loam, very shaly loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	28-36	Shaly loam, very shaly loam, shaly silt loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	36	Weathered bedrock	---	---	---	---	---	---	---	---	---
CcC---------- Catoctin	0-8	Channery silt loam.	ML, SM, GM, CL	A-2, A-4	0-25	55-80	50-75	30-65	25-60	18-30	NP-8
	8-20	Channery silt loam, channery silty clay loam.	SM, SC, CL, GM	A-2, A-4, A-6	0-25	50-80	35-75	30-60	25-60	20-34	2-12
	20-24	Very channery silt loam, channery silt loam.	SM, GM, GC	A-2, A-4, A-1, A-3	10-40	30-75	10-60	9-55	7-50	18-28	NP-8
	24	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ch---------- Chavies	0-9	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4	0	85-100	75-100	40-90	40-75	<25	NP-5
	9-42	Fine sandy loam, silt loam, loam.	SM, ML	A-4	0	85-100	75-100	65-100	45-85	<35	NP-8
	42-60	Fine sandy loam, gravelly fine sandy loam, loam.	SM, ML, CL-ML, SM-SC	A-4, A-2, A-1	0-5	70-100	60-95	40-85	20-75	<25	NP-5
CmB, CmD---------- Clymer	0-12	Very stony loam	ML, SM, GM	A-4, A-2	3-30	60-100	50-95	45-90	30-85	10-30	NP-9
	12-40	Sandy loam, channery loam, channery clay loam.	GM, SM, GC, ML	A-2, A-4	0-20	60-95	50-95	45-85	30-60	14-32	NP-9
	40-60	Channery loam, very channery loam, channery sandy loam.	GM, GP-GM, GC, SM	A-1, A-2, A-3, A-4	10-30	30-75	25-70	20-60	5-40	14-32	NP-9
DuA, DuB, DuC---- Duffield	0-10	Silt loam--------	ML, CL, CL-ML	A-4, A-6, A-7	0	85-100	85-100	80-100	70-95	20-50	5-20
	10-42	Silty clay loam, silty clay, shaly loam.	ML, CL, MH, CH	A-4, A-6, A-7	0-10	65-100	60-100	55-100	55-95	30-55	8-22
	42-78	Shaly silt loam, loam, clay.	CL, MH, CH, GM	A-4, A-6, A-7	0-20	65-100	50-95	45-90	40-90	40-60	9-29
DxA, DxB---------- Duncannon	0-16	Very fine sandy loam.	ML	A-4	0	95-100	90-100	85-100	70-100	20-30	NP-5
	16-58	Silt loam, loam, very fine sandy loam.	ML, CL, CL-ML	A-4	0	95-100	90-100	85-100	70-100	17-30	NP-8
	58-99	Shaly silt loam, gravelly sandy loam, loam.	ML, CL, GM, SM	A-2, A-4, A-1	0-10	40-90	30-80	25-75	20-70	19-30	NP-8

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Dy*. Dystrochrepts											
EdB, EdC, EdD, EdE---------- Edom	0-8	Silty clay loam	ML, CL	A-4, A-6	0	85-100	80-100	75-95	70-90	---	---
	8-35	Silty clay, channery clay, shaly silty clay loam.	CH, CL	A-7, A-6	0-10	70-90	65-85	65-85	55-80	35-55	12-30
	35-67	Shaly silty clay loam, channery silty clay, shaly clay.	GM, ML, SM	A-7, A-6, A-2	5-20	25-80	20-70	15-60	15-55	35-49	10-20
	67	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
EeB, EeC, EeD---- Elliber	0-14	Very cherty silt loam.	GM, GP, GW-GM	A-2, A-1, A-4	5-15	30-60	20-55	15-45	10-40	---	---
	14-70	Cherty silt loam, very cherty sandy loam, very cherty loam.	GM, SP-SM, SM, GP-GM	A-2, A-1, A-4	20-40	40-65	30-60	25-50	5-40	20-35	NP-7
EfB, EfD, EfF---- Elliber	0-14	Very stony silt loam.	GM, GP, GW-GM	A-2, A-1, A-4	3-15	30-60	20-60	15-50	10-40	---	---
	14-70	Cherty silt loam, very cherty sandy loam, very cherty clay loam.	GM, GP-GM, SP-SM	A-2, A-1, A-4	20-40	40-65	30-60	25-50	5-40	20-35	NP-7
EtB, EtC--------- Ernest	0-9	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-10	85-100	80-100	70-95	60-95	20-40	4-15
	9-23	Silty clay loam, silt loam, channery silt loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-15	75-95	70-95	65-90	55-90	25-50	6-22
	23-44	Channery silt loam, channery loam, silty clay loam.	ML, CL, GM, SC	A-4, A-6, A-7	0-20	70-95	55-95	55-90	45-90	20-45	4-18
	44-60	Channery silt loam, silt loam, silty clay loam.	ML, CL, GM, SC	A-4, A-6, A-7	0-20	70-95	45-95	45-90	40-90	25-50	6-22
EvA, EvB--------- Evendale	0-12	Cherty silt loam	ML, CL, GM	A-4, A-6	0-10	60-95	50-85	45-85	35-80	---	---
	12-52	Silty clay loam, cherty silty clay loam, clay.	ML, MH, CL, CH	A-6, A-7	0-20	70-95	60-85	60-85	55-80	35-55	15-25
	52-75	Shaly clay loam, very shaly silty clay loam, shaly clay.	ML, MH, CL, GC	A-6, A-7	0-25	60-85	45-70	45-70	40-65	35-55	15-25
GnB---------- Glenville	0-10	Silt loam--------	ML, SM	A-4	0	85-100	85-100	70-95	45-80	---	---
	10-21	Silt loam, channery loam, channery silty clay loam.	CL-ML, CL, GM, SC	A-4, A-6	0-10	70-100	60-100	60-95	45-80	25-40	5-13
	21-43	Silt loam, channery loam, silty clay loam.	CL-ML, CL, GM, SC	A-4, A-6	0-10	65-100	60-100	55-95	45-80	25-40	5-13
	43-60	Channery fine sandy loam, channery loam, very channery silt loam.	CL-ML, ML, GM, SM	A-4, A-2, A-1	0-20	45-90	20-75	10-75	5-65	25-35	5-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
GoB---------- Glenville	0-10	Very stony silt loam.	ML, SM	A-4	3-10	70-100	65-100	50-95	35-80	---	---
	10-21	Silt loam, channery loam, channery silty clay loam.	CL-ML, CL, GM, SC	A-4, A-6	0-10	70-100	60-100	60-95	45-80	25-40	5-13
	21-43	Silt loam, channery loam, silty clay loam.	CL-ML, CL, GM, SC	A-4, A-6	0-10	65-100	60-100	55-95	45-80	25-40	5-13
	43-60	Channery fine sandy loam, channery loam, very channery silt loam.	CL-ML, ML, GM, SM	A-4, A-2, A-1	0-20	45-90	20-75	10-75	5-65	25-35	5-10
HaA, HaB, HaC, HaD, HcB, HcC, HcD---------- Hagerstown	0-10	Silt loam--------	CL, CL-ML	A-4, A-6, A-7	0-15	85-100	80-100	80-100	70-95	25-50	5-25
	10-19	Clay, clay loam, loam.	CL, CH	A-7	0-5	90-100	80-100	75-100	55-95	48-65	26-34
	19-60	Clay, silty clay, silty clay loam.	CH, CL	A-7, A-6	0-5	85-100	80-100	75-100	75-95	30-70	15-40
	60	Weathered bedrock	---	---	---	---	---	---	---	---	---
HdB*, HdD*, HdF*: Hagerstown------	0-10	Silt loam--------	CL, CL-ML	A-4, A-6, A-7	0-15	85-100	80-100	80-100	70-95	25-50	5-25
	10-19	Clay, clay loam, loam.	CL, CH	A-7	0-5	90-100	80-100	75-100	55-95	48-65	26-34
	19-60	Clay, silty clay, silty clay loam.	CH, CL	A-7, A-6	0-5	85-100	80-100	75-100	75-95	30-70	15-40
	60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
HeB, HeC, HeD---- Hazleton	0-6	Channery sandy loam.	ML, GM, SM	A-4	0-15	60-85	60-80	60-75	35-55	---	---
	6-42	Channery sandy loam, loam, very channery loam.	GM, SM, ML, SC	A-2, A-4, A-1	0-50	60-95	45-90	35-70	20-55	<30	NP-8
	42-54	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC	A-2, A-1, A-4	0-60	55-80	35-75	25-65	15-50	<30	NP-8
	54	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
HfB, HfD, HfF---- Hazleton	0-6	Extremely stony sandy loam.	GM, SM, ML	A-4	15-50	60-85	50-80	50-70	35-55	---	---
	6-42	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
	42-54	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC	A-2, A-1, A-4	5-60	55-80	35-75	25-65	15-50	<30	NP-8
	54	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
HgB, HgC---------- Highfield	0-10	Channery silt loam.	GM, ML, CL	A-4	0-10	65-85	60-75	45-65	40-55	---	---
	10-34	Silt loam, channery silt loam, channery loam.	GM, ML, SM	A-4, A-6, A-7	0-10	55-85	50-80	45-70	40-55	30-49	5-19
	34-60	Channery silt loam, channery loam, very channery loam.	GM, SM	A-2, A-4, A-5, A-7	0-20	45-75	25-70	20-55	20-40	30-45	3-13
	60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
HhB, HhD, HhF---- Highfield	0-10	Very stony silt loam.	ML, CL, GM	A-4	3-15	55-85	55-75	45-65	40-55	---	---
	10-34	Silt loam, channery silt loam, channery loam.	GM, ML, SM	A-4, A-6, A-7	0-10	55-85	50-80	45-70	40-55	30-49	5-19
	34-60	Channery silt loam, channery loam, very channery silt loam.	GM, SM	A-2, A-4, A-5, A-7	0-20	45-75	25-70	20-55	20-40	30-45	3-13
	60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
HuA---------- Huntington	0-11	Silt loam--------	ML, CL	A-4, A-6	0	95-100	95-100	85-100	60-95	25-40	5-15
	11-44	Silt loam, loam, silty clay loam.	ML, CL	A-4, A-6	0	95-100	95-100	85-100	60-95	25-40	5-15
	44-60	Stratified sandy clay loam to silt loam.	SM, SC, ML, CL	A-2, A-4	0	95-100	60-100	50-90	30-75	<30	NP-10
KnB, KnC, KnD---- Klinesville	0-5	Very shaly silt loam.	GM, SM, GP	A-2, A-4, A-1	0-10	35-75	30-55	10-50	4-40	---	---
	5-15	Shaly silt loam, very shaly silt loam.	GM, GP, SM, SP	A-2, A-1, A-4	0-10	25-75	15-55	10-50	4-40	20-35	NP-9
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
KrA, KrB, KrC---- Kreamer	0-9	Cherty silt loam	ML, GM	A-4	0-10	65-90	45-75	40-75	35-70	---	---
	9-60	Cherty silty clay loam, cherty clay loam, clay.	ML, GM, SM	A-7, A-6, A-4	0-10	60-95	45-90	40-90	35-85	35-49	9-20
	60-66	Cherty silty clay, cherty clay loam, clay.	CL, GC, SC	A-6, A-4, A-7	0-10	60-95	45-90	40-90	35-85	25-45	7-20
LdB, LdC---------- Laidig	0-8	Channery loam----	GM, SM, ML, CL	A-4	0-5	65-90	55-80	50-80	35-70	15-30	1-10
	8-32	Channery loam, channery sandy clay loam, channery sandy loam.	SM, SC, CL, ML	A-2, A-4, A-6, A-1	5-20	70-95	55-90	40-80	20-70	15-40	2-18
	32-60	Channery sandy clay loam, channery loam, channery sandy loam.	GC, SC, GM-GC, CL-ML	A-2, A-4, A-6, A-1	5-20	50-90	40-85	30-80	15-70	15-35	2-16

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
LgB---------- Laidig	0-8	Very stony loam	GM-GC, SM, CL-ML, SM-SC	A-4	3-15	65-90	50-80	45-80	35-70	15-30	NP-10
	8-32	Channery loam, channery sandy clay loam, channery sandy loam.	SM, SC, ML, CL	A-2, A-4, A-6, A-1	5-20	70-95	55-90	40-80	20-70	15-40	2-18
	32-60	Channery sandy clay loam, channery loam, channery sandy loam.	SC, GM-GC, CL-ML, GC	A-2, A-4, A-6, A-1	5-20	50-90	40-85	30-80	15-70	15-35	2-16
LgD---------- Laidig	0-8	Very stony loam	GM-GC, SM, CL-ML, SM-SC	A-4	3-15	65-90	50-80	45-80	35-70	15-30	NP-10
	8-32	Channery loam, channery sandy clay loam, channery sandy loam.	SM, SC, ML, CL	A-2, A-4, A-6, A-1	5-20	70-95	55-90	40-80	20-70	15-40	2-18
	32-60	Channery sandy clay loam, channery loam, channery sandy loam.	SC, GM-GC, CL-ML, GC	A-2, A-4, A-6, A-1	5-20	50-90	40-85	30-80	15-70	15-35	2-16
LpB, LpD---------- Lehew	0-9	Very stony loam	SM, GM, ML, CL-ML	A-2, A-4, A-1	5-25	50-90	45-80	40-75	20-55	15-30	NP-7
	9-30	Very channery sandy loam, channery fine sandy loam, channery loam.	SM, GM, GM-GC, SM-SC	A-2, A-4, A-1	5-40	45-75	30-65	20-55	10-40	15-30	NP-7
	30-38	Very channery sandy loam, very channery fine sandy loam, channery loam.	SM, GM, GM-GC, SM-SC	A-2, A-4, A-1	10-50	45-75	30-65	20-55	10-40	15-30	NP-7
	38	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ls---------- Lindside	0-9	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	95-100	80-100	55-90	20-35	2-15
	9-36	Silty clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6	0	100	95-100	90-100	70-95	25-40	4-18
	36-60	Silt loam, silty clay loam, gravelly loam.	CL, ML, SM, SC	A-4, A-6,	0	60-100	55-100	50-100	35-95	20-40	4-18
McB---------- Meckesville	0-10	Silt loam--------	ML	A-4	0-10	90-100	85-95	70-85	55-70	---	---
	10-31	Loam, channery silt loam, gravelly silty clay loam.	ML, CL-ML, CL	A-4, A-6	0-20	60-100	60-95	60-90	55-70	25-40	2-15
	31-54	Loam, channery silt loam, gravelly clay loam.	ML, CL-ML, GM, SC	A-4, A-2	0-20	45-95	40-90	35-85	30-65	20-30	2-10
	54-60	Loam, channery silt loam, gravelly clay loam.	ML, CL-ML, GM, SC	A-4, A-2	0-50	45-90	30-85	30-85	25-60	20-30	2-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
MdB, MdD--------- Meckesville	0-10	Very stony silt loam.	ML	A-4	3-15	80-100	70-95	65-85	55-80	---	---
	10-31	Loam, channery silt loam, gravelly silty clay loam.	ML, CL, CL-ML	A-4, A-6	0-20	60-100	60-95	60-90	55-70	25-40	2-15
	31-54	Loam, channery silt loam, gravelly clay loam.	ML, CL, GM, SC	A-4, A-2	0-20	45-95	40-90	35-85	30-65	20-30	2-10
	54-60	Loam, channery silt loam, gravelly clay loam.	ML, CL, GM, SC	A-4, A-2	0-50	45-90	30-85	30-85	25-60	20-30	2-10
Me--------------- Melvin	0-9	Silt loam--------	CL, CL-ML, ML	A-4	0	95-100	90-100	80-100	80-95	25-35	4-10
	9-40	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	80-95	25-40	5-20
	40-62	Silt loam, silty clay loam, sand.	CL, CL-ML	A-4, A-6	0	85-100	80-100	70-100	60-95	25-40	5-20
Mf*-------------- Middlebury	0-9	Silt loam--------	ML, SM, SM-SC, CL-ML	A-4, A-2	0	80-100	75-100	50-100	30-90	25-35	5-10
	9-34	Silt loam, loam, gravelly fine sandy loam.	ML, SM, SM-SC, CL-ML	A-4, A-2	0	75-100	70-100	50-100	30-85	20-25	2-5
	34-60	Stratified gravelly sandy loam to sand.	GW, GM, SW, SM	A-1, A-2, A-3	0-5	40-100	35-100	20-100	0-35	20-25	NP-5
MnA, MnB, MnC---- Monongahela	0-9	Silt loam--------	ML, SM, CL-ML, SM-SC	A-4	0-5	90-100	85-100	75-100	45-90	20-35	1-10
	9-21	Silt loam, clay loam, gravelly loam.	ML, CL, CL-ML	A-4, A-6	0-15	90-100	80-100	75-100	70-90	20-40	5-15
	21-46	Silt loam, sandy clay loam, gravelly loam.	ML, CL, SM, SC	A-4, A-6	0-10	80-100	60-100	55-95	45-95	20-40	3-15
	46-62	Clay loam, shaly gravelly sandy loam.	ML, CL, SM, SC	A-4, A-6	10-20	75-100	60-90	60-85	40-85	20-40	1-15
MoB, MoC, MoD---- Morrison	0-8	Sandy loam-------	SM, ML	A-2, A-4	0-5	95-100	90-100	50-80	25-55	---	---
	8-53	Sandy loam, gravelly loam, channery sandy clay loam.	SM, ML, SM-SC	A-2, A-4	0-15	80-100	60-100	55-80	25-55	<35	NP-10
	53-60	Sandy loam, gravelly loamy sand, channery sandy loam.	SM, SC, SP-SM	A-2, A-4	0-15	80-100	60-100	55-90	10-45	<25	NP-10
MuA, MuB, MuC---- Murrill	0-16	Channery loam----	ML, GM, CL, SM-SC	A-4, A-6, A-2	0-5	65-80	55-70	45-65	30-65	20-40	3-15
	16-55	Channery silty clay loam, channery sandy clay loam, channery clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-15	65-85	60-70	55-65	50-65	20-50	5-25
	55-62	Clay loam, clay, channery clay loam.	CH, MH, CL	A-6, A-7	0-20	80-100	65-100	60-100	55-100	35-75	20-40

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
NeB, NeC--------- Neshaminy	0-12	Gravelly silt loam.	ML, CL	A-4, A-6	0-10	70-90	65-80	60-75	55-65	---	---
	12-73	Silt loam, gravelly silty clay loam, gravelly sandy clay loam.	ML, SM, MH, GM	A-4, A-7, A-2, A-6	0-40	60-100	55-100	45-100	30-75	25-55	NP-22
NhB, NhD--------- Neshaminy	0-12	Very stony silt loam.	ML, CL	A-4, A-6	3-15	80-100	70-100	60-100	55-85	---	---
	12-73	Silt loam, gravelly silty clay loam, gravelly sandy clay loam.	ML, SM, MH, GM	A-4, A-7, A-2, A-6	0-40	60-100	55-100	45-100	30-75	25-55	NP-22
Pe--------------- Penlaw	0-9	Silt loam---------	CL, CL-ML	A-4, A-6	0-10	95-100	85-100	75-100	60-100	10-40	5-25
	9-21	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6	0-10	95-100	85-100	75-100	60-95	10-40	5-25
	21-49	Silty clay loam, silt loam.	CL, CH, CL-ML	A-4, A-6, A-7	0-20	90-100	85-100	65-100	50-95	15-55	6-30
	49-60	Silty clay, clay, loam.	CL, GC, SC, CH	A-4, A-6, A-7	0-20	65-100	60-100	55-100	40-95	15-55	6-30
Pt*. Pits and quarries											
Pu--------------- Purdy	0-9	Silt loam---------	ML, CL	A-4, A-6, A-7	0	95-100	90-100	90-100	90-100	25-50	4-20
	9-46	Silty clay, clay, clay loam.	CL, CH, MH	A-6, A-7	0	95-100	90-100	85-100	75-85	30-65	11-30
	46-60	Silty clay, clay loam, clay.	CL, CH, MH	A-6, A-7	0	95-100	90-100	85-100	70-95	30-65	11-30
RaA-------------- Raritan	0-10	Silt loam---------	ML, SM	A-4	0	85-100	75-90	60-90	45-80	---	---
	10-29	Clay loam, loam	ML	A-4, A-6	0-5	90-100	80-95	70-90	50-70	25-35	3-11
	29-48	Clay loam, loam	ML	A-4, A-6	0-5	90-100	80-95	70-90	50-70	25-35	3-11
	48-65	Stratified gravelly loamy sand to silty clay loam.	GM, GW-GM, SM, ML	A-1, A-2, A-4	0-10	60-100	40-90	20-90	10-85	25-35	NP-7
Tg*-------------- Tioga	0-9	Silt loam---------	ML, SM	A-4	0	100	95-100	65-95	40-85	<15	NP-4
	9-36	Silt loam, loam, gravelly fine sandy loam.	SM, GM, ML	A-1, A-2, A-4	0	55-100	50-100	35-90	20-80	<15	NP-2
	36-60	Silt loam, gravelly loam, very gravelly loamy sand.	GW-GM, GM, SM, ML	A-1, A-2, A-4, A-3	0-10	35-100	30-100	15-90	5-80	<15	NP-2
Ty--------------- Tyler	0-13	Silt loam---------	ML	A-4	0	100	100	95-100	80-95	30-40	4-10
	13-21	Silty clay loam, silt loam.	CL	A-6, A-7, A-4	0	100	100	95-100	85-100	25-45	8-20
	21-62	Silty clay loam, silt loam, clay loam.	CL	A-6, A-7, A-4	0	100	100	80-100	70-95	25-45	8-20
	62-68	Stratified loam to silty clay loam.	CL, ML, CL-ML	A-6, A-4, A-7	0	95-100	90-100	75-100	60-90	20-45	4-18
Ub*: Urban land.											
Udorthents.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Wa	0-12	Silt loam	ML, OL	A-7, A-5	0	95-100	95-100	90-100	70-95	40-50	5-15
Warners	12-33	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	95-100	90-100	70-95	25-45	5-15
	33-62	Marl	---	---	0	---	---	---	---	---	---
WeB, WeC, WeD	0-6	Very shaly silt loam.	GM, ML, SM	A-1, A-2, A-4	0-10	35-70	35-70	25-65	20-55	30-40	4-10
Weikert	6-17	Weathered bedrock	GM, GP-GM	A-1, A-2	0-20	15-60	10-55	5-45	5-35	28-36	3-9
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
WkF*:											
Weikert	0-6	Very shaly silt loam.	GM, ML, SM	A-1, A-2, A-4	0-10	35-70	35-70	25-65	20-55	30-40	4-10
	6-17	Weathered bedrock	GM, GP-GM	A-1, A-2	0-20	15-60	10-55	5-45	5-35	28-36	3-9
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Klinesville	0-5	Very shaly silt loam.	GM, SM, GP	A-2, A-4, A-1	0-10	35-75	30-55	10-50	4-40	---	---
	5-15	Shaly silt loam, very shaly silt loam.	GM, GP, SM, SP	A-2, A-1, A-4	0-10	25-75	15-55	10-50	4-40	20-35	NP-9
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

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

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

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

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
AbB, AbC----------	0-12	15-27	1.20-1.40	0.6-2.0	0.16-0.20	3.6-5.5	Low----------	0.32	3-2	1-4
Albrights	12-24	18-35	1.30-1.50	0.6-2.0	0.10-0.14	3.6-5.5	Low----------	0.28		
	24-62	18-35	1.40-1.70	0.2-0.6	0.04-0.08	4.5-6.5	Low----------	0.28		
AgA, AgB----------	0-10	15-27	1.20-1.40	0.6-2.0	0.12-0.22	3.6-5.5	Low----------	0.32	4	1-4
Allegheny	10-34	18-35	1.20-1.50	0.6-2.0	0.13-0.18	3.6-5.5	Low----------	0.28		
	34-60	10-35	1.20-1.40	0.6-2.0	0.08-0.17	3.6-5.5	Low----------	0.28		
AnB----------	0-9	10-27	1.20-1.40	0.6-2.0	0.08-0.18	4.5-5.5	Low----------	0.24	3-2	1-4
Andover	9-18	18-35	1.20-1.40	0.6-2.0	0.08-0.12	4.5-5.5	Low----------	0.17		
	18-42	18-35	1.30-1.60	0.06-0.2	0.03-0.06	4.5-5.5	Low----------	0.17		
	42-60	18-40	1.40-1.70	0.06-0.6	0.08-0.12	4.5-5.5	Low----------	0.17		
AoB----------	0-9	10-27	1.20-1.40	0.6-2.0	0.08-0.20	4.5-5.5	Low----------	0.17	3-2	1-4
Andover	9-18	18-35	1.20-1.40	0.6-2.0	0.08-0.12	4.5-5.5	Low----------	0.17		
	18-42	18-35	1.30-1.60	0.06-0.2	0.03-0.06	4.5-5.5	Low----------	0.17		
	42-60	18-40	1.40-1.70	0.06-0.6	0.08-0.12	4.5-5.5	Low----------	0.17		
AtB, AtC, AtD----	0-9	10-27	1.20-1.50	0.6-2.0	0.14-0.20	4.5-5.5	Low----------	0.24	4	2-4
Athol	9-55	15-35	1.30-1.75	0.6-2.0	0.12-0.16	5.1-6.0	Low----------	0.24		
	55-80	15-35	1.30-1.75	0.6-2.0	0.10-0.14	5.1-6.0	Low----------	0.24		
Aw----------	0-9	18-30	1.20-1.40	0.6-2.0	0.14-0.22	4.5-5.5	Low----------	0.28	5	2-4
Atkins	9-42	18-35	1.20-1.50	0.06-2.0	0.14-0.18	4.5-5.5	Low----------	0.28		
	42-60	10-35	1.20-1.50	0.2-6.0	0.08-0.18	4.5-5.5	Low----------	0.28		
Bb*----------	0-8	6-18	1.15-1.40	0.6-2.0	0.16-0.21	4.5-6.0	Low----------	0.32	5	1-5
Barbour	8-24	6-18	1.15-1.45	2.0-6.0	0.10-0.19	4.5-6.0	Low----------	0.32		
	24-60	1-8	1.25-1.55	6.0-20	0.02-0.07	4.5-6.5	Low----------	0.17		
Bc*----------	0-10	6-18	1.15-1.40	0.6-2.0	0.15-0.21	3.6-6.0	Low----------	0.32	5	1-5
Basher	10-38	6-18	1.15-1.45	0.6-2.0	0.10-0.19	3.6-6.0	Low----------	0.32		
	38-52	6-18	1.25-1.55	0.2-2.0	0.10-0.19	4.5-6.5	Low----------	0.32		
	52-60	1-8	1.25-1.55	0.6-6.0	0.02-0.07	4.5-6.5	Low----------	0.17		
BdB, BdC, BdD----	0-9	15-25	1.20-1.50	0.6-2.0	0.12-0.16	4.5-7.3	Low----------	0.20	4	1-3
Bedington	9-35	18-32	1.30-1.60	0.6-2.0	0.12-0.14	4.5-5.5	Low----------	0.20		
	35-56	18-32	1.40-1.60	0.6-2.0	0.08-0.12	4.5-5.5	Low----------	0.20		
	56	---	---	---	---	---	----------	----		
BeB, BeC, BeD, BhB, BhD--------	0-7	5-23	1.20-1.50	0.6-6.0	0.08-0.12	3.6-5.5	Low----------	0.24	3	.5-3
Berks	7-28	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-5.5	Low----------	0.17		
	28-36	5-20	1.20-1.60	2.0-6.0	0.04-0.10	3.6-6.5	Low----------	0.17		
	36	---	---	---	---	---	----------	----		
BoA----------	0-15	10-27	1.20-1.50	0.6-2.0	0.16-0.20	3.6-5.5	Low----------	0.37	4	1-3
Birdsboro	15-44	20-35	1.30-1.60	0.6-2.0	0.14-0.18	3.6-5.5	Low----------	0.28		
	44-62	5-30	1.30-1.60	0.6-20	0.06-0.12	3.6-5.5	Low----------	0.17		
BpB----------	0-9	10-27	1.40-1.60	0.6-2.0	0.14-0.18	3.6-5.5	Low----------	0.43	3-2	1-4
Blairton	9-22	18-35	1.50-1.70	0.2-0.6	0.08-0.14	3.6-5.5	Low----------	0.32		
	22-26	10-27	1.40-1.60	0.2-2.0	0.04-0.10	3.6-5.5	Low----------	0.32		
	26	---	---	---	---	---	----------	----		
BrA, BrB----------	0-12	15-30	1.20-1.40	0.6-2.0	0.10-0.14	4.5-6.0	Low----------	0.32	3	1-4
Brinkerton	12-16	15-35	1.20-1.50	0.6-2.0	0.10-0.14	4.5-6.0	Moderate-----	0.37		
	16-44	15-35	1.40-1.70	0.06-0.2	0.04-0.10	4.5-6.0	Moderate-----	0.32		
	44-62	15-25	1.20-1.60	0.06-0.6	0.14-0.18	5.1-6.5	Low----------	0.20		
BuB, BuC----------	0-11	10-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Moderate-----	0.24	3-2	1-3
Buchanan	11-27	18-30	1.30-1.60	0.6-2.0	0.10-0.16	3.6-5.5	Moderate-----	0.24		
	27-60	18-35	1.40-1.70	0.06-0.2	0.06-0.10	3.6-5.5	Moderate-----	0.17		

See footnote at end of table.

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

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
BxB, BxC----------	0-11	10-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Moderate-----	0.24	3-2	---
Buchanan	11-27	18-30	1.30-1.60	0.6-2.0	0.10-0.16	3.6-5.5	Moderate-----	0.24		
	27-60	18-35	1.40-1.70	0.06-0.2	0.06-0.10	3.6-5.5	Moderate-----	0.17		
CaB, CaC, CaD----	0-10	10-25	1.20-1.40	2.0-6.0	0.10-0.16	4.5-6.0	Low----------	0.20	3-2	.5-2
Calvin	10-28	15-30	1.40-1.60	2.0-6.0	0.08-0.16	4.5-6.0	Low----------	0.20		
	28-38	15-30	1.40-1.60	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20		
	38	---	---	---	---	---	----------	----		
CbB*, CbC*, CbD*:										
Calvin----------	0-10	10-25	1.20-1.40	2.0-6.0	0.10-0.16	4.5-6.0	Low----------	0.20	3-2	.5-2
	10-28	15-30	1.40-1.60	2.0-6.0	0.08-0.16	4.5-6.0	Low----------	0.20		
	28-38	15-30	1.40-1.60	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20		
	38	---	---	---	---	---	----------	----		
Berks-----------	0-7	5-23	1.20-1.50	0.6-6.0	0.08-0.12	3.6-5.5	Low----------	0.24	3	.5-3
	7-28	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-5.5	Low----------	0.17		
	28-36	5-20	1.20-1.60	2.0-6.0	0.04-0.10	3.6-6.5	Low----------	0.17		
	36	---	---	---	---	---	----------	----		
CcC---------------	0-8	5-20	1.20-1.50	2.0-6.0	0.11-0.16	5.1-6.0	Low----------	0.24	3	1-3
Catoctin	8-20	10-35	1.20-1.50	2.0-6.0	0.08-0.16	5.1-6.0	Low----------	0.24		
	20-24	10-25	1.20-1.50	2.0-6.0	0.04-0.15	5.1-6.5	Low----------	0.24		
	24	---	---	---	---	---	----------	----		
Ch----------------	0-9	7-18	1.20-1.40	2.0-6.0	0.11-0.18	4.5-7.3	Low----------	0.24	4	.5-4
Chavies	9-42	7-18	1.20-1.40	2.0-6.0	0.11-0.20	4.5-7.3	Low----------	0.24		
	42-60	7-18	1.30-1.50	2.0-6.0	0.08-0.18	4.5-6.0	Low----------	0.24		
CmB, CmD----------	0-12	15-27	1.20-1.40	0.6-2.0	0.10-0.16	3.6-5.5	Low----------	0.10	4	---
Clymer	12-40	18-30	1.20-1.50	0.6-6.0	0.08-0.14	3.6-5.5	Low----------	0.15		
	40-60	15-27	1.20-1.40	0.6-6.0	0.04-0.08	3.6-5.5	Low----------	0.15		
DuA, DuB, DuC----	0-10	15-30	1.10-1.40	0.6-2.0	0.16-0.22	5.1-7.3	Low----------	0.32	4	1-2
Duffield	10-42	20-42	1.30-1.60	0.6-2.0	0.14-0.20	5.1-7.3	Moderate-----	0.28		
	42-78	18-41	1.30-1.60	0.6-2.0	0.14-0.20	5.1-6.5	Moderate-----	0.28		
DxA, DxB----------	0-16	10-20	1.20-1.40	0.6-2.0	0.16-0.20	5.1-6.0	Low----------	0.37	3	2-4
Duncannon	16-58	10-24	1.40-1.60	0.6-2.0	0.14-0.16	5.1-6.0	Low----------	0.43		
	58-99	10-24	1.40-1.60	0.6-2.0	0.12-0.16	5.1-6.5	Low----------	0.32		
Dy*.										
Dystrochrepts										
EdB, EdC, EdD,										
EdE----------	0-8	15-35	1.20-1.50	0.6-2.0	0.14-0.20	5.1-7.8	Low----------	0.28	3	.5-4
Edom	8-35	35-60	1.30-1.60	0.2-2.0	0.10-0.14	5.1-7.8	Moderate-----	0.28		
	35-67	27-60	1.30-1.60	0.2-2.0	0.04-0.08	5.6-7.8	Moderate-----	0.17		
	67	---	---	---	---	---	----------	----		
EeB, EeC, EeD----	0-14	10-20	1.20-1.40	0.6-6.0	0.04-0.10	3.6-5.5	Low----------	0.17	3	1-3
Elliber	14-70	12-27	1.40-1.60	0.6-6.0	0.04-0.10	3.6-5.5	Low----------	0.17		
EfB, EfD, EfF----	0-14	10-20	1.20-1.40	0.6-6.0	0.06-0.12	3.6-5.5	Low----------	0.17	3	---
Elliber	14-70	12-27	1.40-1.60	0.6-6.0	0.04-0.10	3.6-5.5	Low----------	0.17		
EtB, EtC----------	0-9	15-20	1.20-1.40	0.6-2.0	0.14-0.20	3.6-5.5	Low----------	0.43	3	2-4
Ernest	9-23	20-35	1.30-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Moderate-----	0.28		
	23-44	18-30	1.40-1.70	0.06-0.6	0.08-0.12	3.6-5.5	Low----------	0.28		
	44-60	20-35	1.30-1.60	0.06-0.6	0.08-0.12	3.6-5.5	Moderate-----	0.28		
EvA, EvB----------	0-12	15-35	1.20-1.40	0.6-2.0	0.14-0.18	4.5-7.3	Low----------	0.32	3	1-3
Evendale	12-52	30-50	1.40-1.60	0.06-0.2	0.12-0.20	4.5-7.3	Moderate-----	0.32		
	52-75	30-50	1.40-1.60	0.06-0.6	0.08-0.16	4.5-5.5	Moderate-----	0.28		

See footnote at end of table.

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

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
GnB----------	0-10	10-20	1.20-1.40	0.6-2.0	0.16-0.20	4.5-6.0	Low----------	0.32	3	1-3
Glenville	10-21	20-35	1.40-1.60	0.6-2.0	0.12-0.16	4.5-6.0	Low----------	0.43		
	21-43	20-35	1.60-1.80	0.2-0.6	0.08-0.12	4.5-6.0	Low----------	0.43		
	43-60	5-25	1.40-1.60	0.2-0.6	0.06-0.12	4.5-5.5	Low----------	0.28		
GoB----------	0-10	10-20	1.20-1.40	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.24	3	---
Glenville	10-21	20-35	1.40-1.60	0.6-2.0	0.12-0.16	4.5-6.0	Low----------	0.24		
	21-43	20-35	1.60-1.80	0.2-0.6	0.08-0.12	4.5-6.0	Low----------	0.24		
	43-60	5-25	1.40-1.60	0.2-0.6	0.06-0.12	4.5-5.5	Low----------	0.17		
HaA, HaB, HaC, HaD, HcB, HcC, HcD----------	0-10	15-35	1.20-1.40	0.6-6.0	0.16-0.24	4.5-5.5	Low----------	0.32	4	1-5
Hagerstown	10-19	23-60	1.20-1.60	0.6-2.0	0.10-0.24	4.5-7.3	Moderate-----	0.28		
	19-60	23-60	1.20-1.60	0.6-2.0	0.10-0.24	5.1-7.3	Moderate-----	0.28		
HdB*, HdD*, HdF*:										
Hagerstown------	0-10	15-35	1.20-1.40	0.6-6.0	0.16-0.24	4.5-5.5	Low----------	0.32	4	1-5
	10-19	23-60	1.20-1.60	0.6-2.0	0.10-0.24	4.5-7.3	Moderate-----	0.28		
	19-60	23-60	1.20-1.60	0.6-2.0	0.10-0.24	5.1-7.3	Moderate-----	0.28		
Rock outcrop.										
HeB, HeC, HeD----	0-6	7-18	1.20-1.40	2.0-6.0	0.10-0.14	3.6-5.5	Low----------	0.17	4	2-4
Hazleton	6-42	7-18	1.20-1.40	2.0-20	0.08-0.12	3.6-5.5	Low----------	0.17		
	42-54	5-15	1.20-1.40	2.0-20	0.04-0.10	3.6-5.5	Low----------	0.17		
	54	---	---	---	---	---	----------	----		
HfB, HfD, HfF----	0-6	7-18	1.20-1.40	2.0-6.0	0.10-0.16	3.6-5.5	Low----------	0.17	4	2-4
Hazleton	6-42	7-18	1.20-1.40	2.0-20	0.08-0.12	3.6-5.5	Low----------	0.17		
	42-54	5-15	1.20-1.40	2.0-20	0.04-0.10	3.6-5.5	Low----------	0.17		
	54	---	---	---	---	---	----------	----		
HgB, HgC---------	0-10	10-20	1.20-1.40	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.25	3	1-3
Highfield	10-34	15-27	1.40-1.60	0.6-2.0	0.10-0.14	4.5-5.5	Low----------	0.25		
	34-60	15-27	1.40-1.60	0.6-2.0	0.06-0.10	5.1-6.0	Low----------	0.28		
	60	---	---	---	---	---	----------	----		
HhB, HhD, HhF----	0-10	10-20	1.20-1.40	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.28	3	---
Highfield	10-34	15-27	1.40-1.60	0.6-2.0	0.10-0.14	4.5-5.5	Low----------	0.28		
	34-60	15-27	1.40-1.60	0.6-2.0	0.06-0.10	5.1-6.0	Low----------	0.28		
	60	---	---	---	---	---	----------	----		
HuA----------	0-11	18-30	1.10-1.30	0.6-2.0	0.18-0.24	5.6-7.8	Low----------	0.32	5	3-6
Huntington	11-44	18-30	1.30-1.50	0.6-2.0	0.16-0.22	5.6-7.8	Low----------	0.32		
	44-60	15-27	1.30-1.50	0.6-2.0	0.10-0.16	5.6-7.8	Low----------	0.28		
KnB, KnC, KnD----	0-5	10-25	1.20-1.40	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20	2	.5-2
Klinesville	5-15	10-20	1.40-1.60	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20		
	15	---	---	---	---	---	----------	----		
KrA, KrB, KrC----	0-9	10-25	1.30-1.50	0.6-2.0	0.12-0.16	4.5-7.3	Low----------	0.24	3	.7-2
Kreamer	9-60	33-50	1.50-1.70	0.06-0.2	0.10-0.14	4.5-7.3	Moderate-----	0.17		
	60-66	33-50	1.50-1.70	0.06-0.6	0.10-0.14	4.5-5.5	Moderate-----	0.17		
LdB, LdC---------	0-8	10-27	1.20-1.40	0.6-6.0	0.10-0.14	3.6-5.5	Low----------	0.28	4	1-4
Laidig	8-32	18-35	1.30-1.50	0.6-6.0	0.08-0.12	3.6-5.5	Low----------	0.28		
	32-60	18-35	1.30-1.60	0.2-0.6	0.06-0.10	3.6-5.5	Low----------	0.17		
LgB, LgD---------	0-8	7-27	1.20-1.40	0.6-6.0	0.08-0.12	3.6-5.5	Low----------	0.28	4	---
Laidig	8-32	18-35	1.30-1.50	0.6-6.0	0.08-0.10	3.6-5.5	Low----------	0.28		
	32-60	18-35	1.30-1.60	0.2-0.6	0.06-0.10	3.6-5.5	Low----------	0.17		
LpB, LpD---------	0-9	4-16	1.20-1.40	2.0-20	0.08-0.12	4.5-5.5	Low----------	0.17	3	---
Lehew	9-30	5-18	1.20-1.40	2.0-20	0.06-0.10	4.5-5.5	Low----------	0.17		
	30-38	5-18	1.20-1.40	2.0-20	0.06-0.10	4.5-5.5	Low----------	0.17		
	38	---	---	---	---	---	----------	----		

See footnote at end of table.

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

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
Ls----------	0-9	15-27	1.20-1.40	0.6-2.0	0.20-0.26	5.1-6.5	Low----------	0.37	5	2-4
Lindside	9-36	18-35	1.20-1.40	0.2-2.0	0.17-0.22	5.1-7.3	Low----------	0.32		
	36-60	18-35	1.20-1.40	0.2-6.0	0.12-0.18	5.6-7.3	Low----------	0.32		
McB----------	0-10	10-27	1.10-1.30	0.6-2.0	0.14-0.18	3.6-5.5	Low----------	0.32	4	1-4
Meckesville	10-31	18-35	1.20-1.40	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.24		
	31-54	18-35	1.30-1.60	0.2-0.6	0.08-0.12	3.6-5.5	Low----------	0.24		
	54-60	18-35	1.20-1.40	0.2-0.6	0.08-0.12	3.6-5.5	Low----------	0.24		
MdB, MdD----------	0-10	10-27	1.10-1.30	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.28	4	1-4
Meckesville	10-31	18-35	1.20-1.40	0.6-2.0	0.10-0.14	3.6-5.5	Low----------	0.24		
	31-54	18-35	1.30-1.60	0.2-0.6	0.08-0.12	3.6-5.5	Low----------	0.24		
	54-60	10-35	1.20-1.40	0.2-0.6	0.08-0.12	3.6-5.5	Low----------	0.24		
Me----------	0-9	12-17	1.20-1.60	0.6-2.0	0.18-0.23	6.1-7.8	Low----------	0.43	5	.5-3
Melvin	9-40	12-35	1.30-1.60	0.6-2.0	0.18-0.23	6.1-7.8	Low----------	0.43		
	40-62	7-35	1.40-1.70	0.6-2.0	0.16-0.23	6.1-7.8	Low----------	0.43		
Mf*----------	0-9	5-18	1.15-1.40	0.6-2.0	0.14-0.21	5.1-6.5	Low----------	0.28	5	3-7
Middlebury	9-34	5-18	1.15-1.45	0.6-2.0	0.10-0.20	5.6-7.3	Low----------	0.28		
	34-60	1-10	1.25-1.55	2.0-20	0.01-0.10	5.6-7.3	Low----------	0.20		
MnA, MnB, MnC----	0-9	10-27	1.20-1.40	0.6-2.0	0.18-0.24	4.5-5.5	Low----------	0.43	3	2-4
Monongahela	9-21	18-35	1.30-1.50	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.43		
	21-46	18-35	1.30-1.60	0.06-0.6	0.08-0.12	4.5-5.5	Low----------	0.43		
	46-62	10-35	1.20-1.40	0.2-0.6	0.08-0.12	4.5-5.5	Low----------	0.37		
MoB, MoC, MoD----	0-8	5-20	1.20-1.40	0.6-6.0	0.12-0.16	3.6-5.5	Low----------	0.20	3	1-4
Morrison	8-53	10-27	1.30-1.50	0.6-6.0	0.08-0.12	3.6-6.0	Low----------	0.17		
	53-60	5-20	1.20-1.40	0.6-6.0	0.06-0.10	5.1-6.0	Low----------	0.17		
MuA, MuB, MuC----	0-16	10-20	1.20-1.50	0.6-2.0	0.12-0.16	4.5-6.0	Low----------	0.24	4	1-4
Murrill	16-55	18-35	1.40-1.70	0.6-2.0	0.10-0.14	4.5-6.0	Low----------	0.20		
	55-62	27-55	1.40-1.70	0.2-2.0	0.08-0.12	4.5-6.0	Moderate-----	0.28		
NeB, NeC----------	0-12	10-25	1.20-1.40	0.6-2.0	0.14-0.18	4.5-6.0	Low----------	0.28	4	1-3
Neshaminy	12-73	20-40	1.40-1.60	0.2-0.6	0.10-0.14	4.5-6.0	Low----------	0.17		
NhB, NhD----------	0-12	10-25	1.20-1.40	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.24	4	---
Neshaminy	12-73	20-40	1.40-1.60	0.2-0.6	0.10-0.14	4.5-6.0	Low----------	0.17		
Pe----------	0-9	15-25	1.20-1.40	0.6-2.0	0.16-0.20	5.6-7.3	Low----------	0.43	3	2-4
Penlaw	9-21	20-35	1.40-1.60	0.6-2.0	0.16-0.20	5.6-7.3	Moderate-----	0.24		
	21-49	20-35	1.60-1.80	0.06-0.2	0.10-0.16	5.6-7.3	Moderate-----	0.24		
	49-60	15-50	1.40-1.60	0.06-0.6	0.12-0.16	5.6-7.3	Moderate-----	0.24		
Pt*. Pits and quarries										
Pu----------	0-9	18-35	1.30-1.50	0.2-0.6	0.18-0.24	3.6-5.5	Moderate-----	0.43	3	2-4
Purdy	9-46	35-50	1.30-1.60	<0.2	0.12-0.18	3.6-5.5	Moderate-----	0.28		
	46-60	35-50	1.30-1.60	<0.2	0.10-0.16	3.6-5.5	Moderate-----	0.28		
RaA----------	0-10	10-20	1.20-1.40	0.6-2.0	0.16-0.20	4.5-6.0	Low----------	0.37	3-2	2-4
Raritan	10-29	15-27	1.40-1.60	0.6-2.0	0.12-0.16	4.5-6.0	Low----------	0.28		
	29-48	15-27	1.40-1.60	0.2-0.6	0.08-0.12	4.5-6.0	Low----------	0.28		
	48-65	5-15	1.40-1.60	0.6-6.0	0.06-0.10	4.5-6.0	Low----------	0.28		
Tg*----------	0-9	5-18	1.15-1.40	0.6-6.0	0.15-0.21	5.1-6.5	Low----------	0.37	5	2-6
Tioga	9-36	5-18	1.15-1.45	0.6-6.0	0.07-0.20	5.1-7.3	Low----------	0.28		
	36-60	3-15	1.25-1.55	0.6-20	0.02-0.20	5.6-7.8	Low----------	0.28		
Ty----------	0-13	14-26	1.30-1.50	0.6-2.0	0.18-0.22	3.6-6.5	Low----------	0.43	3	2-4
Tyler	13-21	20-33	1.40-1.60	0.2-0.6	0.16-0.20	3.6-5.5	Moderate-----	0.43		
	21-62	18-33	1.60-1.85	<0.2	0.04-0.12	3.6-5.5	Low----------	0.43		
	62-68	12-30	1.30-1.70	0.2-0.6	0.04-0.12	4.5-6.0	Low----------	0.43		

See footnote at end of table.

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

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
Ub*:										
Urban land.										
Udorthents.										
Wa----------	0-12	18-35	1.05-1.40	0.2-2.0	0.17-0.22	6.1-7.8	Low----------	0.43	5	4-8
Warners	12-33	18-35	1.05-1.40	0.2-2.0	0.16-0.20	7.4-7.8	Low----------	0.43		
	33-62	---	---	---	---	7.9-8.4	Low----------	----		
WeB, WeC, WeD----	0-6	15-27	1.20-1.40	2.0-6.0	0.08-0.14	4.5-6.0	Low----------	0.28	2	1-3
Weikert	6-17	15-27	1.20-1.40	2.0-6.0	0.04-0.08	4.5-6.0	Low----------	0.28		
	17	---	---	---	---	---	----------	----		
WkF*:										
Weikert---------	0-6	15-27	1.20-1.40	2.0-6.0	0.08-0.14	4.5-6.0	Low----------	0.28	2	1-3
	6-17	15-27	1.20-1.40	2.0-6.0	0.04-0.08	4.5-6.0	Low----------	0.28		
	17	---	---	---	---	---	----------	----		
Klinesville-----	0-5	10-25	1.20-1.40	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20	2	.5-2
	5-15	10-20	1.40-1.60	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20		
	15	---	---	---	---	---	----------	----		

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

TABLE 16.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
AbB, AbC---------- Albrights	C	None--------	---	---	0.5-3.0	Perched	Nov-Mar	>60	---	Moderate	High-----	High.
AgA, AgB---------- Allegheny	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.
AnB, AoB---------- Andover	D	None--------	---	---	0-0.5	Perched	Oct-Jun	>60	---	High-----	High-----	High.
AtB, AtC, AtD----- Athol	B	None--------	---	---	>6.0	---	---	>40	Hard	Moderate	Low------	High.
Aw---------- Atkins	D	Frequent----	Very brief	Sep-Jul	0-0.5	Apparent	Nov-Jun	>60	---	High-----	High-----	Moderate.
Bb*---------- Barbour	B	Rare--------	Very brief	Dec-Apr	3.0-6.0	Apparent	Jan-Apr	>60	---	Moderate	Low------	Moderate.
Bc*---------- Basher	B	Occasional	Brief to long.	Dec-Apr	0.5-2.0	Apparent	Jan-May	>60	---	High-----	Moderate	Moderate.
BdB, BdC, BdD----- Bedington	B	None--------	---	---	>6.0	---	---	>40	Soft	Moderate	Low------	High.
BeB, BeC, BeD, BhB, BhD--------- Berks	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	Low------	High.
BoA---------- Birdsboro	B	None--------	---	---	4.0-6.0	Apparent	Nov-Mar	>60	---	Moderate	Moderate	High.
BpB---------- Blairton	C	None--------	---	---	0.5-3.0	Perched	Nov-Mar	20-40	Soft	High-----	High-----	High.
BrA, BrB---------- Brinkerton	D	None--------	---	---	0-0.5	Perched	Oct-May	>60	---	High-----	High-----	High.
BuB, BuC, BxB, BxC---------- Buchanan	C	None--------	---	---	0.5-3.0	Perched	Nov-Mar	>60	---	Moderate	High-----	High.
CaB, CaC, CaD----- Calvin	C	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low------	Moderate.
CbB*, CbC*, CbD*: Calvin----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low------	Moderate.
Berks----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	Low------	High.

See footnotes 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				
CcC---------- Catoctin	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	High-----	Moderate.
Ch---------- Chavies	B	Rare--------	Very brief	Dec-Apr	>6.0	---	---	>60	---	Low------	Low------	Moderate.
CmB, CmD---------- Clymer	B	None--------	---	---	>6.0	---	---	>40	Hard	Moderate	Low------	High.
DuA, DuB, DuC----- Duffield	B	None--------	---	---	>6.0	---	---	>48	Soft	Moderate	Moderate	Moderate.
DxA, DxB---------- Duncannon	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Low------	Moderate.
Dy*. Dystrochrepts												
EdB, EdC, EdD, EdE---------- Edom	C	None--------	---	---	>6.0	---	---	>40	Soft	Moderate	High-----	Low.
EeB, EeC, EeD, EfB, EfD, EfF---- Elliber	A	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
EtB, EtC---------- Ernest	C	None--------	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	Moderate	Moderate	Moderate.
EvA, EvB---------- Evendale	C	None--------	---	---	0.5-1.5	Perched	Nov-Mar	>40	Soft	High-----	High-----	High.
GnB, GoB---------- Glenville	C	None--------	---	---	0.5-3.0	Perched	Nov-Apr	>48	Hard	High-----	High-----	Moderate.
HaA, HaB, HaC, HaD, HcB, HcC, HcD---------- Hagerstown	C	None--------	---	---	>6.0	---	---	>40	Hard	Moderate	Moderate	Low.
HdB*, HdD*, HdF*: Hagerstown-------	C	None--------	---	---	>6.0	---	---	>40	Hard	Moderate	Moderate	Low.
Rock outcrop.												
HeB, HeC, HeD, HfB, HfD, HfF---- Hazleton	B	None--------	---	---	>6.0	---	---	>40	Hard	Moderate	Low------	High.
HgB, HgC---------- Highfield	B	None--------	---	---	>6.0	---	---	>40	Hard	Moderate	Low------	Moderate.
HhB, HhD, HhF----- Highfield	B	None--------	---	---	>6.0	---	---	>40	Hard	Moderate	Low------	Moderate.

See footnotes 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				
HuA---------- Huntington	B	Occasional	Brief-----	Dec-May	4.0-6.0	Apparent	Dec-Apr	>60	---	High-----	Low------	Moderate.
KnB, KnC, KnD----- Klinesville	C/D	None--------	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate	High.
KrA, KrB, KrC----- Kreamer	C	None--------	---	---	1.5-3.0	Perched	Nov-Mar	>60	---	High-----	High-----	Moderate.
LdB, LdC, LgB, LgD---------- Laidig	C	None--------	---	---	2.5-4.0	Perched	Jan-Mar	>60	---	Moderate	Moderate	High.
LpB, LpD---------- Lehew	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	Low------	High.
Ls---------- Lindside	C	Occasional	Very brief	Dec-May	1.5-3.0	Apparent	Dec-Apr	>60	---	High-----	Moderate	Low.
McB, MdB, MdD----- Meckesville	C	None--------	---	---	2.5-4.0	Perched	Nov-Apr	>60	---	Moderate	Moderate	High.
Me---------- Melvin	D	Occasional	Brief-----	Dec-May	0-1.0	Apparent	Dec-May	>60	---	High-----	High-----	Low.
Mf*---------- Middlebury	B	Frequent----	Brief-----	Nov-May	0.5-3.0	Apparent	Feb-Apr	>60	---	High-----	Moderate	Low.
MnA, MnB, MnC----- Monongahela	C	None--------	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	Moderate	High-----	High.
MoB, MoC, MoD----- Morrison	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
MuA, MuB, MuC----- Murrill	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
NeB, NeC, NhB, NhD---------- Neshaminy	B	None--------	---	---	>6.0	---	---	>48	Hard	Moderate	Moderate	Moderate.
Pe---------- Penlaw	C	None--------	---	---	0.5-1.5	Perched	Nov-Mar	>40	Hard	High-----	High-----	Moderate.
Pt*. Pits and quarries												
Pu**---------- Purdy	D	None--------	---	---	+1-1.0	Apparent						
RaA---------- Rartian	C	Rare--------	Very brief	Dec-Apr	0.5-3.0	Perched	Nov-Mar	>60	---	High-----	High-----	Moderate.

See footnotes 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				
Tg*---------- Tioga	B	Occasional	Very brief	Nov-May	3.0-6.0	Apparent	Feb-Apr	>60	---	Moderate	Low------	Moderate.
Ty---------- Tyler	D	None--------	---	---	0.5-2.0	Perched	Nov-May	>60	---	High-----	High-----	High.
Ub*: Urban land. Udorthents.												
Wa---------- Warners	D	Frequent----	Long------	Nov-Jun	0-0.5	Apparent	Nov-Jun	>60	---	High-----	High-----	Low.
WeB, WeC, WeD----- Weikert	C/D	None--------	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate	Moderate.
WkF*: Weikert----------	C/D	None--------	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate	Moderate.
Klinesville------	C/D	None--------	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate	High.

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

** In the "High water table--Depth" column, a plus sign preceding the range in depth indicates that the water table is above the surface. The second numeral indicates the depth below the surface.

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
Andover	Fine-loamy, mixed, mesic Typic Fragiaquults
Athol	Fine-loamy, mixed, mesic Ultic Hapludalfs
Atkins	Fine-loamy, mixed, acid, mesic Typic Fluvaquents
Barbour	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Fluventic Dystrochrepts
Basher	Coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts
Bedington	Fine-loamy, mixed, mesic Typic Hapludults
Berks	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Birdsboro	Fine-loamy, mixed, mesic Typic Hapludults
*Blairton	Fine-loamy, mixed, mesic Aquic Hapludults
Brinkerton	Fine-silty, mixed, mesic Typic Fragiaqualfs
Buchanan	Fine-loamy, mixed, mesic Aquic Fragiudults
Calvin	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Catoctin	Loamy-skeletal, mixed, mesic Ruptic-Alfic Dystrochrepts
Chavies	Coarse-loamy, mixed, mesic Ultic Hapludalfs
Clymer	Fine-loamy, mixed, mesic Typic Hapludults
Duffield	Fine-loamy, mixed, mesic Ultic Hapludalfs
Duncannon	Coarse-silty, mixed, mesic Ultic Hapludalfs
Dystrochrepts	Dystrochrepts
Edom	Fine, illitic, mesic Typic Hapludalfs
Elliber	Loamy-skeletal, mixed, mesic Typic Hapludults
Ernest	Fine-loamy, mixed, mesic Aquic Fragiudults
Evendale	Clayey, mixed, mesic Aeric Ochraquults
*Glenville	Fine-loamy, mixed, mesic Aquic Fragiudults
Hagerstown	Fine, mixed, mesic Typic Hapludalfs
Hazleton	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Highfield	Coarse-loamy, mixed, mesic Ultic Hapludalfs
Huntington	Fine-silty, mixed, mesic Fluventic Hapludolls
Klinesville	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Kreamer	Clayey, illitic, mesic Aquic Hapludults
Laidig	Fine-loamy, mixed, mesic Typic Fragiudults
Lehew	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Lindside	Fine-silty, mixed, mesic Fluvaquentic Eutrochrepts
Meckesville	Fine-loamy, mixed, mesic Typic Fragiudults
Melvin	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Middlebury	Coarse-loamy, mixed, mesic Fluvaquentic Eutrochrepts
Monongahela	Fine-loamy, mixed, mesic Typic Fragiudults
Morrison	Fine-loamy, mixed, mesic Ultic Hapludalfs
Murrill	Fine-loamy, mixed, mesic Typic Hapludults
Neshaminy	Fine-loamy, mixed, mesic Ultic Hapludalfs
Penlaw	Fine-silty, mixed, mesic Aquic Fragiudalfs
Purdy	Clayey, mixed, mesic Typic Ochraquults
Raritan	Fine-loamy, mixed, mesic Aquic Fragiudults
Tioga	Coarse-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
Tyler	Fine-silty, mixed, mesic Aeric Fragiaquults
Udorthents	Udorthents
Warners	Fine-silty, carbonatic, mesic Fluvaquentic Haplaquolls
Weikert	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts

* The soil is a taxadjunct to the series. See text for description of those characteristics of the soil that are outside the range of the series.

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