United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Kentucky Natural
Resources and
Environmental Protection
Cabinet and Kentucky
Agricultural Experiment
Station

Soil Survey of Clinton County, Kentucky

How To Use This Soil Survey

General Soil Map

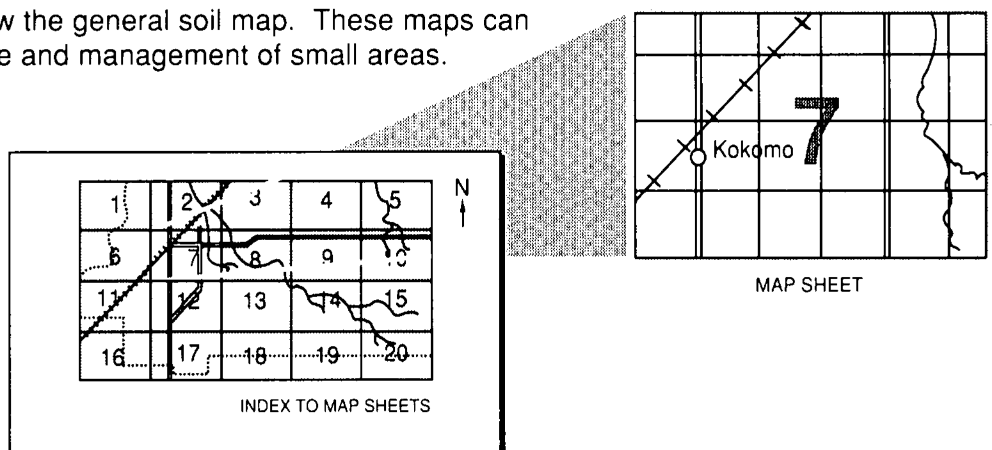
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

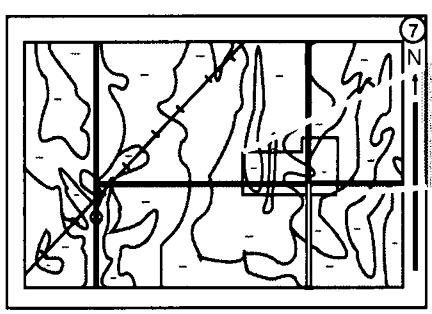
Detailed Soil Maps

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

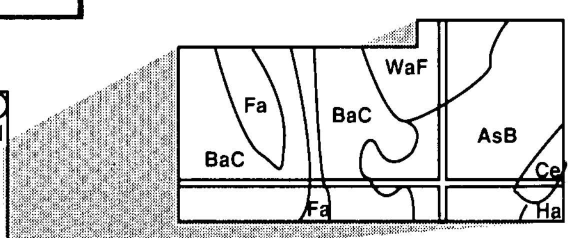
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

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.

Major fieldwork for this soil survey was completed in 1989. Soil names and descriptions were approved in 1990. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1990. This soil survey was made cooperatively by the Kentucky Natural Resources and Environmental Protection Cabinet, the Soil Conservation Service, and the Kentucky Agricultural Experiment Station. It is part of the technical assistance furnished to the Clinton County Conservation District. The Kentucky Natural Resources and Environmental Protection Cabinet, Division of Conservation, provided leadership for the survey. The Clinton County Fiscal Court provided office space for the survey party.

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.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: Cattle grazing in an area of Caneyville-Dewey complex, rocky, 6 to 20 percent slopes. This map unit is used as permanent pasture.

Contents

Index to map units iv
Summary of tables v
Foreword vii
General nature of the county 1
How this survey was made 2
Map unit composition 5
General soil map units 7
Detailed soil map units 13
Prime farmland 35
Use and management of the soils 37
Crops and pasture 37
Woodland management and productivity 42
Recreation 44
Wildlife habitat 45
Engineering 47
Soil properties 53
Engineering index properties 53
Physical and chemical properties 54
Soil and water features 55
Physical and chemical analyses of selected soils 56
Engineering index test data 56
Classification of the soils 59
Soil series and their morphology 59
Allen series 59
Bethesda series 60
Caneyville series 61
Cutshin series 61
Dewey series 62
Elk series 62
Faywood series 63
Garmon series 63
Gilpin series 64
Grigsby series 64
Melvin series 65
Mountview series 65
Muse series 66
Newark series 67
Nolin series 67
Sequoia series 68
Shelocta series 68
Waynesboro series 69
Wernock series 70
Formation of the soils 71
Factors of soil formation 71
Processes of horizon differentiation 72
References 73
Glossary 75
Tables 83

Issued May 1994

Index to Map Units

AnB—Allen loam, 2 to 6 percent slopes 14
AnC2—Allen loam, 6 to 12 percent slopes, eroded 14
AnD2—Allen loam, 12 to 20 percent slopes, eroded 14
BeF—Bethesda channery silty clay loam, 12 to 60 percent slopes 15
CaC—Caneyville silt loam, 6 to 12 percent slopes............ 15
CcD3—Caneyville silty clay loam, rocky, 12 to 30 percent slopes, severely eroded 16
CdD—Caneyville-Dewey complex, rocky, 6 to 20 percent slopes 16
CgD—Caneyville-Garmon association, steep............ 17
DeC2—Dewey loam, 6 to 15 percent slopes, eroded 18
DeD2—Dewey loam, 15 to 25 percent slopes, eroded 18
EkB—Elk silt loam, 2 to 6 percent slopes............ 19
EkC—Elk silt loam, 6 to 12 percent slopes............ 21
FaE2—Faywood silty clay loam, 12 to 30 percent slopes, eroded 21
GcF—Garmon-Caneyville association, very steep 21
GpB—Gilpin loam, 2 to 6 percent slopes 22
GpC—Gilpin loam, 6 to 12 percent slopes 24
Gr—Grigsby fine sandy loam, protected 25
Me—Melvin silt loam, ponded 25
MoB—Mountview silt loam, 2 to 6 percent slopes............ 27
Ne—Newark silt loam, frequently flooded............ 27
No—Nolin silt loam, frequently flooded 29
Pt—Pits, quarries 29
RoF—Rock outcrop-Caneyville complex, 20 to 50 percent slopes 29
SeD—Sequoia-Wernock silt loams, 6 to 20 percent slopes 31
SmF—Shelocta-Muse-Cutshin complex, 20 to 60 percent slopes 32
SsF—Shelocta-Sequoia-Muse silt loams, 20 to 60 percent slopes 33
WaC—Waynesboro loam, 6 to 12 percent slopes............ 33
WaD—Waynesboro loam, 12 to 20 percent slopes............ 34

Summary of Tables

Temperature and precipitation (table 1) 84

Freeze dates in spring and fall (table 2) 85

Growing season (table 3) 85

Acreage and proportionate extent of the soils (table 4) 86

Land capability and yields per acre of crops and pasture (table 5) 87

Capability classes and subclasses (table 6) 89

Woodland management and productivity (table 7) 90

Recreational development (table 8) 96

Wildlife habitat (table 9) 99

Building site development (table 10) 101

Sanitary facilities (table 11) 104

Construction materials (table 12) 107

Water management (table 13) 110

Engineering index properties (table 14) 113

Physical and chemical properties of the soils (table 15) 118

Soil and water features (table 16) 121

Physical analysis of selected soils (table 17) 123

Chemical analysis of selected soils (table 18) 124

Engineering index test data (table 19) 125

Classification of the soils (table 20) 126

Foreword

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

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

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

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

Billy W. Milliken
State Conservationist
Soil Conservation Service

Stanley Head
Director
Kentucky Natural Resources and Environmental Protection Cabinet

Soil Survey of Clinton County, Kentucky

By Gerald A. Richardson and James P. Fehr, Kentucky Natural Resources and Environmental Protection Cabinet

Fieldwork by Gerald A. Richardson, James P. Fehr, and Thomas C. Fristoe, Kentucky Natural Resources and Environmental Protection Cabinet, and Richard L. Livingston, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with Kentucky Natural Resources and Environmental Protection Cabinet and Kentucky Agricultural Experiment Station

Clinton County is in the south-central part of Kentucky (fig. 1). It has a population of 9,321. Albany, the county seat, has a population of 2,083 *(21)*. The county has a land area of 125,568 acres, or approximately 196 square miles. Lake Cumberland and Dale Hollow Lake are in the county. They have a water area of 6,048 acres *(20)*.

The survey area is in the Highland Rim and Pennyroyal major land resource area and the Cumberland Plateau and Mountains major land resource area *(4)*. The northwestern part of the county along the Cumberland River is nearly level to hilly. The soils are well drained to poorly drained. The northern part of the county along Lake Cumberland and the southwestern part of the county along Dale Hollow Lake are characterized by steep side slopes and rolling ridgetops. The soils in these areas are moderately deep or deep and are well drained. In the southeastern part of the county, and protruding into the central part, are steep or very steep mountain side slopes, benches, and narrow ridgetops. The soils in these areas are shallow to deep and are well drained. The rest of the county is undulating to hilly and has mostly karst topography. Most of the soils in these areas are well drained and have a red, clayey subsoil.

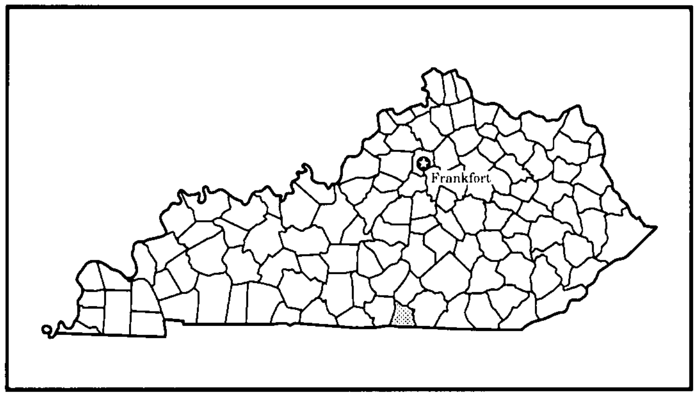


Figure 1.—Location of Clinton County in Kentucky.

General Nature of the County

This section provides general information about Clinton County. It briefly describes climate, history and development, relief and drainage, and farming.

Climate

In Clinton County, summers are hot in the valleys and slightly cooler in the hills. Winters are moderately cold. Rainfall is fairly heavy and is well distributed throughout the year. Snow falls nearly every winter, but the snow cover usually lasts only a few days.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Summer Shade, Kentucky, in the period 1951 to 1988. 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 about 37 degrees F and the average daily minimum temperature is 27 degrees. The lowest temperature on record, which occurred at Summer Shade on January 23, 1963, is -28 degrees. In summer, the average temperature is 75 degrees and the average daily maximum temperature is 87 degrees. The highest recorded temperature, which occurred at Summer Shade on July 28, 1952, 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 (50 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 about 51 inches. Of this, about 26 inches, or 51 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 21 inches. The heaviest 1-day rainfall during the period of record was 6.45 inches at Summer Shade on September 9, 1970. Thunderstorms occur on about 45 days each year.

The average seasonal snowfall is about 13 inches. The greatest snow depth at any one time during the period of record was 13 inches. On an average of 10 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and 45 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 10 miles per hour, in spring.

History and Development

Clinton County was formed in 1836 from territory taken from Cumberland and Wayne Counties. It was named in honor of De Witt Clinton, a former governor of New York. Albany, the county seat, was incorporated in 1836.

During the early development of Clinton County, farming was the primary source of income. It is still a major source of income, but other industries have been established in the county in recent years. Tourism has been important since the completion of Dale Hollow Lake in 1944 and Lake Cumberland in 1950.

Transportation facilities include Kentucky Highway 90, which runs east and west, and U.S. Highway 127, which runs north and south. A network of state and county highways links nearly all parts of the county. The Clinton County airport has a paved runway and facilities for light and medium aircraft.

Lake Cumberland, which extends across the northern boundary of the county, and Dale Hollow Lake, which extends across the southern boundary, provide many recreational facilities (fig. 2). These facilities include Grider Hill Dock, Wolf River Dock, and Dale Hollow Lake State Park. The park provides cabins and camping facilities. Boat-launching ramps are numerous.

Relief and Drainage

Clinton County ranges from nearly level to very steep. Elevation ranges from about 540 feet to 1,780 feet above sea level. The lowest point is where the Cumberland River crosses into Cumberland County, south of Wells Bottom. The highest point is about 6.5 miles southeast of Albany, near the Wayne County line, east of the community of Beech Bottom.

Most of the surface drainage in the northern part of the county flows into Lake Cumberland and the Cumberland River through Indian and Willis Creeks. Most of the drainage in the southern part flows into Dale Hollow Lake through Spring, Sulphur, and Illwill Creeks.

Farming

Farming in Clinton County is diversified (fig. 3). There are about 848 farms in the county averaging about 103 acres each *(22)*. Tobacco, corn, soybeans, pasture, and hay are the main crops. Tobacco is the main cash crop. In recent years vegetable crops, such as tomatoes, peppers, cabbage, and sweet corn, have become important. Most of the forage and grain crops are used locally as livestock feed. Dairy cattle, beef cattle, and hogs are the principal livestock.

Timber production is an additional source of farm income in the county. About 51,600 acres is used as woodland, most of which is privately owned *(18)*.

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 from which the

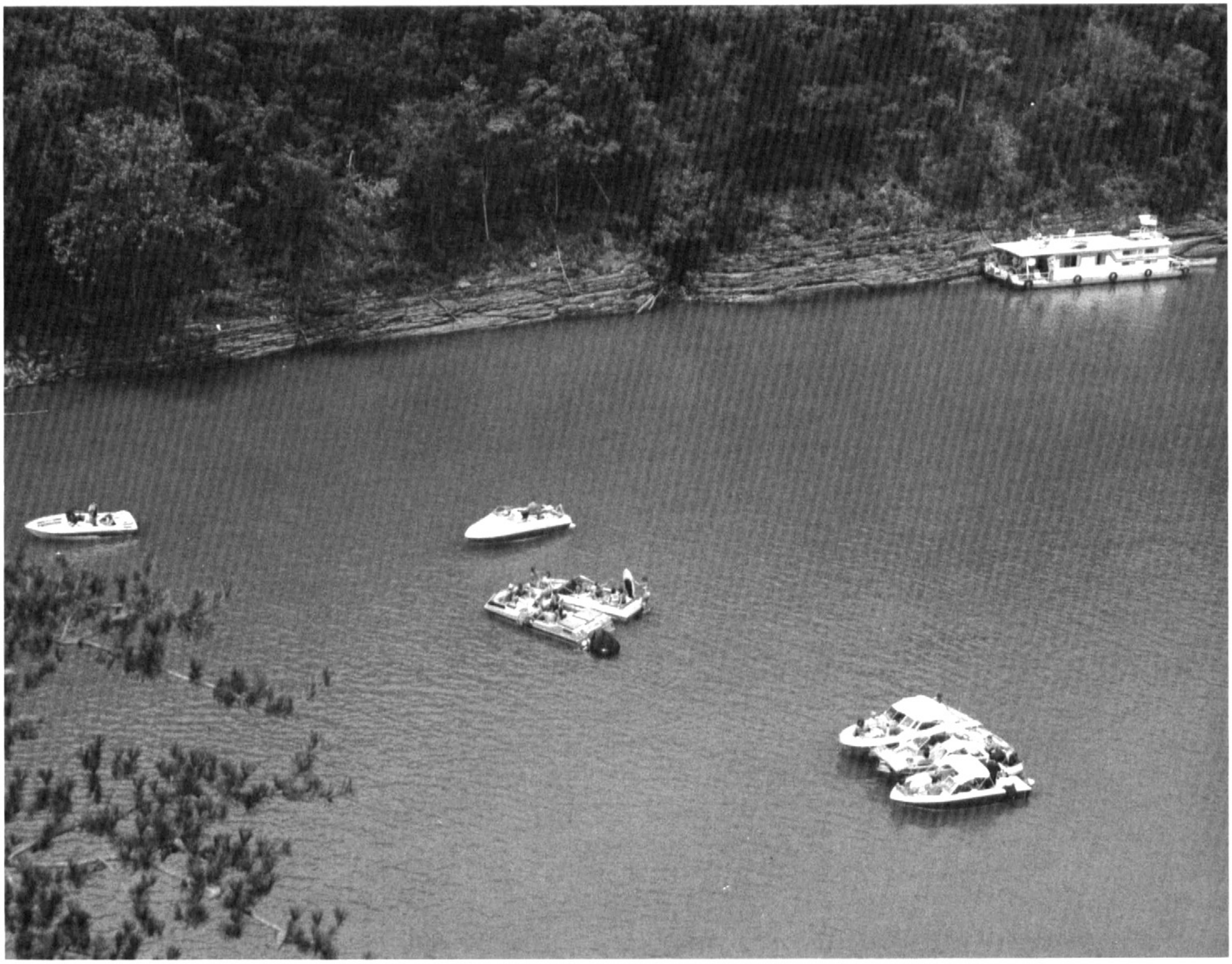


Figure 2.—Boating on Lake Cumberland below 76 Falls.

soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and 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 a considerable degree of 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, reaction, and

Figure 3.—A farmstead in an area of Mountview silt loam, 2 to 6 percent slopes. Farming is a major source of income for most residents of Clinton County.

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 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 are generally collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations sometimes are developed to meet local needs. Data are 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 are 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 predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot 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 two or three 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 including 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 some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

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 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, it 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 another but in a different pattern.

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

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

1. Waynesboro-Nolin-Grigsby

Very deep, nearly level to moderately steep, well drained soils that have a loamy subsoil; formed in mixed alluvium

This map unit consists of soils on long, narrow flood plains and adjacent terraces along the Cumberland River (fig. 4). Slopes range from 0 to 20 percent. The area is drained by many short streams that empty directly into the Cumberland River.

This unit makes up about 1 percent of the county. It is about 30 percent Waynesboro soils, 20 percent Nolin soils, 20 percent Grigsby soils, and 30 percent soils of minor extent.

Waynesboro soils are on high terraces. Slopes range from 6 to 20 percent. These soils formed in old alluvium underlain by material weathered from sandstone, shale, and limestone. Typically, the surface layer is brown loam about 9 inches thick. The subsoil extends to a depth of 78 inches or more. The upper part, to a depth of about 12 inches, is yellowish brown loam. The next part, to a depth of about 18 inches, is yellowish red clay loam. The lower part is red and dark red sandy clay.

Nolin soils are on flood plains. Slopes range from 0 to 2 percent. These soils formed in mixed alluvium. Typically, the surface layer is brown silt loam about 10 inches thick. The subsoil extends to a depth of about 44 inches. The upper part, to a depth of about 16 inches, is brown silt loam. The next part, to a depth of about 29 inches, is dark yellowish brown silt loam. The lower part is yellowish brown loam. The underlying material to a depth of 62 inches or more is yellowish brown gravelly loam.

Grigsby soils are on flood plains. Slopes range from 0 to 4 percent. These soils formed in mixed alluvium. Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The subsoil extends to a depth of about 40 inches. The upper part, to a depth of about 18 inches, is brown fine sandy loam. The lower part is dark yellowish brown fine sandy loam. The underlying material to a depth of 62 inches or more is dark yellowish brown sandy loam.

Of minor extent in this unit are Elk, Melvin, and Newark soils. Elk soils are on stream terraces. Melvin and Newark soils are on flood plains.

Most of the acreage in this unit is used for row crops. A few areas support grasses and legumes. The areas that are on flood plains are protected from flooding by Wolf Creek Dam.

The nearly level and gently sloping soils are well suited to cultivated crops. They also are well suited to specialty crops, such as vegetables. The more sloping areas are suited to hay, pasture, and woodland. The slope and the hazard of erosion are management concerns on the gently sloping to moderately steep soils. Flooding and wetness are management concerns in nearly level areas and in low areas.

The soils in this map unit are well suited to woodland, and productivity is high or very high. Native tree species include yellow-poplar, pin oak, white oak, southern red oak, sweetgum, and cherrybark oak. The hazard of erosion, the equipment limitation, seedling mortality, and plant competition are management concerns.

The soils in this map unit have varying suitability for urban uses. The soils in the low areas are generally poorly suited to most urban uses because of flooding, wetness, and low strength. The soils in the higher

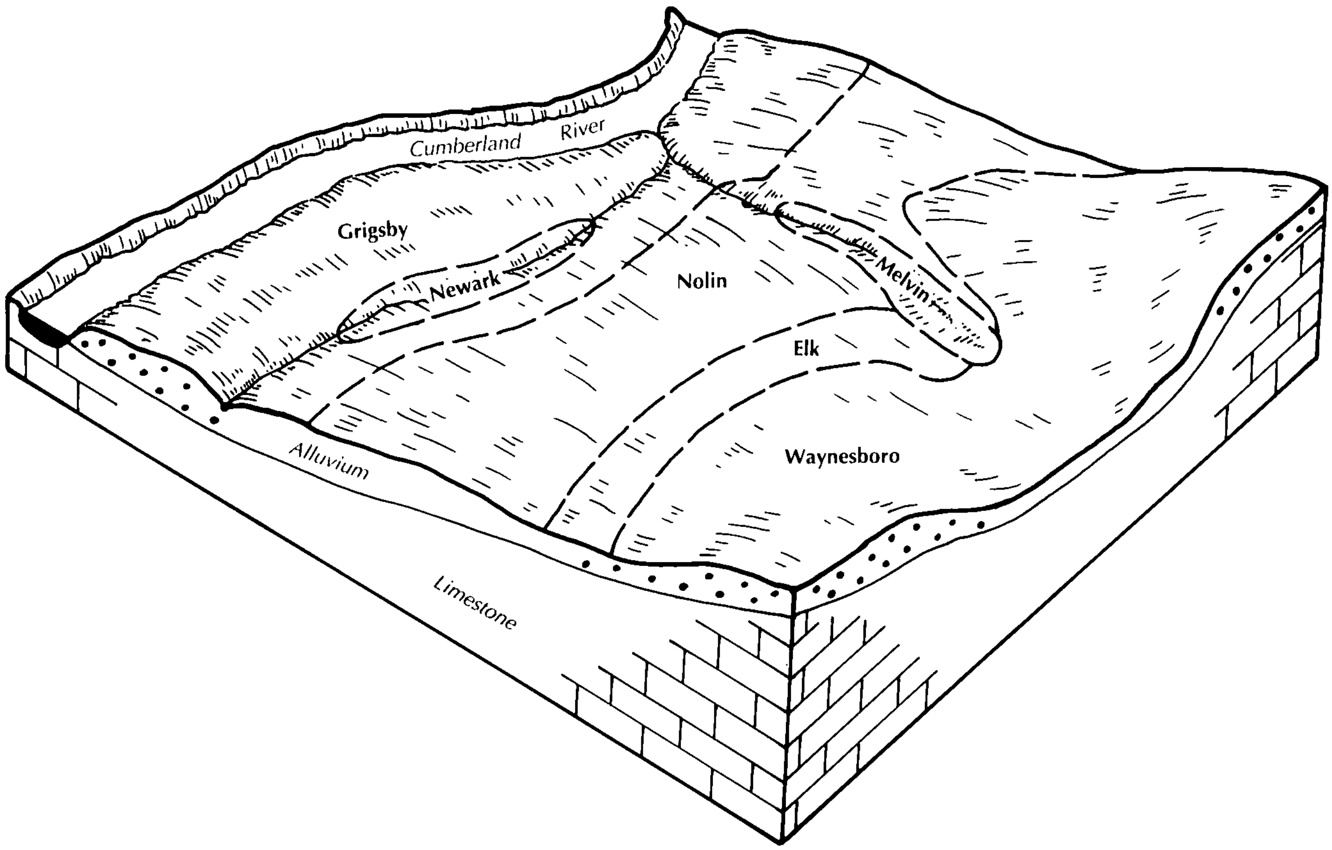


Figure 4.—Pattern of soils and parent material in the Waynesboro-Nolin-Grigsby general soil map unit.

landscape positions are suited to some urban uses, but the slope, a high content of clay, slow permeability, and the shrink-swell potential are limitations.

2. Garmon-Caneyville-Dewey

Moderately deep and very deep, sloping to very steep, well drained soils that have a loamy or clayey subsoil; formed in material weathered from limestone, siltstone, and shale

This map unit consists of soils on very steep side slopes and narrow, winding ridgetops surrounding Cumberland Lake and Dale Hollow Lake. The side slopes are highly dissected by small streams (fig. 5). Numerous drainageways and intermittent streams join to form small creeks and perennial streams that flow through the narrow valleys. Slopes range from 6 to 75 percent.

This unit makes up about 31 percent of the county. It is about 35 percent Garmon soils, 30 percent Caneyville soils, 15 percent Dewey soils, and 20 percent soils of minor extent.

Garmon soils are moderately deep. They are in saddles of ridgetops and on side slopes. Slopes range from 12 to 70 percent. These soils formed in material weathered from shaly limestone, calcareous shale, and siltstone. Typically, the surface layer is dark grayish brown silt loam about 2 inches thick. The upper part of the subsoil, to a depth of about 13 inches, is yellowish brown silt loam. The lower part is yellowish brown channery silt loam about 12 inches thick. Shaly limestone bedrock is at a depth of about 25 inches.

Caneyville soils are moderately deep. They are on ridgetops and the upper side slopes. Slopes range from 12 to 70 percent. These soils formed in material weathered from limestone. Typically, the surface layer is dark yellowish brown silt loam about 6 inches thick. The upper part of the subsoil, to a depth of about 12 inches, is yellowish red silty clay loam. The next part, to a depth of about 18 inches, is red silty clay. The lower part is red clay about 11 inches thick. Limestone bedrock is at a depth of about 29 inches.

Dewey soils are very deep. They are on ridgetops and the upper side slopes. Slopes range from 6 to 25

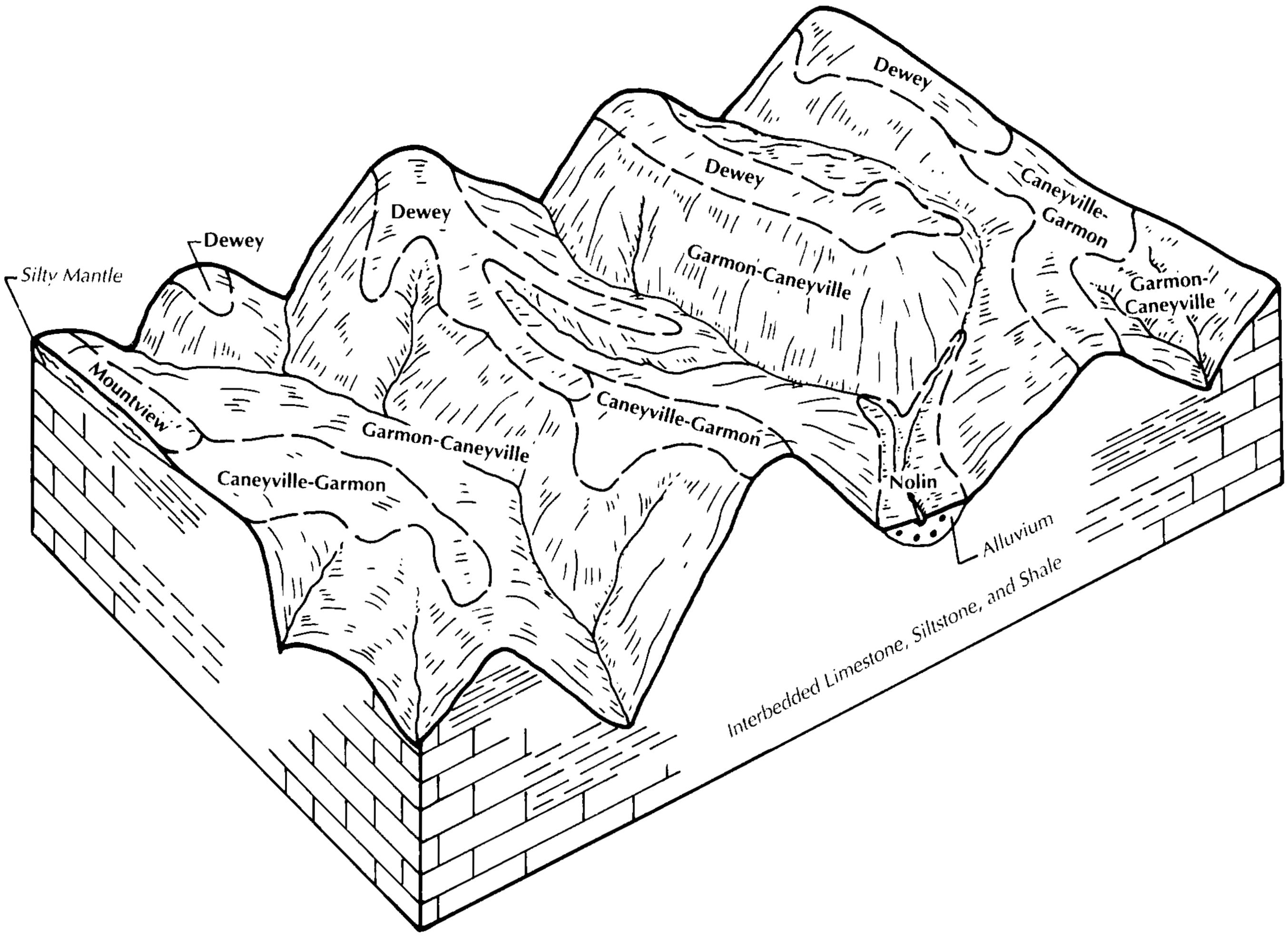


Figure 5.—Pattern of soils and parent material in the Garmon-Caneyville-Dewey general soil map unit.

percent. These soils formed in material weathered from limestone or in old alluvium underlain by material weathered from limestone. Typically, the surface layer is brown loam about 7 inches thick. The subsoil extends to a depth of 70 inches or more. The upper part, to a depth of about 24 inches, is yellowish red clay. The lower part is red clay.

Of minor extent in this unit are Nolin, Newark, Faywood, Gilpin, and Mountview soils. Nolin and Newark soils are on narrow flood plains. Faywood soils are at the base of steep side slopes. Gilpin and Mountview soils are on long, narrow ridgetops.

Most of the acreage in this unit is farmland. The less sloping areas are used for tobacco, corn, hay, or pasture. The steeper areas are predominantly used as woodland. Some of the less sloping areas near Cumberland Lake and Dale Hollow Lake are used for residential development. The steep areas bordering the lakes are state owned and federally owned. They are used primarily for recreation or as wildlife habitat.

The gently sloping soils on the ridgetops are well suited to cultivated crops. They also are well suited to specialty crops, such as vegetables. The more sloping areas are suited to hay, pasture, and woodland. The slope and the hazard of erosion are the main management concerns.

The soils in this map unit are well suited to woodland, and productivity is medium to very high. Native tree species include yellow-poplar, black oak, white oak, northern red oak, ash, eastern redcedar, black walnut, and hickory. The hazard of erosion, the equipment limitation, seedling mortality, and plant competition are management concerns.

The soils in this map unit have varying suitability for urban uses. The soils on the steep side slopes are poorly suited to most urban uses because of the slope

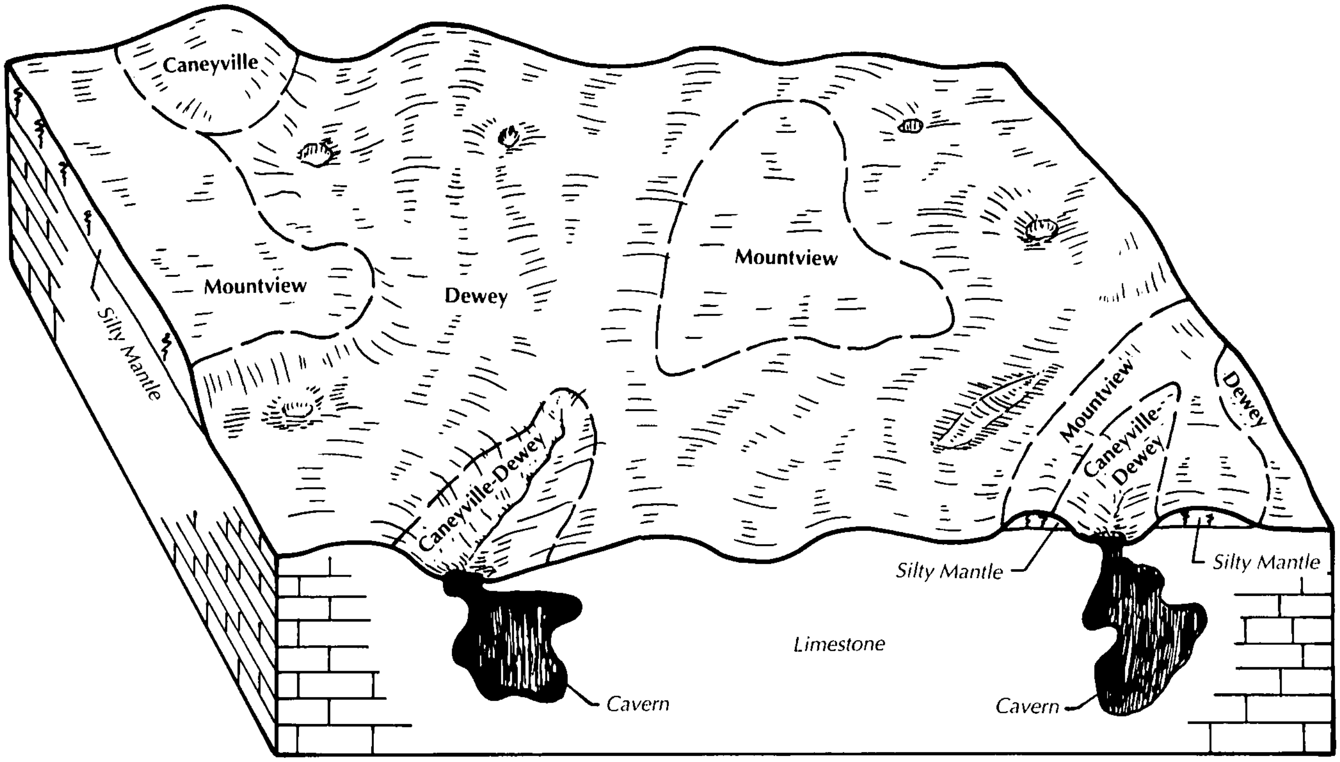


Figure 6.—Pattern of soils and parent material in the Dewey-Mountview general soil map unit.

and the depth to bedrock. The soils on ridgetops are suited to some urban uses, but the slope, the depth to bedrock, a high content of clay, slow permeability, and the shrink-swell potential are limitations.

3. Dewey-Mountview

Very deep, gently sloping to steep, well drained soils that have a clayey or loamy and clayey subsoil; formed in old alluvium underlain by material weathered from limestone and limestone residuum capped by loess

This map unit consists of soils on ridgetops and side slopes with karst topography (fig. 6). It is in the central and south-central part of the county. The ridgetops are long and narrow, and the side slopes are short and highly dissected. Slopes range from 2 to 25 percent. The unit has many intermittent streams that drain into limestone sinks.

This unit makes up about 54 percent of the county. It is about 50 percent Dewey soils, 10 percent Mountview soils, and 40 percent soils of minor extent.

Dewey soils are on ridgetops and the upper side slopes. Slopes range from 6 to 25 percent. These soils formed in material weathered from limestone or in old alluvium underlain by material weathered from limestone. Typically, the surface layer is brown loam about 7 inches thick. The subsoil extends to a depth of 70 inches or more. The upper part, to a depth of about 24 inches, is yellowish red clay. The lower part is red clay.

Mountview soils are on ridgetops. Slopes range from 2 to 6 percent. These soils formed in material weathered from cherty or clayey limestone capped by a mantle of silt 2 to 3 feet thick. Typically, the surface layer is brown silt loam about 9 inches thick. The subsoil extends to a depth of 75 inches or more. The upper part, to a depth of about 24 inches, is yellowish brown and strong brown silt loam. The next part, to a depth of about 60 inches, is yellowish red and red silty clay loam. The lower part is red clay.

Of minor extent in this unit are Allen, Caneyville, Nolin, Melvin, and Newark soils. Allen soils are on colluvial fans. Caneyville soils are on sloping to steep side slopes. Nolin soils are on narrow flood plains. Melvin and Newark soils are in upland depressions.

Most of the acreage in this unit is used for row crops, hay, pasture, or woodland. Most of the roads and the residential and commercial development in the county are in this unit.

The gently sloping or sloping soils are well suited to

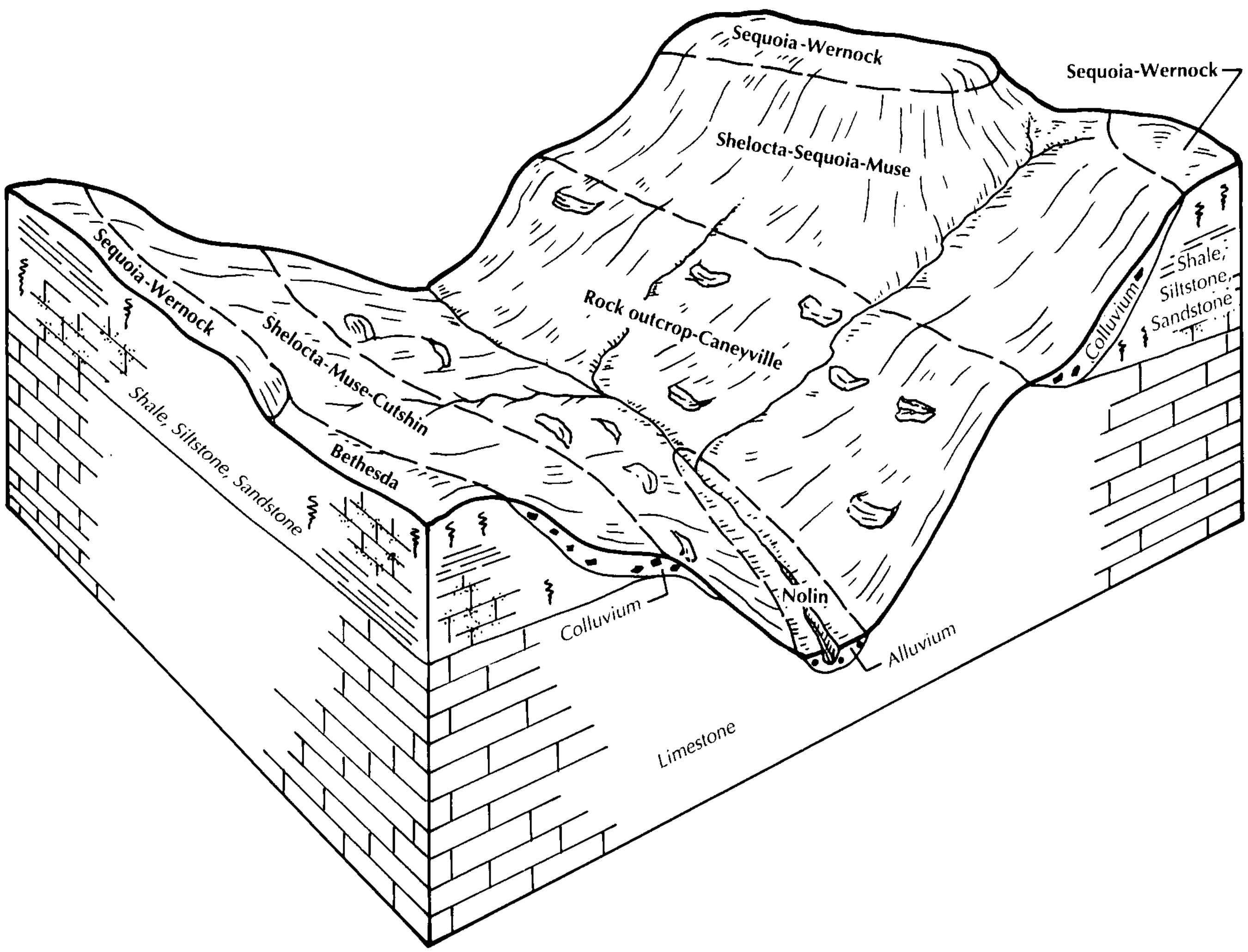


Figure 7.—Pattern of soils and parent material in the Rock Outcrop-Caneyville-Sequoia-Shelocta general soil map unit.

cultivated crops. They also are well suited to specialty crops, such as vegetables. The more sloping areas are suited to hay, pasture, and woodland. The main management concerns affecting farming are the slope, the hazard of erosion, and wetness in the low areas.

The soils in this map unit are well suited to woodland, and productivity is high. Native tree species include yellow-poplar, white oak, northern red oak, black walnut, and Virginia pine. The hazard of erosion, the equipment limitation, and plant competition are management concerns.

The soils in this map unit have varying suitability for urban uses. They are generally suited to most urban uses. The main limitations are low strength, a high content of clay, and the shrink-swell potential. Soils on the side slopes are suited to some urban uses, but the slope, the high content of clay, slow permeability, and the shrink-swell potential are limitations.

4. Rock Outcrop-Caneyville-Sequoia-Shelocta

Areas of Rock outcrop and moderately deep to very deep, sloping to very steep, well drained soils that have a loamy or clayey subsoil; formed in material weathered from limestone, siltstone, and shale or colluvium from sandstone and shale

This map unit consists of soils on steep mountain side slopes, on long, narrow ridgetops, and in coves (fig. 7). It is in the eastern part of the county. The side slopes are a series of short, steep slopes and benches. Slopes range from 6 to 60 percent. The unit is highly dissected by small intermittent streams.

This unit makes up about 14 percent of the county. It is about 25 percent Rock outcrop, 20 percent Caneyville soils, 13 percent Sequoia soils, 12 percent Shelocta soils, and 30 percent soils of minor extent.

Rock outcrop covers most of the lower half of the mountain side slopes. It is mostly in scattered areas but also occurs as continuous ledges.

Caneyville soils are moderately deep. They are on the lower half of the mountain side slopes. Slopes range from 20 to 50 percent. These soils formed in material weathered from limestone. Typically, the surface layer is dark yellowish brown silt loam about 6 inches thick. The upper part of the subsoil, to a depth of about 12 inches, is yellowish red silty clay loam. The next part, to a depth of about 18 inches, is red silty clay. The lower part is red clay about 11 inches thick. Limestone bedrock is at a depth of about 29 inches.

Sequoia soils are moderately deep. They are on ridgetops and side slopes. Slopes range from 6 to 60 percent. These soils formed in material weathered from acid shale and siltstone. Typically, the surface layer is yellowish brown silt loam about 6 inches thick. The subsoil extends to a depth of about 35 inches. The upper part, to a depth of about 10 inches, is strong brown silt loam. The next part, to a depth of about 28 inches, is yellowish red silty clay. The lower part is variegated pale brown, light gray, and red clay. The underlying material to a depth of 60 inches or more is soft, red and gray clay shale.

Shelocta soils are deep and very deep. They are on side slopes. Slopes range from 20 to 60 percent. These soils formed in mixed colluvium from acid shale, siltstone, and sandstone. Typically, the surface layer is dark grayish brown silt loam about 10 inches thick. The subsoil extends to a depth of about 50 inches. The upper part, to a depth of about 22 inches, is yellowish brown silt loam. The lower part is strong brown silty clay loam. The underlying material to a depth of 60 inches or more is brown silty clay loam.

Of minor extent in this unit are Cutshin, Muse, Allen, Bethesda, Wernock, and Nolin soils. Cutshin soils are in coves. Muse soils are on side slopes. Allen and Nolin soils are in narrow stream valleys. Bethesda soils are on ridgetops and side slopes in strip-mined areas near the tops of mountains. Wernock soils are on ridgetops and the upper side slopes.

Most of the acreage in this unit is used as woodland. Some areas are used for row crops, hay, or pasture. Some areas near the tops of the mountains have been mined for coal.

The soils in this map unit are generally not suited to cultivated crops because of the slope and the depth to bedrock. The soils in the less sloping areas are suited to hay and pasture. The main management concerns affecting farming are the slope and the hazard of erosion.

The soils in this map unit are well suited to woodland, and productivity is medium to very high. Native tree species include yellow-poplar, pin oak, white oak, southern red oak, sweetgum, and cherrybark oak. The hazard of erosion, the equipment limitation, seedling mortality, and plant competition are management concerns.

The soils in this map unit are generally not suited to urban uses because of the slope and the depth to bedrock. The soils in the less sloping areas are suited to some urban uses, but the slope, low strength, a high content of clay, slow permeability, and the shrink-swell potential are limitations.

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 the heading "Use and Management of the Soils."

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

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

In these descriptions the suitability of the soils for various uses is described. *Well suited* indicates that the soils have favorable properties for the specified use and that limitations are easy to overcome. Good performance and low maintenance can be expected. *Moderately well suited* indicates that the soils have moderately favorable properties for the selected use. One or more properties make these soils less desirable than well suited soils. *Poorly suited* indicates that the soils have one or more properties unfavorable for the selected use. Overcoming the limitations requires special design, extra maintenance, or costly operation. *Generally not suited* indicates that the soils do not meet the expected performance for the selected use or that extreme measures are needed to overcome the undesirable features.

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, salinity, 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, Allen loam, 2 to 6 percent slopes, is a phase of the Allen series.

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

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. Sequoia-Wernock silt loams, 6 to 20 percent slopes, is an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Caneyville-Garmon association, steep, is an example.

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

This survey includes *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. Pits, 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.

AnB—Allen loam, 2 to 6 percent slopes. This very deep, well drained, gently sloping soil is on ridgetops and toe slopes in the eastern and southeastern part of the county. Individual areas are about 5 to 10 acres in size.

Typically, the surface layer is dark brown loam about 7 inches thick. The subsoil is clay loam. The upper part, to a depth of about 23 inches, is yellowish red. The lower part to a depth of 72 inches or more is red.

The content of organic matter is moderate. Permeability also is moderate, and the available water capacity is high. Runoff is medium. Tilth is good. The root zone is very deep, and the depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Caneyville and Dewey soils. Included soils make up about 5 to 10 percent of the unit.

Most areas of the Allen soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is well suited to the row crops and small grain crops commonly grown in the county. The hazard of erosion is moderate if a conventional tillage method is used. If cultivated crops are grown, a combination of cropping systems and erosion-control measures is needed to control runoff and erosion. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

This soil is well suited to the hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland. Trees preferred for planting are yellow-poplar, black walnut, white oak, eastern white pine, shortleaf pine, and loblolly pine. Plant competition is a management concern. See table 7 for specific information relating to potential productivity.

This soil is well suited to most urban uses. The moderate permeability, the content of clay, and low strength are limitations. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is IIe.

AnC2—Allen loam, 6 to 12 percent slopes, eroded. This very deep, well drained, sloping soil is on ridgetops, side slopes, and toe slopes in the eastern and southeastern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Individual areas are about 5 to 50 acres in size.

Typically, the surface layer is dark yellowish brown loam about 7 inches thick. The subsoil is clay loam. The upper part, to a depth of about 23 inches, is yellowish red. The lower part to a depth of 72 inches or more is red.

The content of organic matter is low. Permeability is moderate, and the available water capacity is high. Runoff is medium. Tilth is good. The root zone is very deep, and the depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Caneyville and Dewey soils. Included soils make up about 5 to 10 percent of the unit.

Most areas of the Allen soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is well suited to the row crops and small grain crops commonly grown in the county. The hazard of erosion is severe if a conventional tillage method is used. If cultivated crops are grown, a combination of cropping systems and erosion-control measures is needed to control runoff and erosion. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

This soil is well suited to the hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland. Trees preferred for planting are yellow-poplar, black walnut, white oak, eastern white pine, shortleaf pine, and loblolly pine. Plant competition is a management concern. See table 7 for specific information relating to potential productivity.

This soil is moderately well suited to most urban uses. The slope, the moderate permeability, the high content of clay, and low strength are limitations. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is IIIe.

AnD2—Allen loam, 12 to 20 percent slopes, eroded. This very deep, well drained, moderately steep soil is on side slopes and toe slopes in the eastern and southeastern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Individual areas are about 5 to 50 acres in size.

Typically, the surface layer is dark yellowish brown loam about 7 inches thick. The subsoil is clay loam. The upper part, to a depth of about 23 inches, is yellowish red. The lower part to a depth of 72 inches or more is red.

The content of organic matter is low. Permeability is moderate, and the available water capacity is high. Runoff is medium or rapid. Tilth is good. The root zone is very deep, and the depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Caneyville and Dewey soils. Included areas make up about 5 to 10 percent of the unit.

Most areas of the Allen soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is moderately well suited to the row crops and small grain crops commonly grown in the county. The hazard of erosion is very severe if a conventional tillage method is used. If cultivated crops are grown, a combination of cropping systems and erosion-control measures is needed to control runoff and erosion. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

This soil is well suited to the hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland. Trees preferred for planting are yellow-poplar, black walnut, white oak, eastern white pine, shortleaf pine, and loblolly pine on cool aspects and shortleaf pine and loblolly pine on warm aspects. Plant competition, the hazard of erosion, and the equipment limitation are management concerns on cool aspects. Plant competition, the hazard of erosion, the equipment limitation, and seedling mortality are management concerns on warm aspects. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses because of the slope. Proper engineering techniques can help to overcome this limitation in some areas.

The capability subclass is IVe.

BeF—Bethesda channery silty clay loam, 12 to 60 percent slopes. This very deep, well drained, moderately steep to very steep soil is on ridgetops and side slopes near the tops of mountains in the eastern and southeastern part of the county. Individual areas are about 5 to 100 acres in size.

Typically, the surface layer is yellowish brown channery silty clay loam about 6 inches thick. The underlying material is very channery clay loam. It is mottled. The upper part, to a depth of about 27 inches, is strong brown. The lower part to a depth of 62 inches or more is yellowish brown.

The content of organic matter is low. Permeability is moderately slow, and the available water capacity is low. Runoff is very rapid. Tilth is poor. The root zone is very deep, and the depth to bedrock is more than 60 inches.

Included with this soil in mapping are a few highwalls, which are vertical walls of overburden in a coal mine or quarry, and a few small wet areas. Also included are small areas of Cutshin, Muse, Sequoia, Shelocta, and Wernock soils. Included areas make up about 10 to 15 percent of the unit.

Most areas of the Bethesda soil have been reseeded and support grasses and legumes. Stands of planted black locust and pines also are common. Some areas have revegetated naturally.

This soil is generally not suited to cultivated crops.

This soil is moderately well suited to most of the hay and pasture plants commonly grown in the county. Hay and pasture plants provide a quick and permanent protective cover. Because of the equipment limitation, grading is necessary before the plants are seeded. Applications of fertilizer and lime are needed. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland. Trees preferred for planting include eastern white pine, loblolly pine, white oak, and black locust. The hazard of erosion, the equipment limitation, plant competition, and seedling mortality are management concerns. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to all urban uses because of the hazard of slippage, the slope, and the moderately slow permeability. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is VIIe.

CaC—Caneyville silt loam, 6 to 12 percent slopes. This moderately deep, well drained, sloping soil is on side slopes and ridgetops throughout the county. Individual areas are about 5 to 50 acres in size.

Typically, the surface layer is dark yellowish brown silt loam about 6 inches thick. The upper part of the subsoil, to a depth of about 12 inches, is yellowish red silty clay loam. The next part, to a depth of about 18 inches, is red silty clay. The lower part is red clay about 11 inches thick. Limestone bedrock is at a depth of about 29 inches.

The content of organic matter is moderate. Permeability is moderately slow, and the available water capacity is moderate. The shrink-swell potential also is moderate. Runoff is medium or rapid. Tilth is fair. The root zone is moderately deep, and the depth to bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Allen and Dewey soils. Also included are small areas of a soil that is similar to the Caneyville soil but has bedrock at a depth of more than 40 inches. Included soils make up about 10 to 15 percent of the unit.

Most areas of the Caneyville soil are used for hay and pasture. A few areas are used for cultivated crops or are wooded.

This soil is moderately well suited to the row crops and small grain crops commonly grown in the county. The hazard of erosion is severe if a conventional tillage method is used. If cultivated crops are grown, a combination of cropping systems and erosion-control measures is needed to control runoff and erosion. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

This soil is well suited to the hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is moderately well suited to woodland. Trees preferred for planting include eastern white pine, white ash, yellow-poplar, and white oak. The equipment limitation, the hazard of erosion, and plant competition are management concerns. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses because of the depth to bedrock, the high content of clay, the moderate shrink-swell potential, and the moderately slow permeability. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is IIIe.

CcD3—Caneyville silty clay loam, rocky, 12 to 30 percent slopes, severely eroded. This moderately deep, well drained, moderately steep and steep soil is on side slopes and ridgetops throughout the county. Erosion has removed more than 75 percent of the original surface layer. Limestone outcrops cover about 5 to 10 percent of the surface. Individual areas of this unit are about 5 to 50 acres in size.

Typically, the surface layer is yellowish brown silty clay loam about 6 inches thick. The upper part of the subsoil, to a depth of about 12 inches, is yellowish red silty clay loam. The next part, to a depth of about 18 inches, is red silty clay. The lower part is red clay about 11 inches thick. Limestone bedrock is at a depth of about 29 inches.

The content of organic matter is low. Permeability is moderately slow, and the available water capacity is moderate. The shrink-swell potential also is moderate. Runoff is rapid. Tilth is poor. The root zone is moderately deep, and the depth to bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Allen and Dewey soils. Also included are small areas of a soil that is similar to the Caneyville soil but has bedrock at a depth of more than 40 inches. Included soils make up about 10 to 15 percent of the unit.

Most areas of the Caneyville soil are used for hay and pasture. A few areas are used for cultivated crops or are wooded.

This soil is generally not suited to cultivated crops because of the slope, the depth to bedrock, and the rock outcrop.

This soil is poorly suited to the hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is moderately well suited to woodland. Trees preferred for planting are Virginia pine, eastern redcedar, and white oak. The hazard of erosion, the equipment limitation, seedling mortality, and plant competition are management concerns. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to all urban uses because of the depth to bedrock, the moderately slow permeability, the slope, and the high content of clay. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is VIIe.

CdD—Caneyville-Dewey complex, rocky, 6 to 20 percent slopes. These moderately deep and very deep, well drained, sloping and moderately steep soils are on ridgetops and side slopes throughout the county. They occur as areas so intermingled that they could not be separated at the scale used in mapping. Mapped areas are 10 to 250 acres in size. Individual areas of each soil are 2 to 5 acres in size.

The Caneyville soil makes up about 50 percent of the unit and the Dewey soil about 35 percent. Limestone outcrop makes up about 3 percent, and included soils make up the rest.

Typically, the surface layer of the Caneyville soil is dark yellowish brown silt loam about 6 inches thick. The upper part of the subsoil, to a depth of about 12 inches, is yellowish red silty clay loam. The next part, to a depth of about 18 inches, is red silty clay. The lower part is red clay about 11 inches thick. Limestone bedrock is at a depth of about 29 inches.

The content of organic matter is moderate in the Caneyville soil. Permeability is moderately slow, and the available water capacity is moderate. The shrink-swell potential also is moderate. Runoff is rapid. Tilth is fair. The root zone is moderately deep, and the depth to bedrock ranges from 20 to 40 inches.

Typically, the surface layer of the Dewey soil is brown loam about 7 inches thick. The subsoil is clay. The upper part, to a depth of about 24 inches, is yellowish red. The lower part to a depth of 70 inches or more is red.

The content of organic matter is moderate in the Dewey soil. Permeability also is moderate, and the available water capacity is high. The shrink-swell potential is moderate. Runoff is rapid. Tilth is good. The root zone is very deep, and the depth to bedrock is more than 60 inches.

Included with these soils in mapping are small areas of Allen soils. Also included are small areas of a soil that is shallow over bedrock. Included areas make up about 12 percent of the unit.

Most areas of the Caneyville and Dewey soils are used for hay or pasture. Some areas are used as cropland or are wooded.

These soils are generally not suited to cultivated crops because of the rock outcrop and the steep slopes.

These soils are moderately well suited to the hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soils are too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

These soils are moderately well suited to woodland. Trees preferred for planting are Virginia pine, eastern redcedar, and white oak on the Caneyville soil and eastern white pine, yellow-poplar, loblolly pine, shortleaf pine, northern red oak, and white oak on the Dewey soil. The main management concerns are the hazard of erosion, the equipment limitation, and plant competition. Seedling mortality is an additional concern on the Caneyville soil. See table 7 for specific information relating to potential productivity.

These soils are poorly suited to most urban uses because of the slope, the moderately slow permeability, the high content of clay, the shrink-swell potential, and the depth to bedrock. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is VIs.

CgD—Caneyville-Garmon association, steep. These moderately deep, well drained soils occur in a regular and repeating pattern on a series of moderately steep and steep side slopes and narrow, winding ridgetops in the northern and southwestern parts of the county. Individual areas of these soils are large enough to map separately, but they were mapped as one unit because of present and predicted use. The Caneyville soil formed in material weathered from limestone that underlies the ridgetops and extends over the upper side slopes. The Garmon soil formed in material weathered from shaly limestone, calcareous shales, and siltstone on side slopes below the Caneyville soil. Mapped areas are about 5 to 250 acres in size. Individual areas of each soil are about 5 to 100 acres in size. Slopes range from 12 to 30 percent.

The Caneyville soil makes up about 45 percent of this unit and the Garmon soil about 35 percent. Limestone outcrops make up about 3 to 5 percent, and included soils make up the rest.

Typically, the surface layer of the Caneyville soil is dark yellowish brown silt loam about 6 inches thick. The upper part of the subsoil, to a depth of about 12 inches, is yellowish red silty clay loam. The next part, to a depth of about 18 inches, is red silty clay. The lower part is red clay about 11 inches thick. Limestone bedrock is at a depth of about 29 inches.

The content of organic matter is moderate in the Caneyville soil. Permeability is moderately slow, and the available water capacity is moderate. The shrink-swell potential also is moderate. Runoff is rapid. Tilth is poor. The root zone is moderately deep, and the depth to bedrock ranges from 20 to 40 inches.

Typically, the surface layer of the Garmon soil is dark grayish brown silt loam about 2 inches thick. The upper part of the subsoil, to a depth of about 13 inches, is yellowish brown silt loam. The lower part is yellowish brown channery silt loam about 12 inches thick. Shaly limestone bedrock is at a depth of about 25 inches.

The content of organic matter is moderate in the Garmon soil. Permeability is moderately rapid, and the available water capacity is moderate. Runoff is rapid. Tilth is good. The root zone is moderately deep, and the depth to bedrock ranges from 20 to 40 inches.

Included with these soils in mapping are small areas of Waynesboro and Dewey soils and small areas of a soil that is shallow over bedrock. Included soils make up about 15 to 17 percent of the unit.

Most areas of the Caneyville and Garmon soils are wooded. Some small areas are used for cultivated crops or pasture.

These soils are generally not suited to cultivated crops and are poorly suited to hay and pasture because of the slope, the rock outcrop, and the depth to bedrock.

These soils are moderately well suited to woodland. Black oak, white oak, sugar maple, hickory, white ash, eastern redcedar, yellow-poplar, chestnut oak, red maple, and northern red oak are some of the native trees on cool aspects. Black oak, white oak, sugar maple, hickory, eastern redcedar, chinkapin oak, scarlet oak, and chestnut oak are some of the native trees on warm aspects. Trees preferred for planting on cool aspects include yellow-poplar, white oak, white ash, and eastern white pine. On warm aspects they are Virginia pine, eastern redcedar, and white oak. The main management concerns are the hazard of erosion, the equipment limitation, seedling mortality, and plant competition. Using proper harvesting techniques can minimize the disturbance of the surface layer. The slope and the rock outcrop restrict the use of rubber-tired and crawler equipment. If openings are made in the canopy, invading brushy plants can delay natural regeneration. See table 7 for specific information relating to potential productivity.

These soils are poorly suited to most urban uses because of the slope, the moderately slow permeability, the high content of clay, the hazard of seepage, the rock outcrop, and the depth to bedrock. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is VIs.

DeC2—Dewey loam, 6 to 15 percent slopes, eroded. This very deep, well drained, sloping and moderately steep soil is on convex ridgetops and side slopes throughout the county. Erosion has removed about 25 to 75 percent of the original surface layer. Individual areas are about 5 to 50 acres in size.

Typically, the surface layer is brown loam about 7 inches thick. The subsoil is clay. The upper part, to a depth of about 24 inches, is yellowish red. The lower part to a depth of 70 inches or more is red.

The content of organic matter is low to moderate. Permeability is moderate, and the available water capacity is high. The shrink-swell potential is moderate. Runoff is medium. Tilth is good. The root zone is very deep, and the depth to bedrock is more than 60 inches.

Included with this soil in mapping are a few small areas of Allen, Caneyville, and Mountview soils. Included soils make up about 10 to 15 percent of the unit.

Most areas of the Dewey soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is well suited to the row crops and small grain crops commonly grown in the county. The hazard of erosion is moderate if a conventional tillage method is used. If cultivated crops are grown, a combination of cropping systems and erosion-control measures is needed to control runoff and erosion. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

This soil is well suited to the hay and pasture plants commonly grown in the county (fig. 8). Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland. Trees preferred for planting include eastern white pine, yellow-poplar, loblolly pine, shortleaf pine, northern red oak, and white oak. Plant competition is a management concern. See table 7 for specific information relating to potential productivity.

This soil is moderately well suited to most urban uses. The moderate shrink-swell potential, low strength, the moderate permeability, and the high content of clay are limitations. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is IIIe.

DeD2—Dewey loam, 15 to 25 percent slopes, eroded. This very deep, well drained, moderately steep and steep soil is on convex ridgetops and side slopes throughout the county. Erosion has removed about 25 to 75 percent of the original surface layer. Individual areas are about 5 to 50 acres in size.

Typically, the surface layer is brown loam about 7 inches thick. The subsoil is clay. The upper part, to a depth of about 24 inches, is yellowish red. The lower part to a depth of 70 inches or more is red.

The content of organic matter is low to moderate. Permeability is moderate, and the available water capacity is high. The shrink-swell potential is moderate. Runoff is rapid. Tilth is good. The root zone is very deep, and the depth to bedrock is more than 60 inches.

Included with this soil in mapping are a few small areas of Allen and Caneyville soils. Included soils make up about 10 to 15 percent of the unit.

Most areas of the Dewey soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is moderately well suited to the row crops and small grain crops commonly grown in the county. The hazard of erosion is severe if a conventional tillage method is used. If cultivated crops are grown, a combination of cropping systems and erosion-control measures is needed to control runoff and erosion. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

This soil is well suited to the hay and pasture plants

Figure 8.—A pasture in an area of Dewey loam, 6 to 15 percent slopes, eroded.

commonly grown in the county (fig. 9). Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland. Trees preferred for planting include eastern white pine, yellow-poplar, loblolly pine, shortleaf pine, northern red oak, and white oak. The hazard of erosion, the equipment limitation, and plant competition are management concerns. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses because of the moderate shrink-swell potential, low strength, the moderate permeability, and the high content of clay. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is IVe.

EkB—Elk silt loam, 2 to 6 percent slopes. This very deep, well drained, gently sloping soil is on convex stream terraces throughout the county. Individual areas are about 5 to 50 acres in size.

Typically, the surface layer is brown silt loam about 8

Figure 9.—Hay and pasture in an area of Dewey loam, 15 to 25 percent slopes, eroded.

inches thick. The upper part of the subsoil, to a depth of about 14 inches, is yellowish brown silt loam. The lower part, to a depth of about 45 inches, is strong brown silty clay loam. The underlying material to a depth of 62 inches or more is strong brown, mottled silty clay loam.

The content of organic matter is moderate. Permeability also is moderate, and the available water capacity is high. Runoff is medium. Tilth is good. The root zone is very deep, and the depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Allen, Dewey, and Nolin soils. Included soils make up about 5 to 10 percent of the unit.

Most areas of the Elk soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is well suited to the row crops and small grain crops commonly grown in the county. The hazard of erosion is moderate if a conventional tillage method is used. If cultivated crops are grown, a combination of cropping systems and erosion-control measures is needed to control runoff and erosion. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

This soil is well suited to the hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland. Trees preferred for planting are yellow-poplar, black walnut, white oak, eastern white pine, loblolly pine, and northern red oak.

Plant competition is a management concern. See table 7 for specific information relating to potential productivity.

This soil is well suited to most urban uses. The hazard of seepage, the moderate permeability, and low strength are limitations. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is IIe.

EkC—Elk silt loam, 6 to 12 percent slopes. This very deep, well drained, sloping soil is on convex stream terraces throughout the county. Individual areas are about 5 to 20 acres in size.

Typically, the surface layer is brown silt loam about 8 inches thick. The upper part of the subsoil, to a depth of about 14 inches, is yellowish brown silt loam. The lower part, to a depth of about 45 inches, is strong brown silty clay loam. The underlying material to a depth of 62 inches or more is strong brown, mottled silty clay loam.

The content of organic matter is moderate. Permeability also is moderate, and the available water capacity is high. Runoff is medium. Tilth is good. The root zone is very deep, and the depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Allen, Dewey, and Nolin soils. Included soils make up about 5 to 10 percent of the unit.

Most areas of the Elk soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is well suited to the row crops and small grain crops commonly grown in the county. The hazard of erosion is severe if a conventional tillage method is used. If cultivated crops are grown, a combination of cropping systems and erosion-control measures is needed to control runoff and erosion. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

This soil is well suited to the hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland. Trees preferred for planting are yellow-poplar, black walnut, white oak, eastern white pine, loblolly pine, and northern red oak. Plant competition is a management concern. See table 7 for specific information relating to potential productivity.

This soil is moderately well suited to most urban uses. The hazard of seepage, the moderate permeability, low strength, and the slope are limitations. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is IIIe.

FaE2—Faywood silty clay loam, 12 to 30 percent slopes, eroded. This moderately deep, well drained, moderately steep and steep soil is on upland side slopes in the northern part of the county. Individual areas are about 100 to 400 acres in size.

Typically, the surface layer is brown silty clay loam about 5 inches thick. The upper part of the subsoil, to a depth of about 15 inches, is dark yellowish brown silty clay. The lower part is yellowish brown, mottled silty clay about 16 inches thick. Limestone bedrock is at a depth of about 31 inches.

The content of organic matter is low. Permeability is moderately slow or slow, and the available water capacity is moderate. The shrink-swell potential also is moderate. Runoff is medium or rapid. Tilth is poor. The root zone is moderately deep, and the depth to bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of soils that are similar to the Faywood soil but are more than 40 inches deep over bedrock or are less than 20 inches deep over bedrock. Included soils make up about 5 to 10 percent of the unit.

Most areas of the Faywood soil are used as woodland. A few areas are used for hay or pasture.

This soil is generally not suited to cultivated crops because of the slope.

This soil is moderately well suited to the hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is moderately well suited to woodland. Trees preferred for planting are white oak, eastern white pine, and white ash. The hazard of erosion, plant competition, and the equipment limitation are management concerns. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses because of the moderately slow or slow permeability, the depth to bedrock, low strength, and the slope. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is VIe.

GcF—Garmon-Caneyville association, very steep. These moderately deep, well drained, very steep soils occur in a regular and repeating pattern on a series of highly dissected side slopes and bluffs in the northern and southwestern parts of the county. Individual areas of these soils are large enough to map separately, but they were mapped as one unit because of present and predicted use. The Garmon soil formed in material weathered from shaly limestone, calcareous shales, and siltstone on side slopes below the Caneyville soil. The Caneyville soil formed in material weathered from hard limestone on the upper side slopes and on the points of narrow ridgetops. Mapped areas are about 100 to 3,000 acres in size. Individual areas of each soil are about 5 to 100 acres in size. Most mapped areas contain both soils, but a few contain only one of the soils. Slopes range from 30 to 70 percent.

The Garmon soil makes up about 50 percent of the map unit and the Caneyville soil about 30 percent. Included soils make up the rest.

Typically, the surface layer of the Garmon soil is dark grayish brown silt loam about 2 inches thick. The upper part of the subsoil, to a depth of about 13 inches, is yellowish brown silt loam. The lower part is yellowish brown channery silt loam about 12 inches thick. Shaly limestone bedrock is at a depth of about 25 inches.

The content of organic matter is moderate in the Garmon soil. Permeability is moderately rapid, and the available water capacity is moderate. Runoff is medium or rapid. Tilth is good. The root zone is moderately deep, and the depth to bedrock ranges from 20 to 40 inches.

Typically, the surface layer of the Caneyville soil is dark yellowish brown silt loam about 6 inches thick. The upper part of the subsoil, to a depth of about 12 inches, is yellowish red silty clay loam. The next part, to a depth of about 18 inches, is red silty clay. The lower part is red clay about 11 inches thick. Limestone bedrock is at a depth of about 29 inches.

The content of organic matter is moderate in the Caneyville soil. Permeability is moderately slow, and the available water capacity is moderate. The shrink-swell potential also is moderate. Runoff is very rapid. Tilth is poor. The root zone is moderately deep, and the depth to bedrock ranges from 20 to 40 inches.

Included with these soils in mapping are small areas of Dewey and Waynesboro soils. Also included are small areas of rock outcrop and narrow bands of a shallow soil that formed in material weathered from hard black shale. Included areas make up about 20 percent of the unit.

Most areas of the Garmon and Caneyville soils are used as woodland. Some small areas are used for pasture.

These soils are generally not suited to cultivated crops, hay, or pasture because of the slope.

These soils are moderately well suited to woodland (fig. 10). Black oak, white oak, sugar maple, hickory, white ash, eastern redcedar, yellow-poplar, chestnut oak, red maple, and northern red oak are some of the native trees on cool aspects. Black oak, white oak, sugar maple, hickory, eastern redcedar, chinkapin oak, scarlet oak, and chestnut oak are some of the native trees on warm aspects. Trees preferred for planting on cool aspects include yellow-poplar, eastern white pine, white ash, white oak, and northern red oak. On warm aspects they are Virginia pine, eastern redcedar, and white oak. The main management concerns are the hazard of erosion, the equipment limitation, and plant competition. Seedling mortality is an additional concern on warm aspects. Careful harvesting techniques can minimize the disturbance of the surface layer. The slope and the rock outcrop restrict the use of rubber-tired and crawler equipment. If openings are made in the canopy, invading brushy plants can delay natural regeneration. See table 7 for specific information relating to potential productivity.

These soils are poorly suited to most urban uses because of the slope and the depth to bedrock. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is VIIe.

GpB—Gilpin loam, 2 to 6 percent slopes. This moderately deep, well drained, gently sloping soil is on convex ridgetops and side slopes in the southwestern part of the county. Individual areas are about 5 to 10 acres in size.

Typically, the surface layer is brown loam about 7 inches thick. The upper part of the subsoil, to a depth of about 12 inches, is light yellowish brown loam. The next part, to a depth of about 25 inches, is yellowish brown channery clay loam. The lower part is yellowish brown clay loam about 11 inches thick. Sandstone bedrock is at a depth of about 36 inches.

The content of organic matter is moderate. Permeability and the available water capacity also are moderate. Runoff is medium. Tilth is good. The root zone is moderately deep, and the depth to bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are a few small areas of Caneyville and Dewey soils. Also included are areas of a soil that is similar to the Gilpin soil but is 40 to 50 inches deep over bedrock. Included soils make up about 5 to 10 percent of the unit.

Most areas of the Gilpin soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is well suited to the row crops and small grain crops commonly grown in the county. The hazard of erosion is moderate if a conventional tillage method is used. If cultivated crops are grown, a combination of cropping systems and erosion-control measures is

Figure 10.—Indian Creek flowing along a wooded hillside in an area of Garmon-Caneyville association, very steep.

Figure 11.—Hay and pasture in an area of Gilpin loam, 6 to 12 percent slopes.

needed to control runoff and erosion. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

This soil is well suited to the hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland. Trees preferred for planting are yellow-poplar, white oak, eastern white pine, and shortleaf pine. Plant competition is a management concern. See table 7 for specific information relating to potential productivity.

This soil is moderately well suited to most urban uses. The depth to bedrock is a limitation. Proper engineering techniques can help to overcome this limitation in some areas.

The capability subclass is IIe.

GpC—Gilpin loam, 6 to 12 percent slopes. This moderately deep, well drained, sloping soil is on convex ridgetops and side slopes in the southwestern part of the county. Individual areas are about 5 to 50 acres in size.

Typically, the surface layer is brown loam about 7 inches thick. The upper part of the subsoil, to a depth of about 12 inches, is light yellowish brown loam. The next part, to a depth of about 25 inches, is yellowish brown channery clay loam. The lower part is yellowish brown clay loam about 11 inches thick. Sandstone bedrock is at a depth of about 36 inches.

The content of organic matter is moderate. Permeability and the available water capacity also are moderate. Runoff is medium. Tilth is good. The root zone is moderately deep, and the depth to bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are a few small areas of Caneyville and Dewey soils. Also included are areas of a soil that is similar to the Gilpin soil but is 40 to 50 inches deep over bedrock. Included soils make up about 5 to 10 percent of the unit.

Most areas of the Gilpin soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is well suited to the row crops and small grain crops commonly grown in the county. The hazard of erosion is severe if a conventional tillage method is used. If cultivated crops are grown, a combination of cropping systems and erosion-control measures is needed to control runoff and erosion. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

This soil is well suited to the hay and pasture plants commonly grown in the county (fig. 11). Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland. Trees preferred for planting are yellow-poplar, white oak, eastern white pine, and shortleaf pine. Plant competition is a management concern. See table 7 for specific information relating to potential productivity.

This soil is moderately well suited to most urban uses. The depth to bedrock and the slope are limitations. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is IIIe.

Gr—Grigsby fine sandy loam, protected. This very deep, well drained, nearly level and gently sloping soil is on the flood plain along the Cumberland River below Wolf Creek Dam. Individual areas are about 5 to 100 acres in size. Slopes range from 0 to 4 percent.

Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The subsoil is fine sandy loam. The upper part, to a depth of about 18 inches, is brown. The lower part, to a depth of about 40 inches, is dark yellowish brown. The underlying material to a depth of 62 inches or more is dark yellowish brown sandy loam.

The content of organic matter is low to moderate. Permeability is moderate or moderately rapid, and the available water capacity is high. The seasonal high water table is at a depth of 3.5 to 6.0 feet. Runoff is slow. This soil is protected from flooding by Wolf Creek Dam on the Cumberland River. Tilth is good. The root zone is very deep, and the depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Newark and Nolin soils and small areas of a soil that is subject to rare flooding. Included soils make up about 5 to 10 percent of the unit.

Most areas of the Grigsby soil are used for cultivated crops, hay, or pasture. A few areas are used for pasture or as woodland.

This soil is well suited to the row crops and small grain crops commonly grown in the county. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

This soil is well suited to the hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland. Trees preferred for planting are yellow-poplar, black walnut, white oak, eastern white pine, shortleaf pine, northern red oak, and white ash. Plant competition and seedling mortality are management concerns. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to nearly all urban uses because of the hazard of seepage and the flooding. Proper engineering techniques can help to overcome these limitations in some areas.

The capability class is I.

Me—Melvin silt loam, ponded. This very deep, poorly drained, nearly level soil is on flood plains and in upland depressions throughout the county. Individual areas are about 5 to 50 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is very dark gray silt loam about 4 inches thick. The upper part of the subsoil, to a depth of about 9 inches, is gray silt loam. The lower part, to a depth of about 34 inches, is gray, mottled silt loam. The underlying material to a depth of 62 inches or more also is gray, mottled silt loam.

The content of organic matter is moderate. Permeability also is moderate, and the available water capacity is high. This soil is frequently flooded for very long periods. The seasonal high water table is 2.0 feet above to 0.5 foot below the surface. Runoff is slow to

Figure 12.—Mixed hardwoods in an area of Melvin silt loam, ponded.

ponded. Tilth is good. The root zone is very deep, and the depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Newark and Nolin soils. Included soils make up about 5 to 10 percent of the unit.

Most areas of the Melvin soil are used for pasture or as woodland. A few areas are used for cultivated crops or hay.

This soil is generally not suited to cultivated crops because of the frequent flooding and the ponding.

This soil is poorly suited to hay and pasture plants because of the frequent flooding and the ponding. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland (fig. 12). Trees preferred for planting are sweetgum, willow oak, green ash, American sycamore, and pin oak. The equipment limitation, plant competition, and seedling mortality are management concerns. See table 7 for specific information relating to potential productivity.

This soil is generally not suited to urban uses because of the flooding, low strength, and wetness. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is Vw.

MoB—Mountview silt loam, 2 to 6 percent slopes. This very deep, well drained, gently sloping soil is on convex ridgetops throughout the county. Individual areas are about 5 to 25 acres in size.

Typically, the surface layer is brown silt loam about 9 inches thick. The upper part of the subsoil, to a depth of about 24 inches, is yellowish brown and strong brown silt loam. The next part, to a depth of about 60 inches, is yellowish red and red silty clay loam. The lower part to a depth of 75 inches or more is red clay.

The content of organic matter is moderate. Permeability also is moderate, and the available water capacity is high. The shrink-swell potential is moderate in the lower part of the subsoil. Runoff is medium. Tilth is good. The root zone is very deep, and the depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Allen and Dewey soils. Included soils make up about 5 to 10 percent of the unit.

Most areas of the Mountview soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is well suited to the row crops and small grain crops commonly grown in the county (fig. 13). The hazard of erosion is moderate if a conventional tillage method is used. If cultivated crops are grown, a combination of cropping systems and erosion-control measures is needed to control runoff and erosion. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

This soil is well suited to the hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland. Trees preferred for planting are yellow-poplar, white oak, eastern white pine, shortleaf pine, black walnut, and white ash. Plant competition is a management concern. See table 7 for specific information relating to potential productivity.

This soil is moderately well suited to most urban uses. The moderate permeability, the moderate shrink-swell potential, the high content of clay, low strength, and the hazard of seepage are limitations. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is IIe.

Ne—Newark silt loam, frequently flooded. This very deep, somewhat poorly drained, nearly level soil is on flood plains and upland depressions throughout the county. Individual areas are about 5 to 50 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is grayish brown silt loam about 7 inches thick. The subsoil is silt loam. The upper part, to a depth of about 14 inches, is brown. The lower part, to a depth of about 42 inches, is light gray and is mottled. The underlying material to a depth of 62 inches or more is mottled gray, light gray, and strong brown gravelly silty clay loam.

The content of organic matter is moderate. Permeability also is moderate, and the available water capacity is high. The seasonal high water table is at a depth of 0.5 foot to 1.5 feet. Runoff is slow. This soil is frequently flooded for brief periods. Tilth is good. The root zone is very deep, and the depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Melvin and Nolin soils. Included soils make up about 5 to 10 percent of the unit.

Most areas of the Newark soil are used as woodland. Some areas are used for cultivated crops, hay, or pasture.

This soil is moderately well suited to cultivated crops that can tolerate wetness and that can withstand flooding for brief periods. Unless drained, it is better suited to hay and pasture. It is poorly suited to winter

Figure 13.—Tomatoes in an area of Mountview silt loam, 2 to 6 percent slopes.

crops because of the seasonal high water table and the flooding during winter and spring. Fieldwork is often delayed because of the excessive wetness. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

This soil is moderately well suited to hay and pasture plants that tolerate wetness and flooding. If drained, it is suited to a wide range of hay and pasture plants. Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland. Trees preferred for planting include eastern cottonwood, sweetgum, green ash, and American sycamore. The equipment limitation, seedling mortality, and plant competition are management concerns. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses because of the flooding, low strength, and wetness. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is IIw.

No—Nolin silt loam, frequently flooded. This very deep, well drained, nearly level soil is on flood plains throughout the county. Individual areas are about 5 to 50 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is brown silt loam about 10 inches thick. The upper part of the subsoil, to a depth of about 16 inches, is brown silt loam. The next part, to a depth of about 29 inches, is dark yellowish brown silt loam. The lower part, to a depth of about 44 inches, is yellowish brown loam. The underlying material to a depth of 62 inches or more is yellowish brown, mottled gravelly loam.

The content of organic matter is moderate. Permeability also is moderate, and the available water capacity is high. The seasonal high water table is at a depth of 3 to 6 feet. Runoff is slow. This soil is frequently flooded for brief periods. Tilth is good. The root zone is very deep, and the depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Newark soils. Included soils make up about 5 to 10 percent of the unit.

Most areas of the Nolin soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is well suited to the row crops and small grain crops commonly grown in the county. Frequent flooding during winter and early spring may delay tillage operations. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

This soil is well suited to hay and pasture plants that tolerate wetness and flooding. Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland. Trees preferred for planting are eastern cottonwood, sweetgum, black walnut, yellow-poplar, and eastern white pine. Plant competition and seedling mortality are management concerns. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses because of the flooding, low strength, and wetness. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is IIw.

Pt—Pits, quarries. This map unit consists of open excavations from which the soil and underlying material have been removed and in which limestone or other material is exposed. This material supports little or no vegetation. All of the pits are deep and have almost vertical walls.

The capability subclass is VIIIs.

RoF—Rock outcrop-Caneyville complex, 20 to 50 percent slopes. These areas of Rock outcrop and Caneyville soil are so intermingled that they could not be separated at the scale used in mapping. The Caneyville soil is moderately deep and is well drained. This map unit occurs on the lower steep and very steep mountain side slopes and in low saddles. Mapped areas are 25 to 3,000 acres in size. Individual areas of each component are 5 to 100 acres in size.

Rock outcrop makes up about 60 percent of the map unit and the Caneyville soil about 30 percent. Included soils make up the rest.

Typically, the Rock outcrop consists of exposed areas of limestone that occur randomly throughout the map unit.

Typically, the surface layer of the Caneyville soil is dark yellowish brown silt loam about 6 inches thick. The upper part of the subsoil, to a depth of about 12 inches, is yellowish red silty clay loam. The next part, to a depth of about 18 inches, is red silty clay. The lower part is red clay about 11 inches thick. Limestone bedrock is at a depth of about 29 inches.

The content of organic matter is moderate.

Figure 14.—A stand of mixed hardwoods in an area of Rock outcrop-Caneyville complex, 20 to 50 percent slopes.

Permeability is moderately slow, and the available water capacity is moderate. The shrink-swell potential also is moderate, and runoff is rapid. This soil is somewhat difficult to till because of the Rock outcrop. The root zone is moderately deep, and the depth to bedrock ranges from 20 to 40 inches.

Included in mapping are small areas of a soil that is more acid and loamy in the upper 2 feet than the Caneyville soil and small areas of a soil that is more than 40 inches deep over bedrock. Also included, in the areas of Rock outcrop, are soils that are shallow over bedrock. Included soils make up about 10 percent of the unit.

Most areas of this map unit are wooded. Some small areas are used for cultivated crops or pasture.

This map unit is generally not suited to cultivated crops, hay, or pasture because of the slope and the Rock outcrop.

The Caneyville soil is moderately well suited to woodland (fig. 14). White oak, black oak, sugar maple, hickory, white ash, eastern redcedar, and yellow-poplar are some of the native trees on cool aspects. White oak, black oak, sugar maple, chinkapin oak, scarlet oak, hickory, and eastern redcedar are some of the native trees on warm aspects. Trees preferred for planting on cool aspects are white oak, yellow-poplar, white ash, and eastern white pine. On warm aspects they are Virginia pine, white oak, and eastern redcedar. Management concerns are the hazard of erosion, the equipment limitation, seedling mortality, and plant competition. Careful harvesting techniques can minimize the disturbance of the surface layer. The slope and the Rock outcrop restrict the use of rubber-tired and crawler equipment. If openings are made in the canopy, invading brushy plants can delay natural regeneration. See table 7 for specific information relating to potential productivity.

This map unit is generally not suited to most urban uses because of the slope and the depth to bedrock.

The capability subclass is VIIIs for the Rock outcrop and VIIs for the Caneyville soil.

SeD—Sequoia-Wernock silt loams, 6 to 20 percent slopes. These moderately deep, well drained, sloping and moderately steep soils are on ridgetops and the upper side slopes of mountains in the eastern part of the county. They are in areas of regular relief. The ridgetops are about 600 to 800 feet above the valley floor. The two soils occur as areas so closely intermingled that they could not be separated at the scale used in mapping. Most areas are narrow and elongated. The Sequoia soil formed in material weathered from acid shale and siltstone on ridgetops. It formed in a landscape position lower than that of the Wernock soil. The Wernock soil formed in material weathered from sandstone, siltstone, and shale. Mapped areas are about 5 to 100 acres in size.

The Sequoia soil makes up about 55 percent of the map unit and the Wernock soil about 40 percent. Included soils make up the rest.

Typically, the surface layer of the Sequoia soil is yellowish brown silt loam about 6 inches thick. The upper part of the subsoil, to a depth of about 10 inches, is strong brown silt loam. The next part, to a depth of about 28 inches, is yellowish red silty clay. The lower part is variegated pale brown, light gray, and red clay about 7 inches thick. Soft, red and gray clay shale bedrock is at a depth of about 35 inches.

The content of organic matter is low in the Sequoia soil. Permeability is moderately slow, and the available water capacity is moderate. The shrink-swell potential also is moderate. Runoff is medium or rapid. Tilth is fair. The root zone is moderately deep. The depth to soft shale bedrock ranges from 20 to 40 inches, and the depth to hard bedrock is more than 60 inches.

Typically, the surface layer of the Wernock soil is dark grayish brown silt loam about 2 inches thick. The subsurface layer is brown silt loam about 4 inches thick. The upper part of the subsoil, to a depth of about 10 inches, is yellowish brown silt loam. The lower part is strong brown silty clay loam about 28 inches thick. Interbedded sandstone and shale bedrock is at a depth of about 38 inches.

The content of organic matter is low in the Wernock soil. Permeability and the available water capacity are moderate. Runoff is medium or rapid. Tilth is good. The root zone is moderately deep, and the depth to bedrock ranges from 30 to 40 inches.

Included with these soils in mapping are small areas of rock outcrop, small areas of a moderately well drained soil that has a clayey subsoil, and a few areas of a well drained soil that has a clayey or loamy subsoil and that is less than 20 inches deep over bedrock. Also included are areas of the Sequoia and Wernock soils that are on slopes of less than 6 percent or more than 20 percent. Included areas make up about 5 percent of the unit.

Most areas of the Sequoia and Wernock soils are wooded. Some small areas are used for cultivated crops, hay, or pasture.

These soils are moderately well suited to the row crops and small grain crops commonly grown in the county. The hazard of erosion is very severe if a conventional tillage method is used. If cultivated crops are grown, a combination of cropping systems and erosion-control measures is needed to control runoff and erosion. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

These soils are well suited to the hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

These soils are well suited to woodland. Northern red oak, shortleaf pine, hickory, red maple, black oak, scarlet oak, chestnut oak, white oak, and Virginia pine are some of the native trees. Trees preferred for planting include shortleaf pine, eastern white pine, and white oak. The main management concern is plant competition. Using proper harvesting techniques can minimize the disturbance of the surface layer. If openings are made in the canopy, invading brushy plants can delay natural regeneration. See table 7 for specific information relating to potential productivity.

These soils are poorly suited to most urban uses because of the depth to bedrock, the slope, the moderately slow permeability, and the high content of clay. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is IVe.

SmF—Shelocta-Muse-Cutshin complex, 20 to 60 percent slopes. These areas of Shelocta, Muse, and Cutshin soils are so intermingled that they could not be separated at the scale used in mapping. The soils are deep and very deep, well drained, and steep and very steep. They are on cool aspects and are in the eastern part of the county. The Shelocta soil is on steep colluvial side slopes. The Muse soil is on the upper part of mountain side slopes and on benches. The Cutshin soil is in coves. Mapped areas are 50 to 1,000 acres in size.

The Shelocta soil makes up about 25 percent of the map unit, the Muse soil about 20 percent, and the Cutshin soil about 15 percent. Included soils make up the rest.

Typically, the surface layer of the Shelocta soil is dark grayish brown silt loam about 10 inches thick. The upper part of the subsoil, to a depth of about 22 inches, is yellowish brown silt loam. The lower part, to a depth of about 50 inches, is strong brown channery silty clay loam. The underlying material to a depth of 60 inches or more also is strong brown channery silty clay loam.

The content of organic matter is moderate in the Shelocta soil. Permeability also is moderate, and the available water capacity is high. Runoff is medium or rapid. Tilth is good. The root zone is deep and very deep, and the depth to bedrock ranges from 48 to more than 120 inches.

Typically, the surface layer of the Muse soil is dark brown silt loam about 3 inches thick. The subsurface layer is yellowish brown silt loam about 4 inches thick. The upper part of the subsoil, to a depth of about 12 inches, is yellowish brown silty clay loam. The next part, to a depth of about 29 inches, is yellowish brown, mottled channery silty clay. The lower part is yellowish brown, mottled silty clay about 13 inches thick. Soft, gray and brown clay shale bedrock is at a depth of about 42 inches.

The content of organic matter is low to moderate in the Muse soil. Permeability is slow, and the available water capacity is high. The shrink-swell potential is moderate. Runoff is rapid, and the seasonal high water table is at a depth of more than 4 feet. Tilth is fair. The root zone is deep to very deep, and the depth to bedrock is more than 40 inches.

Typically, the surface layer of the Cutshin soil is very dark grayish brown channery loam about 10 inches thick. The subsurface layer is dark brown channery loam about 7 inches thick. The upper part of the subsoil, to a depth of about 26 inches, is dark brown channery clay loam. The lower part is yellowish brown channery clay loam about 16 inches thick. Soft, gray and brown siltstone bedrock is at a depth of about 42 inches.

The content of organic matter is high in the Cutshin soil. Permeability is moderate, and the available water capacity is high. Runoff is medium or rapid. Tilth is fair. The root zone is deep and very deep, and the depth to bedrock ranges from 40 to more than 80 inches.

Included with these soils in mapping are areas of rock outcrop and small areas of a well drained soil that has a clayey and loamy subsoil and is less than 40 inches deep over bedrock. Also included are a few small areas that have slopes of less than 20 percent or more than 60 percent. Included areas make up about 40 percent of the unit.

Most areas of the Shelocta, Muse, and Cutshin soils are wooded. Some small areas are used for cultivated crops, hay, or pasture.

These soils are generally not suited to cultivated crops, hay, and pasture because of the slope.

These soils are well suited to woodland. Yellow-poplar, American beech, white oak, shortleaf pine, cucumbertree, red maple, black oak, Virginia pine, scarlet oak, northern red oak, sweet birch, sugar maple, American basswood, white ash, blackgum, eastern hemlock, hickory, and black walnut are some of the native trees. Trees preferred for planting include yellow-poplar, black walnut, eastern white pine, white ash, northern red oak, and white oak on the Shelocta and Cutshin soils and shortleaf pine, white oak, eastern white pine, and yellow-poplar on the Muse soil. Management concerns are the hazard of erosion, the equipment limitation, and plant competition. Careful harvesting techniques can minimize the disturbance of the surface layer. The slope and the rock outcrop restrict the use of rubber-tired and crawler equipment. If openings are made in the canopy, invading brushy plants can delay natural regeneration. See table 7 for specific information relating to potential productivity.

These soils are generally not suited to most urban uses because of the slope. Proper engineering techniques can help to overcome this limitation in some areas.

The capability subclass is VIIe.

SsF—Shelocta-Sequoia-Muse silt loams, 20 to 60 percent slopes. These areas of Shelocta, Sequoia, and Muse soils are so intermingled that they could not be separated at the scale used in mapping. The soils are very deep and deep, well drained, and steep and very steep. They are on warm aspects in the eastern part of the county. The Shelocta soil is on colluvial mountain side slopes. The Sequoia and Muse soils are on mountain side slopes, narrow ridgetops, and benches. Mapped areas are 50 to 1,000 acres in size.

The Shelocta soil makes up about 35 percent of the map unit, the Sequoia soil about 30 percent, and the Muse soil about 15 percent. Included soils make up the rest.

Typically, the surface layer of the Shelocta soil is dark grayish brown silt loam about 10 inches thick. The upper part of the subsoil, to a depth of about 22 inches, is yellowish brown silt loam. The lower part, to a depth of about 50 inches, is strong brown channery silty clay loam. The underlying material to a depth of 60 inches or more also is strong brown channery silty clay loam.

The content of organic matter is moderate in the Shelocta soil. Permeability also is moderate, and the available water capacity is high. Runoff is medium or rapid. Tilth is good. The root zone is deep and very deep, and the depth to bedrock ranges from 48 to more than 120 inches.

Typically, the surface layer of the Sequoia soil is yellowish brown silt loam about 6 inches thick. The upper part of the subsoil, to a depth of about 10 inches, is strong brown silt loam. The next part, to a depth of about 28 inches, is yellowish red silty clay. The lower part is variegated pale brown, light gray, and red clay about 7 inches thick. Soft, red and gray clay shale bedrock is at a depth of about 35 inches.

The content of organic matter is low in the Sequoia soil. Permeability is moderately slow, and the available water capacity is moderate. The shrink-swell potential also is moderate. Runoff is medium or rapid. Tilth is fair. The root zone is moderately deep. The depth to soft shale bedrock ranges from 20 to 40 inches, and the depth to hard bedrock is more than 60 inches.

Typically, the surface layer of the Muse soil is dark brown silt loam about 3 inches thick. The subsurface layer is yellowish brown silt loam about 4 inches thick. The upper part of the subsoil, to a depth of about 12 inches, is yellowish brown silty clay loam. The next part, to a depth of about 29 inches, is yellowish brown, mottled channery silty clay. The lower part is yellowish brown, mottled silty clay about 13 inches thick. Soft, gray and brown clay shale bedrock is at a depth of about 42 inches.

The content of organic matter is low to moderate in the Muse soil. Permeability is slow, and the available water capacity is high. The shrink-swell potential is moderate. Runoff is rapid, and the high water table is at a depth of more than 4 feet. Tilth is fair. The root zone is deep and very deep, and the depth to bedrock ranges from 40 to 80 inches.

Included with these soils in mapping are areas of rock outcrop and small areas of a well drained soil that has a clayey and loamy subsoil and is less than 40 inches deep over bedrock. Also included are small areas of a soil that has a dark surface layer and a few small areas that have slopes ranging from less than 20 percent to more than 60 percent. Included areas make up about 20 percent of the unit.

Most areas of the Shelocta, Sequoia, and Muse soils are used as woodland. Some small areas are used for cultivated crops, hay, or pasture.

These soils are generally not suited to cultivated crops, hay, or pasture because of the slope.

These soils are moderately well suited to woodland. Virginia pine, northern red oak, white oak, black oak, scarlet oak, blackgum, red maple, shortleaf pine, and American beech are some of the native trees. Trees preferred for planting include white oak, eastern white pine, and shortleaf pine on the Shelocta and Muse soils and loblolly pine, shortleaf pine, and eastern white pine on the Sequoia soil. Management concerns are the hazard of erosion, the equipment limitation, seedling mortality, and plant competition. Careful harvesting techniques can minimize the disturbance of the surface layer. The slope and the rock outcrop restrict the use of rubber-tired and crawler equipment. If openings are made in the canopy, invading brushy plants can delay natural regeneration. See table 7 for specific information relating to potential productivity.

These soils are generally not suited to most urban uses because of the slope. Proper engineering techniques can help to overcome this limitation in some areas.

The capability subclass is VIIe.

WaC—Waynesboro loam, 6 to 12 percent slopes. This very deep, well drained, sloping soil is on high stream terraces along the Cumberland River. Individual areas are about 10 to 25 acres in size.

Typically, the surface layer is brown loam about 9 inches thick. The upper part of the subsoil, to a depth of about 12 inches, is yellowish brown loam. The next part, to a depth of about 18 inches, is yellowish red clay loam. The lower part to a depth of 78 inches or more is red and dark red sandy clay.

The content of organic matter is moderate. Permeability also is moderate, and the available water capacity is high. Runoff is medium. Tilth is good. The root zone is very deep, and the depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Elk and Faywood soils. Included soils make up about 5 to 10 percent of the unit.

Most areas of the Waynesboro soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is well suited to the row crops and small grain crops commonly grown in the county. The hazard of erosion is severe if a conventional tillage method is used. If cultivated crops are grown, a combination of cropping systems and erosion-control measures is needed to control runoff and erosion. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

This soil is well suited to the hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland. Trees preferred for planting are yellow-poplar, loblolly pine, white oak, eastern white pine, and shortleaf pine. Plant competition is a management concern. See table 7 for specific information relating to potential productivity.

This soil is moderately well suited to most urban uses. The slope, the moderate permeability, the high content of clay, and low strength are limitations. Proper engineering techniques can help to overcome these limitations in some areas.

The capability subclass is IIIe.

WaD—Waynesboro loam, 12 to 20 percent slopes. This very deep, well drained, moderately steep soil is on high stream terraces along the Cumberland River. Individual areas are about 10 to 150 acres in size.

Typically, the surface layer is brown loam about 9 inches thick. The upper part of the subsoil, to a depth of about 12 inches, is yellowish brown loam. The next part, to a depth of about 18 inches, is yellowish red clay loam. The lower part to a depth of 78 inches or more is red and dark red sandy clay.

The content of organic matter is moderate. Permeability also is moderate, and the available water capacity is high. Runoff is medium. Tilth is good. The root zone is very deep, and the depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Elk and Faywood soils. Included soils make up about 5 to 10 percent of the unit.

Most areas of the Waynesboro soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is moderately well suited to the row crops and small grain crops commonly grown in the county. The hazard of erosion is very severe if a conventional tillage method is used. If cultivated crops are grown, a combination of cropping systems and erosion-control measures is needed to control runoff and erosion. Returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to maintain or improve tilth.

This soil is well suited to the hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and results in excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to keep the pasture in good condition.

This soil is well suited to woodland. Trees preferred for planting are yellow-poplar, loblolly pine, white oak, eastern white pine, and shortleaf pine on cool aspects and shortleaf pine, loblolly pine, and white oak on warm aspects. The main management concerns are the hazard of erosion, the equipment limitation, and plant competition. Seedling mortality is an additional concern on warm aspects. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses because of the slope. Proper engineering techniques can help to overcome this limitation in some areas.

The capability subclass is IVe.

Prime Farmland

In this section, prime farmland is defined and the soils in Clinton County that are considered prime farmland are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent.

The map units that are considered prime farmland in Clinton County are listed at the end of this section. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Some soils that have a high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. If applicable, the need for these measures is indicated in parentheses after the map unit name in the following list. Onsite evaluation is necessary to determine whether the limitations have been overcome by corrective measures.

The soils identified as prime farmland in Clinton County are:

AnB	Allen loam, 2 to 6 percent slopes
EkB	Elk silt loam, 2 to 6 percent slopes
GpB	Gilpin loam, 2 to 6 percent slopes
Gr	Grigsby fine sandy loam, protected
MoB	Mountview silt loam, 2 to 6 percent slopes
Ne	Newark silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
No	Nolin silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)

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 to prevent soil-related failures in land uses.

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

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

William H. Amos, Jr., 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 the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Cropland

In 1982, approximately 17,800 acres in Clinton County was used as cropland *(18)*. Principal crops included corn, soybeans, tobacco, grass-legume hay, and wheat.

Field crops suited to the soils and climate of Clinton County include many that are not commonly grown. Corn, burley tobacco (fig. 15), and soybeans are the dominant row crops. Grain sorghum, sunflowers, and other similar crops can be grown if economic conditions are favorable.

Wheat is the most common close-grown crop. Rye, barley, and oats could be grown, and grass seed could be produced from fescue and orchardgrass.

The specialty crops grown in Clinton County are vegetables, small fruits, and tree fruits. Tomatoes, cucumbers, and apples are the most common vegetables and fruits. A small acreage is used for melons, strawberries, sweet corn, peppers, or other vegetables and small fruits.

Very deep to moderately deep soils that are characterized by good natural drainage and that warm up early in spring are especially well suited to many vegetables and fruits. In Clinton County, these soils include the Allen, Elk, Gilpin, Grigsby, Mountview, and Nolin soils that have slopes of less than 6 percent. They make up about 13,200 acres in the survey area. Crops can generally be planted and harvested earlier on these soils than on other soils in the survey area.

The potential of the soils in the survey area for

Figure 15.—Tobacco in an area of Mountview silt loam, 2 to 6 percent slopes.

increased production is good. Additional acreage is available for future crop production. About 18,500 acres of potentially good cropland is used for pasture, and 2,000 acres is wooded *(18)*. Production can also be increased considerably by applying the latest crop production technology. This soil survey can facilitate the application of such technology.

Erosion is a major hazard on most of the soils used for crops and pasture in Clinton County. It is a hazard where slopes are more than 2 percent. Allen, Caneyville, Dewey, and Gilpin soils have slopes of more than 2 percent.

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 clayey subsoil, such as Caneyville, Dewey, and Faywood soils, and on soils that have a restricted root zone. Second, erosion on farmland results in the sedimentation of streams. Control of erosion minimizes this pollution and improves the quality of water for municipal and recreational uses and for fish and wildlife.

In many sloping areas of clayey soils, preparing a good seedbed is difficult because the original friable surface layer has been eroded. This degree of erosion is common in areas of Caneyville and Dewey soils.

Erosion-control practices provide a protective surface cover, help to control runoff, and increase the rate of water infiltration. A cropping system that keeps a plant cover on the surface for extended periods generally can keep soil losses to an amount that does not reduce the productivity of the soil. On livestock farms, which require pasture and hay, including forage crops of grasses and legumes in the cropping system helps to control erosion on sloping land. The forage crops also add nitrogen to the soil and improve soil tilth.

Minimizing tillage and leaving crop residue on the surface increase the rate of water infiltration and reduce the hazards of runoff and erosion. These practices can be effective on most of the soils in the survey area. In the more sloping areas used for corn and double cropped soybeans, no-till farming is effective in controlling erosion. It is practical on most of the soils in the survey area.

Terraces and diversions reduce the length of slopes and thus help to control runoff and erosion. They are most effective on deep, well drained soils that have regular slopes, such as Allen, Elk, and Mountview soils. These measures are less effective on soils that have irregular slopes, would be excessively wet in the terrace channels, have a clayey subsoil that would be exposed in the terrace channels, or have bedrock within a depth of 40 inches.

Contour farming and contour stripcropping help to control erosion in the survey area. They are best suited to soils that have smooth, uniform slopes, including most areas of Allen, Elk, and Mountview soils.

Wetness is a management concern on some of the soils in Clinton County that are used for crops and pasture. Some of the soils are so wet that the production of crops common to the area is generally difficult, except in areas that have been artificially drained. The poorly drained Melvin soils are examples. Because of wetness, some crop yields are reduced in most years on the somewhat poorly drained Newark soils, unless the soils are drained. Melvin and Newark soils make up about 2,500 acres in the survey area.

Many soils on uplands and stream terraces are very strongly acid to medium acid unless the surface has been limed. Applications of ground limestone are needed to raise the pH level sufficiently for the production of alfalfa and other crops that grow best on nearly neutral soils. The levels of available phosphorus and potash are naturally low in most of these soils. On all soils, additions of lime and fertilizer should be based on the results of soil tests, the needs of the crop, and the expected level of yields. The Cooperative Extension Service can help to determine the kinds and amounts of fertilizer and lime needed and the proper method of application.

Soil tilth is an important factor affecting seed germination and the infiltration of water into the soil. Soils that have good tilth are granular and porous.

Some of the soils in the county that are used for crops have a surface layer of silt loam that is light in color and low in organic matter content. Generally, the structure of such soils is weak. A surface crust forms during periods of intense rainfall. The crust is hard when dry and nearly impervious to water. It reduces the rate of water infiltration and increases the runoff rate. Regular additions of crop residue, manure, and other organic material can improve soil structure and minimize crusting.

Pasture and Hayland

In Clinton County, about 44,500 acres is used as pasture and hayland *(18)*. On much of this acreage, renovation, brush control, and protection from grazing are needed.

A successful livestock program depends on a forage program that provides large quantities of good-quality feed (fig. 16). Such a program can provide as much as 78 percent of the feed for beef cattle and 66 percent of the feed for dairy cattle *(8)*.

The soils in the survey area vary widely in their ability to produce grasses and legumes because of differences in depth to bedrock, internal drainage, available water capacity, and many other properties. The forage species selected for planting should be those that are suited to the different kinds of soil.

The nearly level and gently sloping, deep, well drained soils should be planted to the highest producing crops, such as corn silage, alfalfa, or a mixture of alfalfa and orchardgrass or of alfalfa and timothy. Sod-forming grasses, such as tall fescue, minimize erosion in the steeper areas. Alfalfa should be seeded with cool-season grasses in areas where the soils are at least 2 feet deep and are well drained. The more poorly drained soils and the soils that are less than 2 feet

Figure 16.—An improved pasture in an area of Dewey loam, 6 to 15 percent slopes, eroded.

deep are suited to clover-grass mixtures or to pure stands of grasses. Legumes can be established through renovation in areas that support sod-forming grasses.

The forage species selected for planting should be those that are suited not only to the soil but also to the intended use. They should be those that provide maximum quality and versatility in the forage program. Legumes generally produce higher quality feed than grasses. As a result, they should be grown to the maximum extent possible.

Additional information about pasture and hayland management is available at the local office of the Soil Conservation Service or the Kentucky Cooperative Extension Service.

Yields per Acre

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

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations 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 ensures 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 use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit *(15)*. Only class and subclass are used in this survey.

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 they 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 hazard is the risk of erosion unless a 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.

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

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

Charles A. Foster, forester, Soil Conservation Service, helped prepare this section.

Commercial forest land in Clinton County makes up about 41 percent of the total land area, or about 51,600 acres *(18)*. The dominant forest types are oak-hickory, which makes up approximately 44 percent of the forest land; central mixed hardwoods, 36 percent; redcedar-hardwoods, 7 percent; elm-ash-cottonwood, 4 percent; and maple-beech, white oak, oak-pine, and southern pine, 9 percent *(9)*.

Woodland tracts in the survey area are generally small private holdings of approximately 24 acres each. They are essentially unmanaged. Most of the forest land is capable of producing 50 cubic feet or more of wood per acre per year, but actual growth is only about 33 cubic feet of wood per acre per year. Much of the forest land is not properly managed because about 30 percent of it is part of a larger farm or tract. Most stands are sold after less than 10 years, and many are not well stocked with desirable, high-quality trees.

Good management can improve tree growth, stocking, and the quality of the stands. It involves the removal of low-quality trees in fully stocked and understocked stands and the regeneration of sawtimber stands after harvest. The information in this survey can be used to identify the most productive forest land, the soil limitations that affect management, and the most desirable tree species.

The survey area has five commercial sawmills, a pallet mill, a charcoal plant, and a timber concentration yard. Products include rough lumber, pallet cants, crossties and timbers, tobacco sticks, fuelwood, pallets, and charcoal. Several mills in adjacent counties also buy logs or standing trees that are produced in the county.

Soils vary in their ability to produce trees. Available water capacity and depth of the root zone have major effects on tree growth. Fertility and texture also influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. Elevation and aspect are of particular importance in mountainous areas.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber (fig. 17). Table 7 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, and susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment is needed. On the steepest slopes, even tracked equipment cannot be operated and more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use for 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the

Figure 17.—Woodland in an area of Sequoia-Wernock silt loams, 6 to 20 percent slopes.

use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. Ratings of moderate or severe indicate a need to choose the best suited equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. Plant competition is more severe on the more productive soils, on poorly drained soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants hinders adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants hinders natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A moderate or severe rating indicates the need for site preparation to ensure the development of an adequately stocked stand. Managers must plan site preparation measures to ensure reforestation without delays.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* and a *volume* number. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The estimates of the productivity of the soils in this survey are based on published data *(5, 6, 7, 10, 11, 12)*.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation.

Recreation

In table 8, the soils of the survey area are rated according to the 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 sewer lines. 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 recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

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 gentle 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 (fig. 18). 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, 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

Gregory K. Johnson, resource specialist, Soil Conservation Service, helped prepare this section.

The principal kinds of wildlife in Clinton County are cottontail rabbit, red squirrel, fox squirrel, raccoon, opossum, skunk, red fox, gray fox, white-tailed deer, bobwhite quail, mourning dove, turkey, grouse, and various kinds of ducks and geese. There also are many species of nongame birds and mammals, and there are approximately 41 species of reptiles and amphibians.

Photographers, birdwatchers, and others are interested in the wildlife of the survey area. Six species whose ranges include Clinton County have been declared endangered by the U.S. Fish and Wildlife Service. They are gray bat, rough pigtoe, orange-footed pearly mussel, bald eagle, dromedary pearly mussel, and red-cockaded woodpecker.

The streams in the county contain a variety of warm-water game fish, pan fish, and rough fish. Examples are largemouth bass and bluegill.

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 *(3)*.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife *(23)*. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

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

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

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil

Figure 18.—A picnic area above 76 Falls. The wooded side slopes are in an area of Garmon-Caneyville association, very steep.

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, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, orchardgrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, aster, and thistle.

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, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse 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, cedar, and hemlock.

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, cattail, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas (fig. 19). 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. Wildlife attracted to these areas include bobwhite quail, 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, and deer.

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

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, 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 should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the

Figure 19.—A natural shallow water area on Melvin silt loam, ponded.

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

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

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

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

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 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, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 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 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 landfill. 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 resulting from rapid permeability in 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 should 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 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 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 to 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, a 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 a 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 have a water table at a depth of 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. They 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 high 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 releases a variety of plant nutrients as it decomposes.

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

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

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

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

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

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

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for 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 control 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 erosion 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. These results are reported in table 19.

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 *(16)*. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, 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 the heading "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, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of 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. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 19.

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.

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, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-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 and septic tank absorption fields *(13)*.

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 classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, more 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 in 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 are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

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, occasional*, and *frequent*. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). *Common* is used when the occasional and frequent classes are grouped for certain purposes. Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. 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* 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. 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.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

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 either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. 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.

Physical and Chemical Analyses of Selected Soils

The results of physical analysis of several typical pedons in the survey area are given in table 17 and the results of chemical analysis in table 18. The data are for soils sampled at carefully selected sites. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by the Kentucky Agricultural Experiment Station.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(19)*.

Sand—(0.05-2.0 mm fraction) weight percentages of material less than 2 mm (3A1).
Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all material less than 2 mm (3A1).
Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of material less than 2 mm (3A1).
Organic carbon—wet combustion. Walkley-Black modified acid-dichromate, ferric sulfate titration (6A1c).
Extractable acidity—barium chloride-triethanolamine IV (6H5a).
Cation-exchange capacity—ammonium acetate, pH 7.0, steam distillation (5A8b).
Base saturation—ammonium acetate, pH 7.0 (5C1).
Base saturation—sum of cations, TEA, pH 8.2 (5C3).
Reaction (pH)—1:1 water dilution (8C1f).
Available phosphorus—Kentucky Agricultural Experiment Station (656).
Field sampling—site selection (1A1).
Field sampling—soil sampling (1A2).
Laboratory preparation—standard (air-dry) material (1B1).
Data sheet symbols—(2B).
Particles—greater than 2 mm by field or laboratory weighing (3B1a).
Particles—(specified size) 2 mm (2A2).
Particles—less than 2 mm (A1).
Extractable bases—(5B1a).
Exchangeable acidity (H+Al)—Yuan procedure 67-3.52, part 2, methods of analysis, ASA, 1965.
Calcium carbonate equivalent—procedure (23b) USDA Handbook 60, USDA salinity laboratory 1954 (6N7).

Engineering Index Test Data

Table 19 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by the Soil Conservation Service, Soil Mechanics Laboratory, Fort Worth, Texas.

The testing methods generally are those of the American Association of State Highway and

Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 4318 (ASTM); and Plasticity index—T 90 (AASHTO), D 4318 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(17)*. 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 on laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven 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 flood plain, plus *aquent*, the suborder of the Entisols that has 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. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size 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" *(14)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(17)*. 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."

Allen Series

The Allen series consists of very deep, well drained, moderately permeable soils that formed in alluvium, colluvium, or residuum weathered mostly from sandstone and shale. These soils are on high terraces, side slopes, and toe slopes. Slopes range from 2 to 20 percent. The soils are fine-loamy, siliceous, thermic Typic Paleudults.

Allen soils are associated with Caneyville, Dewey, and Nolin soils. Caneyville soils are above the Allen soils on side slopes. They are fine textured and are moderately deep over bedrock. Dewey soils are mostly on ridgetops above the Allen soils. They are clayey. Nolin soils are on flood plains below the Allen soils. They are fine-silty.

Typical pedon of Allen loam, 6 to 12 percent slopes, eroded; about 6.2 miles southeast of Albany, 1.4 miles north of Beach Bottom Church, about 500 yards north of McIver Creek from Kentucky Highway 415:

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) loam; weak fine granular structure; very friable; many fine and medium roots; about 3 percent sandstone fragments less than 1 inch in diameter; strongly acid; abrupt smooth boundary.

Bt1—7 to 15 inches; yellowish red (5YR 4/6) clay loam; moderate fine subangular blocky structure; friable; common fine and medium roots; common distinct clay films on faces of peds; about 3 percent sandstone fragments less than 1 inch in diameter; very strongly acid; clear smooth boundary.

Bt2—15 to 23 inches; yellowish red (5YR 5/6) clay loam; few fine distinct yellowish brown (10YR 5/6) and brown (7.5YR 4/4) mottles; moderate fine and medium angular and subangular blocky structure; firm; common fine and medium roots; many distinct clay films on faces of peds; about 3 percent sandstone fragments less than 1 inch in diameter; strongly acid; clear smooth boundary.

Bt3—23 to 33 inches; red (2.5YR 4/6) clay loam; common medium distinct yellowish brown (10YR 5/6) and yellowish red (5YR 5/6) mottles; moderate fine and medium angular and subangular blocky structure; firm; common fine and medium roots; many distinct clay films on faces of peds; about 6 percent sandstone fragments less than 1 inch in diameter; strongly acid; gradual smooth boundary.

Bt4—33 to 45 inches; red (2.5YR 4/6) clay loam; common medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; moderate fine and medium angular and subangular blocky structure; firm; few fine roots; many prominent clay films on faces of peds; about 10 percent sandstone fragments less than 2 inches in diameter; very strongly acid; gradual smooth boundary.

Bt5—45 to 56 inches; red (2.5YR 5/6) clay loam; many medium prominent reddish yellow (7.5YR 6/8) mottles; strong fine and medium angular and subangular blocky structure; firm; few fine roots; many prominent clay films on faces of peds; about 12 percent sandstone fragments less than 2 inches in diameter; very strongly acid; gradual smooth boundary.

Bt6—56 to 72 inches; red (2.5YR 5/6) clay loam; many medium prominent reddish yellow (7.5YR 6/8) mottles; strong fine and medium angular and subangular blocky structure; firm; many prominent clay films on faces of peds; about 14 percent sandstone fragments; very strongly acid.

Thickness of the solum ranges from 60 to more than 80 inches. The depth to bedrock is more than 60 inches. Unless the soils have been limed, reaction is very strongly acid or strongly acid. The content of coarse fragments, mostly rounded sandstone, ranges from 0 to 15 percent throughout the profile.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 3 or 4. Some pedons have a BA horizon, which has hue of 10YR to 5YR, value of 4 or 5 and chroma of 4 to 8. In the fine-earth fraction, this horizon is fine sandy loam, loam, sandy clay loam, or clay loam. The Bt horizon has hue of 5YR or 2.5YR, value of 4 to 6, and chroma of 6 to 8. It has mottles in shades of brown, yellow, or red. They range from none to common in the upper part and from few to many in the lower part. In the fine-earth fraction, this horizon is loam, sandy clay loam, or clay loam. It ranges to sandy clay, clay, or silty clay below a depth of 3 feet.

Bethesda Series

The Bethesda series consists of very deep, well drained, moderately slowly permeable soils that formed in acid regolith from surface coal mining operations. These soils are on ridgetops and side slopes in strip-mined areas. Slopes range from 12 to 60 percent. The soils are loamy-skeletal, mixed, acid, mesic Typic Udorthents.

Bethesda soils are associated with Cutshin, Muse, Sequoia, Shelocta, and Wernock soils. Cutshin and Shelocta soils are fine-loamy. Muse and Sequoia soils are clayey. Sequoia soils are moderately deep. Wernock soils are fine-silty and are moderately deep.

Typical pedon of Bethesda channery silty clay loam, 12 to 60 percent slopes; about 5.2 miles northeast of Albany, 0.3 mile south of Kentucky Highway 90, about 3.2 miles west of the Wayne County line:

Ap—0 to 6 inches; yellowish brown (10YR 5/8) channery silty clay loam; common fine distinct light gray (N 7/0) relict mottles; weak medium granular structure; firm; about 20 percent soft, gray shale fragments; slightly acid; clear smooth boundary.

C1—6 to 27 inches; strong brown (7.5YR 5/6) very channery clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; massive; firm; about 40 percent shale and sandstone fragments; very strongly acid; gradual wavy boundary.

C2—27 to 62 inches; yellowish brown (10YR 5/6) very channery clay loam; common fine distinct strong brown (7.5YR 5/6) and light brownish gray (10YR 6/2) mottles; massive; firm; about 45 percent shale and sandstone fragments; very strongly acid.

The depth to bedrock is more than 60 inches. Unless the soils have been limed, reaction ranges from extremely acid to strongly acid. The content of coarse fragments, including shale, sandstone, siltstone, and coal, ranges from 15 to 35 percent in the A horizon and from 35 to 80 percent in the C horizon.

The A horizon has hue of 7.5YR to 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 8. The C horizon has hue of 7.5YR to 5Y or is neutral in hue. It has value of 3 to 6 and chroma of 0 to 8. In the fine-earth fraction, it is silty clay loam, clay loam, silt loam, or loam.

Caneyville Series

The Caneyville series consists of moderately deep, well drained, moderately slowly permeable soils that formed in clayey material weathered from limestone. These soils are on side slopes and ridgetops. Slopes range from 6 to 70 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Caneyville soils are associated with Mountview, Dewey, and Garmon soils. Mountview and Dewey soils are mostly on ridgetops above the Caneyville soils. They are very deep over bedrock. Mountview soils are fine-silty. Garmon soils are on side slopes below the Caneyville soils. They are fine-loamy.

Typical pedon of Caneyville silt loam, 6 to 12 percent slopes; about 4.2 miles south of Albany, 1.4 miles south of Kentucky Highway 969, about 0.4 mile east of U.S. Highway 127:

Ap—0 to 6 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable; common fine roots; about 10 percent limestone gravel; neutral; clear smooth boundary.

Bt1—6 to 12 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; few distinct clay films on faces of peds; about 2 percent gravel; slightly acid; clear smooth boundary.

Bt2—12 to 18 inches; red (2.5YR 4/6) silty clay; moderate medium subangular blocky structure; firm; few fine roots; few distinct clay films on faces of peds; about 2 percent gravel; slightly acid; clear smooth boundary.

Bt3—18 to 29 inches; red (2.5YR 4/6) clay; strong medium subangular blocky structure; firm; few fine roots; many distinct clay films on faces of peds; about 2 percent gravel; medium acid; abrupt smooth boundary.

R—29 inches; limestone bedrock.

Thickness of the solum and the depth to bedrock range from 20 to 40 inches. Reaction ranges from very strongly acid to neutral in the upper part of the solum and from medium acid to mildly alkaline in the lower part. The content of rock fragments, mostly limestone, chert, or sandstone, ranges from 0 to 10 percent in the upper part of the solum and is as much as 35 percent in the lower part.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. Some pedons have an A horizon, which has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 or 3. Some pedons have a BA horizon, which has hue of 10YR to 5YR, value of 5 or 6, and chroma of 4 to 6. This horizon is silt loam or silty clay loam. The Bt horizon has hue of 10YR to 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is silty clay loam, silty clay, or clay. Some pedons have a C or BC horizon, which has matrix colors and mottles in shades of red, brown, yellow, olive, or gray. In the fine-earth fraction, this horizon is silty clay or clay.

Cutshin Series

The Cutshin series consists of deep and very deep, well drained, moderately permeable soils that formed in loamy colluvium weathered from sandstone, siltstone, and shale. These soils are on mountain side slopes and benches and in coves. Slopes range from 20 to 60 percent. The soils are fine-loamy, mixed, mesic Typic Haplumbrepts.

Cutshin soils are associated with Shelocta and Muse soils on mountain side slopes and benches. Shelocta and Muse soils have an argillic horizon. Muse soils are clayey.

Typical pedon of Cutshin channery loam, in an area of Shelocta-Muse-Cutshin complex, 20 to 60 percent slopes; about 7.6 miles southeast of Albany, 1.2 miles south of Kentucky Highway 415, about 0.7 mile west of the Wayne County line, on Kennedy Mountain:

Oe—2 inches to 0; partially decomposed leaf litter.

A1—0 to 10 inches; very dark grayish brown (10YR 3/2) channery loam; weak fine granular structure; friable; many fine and medium roots; about 25 percent sandstone fragments; neutral; clear smooth boundary.

A2—10 to 17 inches; dark brown (10YR 3/3) channery loam; weak fine granular structure; friable; common fine and medium roots; about 25 percent sandstone fragments; neutral; gradual smooth boundary.

Bw1—17 to 26 inches; dark brown (10YR 4/3) channery clay loam; weak fine subangular blocky structure; friable; few fine roots; about 25 percent sandstone fragments; slightly acid; gradual smooth boundary.

Bw2—26 to 42 inches; yellowish brown (10YR 5/4) channery clay loam; weak fine subangular blocky structure; friable; few fine roots; about 30 percent sandstone fragments; strongly acid; gradual smooth boundary.

Cr—42 to 65 inches; soft, gray and brown siltstone bedrock.

Thickness of the solum and the depth to soft bedrock range from 40 to more than 80 inches. Reaction ranges from medium acid to neutral in the A horizon and from very strongly acid to medium acid in the Bw horizon. Thin, flat or subrounded fragments are as much as 15 inches across. They make up 10 to 35 percent of individual horizons.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3. The Bw horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. In the fine-earth fraction, it is loam, sandy loam, clay loam, or sandy clay loam. In some pedons it has mottles in shades of brown in the upper part and in shades of gray in the lower part. The Cr horizon is siltstone, sandstone, or shale.

Dewey Series

The Dewey series consists of very deep, well drained, moderately permeable soils that formed in residuum of limestone or old alluvium underlain by material weathered from limestone. These soils are on convex ridgetops and side slopes. Some areas have karst topography. Slopes range from 6 to 25 percent. The soils are clayey, kaolinitic, thermic Typic Paleudults. They have a slightly higher content of sand than is defined as the range for the series.

Dewey soils are associated with Caneyville, Garmon, and Mountview soils. Caneyville and Garmon soils are on side slopes below the Dewey soils. They are moderately deep over bedrock. Garmon soils are fine-loamy. Mountview soils are on smooth ridgetops above the Dewey soils. They are fine-silty.

Typical pedon of Dewey loam, 6 to 15 percent slopes, eroded; about 3.9 miles south of Albany, 0.25 mile south of Kentucky Highway 969, about 300 yards east of U.S. Highway 127:

Ap—0 to 7 inches; brown (7.5YR 4/3) loam; weak fine granular structure; very friable; many fine and medium roots; slightly acid; abrupt smooth boundary.

Bt1—7 to 13 inches; yellowish red (5YR 4/6) clay; tongues of brown (10YR 4/3); moderate fine and medium subangular blocky structure; firm; common fine and medium roots; common faint clay films on faces of peds; neutral; clear wavy boundary.

Bt2—13 to 24 inches; yellowish red (5YR 4/6) clay; moderate medium subangular blocky structure; firm; common fine and medium roots; common distinct reddish brown (5YR 4/4) clay films on faces of peds; neutral; gradual smooth boundary.

Bt3—24 to 37 inches; red (2.5YR 4/6) clay; strong fine and medium subangular blocky structure; firm; common fine and medium roots; many distinct dark reddish brown (2.5YR 3/4) clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt4—37 to 49 inches; red (2.5YR 4/6) clay; strong fine and medium angular blocky structure; firm; few fine roots; many distinct dark reddish brown (2.5YR 3/4) clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt5—49 to 60 inches; red (2.5YR 4/6) clay; strong fine and medium angular blocky structure; firm; many distinct dark reddish brown (2.5YR 3/4) clay films on faces of peds; about 2 percent chert fragments less than 2 inches in diameter; strongly acid; gradual smooth boundary.

Bt6—60 to 70 inches; red (2.5YR 4/6) clay; moderate fine and medium angular and subangular blocky structure; firm; many distinct dark reddish brown (2.5YR 3/4) clay films on faces of peds; strongly acid.

Thickness of the solum and the depth to bedrock are more than 60 inches. Reaction ranges from neutral to strongly acid in the upper part of the solum and is strongly acid or very strongly acid in the lower part. The content of coarse fragments, to a depth of 40 inches or more, is less than 15 percent by volume.

The Ap horizon has hue of 7.5YR or 5YR, value of 3 to 5, and chroma of 3 or 4. The Bt horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 6 to 8. It has common or many mottles of brown, yellow, or red. It is silty clay or clay. Some pedons have a horizon of silty clay loam or clay loam that is 4 to 8 inches thick directly below the plow layer.

Elk Series

The Elk series consists of very deep, well drained, moderately permeable soils that formed in mixed alluvium from soils that formed in material weathered from limestone, siltstone, shale, and sandstone. These soils are on stream terraces throughout the county. Slopes range from 2 to 12 percent. The soils are fine-silty, mixed, mesic Ultic Hapludalfs.

Elk soils are associated with Grigsby and Nolin soils. Grigsby and Nolin soils are on flood plains below the Elk soils. They do not have an argillic horizon. Grigsby soils are coarse-loamy.

Typical pedon of Elk silt loam, 2 to 6 percent slopes; about 3.1 miles northeast of Albany, 100 yards west of Kentucky Highway 350, at a point 1.5 miles north of the junction of Kentucky Highway 350 and Kentucky Highway 415:

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

Bt1—8 to 14 inches; yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky structure; friable; common roots; few distinct clay films on faces of peds; few sandstone pebbles; slightly acid; clear smooth boundary.

Bt2—14 to 30 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few roots; thin distinct clay films on faces of peds; about 5 percent sandstone gravel in the lower 4 inches; slightly acid; gradual smooth boundary.

Bt3—30 to 45 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; common distinct clay films on faces of peds and in pores; about 4 percent sandstone gravel; slightly acid; gradual smooth boundary.

C—45 to 62 inches; strong brown (7.5YR 5/6) silty clay loam; common fine distinct light yellowish brown (10YR 6/4) mottles; massive; firm; slightly acid.

Thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. Reaction ranges from very strongly acid to slightly acid in the solum and from strongly acid to slightly acid in the C horizon. The content of gravel ranges from 0 to 5 percent in the solum and from 0 to 35 percent 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. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silty clay loam. It has few or common mottles in shades of brown in the upper part and has mottles in shades of brown or gray in the lower part. The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. In the fine-earth fraction, it is silt loam or silty clay loam.

Faywood Series

The Faywood series consists of moderately deep, well drained, moderately slowly permeable or slowly permeable soils that formed in material weathered from interbedded limestone and shale. These soils are on side slopes. Slopes range from 12 to 30 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Faywood soils are associated with Garmon, Nolin, and Waynesboro soils. Garmon soils are fine-loamy. Nolin and Waynesboro soils are very deep over bedrock. Nolin soils are fine-silty.

Typical pedon of Faywood silty clay loam, 12 to 30 percent slopes, eroded; about 12.8 miles north of Albany, 1.6 miles northwest of the junction of U.S. Highway 127 and Kentucky Highway 1865, about 0.1 mile east of the Cumberland River:

Ap—0 to 5 inches; brown (10YR 4/3) silty clay loam; weak fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

Bt1—5 to 15 inches; dark yellowish brown (10YR 4/4) silty clay; moderate medium subangular blocky structure; firm; few fine roots; many distinct clay films on faces of peds; slightly acid; gradual smooth boundary.

Bt2—15 to 31 inches; yellowish brown (10YR 5/6) silty clay; few fine distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; very firm; few fine roots; many distinct clay films on faces of peds; slightly acid; abrupt smooth boundary.

R—31 inches; limestone bedrock.

Thickness of the solum and the depth to bedrock range from 20 to 40 inches. Reaction ranges from strongly acid to mildly alkaline throughout the profile. The content of limestone fragments ranges from 0 to 15 percent in the solum and is as much as 35 percent in the C horizon, if it occurs.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. It is commonly mottled in shades of brown or olive in the lower part. It is silty clay or clay.

Garmon Series

The Garmon series consists of moderately deep, well drained, moderately rapidly permeable soils that formed in material weathered from shaly limestone, calcareous shale, and siltstone. These soils are on highly dissected side slopes. Slopes range from 12 to 70 percent. The soils are fine-loamy, mixed, mesic Dystric Eutrochrepts.

Garmon soils are associated with Caneyville and

Dewey soils. Caneyville soils are on side slopes above the Garmon soils. They are fine textured. Dewey soils are on convex ridgetops and side slopes above the Garmon soils. They are very deep over bedrock and are clayey.

Typical pedon of Garmon silt loam, in an area of Caneyville-Garmon association, steep; 12.4 miles north of Albany, 0.5 mile south of the Russell and Clinton County line on U.S. Highway 127, about 300 feet southeast of Agee Cemetery:

A—0 to 2 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; friable; many fine roots; about 5 percent gravel; slightly acid; clear smooth boundary.

Bw1—2 to 13 inches; yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky structure; friable; many fine roots; about 10 percent gravel; slightly acid; clear smooth boundary.

Bw2—13 to 25 inches; yellowish brown (10YR 5/6) channery silt loam; weak fine subangular blocky structure; friable; few medium roots; about 30 percent channers; slightly acid; abrupt smooth boundary.

R—25 inches; shaly limestone bedrock.

Thickness of the solum and the depth to bedrock range from 20 to 40 inches. Reaction ranges from medium acid to neutral throughout the profile. The content of rock fragments, mostly shale, siltstone, and limestone, ranges from 2 to 45 percent in the solum. The weighted average in the control section is 10 to 35 percent.

The A horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 or 3. The Bw horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. In the fine-earth fraction, it is loam, silt loam, or silty clay loam.

Gilpin Series

The Gilpin series consists of moderately deep, well drained, moderately permeable soils that formed in material weathered from interbedded acid siltstone, shale, and sandstone. These soils are on convex ridgetops. Slopes range from 2 to 12 percent. The soils are fine-loamy, mixed, mesic Typic Hapludults.

Gilpin soils are associated with Garmon, Dewey, and Caneyville soils. Garmon soils do not have an argillic horizon. Dewey soils are clayey and are very deep over bedrock. Caneyville soils are fine textured.

Typical pedon of Gilpin loam, 6 to 12 percent slopes; about 7.0 miles northwest of Albany, 0.4 mile east of the Cumberland County line, 0.25 mile west of Illwill Creek, 1.4 miles south of Kentucky Highway 90:

Ap—0 to 7 inches; brown (10YR 4/3) loam; weak fine granular structure; friable; many fine roots; about 5 percent gravel; moderately alkaline; abrupt smooth boundary.

BA—7 to 12 inches; light yellowish brown (10YR 6/4) loam; weak fine subangular blocky structure; friable; few fine roots; about 10 percent gravel; strongly acid; clear smooth boundary.

Bt1—12 to 25 inches; yellowish brown (10YR 5/6) channery clay loam; weak medium subangular blocky structure; friable; few fine roots; few distinct clay films on horizontal faces of peds; about 30 percent channers; very strongly acid; clear smooth boundary.

Bt2—25 to 36 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; few distinct clay films on horizontal faces of peds; about 10 percent channers; extremely acid; abrupt smooth boundary.

R—36 inches; sandstone bedrock.

Thickness of the solum ranges from 18 to 36 inches. The depth to bedrock ranges from 20 to 40 inches. Unless the soils have been limed, reaction ranges from extremely acid to strongly acid. The content of coarse fragments, mostly sandstone, siltstone, and shale, ranges from 5 to 15 percent in the Ap horizon, from 5 to 40 percent in the Bt horizon, and from 30 to 90 percent in the C horizon, if it occurs.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. The BA horizon has hue of 10YR and value and chroma of 4 to 6. It is loam or silt loam. The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. In the fine-earth fraction, it is silt loam, loam, clay loam, or silty clay loam. The C or BC horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 6. In the fine-earth fraction, it is silt loam, loam, or silty clay loam.

Grigsby Series

The Grigsby series consists of very deep, well drained, moderately permeable or moderately rapidly permeable soils that formed in mixed alluvium on flood plains. Slopes range from 0 to 4 percent. The soils are coarse-loamy, mixed, mesic Dystric Fluventic Eutrochrepts.

Grigsby soils are associated with Elk, Nolin, Newark, and Melvin soils. Elk soils are on stream terraces above the Grigsby soils. They have an argillic horizon. Elk, Nolin, Newark, and Melvin soils are fine-silty. Newark soils are somewhat poorly drained, and Melvin soils are poorly drained.

Typical pedon of Grigsby fine sandy loam, protected;

about 14.3 miles northwest of Albany, 1.75 miles northwest of Kentucky Highway 1865, about 200 yards north of the Cumberland River:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; slightly acid; clear smooth boundary.

Bw1—7 to 18 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; medium acid; gradual smooth boundary.

Bw2—18 to 40 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; friable; medium acid; gradual smooth boundary.

C—40 to 62 inches; dark yellowish brown (10YR 4/4) sandy loam; massive; friable; slightly acid.

Thickness of the solum ranges from 30 to 50 inches. The depth to bedrock is more than 60 inches. Reaction ranges from medium acid to neutral in the solum and from strongly acid to neutral in the C horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The Bw horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is loam, fine sandy loam, or sandy loam. The C horizon has colors and textures similar to those of the Bw horizon. It is commonly stratified.

Melvin Series

The Melvin series consists of very deep, poorly drained, moderately permeable soils that formed in mixed alluvium. These soils are on flood plains and in upland depressions. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, nonacid, mesic Typic Fluvaquents.

Melvin soils are associated with Newark and Nolin soils. Newark soils are somewhat poorly drained, and Nolin soils are well drained.

Typical pedon of Melvin silt loam, ponded; about 4.3 miles north of Albany, 500 feet west of Kentucky Highway 639, at a point 0.6 mile south of the junction of Kentucky Highway 639 and Kentucky Highway 90:

A—0 to 4 inches; very dark gray (10YR 3/1) silt loam; weak fine granular structure; friable; common fine and medium roots; medium acid; abrupt smooth boundary.

Bg1—4 to 9 inches; gray (10YR 6/1) silt loam; weak fine granular structure; friable; few fine and medium roots; medium acid; clear smooth boundary.

Bg2—9 to 21 inches; mottled gray (10YR 6/1 and 5/1) silt loam; weak fine angular blocky structure; friable; few fine roots; medium acid; gradual smooth boundary.

Bg3—21 to 34 inches; gray (10YR 6/1) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine angular blocky structure; friable; few roots; medium acid; gradual smooth boundary.

Cg—34 to 62 inches; gray (10YR 6/1) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; few roots; medium acid.

Thickness of the solum ranges from 20 to 40 inches. The depth to bedrock is more than 60 inches. Reaction ranges from medium acid to mildly alkaline throughout the profile.

The A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 2 or less. The Ap horizon, if it occurs, has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 to 4. The Bg horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 4 to 7 and chroma of 2 or less. It has brown and red mottles. It is silt loam or silty clay loam. The Cg horizon has colors similar to those of the Bg horizon. It is silt loam, silty clay loam, or loam.

Mountview Series

The Mountview series consists of very deep, well drained, moderately permeable soils that formed in a silty mantle underlain by material weathered from limestone or old alluvium. These soils are on smooth convex ridgetops. Slopes range from 2 to 6 percent. The soils are fine-silty, siliceous, thermic Typic Paleudults.

Mountview soils are associated with Dewey, Garmon, and Caneyville soils. Dewey soils are on ridgetops and side slopes below the Mountview soils. They are clayey. Garmon and Caneyville soils are on steep side slopes below the Mountview soils. They are moderately deep over bedrock. Garmon soils are fine-loamy, and Caneyville soils are fine textured.

Typical pedon of Mountview silt loam, 2 to 6 percent slopes; about 3.9 miles south of Albany, 90 yards east of U.S. Highway 127, about 0.5 mile south of Kentucky Highway 969:

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine and medium roots; slightly acid; abrupt smooth boundary.

Bt1—9 to 15 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine black concretions; many fine and medium roots; few faint clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—15 to 24 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; many fine black concretions;

common fine and medium roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt3—24 to 33 inches; yellowish red (5YR 4/6) silty clay loam; moderate fine and medium subangular blocky structure; firm; many fine black concretions; few fine and medium roots; many distinct brown (7.5YR 4/3) clay films on faces of peds; strongly acid; gradual smooth boundary.

2Bt4—33 to 43 inches; red (2.5YR 4/6) silty clay loam; common fine distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; firm; many fine black concretions; few fine roots; many distinct dark reddish brown (2.5YR 3/3) clay films on faces of peds; strongly acid; gradual smooth boundary.

2Bt5—43 to 60 inches; red (2.5YR 4/6) silty clay loam; few fine distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; firm; many fine black concretions; many distinct dark reddish brown (2.5YR 3/3) clay films on faces of peds; about 5 percent chert pebbles; very strongly acid; gradual smooth boundary.

2Bt6—60 to 75 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm; many fine black concretions; many distinct dark reddish brown (2.5YR 3/3) clay films on faces of peds; about 5 percent chert pebbles; very strongly acid.

Thickness of the solum and the depth to bedrock are more than 60 inches. Reaction ranges from neutral to strongly acid in the upper part of the solum and is strongly acid or very strongly acid in the lower part. The upper part of the solum formed in a silty mantle and ranges from 22 to 36 inches in thickness. The content of chert and sandstone fragments ranges from 0 to 5 percent in the upper part of the solum and from 5 to 35 percent in the lower part.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The Bt horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 to 8. It is silt loam or silty clay loam. The 2Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6. In the fine-earth fraction, it is silty clay loam, silty clay, or clay. Some pedons have few or common mottles in shades of brown, yellow, red, or gray in the lower part of the solum.

Muse Series

The Muse series consists of deep and very deep, well drained, slowly permeable soils that formed in residuum or colluvium weathered from shale and siltstone. These soils are on mountain side slopes, foot slopes, and benches. Slopes range from 20 to 60 percent. The soils are clayey, mixed, mesic Typic Hapludults.

Muse soils are associated with Sequoia, Shelocta, and Cutshin soils on mountain side slopes and in coves. Sequoia soils are moderately deep over bedrock. Shelocta and Cutshin soils are fine-loamy. Cutshin soils have an umbric epipedon.

Typical pedon of Muse silt loam, in an area of Shelocta-Muse-Cutshin complex, 20 to 60 percent slopes; approximately 7.8 miles southeast of Albany, 1.1 miles south of Kentucky Highway 415, about 0.8 mile west of the Wayne County line, on Kennedy Mountain:

Oe—2 inches to 0; partially decomposed hardwood leaf litter.

A—0 to 3 inches; dark brown (10YR 3/3) silt loam; weak fine granular structure; friable; many fine and medium roots; about 10 percent sandstone fragments; neutral; clear smooth boundary.

E—3 to 7 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; many fine and medium roots; about 10 percent sandstone gravel; strongly acid; clear smooth boundary.

Bt1—7 to 12 inches; yellowish brown (10YR 5/6) silty clay loam; weak fine subangular blocky structure; friable; common fine roots; few faint clay films on horizontal faces of peds; about 10 percent sandstone gravel; strongly acid; clear smooth boundary.

Bt2—12 to 29 inches; yellowish brown (10YR 5/6) channery silty clay; common fine distinct pale brown (10YR 6/3) mottles; moderate medium angular and subangular blocky structure; firm; few fine roots; many distinct clay films on faces of peds; about 15 percent sandstone channers; strongly acid; gradual smooth boundary.

Bt3—29 to 42 inches; yellowish brown (10YR 5/6) silty clay; common fine distinct strong brown (7.5YR 5/8) and pale brown (10YR 6/3) mottles; moderate medium angular and subangular blocky structure; very firm; many distinct clay films on faces of peds; about 5 percent shale and sandstone fragments; strongly acid; gradual smooth boundary.

Cr—42 to 50 inches; soft, gray and brown clay shale bedrock.

Thickness of the solum ranges from 40 to 60 inches. The depth to bedrock ranges from 40 to 80 inches. Reaction ranges from very strongly acid to neutral in the A horizon and is very strongly acid or strongly acid in the B horizon. The content of shale and siltstone fragments ranges from 0 to 15 percent in the A and E horizons, from 0 to 35 percent in the Bt horizon, and from 0 to 60 percent in the C horizon.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 4. The E horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 or 4. The Bt horizon has hue of 10YR to 5YR, value of 4 or 5, and chroma of 4 to 8. It has mottles in shades of brown or red in the lower part. In the fine-earth fraction, it is silty clay loam, silty clay, or clay. The C horizon, if it occurs, has hue of 10YR to 5YR, value of 4 to 6, and chroma of 1 to 6. It has mottles in shades of brown, red, or gray. It has textures similar to those of the Bt horizon. The Cr horizon is shale or siltstone and is commonly interbedded with thin layers of sandstone.

Newark Series

The Newark series consists of very deep, somewhat poorly drained, moderately permeable soils that formed in mixed alluvium. These soils are on flood plains and in upland depressions. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, nonacid, mesic Aeric Fluvaquents.

Newark soils are associated with Nolin and Melvin soils. Nolin soils are well drained, and Melvin soils are poorly drained.

Typical pedon of Newark silt loam, frequently flooded; about 1.9 miles west of Albany, 1.2 miles south of the junction of Kentucky Highway 1590 and Kentucky Highway 639, about 0.6 mile northwest of Kentucky Highway 553:

A—0 to 7 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

Bw—7 to 14 inches; brown (10YR 5/3) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; common fine roots; about 5 percent pebbles; slightly acid; clear smooth boundary.

Bg1—14 to 18 inches; light gray (10YR 7/1) silt loam; many fine distinct yellowish brown (10YR 5/6) mottles; weak fine angular blocky structure; friable; few fine roots; few brown concretionary stains; slightly acid; gradual smooth boundary.

Bg2—18 to 42 inches; light gray (10YR 7/1) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak fine angular blocky structure; friable; few fine roots; medium acid; clear smooth boundary.

Cg—42 to 62 inches; mottled light gray (10YR 7/2), strong brown (7.5YR 5/6), and gray (10YR 5/1) gravelly silty clay loam; massive; firm; about 30 percent rounded pebbles; medium acid.

Thickness of the solum ranges from 20 to 44 inches. The depth to bedrock is more than 60 inches. Reaction ranges from medium acid to mildly alkaline throughout the profile. The content of rock fragments ranges from 0 to 5 percent above a depth of 30 inches, from 0 to 15 percent below a depth of 30 inches, and from 0 to 60 percent below a depth of 40 inches.

The A horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. The Bw horizon also has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is mottled in shades of brown or gray. It is silt loam or silty clay loam. The Bg horizon has hue of 2.5Y to 7.5YR, value of 4 to 7, and chroma of 2 or less. It is mottled in shades of brown. It is silt loam or silty clay loam. The Cg horizon has hue of 2.5Y to 7.5YR, value of 4 to 7, and chroma of 2 or less. It is mottled in shades of brown. In the fine-earth fraction, it is silt loam or silty clay loam.

Nolin Series

The Nolin series consists of very deep, well drained, moderately permeable soils that formed in mixed alluvium. These soils are on flood plains. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts.

The Nolin soils in this survey area are taxadjuncts because the control section has more sand than is defined as the range for the series. Mineralogy is borderline mixed-siliceous. These differences do not affect the use or management of the soils.

Nolin soils are associated with Elk, Melvin, and Newark soils. Elk soils are on stream terraces above the Nolin soils. They have an argillic horizon. Melvin soils are poorly drained. Newark soils are somewhat poorly drained.

Typical pedon of Nolin silt loam, frequently flooded; about 3.3 miles east of Albany, 0.8 mile north of Central Grove Church, 0.3 mile west of the road:

Ap—0 to 10 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine and medium roots; medium acid; clear smooth boundary.

Bw1—10 to 16 inches; brown (10YR 4/3) silt loam; moderate fine and medium granular structure; very friable; few fine black concretions; common fine and medium roots; medium acid; abrupt smooth boundary.

Bw2—16 to 29 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine and medium subangular blocky structure parting to moderate fine granular; friable; common fine black concretions; few fine roots; medium acid; gradual smooth boundary.

Bw3—29 to 44 inches; yellowish brown (10YR 5/4) loam; few fine distinct pale brown (10YR 6/3) and brown (7.5YR 4/4) mottles; weak fine and medium subangular blocky structure; friable; few fine roots; common fine dark brown concretions; medium acid; gradual smooth boundary.

C—44 to 62 inches; yellowish brown (10YR 5/4) gravelly loam; common fine distinct brown (7.5YR 4/4) and light brownish gray (10YR 6/2) mottles; massive; friable; few fine roots; common fine dark brown concretions; about 25 percent chert fragments 0.5 inch to 2.0 inches in diameter; medium acid.

Thickness of the solum is more than 40 inches. The depth to bedrock is more than 60 inches. Reaction ranges from medium acid to moderately alkaline throughout the profile. The content of rock fragments, mostly pebbles, ranges from 0 to about 5 percent in the solum and from 0 to 35 percent in the C horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is mottled in shades of brown and gray at a depth of about 30 inches. It is loam, silt loam, or silty clay loam. The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. In the fine-earth fraction, it is loam, silt loam, or silty clay loam.

Sequoia Series

The Sequoia series consists of moderately deep, well drained, moderately slowly permeable soils that formed in residuum from acid shale and siltstone. These soils are on ridgetops and concave side slopes. Slopes range from 6 to 60 percent. The soils are clayey, mixed, mesic Typic Hapludults.

Sequoia soils are associated with Wernock soils on ridgetops and with Muse and Shelocta soils on concave side slopes. Wernock soils are fine-silty. Muse and Shelocta soils have a solum that is more than 40 inches thick. Shelocta soils are fine-loamy.

Typical pedon of Sequoia silt loam, in an area of Sequoia-Wernock silt loams, 6 to 20 percent slopes; about 6.6 miles northeast of Albany, 1.0 mile south of Kentucky Highway 696, on the Wayne County line:

A—0 to 6 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; friable; many roots; about 2 percent sandstone gravel; strongly acid; clear smooth boundary.

BA—6 to 10 inches; strong brown (7.5YR 5/6) silt loam; weak fine subangular blocky structure; friable; common roots; about 2 percent sandstone gravel; very strongly acid; gradual smooth boundary.

Bt1—10 to 18 inches; yellowish red (5YR 5/6) silty clay; moderate medium angular and subangular blocky structure; firm; few roots; many distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—18 to 28 inches; yellowish red (5YR 5/6) silty clay; common fine distinct pale brown (10YR 6/3) and light yellowish brown (2.5Y 6/4) mottles; moderate medium angular and subangular blocky structure; firm; few roots; many distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

BC—28 to 35 inches; variegated pale brown (10YR 6/3), light gray (10YR 7/2), and red (2.5YR 4/6) clay; moderate medium angular and subangular blocky structure; firm; very strongly acid; clear smooth boundary.

Cr—35 to 60 inches; soft, red and gray clay shale bedrock.

Thickness of the solum and the depth to soft shale bedrock range from 20 to 40 inches. The depth to hard shale bedrock is more than 60 inches. Unless the soils have been limed, reaction is very strongly acid or strongly acid. The content of coarse fragments, mostly shale, ranges from 0 to 10 percent by volume in the A horizon and from 0 to 25 percent in the B and C horizons. The weighted average is 15 to 35 percent. The content of coarse fragments ranges from 15 to 70 percent in the C horizon.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. The BA horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. It is silty clay loam or silt loam. The Bt horizon has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 4 to 8. In some pedons it is mottled in shades of brown, yellow, or red. In the fine-earth fraction, it is silty clay or clay. The BC horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 6 to 8. In some pedons it is mottled in shades of yellow, brown, red, and gray. In the fine-earth fraction, it is silty clay loam, silty clay, or clay.

Shelocta Series

The Shelocta series consists of deep and very deep, well drained, moderately permeable soils that formed in mixed colluvium weathered from acid shale, siltstone, and sandstone. These soils are on mountain side slopes and benches. Slopes range from 20 to 60 percent. The soils are fine-loamy, mixed, mesic Typic Hapludults.

Shelocta soils are associated with Sequoia, Muse, and Cutshin soils on mountain side slopes and benches and in coves. Sequoia and Muse soils are clayey. Sequoia soils are moderately deep over bedrock. Cutshin soils have an umbric epipedon.

Typical pedon of Shelocta silt loam, in an area of Shelocta-Muse-Cutshin complex, 20 to 60 percent slopes; about 7.7 miles southeast of Albany, 1.3 miles south of Kentucky Highway 415, about 0.6 mile west of the Wayne County line, on Kennedy Mountain:

Oe—2 inches to 0; partially decomposed hardwood leaf litter.

A—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine and medium roots; about 10 percent sandstone fragments less than 2 inches in diameter; slightly acid; clear smooth boundary.

Bt1—10 to 22 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; common fine and medium roots; few faint clay films on horizontal faces of peds; about 10 percent sandstone fragments less than 3 inches in diameter; strongly acid; gradual smooth boundary.

Bt2—22 to 42 inches; strong brown (7.5YR 5/6) channery silty clay loam; moderate fine angular and subangular blocky structure; friable; few fine roots; many prominent clay films in pores and on faces of peds; about 15 percent sandstone channers; strongly acid; gradual smooth boundary.

Bt3—42 to 50 inches; strong brown (7.5YR 5/6) channery silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; many prominent clay films in pores and on faces of peds; about 20 percent sandstone channers; strongly acid; gradual smooth boundary.

C—50 to 60 inches; strong brown (10YR 5/6) channery silty clay loam; massive; about 20 percent sandstone channers; strongly acid.

Thickness of the solum ranges from 40 to more than 60 inches. The depth to hard bedrock is more than 48 inches. Reaction ranges from extremely acid to slightly acid in the A horizon and from extremely acid to strongly acid in the B and C horizons. The content of thin, flat or subrounded fragments ranges from 2 to 15 percent in the A horizon and from 5 to 50 percent in the B horizon. The weighted average is 15 to 35 percent. The content of coarse fragments ranges from 15 to 70 percent in the C horizon.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 1 to 3. The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. In some pedons it has mottles in shades of brown in the upper part and shades of gray in the lower part. In the fine-earth fraction, it is silty clay loam or silt loam. The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. In some pedons it is mottled in shades of brown, olive, or gray. In the fine-earth fraction, it is loam, silt loam, silty clay loam, or clay loam.

Waynesboro Series

The Waynesboro series consists of very deep, well drained, moderately permeable soils that formed in old alluvium or unconsolidated material weathered from sandstone, shale, and limestone. These soils are on high stream terraces. Slopes range from 6 to 20 percent. The soils are clayey, kaolinitic, thermic Typic Paleudults.

Waynesboro soils are associated with Caneyville and Dewey soils. Dewey soils are on convex ridgetops and side slopes above the Waynesboro soils. They contain less than 20 percent sand in the B horizon. Caneyville soils are on steep side slopes below the Waynesboro soils. They are fine textured and are moderately deep over bedrock.

Typical pedon of Waynesboro loam, 6 to 12 percent slopes; about 13.4 miles northwest of Albany, 0.6 mile from U.S. Highway 127 at Wells Bottom Church, on a ridgetop:

Ap—0 to 9 inches; brown (10YR 4/3) loam; weak fine granular structure; friable; many fine roots; moderately alkaline; clear smooth boundary.

BA—9 to 12 inches; yellowish brown (7.5YR 5/4) loam; common yellowish red (5YR 4/6) mottles; weak medium subangular blocky structure; firm; few fine roots; neutral; gradual smooth boundary.

Bt1—12 to 18 inches; yellowish red (5YR 5/8) clay loam; moderate medium subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—18 to 32 inches; red (2.5YR 4/6) sandy clay; moderate medium subangular blocky structure; firm; many distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt3—32 to 78 inches; dark red (2.5YR 3/6) sandy clay; moderate medium subangular blocky structure; firm; many distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

Thickness of the solum and the depth to bedrock are more than 60 inches. Unless the soils have been limed, reaction is very strongly acid or strongly acid. Each horizon contains 0 to 15 percent angular chert or rounded pebbles.

The Ap horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 3 to 8. The BA horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is sandy clay loam, loam, or clay loam. The Bt horizon has hue of 2.5YR or 5YR and chroma of 6 to 8. It has value of 4 or 5 in the upper part and value of 3 in the lower part. In some pedons it has few or common brown and red mottles in the lower part. It is clay loam, sandy clay, or clay.

Wernock Series

The Wernock series consists of moderately deep, well drained, moderately permeable soils that formed in material weathered from acid siltstone, shale, and sandstone. These soils are on ridgetops and the upper side slopes. Slopes range from 6 to 20 percent. The soils are fine-silty, mixed, mesic Typic Hapludults.

Wernock soils are associated on the landscape with Sequoia soils. Sequoia soils are clayey.

Typical pedon of Wernock silt loam, in an area of Sequoia-Wernock silt loams, 6 to 20 percent slopes; about 6.5 miles northeast of Albany, 100 feet west of the Wayne County line, 1.1 miles south of Kentucky Highway 696:

Oe—2 inches to 0; partially decomposed hardwood leaf litter.

A—0 to 2 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many roots; strongly acid; abrupt smooth boundary.

AB—2 to 6 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; many roots; very strongly acid; clear smooth boundary.

Bt1—6 to 10 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; many roots; few distinct clay films on horizontal faces of peds; very strongly acid; gradual smooth boundary.

Bt2—10 to 23 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; few roots; about 5 percent sandstone gravel; common distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt3—23 to 38 inches; strong brown (7.5YR 5/6) silty clay loam; common fine distinct yellowish red (5YR 5/6) and dark brown (10YR 3/3) mottles; moderate medium subangular blocky structure; few roots; firm; about 10 percent sandstone gravel; common distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Cr—38 to 42 inches; interbedded sandstone and shale.

Thickness of the solum and the depth to bedrock range from 30 to 40 inches. Reaction ranges from extremely acid to neutral in the A horizon and from strongly acid to extremely acid in the Bt horizon. The content of coarse fragments ranges from 0 to 10 percent to a depth of about 24 inches and from 1 to 50 percent below this depth.

The A horizon has hue of 10YR to 2.5YR, value of 3 to 5, and chroma of 2 or 3. The AB horizon has hue of 10YR to 2.5YR, value of 4 to 6, and chroma of 2 to 6. The Bt horizon has hue of 10YR to 5YR, value of 4 to 6, and chroma of 4 to 8. It is mottled in shades of brown or red. In some pedons it has mottles in shades of gray below a depth of 24 inches. In the fine-earth fraction, it is silt loam, silty clay loam, loam, or clay loam.

Formation of the Soils

This section discusses the factors of soil formation, relates them to the soils in the county, and explains the processes of horizon differentiation.

Factors of Soil Formation

The characteristics of a soil depend on the physical and chemical composition of the parent material and on climate, relief, plant and animal life, and time. Soils form through the interaction of these five factors. The relative importance of each factor differs from one soil to another. In some areas one factor may dominate the formation of soil characteristics, and in other areas another factor may dominate. Because the interrelationships between the five factors are so complex, the effect of any one factor is difficult to determine. In Clinton County, relief and parent material have had the greatest influence on soil formation. The climate of the county and the plant and animal life are not likely to vary greatly, and thus their influence has been less important.

Parent Material

Parent material is the unconsolidated material in which a soil forms. It influences the mineral and chemical composition of the soil and, to a large extent, the rate at which soil formation takes place.

In Clinton County, the soils formed in residuum, or material weathered in place from rocks; in loess, or material deposited by the wind; in alluvium, or material washed from the uplands and deposited adjacent to streams and in depressions; and from colluvium, or material moved a relatively short distance and deposited in the lower positions on the landscape.

Most of the soils in Clinton County formed in material weathered from rock formations of the Mississippian and Pennsylvanian Systems. These formations are made up of limestone, sandstone, shale, and siltstone. Dewey and Caneyville soils formed in material weathered from limestone, and Sequoia soils formed in material weathered from siltstone and shale. Mountview soils formed in a mantle of silty material over material weathered from limestone or old alluvium. Shelocta soils formed in colluvium. Elk, Nolin, and Melvin soils formed in alluvium. Waynesboro soils formed in old alluvium or in unconsolidated material weathered from sandstone, shale, or limestone.

Climate

The climate in Clinton County is humid and temperate. The average annual precipitation is 51 inches, and the soils are rarely completely dry. They are subject to leaching throughout most of the year. The average temperature in summer is 74 degrees F, and the average temperature in winter is 38 degrees.

In Clinton County, the soils that have been the most influenced by climate have a leached, acid Bt horizon that is finer textured than the surface layer. The well drained Dewey soils are examples.

Relief

Relief affects soil formation mainly through its influence on drainage, erosion, soil temperature, and plant cover. Variations in relief also modify exposure to the sun and wind.

In areas of steep soils, a considerable amount of rainfall is lost through runoff and only a small amount of water enters the soil. As a result, erosion removes the soil almost as rapidly as it forms. At the other extreme are soils in nearly level areas on flood plains or in upland depressions. Newark soils are examples. They are somewhat poorly drained and have a seasonal high water table. In areas of gently sloping soils on uplands, enough water moves downward through the soil to cause leaching and a pronounced accumulation of clay in the subsoil. These soils are likely to be deep and have well developed profiles. In some places the soils show evidence of wetness, such as mottling in the subsoil.

Plant and Animal Life

Plants affect soil formation mainly by adding organic matter. Animals, bacteria, and fungi contribute to soil formation by converting the remains of plants to decomposed organic matter and plant nutrients. The organic matter imparts a dark color to the soil material, and the humus, or decomposed organic matter, aids in the formation of soil structure and the retention of plant nutrients.

Most of the soils in Clinton County formed under hardwood forests. Soils that formed under this type of vegetation typically have a thin, dark surface layer and a brighter colored subsoil.

Humans have greatly altered the surface layer and the soil environment by clearing the forests and plowing the soil. They have mixed the soil layers, moved soil from place to place, added fertilizer and lime, and introduced new plant species. In places, as a result of accelerated erosion, most of the original surface layer has been removed and the less productive subsoil exposed.

Time

A long period of time is required for the development of distinct soil profiles. The length of time required depends mainly upon the nature of the parent material and on the relief and climate of the area. With the exception of the soils that formed in recent alluvium, enough time has elapsed for the factors of soil formation to be evident in Clinton County.

Soils that formed in recent deposits have weakly developed subsoil horizons. The surface layer may have only a slight increase in organic matter content, and the subsoil may have weak structure. Such soils are relatively young. Nolin and Newark soils are examples of young soils in Clinton County.

Distinct horizons develop in these soils after a long time if no additional sediments are deposited. The weathering process causes some of the material from the surface layer to move into the subsoil, thus altering the color and structure of the subsoil. Elk soils are examples of soils that have undergone this maturing process.

A soil is generally said to be mature when it has been in place long enough to acquire distinct profile characteristics. Examples of mature soils in Clinton County are Dewey and Mountview soils.

Processes of Horizon Differentiation

The formation of a succession of soil layers, or horizons, is the result of one or more of the soil-forming processes. These processes are the accumulation of organic matter, the leaching of carbonates and other soluble minerals, the chemical weathering of primary materials into silicate clay minerals, the translocation of the silicate clays from one horizon to another, and the reduction and transfer of iron. Several of these processes have been active in the formation of most of the soils in Clinton County.

Some organic matter has accumulated in all of the soils in the county to form the surface layer, or the A horizon. Most of the soils in the survey area contain moderate amounts of organic matter in the surface layer. In cultivated areas, the A horizon is called the Ap horizon, or plow layer.

The translocation of clay minerals is an important process in the horizon development of many of the soils in the county. As clay minerals are removed from the A horizon, they accumulate as clay films on ped surfaces, in pores, and in root channels in the B horizon.

The reduction and transfer of iron has occurred in all of the soils that are not characterized by good natural drainage. This process, called gleying, is evidenced by a gray matrix color and gray mottles. Part of the iron may be reoxidized and segregated, forming yellowish brown, strong brown, and other brightly colored mottles in an essentially gray matrix in the subsoil. Nodules or concretions of iron or manganese commonly form as a result of this process.

As silicate clay forms from primary minerals, some iron is commonly released as hydrated oxides. These oxides are commonly red or brown. Even if they occur in small amounts, they impart a brownish or reddish color to the soil material. They are largely responsible for the strong brown and yellowish brown colors that dominate the subsoil of many of the soils in the county.

References

(1) American Association of State Highway and Transportation Officials. 1986. Standard specifications for highway materials and methods of sampling and testing. Ed. 14, 2 vols., illus.

(2) American Society for Testing and Materials. 1993. Standard classification of soils for engineering purposes. ASTM Stand. D 2487.

(3) Anderson, Wallace L. 1951 (rev. 1960, 1969). Making land produce useful wildlife. U.S. Dep. Agric. Farmers Bull. 2035, 29 pp., illus.

(4) Austin, Morris E. 1965. Land resource regions and major land resource areas of the United States. U.S. Dep. Agric. Handb. 296, 82 pp., illus.

(5) Beck, Donald E. 1962. Yellow-poplar site index curves. U.S. Dep. Agric., Forest Serv., Southeast. Forest Exp. Stn. Res. Note 180, 2 pp., illus.

(6) Broadfoot, Walter M., and R.M. Krinard. 1959. Guide for evaluating sweetgum sites. U.S. Dep. Agric., Forest Serv., South. Forest Exp. Stn. Occas. Pap. 176, 8 pp., illus.

(7) Coile, T.S., and F.X. Schumacher. 1953. Site index of young stands of loblolly and shortleaf pines in the Piedmont Plateau Region. J. For. 51: 432-435, illus.

(8) Evans, J. Kenneth, and Gary Lacefield. 1977. Establishing forage crops. Univ. Ky., Coll. Agric., Coop. Ext. Serv., AGR-64, 2 pp.

(9) Kinsley, Neal P., and Douglas E. Powell. 1978. The forest resources of Kentucky. U.S. Dep. Agric., Forest Serv., Forest Res. Bull. NE-54, 97 pp., illus.

(10) Nelson, T.C., J.L. Clutter, and L.E. Chaiken. 1961. Yield of Virginia pine. U.S. Dep. Agric., Forest Serv., Southeast. Forest Exp. Stn. Pap. 124, 11 pp.

(11) Schnur, G. Luther. 1937 (reprinted in 1961). Yield, stand, and volume tables for even-aged upland oak forest. U.S. Dep. Agric. Tech. Bull. 560, 88 pp., illus.

(12) Tennessee Valley Authority. Site curves for eastern redcedar. (Unpublished, processed curves based on 271 observations from plots throughout the Tennessee Valley)

(13) Uhland, R.E., and A.M. O'Neal. 1951. Soil permeability determinations for use in soil and water conservation. U.S. Dep. Agric., Soil Conserv. Serv. Tech. Pap. 101, 36 pp., illus.

(14) United States Department of Agriculture. 1951 (being revised). Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus.

(15) United States Department of Agriculture. 1961. Land capability classification. U.S. Dep. Agric. Handb. 210, 21 pp.

(16) United States Department of Agriculture. 1967. Soil survey laboratory data and descriptions for some soils of Kentucky. Soil Surv. Invest. Rep. 14, 137 pp., illus.

(17) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.

(18) United States Department of Agriculture. 1982. Clinton County, Kentucky: Resource data estimates from the National Resource Inventory—1982. Soil Conserv. Serv., 2 pp., illus.

(19) United States Department of Agriculture. 1984 (rev.). Procedures for collecting soil samples and methods of analysis for soil survey. Soil Surv. Invest. Rep. 1, 68 pp., illus.

(20) United States Department of Commerce. 1983. Land and water areas—Kentucky counties.

(21) United States Department of Commerce, Bureau of the Census. 1982. Kentucky demographics: The 1980 census of Kentucky. Univ. Louisville. 163 pp.

(22) United States Department of Commerce, Bureau of the Census. 1989. 1987 census of agriculture—Kentucky state and county data, vol. 1, part 17.

(23) Wildlife Management Institute. 1963. Rating northeastern soils for their suitability for wildlife habitat. Trans. 28th North Am. Wildl. & Nat. Resour. Conf., Washington, D.C., pp. 247-261, illus.

Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Aspect. The direction in which a slope faces. Warm aspects are slopes of more than 15 percent that face an azimuth of 135 to 315 degrees. Cool aspects are slopes of more than 15 percent that face an azimuth of 315 to 135 degrees.

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 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

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

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

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

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

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

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.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, 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. A tillage system that does not invert the soil and that leaves a protective amount of crop residue 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.

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 grazing land for a prescribed period.

Depth, soil. The distance from the top of the soil to the underlying bedrock. The distance, in inches, is expressed as:

Shallow	less than 20
Moderately deep	20 to 40
Deep	40 to 60
Very deep	more than 60

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

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

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

Erosion (accelerated)—Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as 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.

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.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine earth. The portion of the soil finer than a No. 10 (2-millimeter) U.S. standard sieve.

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

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 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 (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

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

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Highwall. The working face of a surface mine or quarry, especially of an open-pit coal mine.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue 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 accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or 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.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

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 that are 3 inches (7.6 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.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

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

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

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

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

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

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or 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 three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, 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.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves 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). Subsurface tunnels or pipelike cavities are formed 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.

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 the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3

Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

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

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

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

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

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 adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

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

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

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

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

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

Sinkhole. A depression in the landscape where limestone has been dissolved.

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

Slippage (in tables). The soil mass is susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. The slope classes in this survey are:

Nearly level	0 to 2 percent
Gently sloping	2 to 6 percent
Sloping	6 to 12 percent
Moderately steep	12 to 20 percent
Steep	20 to 30 percent
Very steep	30 to 70 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 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, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, 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 if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

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

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content 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 on the contour or at a slight angle to the contour across sloping soils. 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). An otherwise suitable soil material that is 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.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, such as zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). There is a 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 that are assumed to be inherited from the parent material rather than to be the result of poor drainage.

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

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

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-88 at Summer Shade, Kentucky)

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*	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-----	43.6	24.2	33.9	70	-10	18	4.18	1.94	6.11	8	4.9
February----	48.8	27.4	38.1	75	-4	25	4.02	1.87	5.86	7	4.0
March-------	58.2	35.3	46.8	81	13	98	5.00	2.77	6.95	9	1.6
April-------	69.4	44.7	57.1	87	24	232	4.31	2.63	5.81	8	.1
May---------	77.5	53.4	65.5	90	33	481	4.70	2.75	6.43	8	.0
June--------	84.8	61.3	73.1	95	44	693	4.47	2.13	6.48	7	.0
July--------	87.9	65.1	76.5	97	51	822	4.86	2.77	6.70	7	.0
August------	86.8	63.7	75.3	97	48	784	3.31	1.61	4.77	6	.0
September---	80.7	57.4	69.1	94	39	573	3.92	1.69	5.80	6	.0
October-----	69.7	45.0	57.4	87	24	258	2.68	.90	4.14	5	.0
November----	58.0	35.7	46.9	79	13	56	4.51	2.47	6.30	8	.7
December----	48.2	28.7	38.5	71	1	28	4.76	2.40	6.80	8	1.9
Yearly:											
Average----	67.8	45.2	56.5	---	---	---	---	---	---	---	---
Extreme----	---	---	---	99	-12	---	---	---	---	---	---
Total------	---	---	---	---	---	4,068	50.72	43.34	57.79	87	13.2

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

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-88 at Summer Shade, Kentucky)

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--	Apr. 10	Apr. 21	May 7
2 years in 10 later than--	Apr. 5	Apr. 16	May 1
5 years in 10 later than--	Mar. 26	Apr. 7	Apr. 21
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 24	Oct. 14	Oct. 4
2 years in 10 earlier than--	Oct. 30	Oct. 20	Oct. 9
5 years in 10 earlier than--	Nov. 9	Oct. 30	Oct. 18

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-88 at Summer Shade, Kentucky)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	206	186	159
8 years in 10	213	192	166
5 years in 10	226	205	179
2 years in 10	240	218	192
1 year in 10	247	225	199

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

Map symbol	Soil name	Acres	Percent
AnB	Allen loam, 2 to 6 percent slopes	1,247	0.9
AnC2	Allen loam, 6 to 12 percent slopes, eroded	1,222	0.9
AnD2	Allen loam, 12 to 20 percent slopes, eroded	1,191	0.9
BeF	Bethesda channery silty clay loam, 12 to 60 percent slopes	411	0.3
CaC	Caneyville silt loam, 6 to 12 percent slopes	937	0.7
CcD3	Caneyville silty clay loam, rocky, 12 to 30 percent slopes, severely eroded	1,563	1.2
CdD	Caneyville-Dewey complex, rocky, 6 to 20 percent slopes	9,998	7.6
CgD	Caneyville-Garmon association, steep	4,809	3.7
DeC2	Dewey loam, 6 to 15 percent slopes, eroded	22,916	17.4
DeD2	Dewey loam, 15 to 25 percent slopes, eroded	19,344	14.7
EkB	Elk silt loam, 2 to 6 percent slopes	424	0.3
EkC	Elk silt loam, 6 to 12 percent slopes	215	0.2
FaE2	Faywood silty clay loam, 12 to 30 percent slopes, eroded	861	0.7
GcF	Garmon-Caneyville association, very steep	24,592	18.7
GpB	Gilpin loam, 2 to 6 percent slopes	60	*
GpC	Gilpin loam, 6 to 12 percent slopes	1,076	0.8
Gr	Grigsby fine sandy loam, protected	321	0.2
Me	Melvin silt loam, ponded	1,189	0.9
MoB	Mountview silt loam, 2 to 6 percent slopes	7,708	5.9
Ne	Newark silt loam, frequently flooded	1,353	1.0
No	Nolin silt loam, frequently flooded	3,440	2.6
Pt	Pits, quarries	80	0.1
RoF	Rock outcrop-Caneyville complex, 20 to 50 percent slopes	11,642	8.9
SeD	Sequoia-Wernock silt loams, 6 to 20 percent slopes	1,633	1.2
SmF	Shelocta-Muse-Cutshin complex, 20 to 60 percent slopes	2,048	1.6
SsF	Shelocta-Sequoia-Muse silt loams, 20 to 60 percent slopes	4,903	3.7
WaC	Waynesboro loam, 6 to 12 percent slopes	130	0.1
WaD	Waynesboro loam, 12 to 20 percent slopes	255	0.2
	Large bodies of water	6,048	4.6
	Total	131,616	100.0

* Less than 0.1 percent.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Tobacco	Soybeans	Wheat	Grass-legume hay	Alfalfa hay	Pasture
		Bu	Lb	Bu	Bu	Ton	Ton	AUM*
AnB------------- Allen	IIe	100	2,500	40	50	3.0	3.5	6.5
AnC2------------ Allen	IIIe	80	2,250	30	45	2.5	3.0	6.0
AnD2------------ Allen	IVe	65	1,900	25	40	2.0	2.5	5.5
BeF------------- Bethesda	VIIe	---	---	---	---	1.5	---	3.0
CaC------------- Caneyville	IIIe	75	2,200	---	---	2.5	---	5.0
CcD3------------ Caneyville	VIIe	---	---	---	---	---	---	3.0
CdD------------- Caneyville-Dewey	VIs	---	---	---	---	2.5	---	5.0
CgD**----------- Caneyville-Garmon	VIs	---	---	---	---	---	---	5.0
DeC2------------ Dewey	IIIe	90	2,400	35	45	3.0	3.5	6.5
DeD2------------ Dewey	IVe	80	1,900	25	35	2.5	3.0	5.5
EkB------------- Elk	IIe	125	3,200	45	50	3.5	4.5	7.0
EkC------------- Elk	IIIe	110	2,500	35	40	3.0	4.0	6.5
FaE2------------ Faywood	VIe	---	---	---	---	2.0	---	4.0
GcF**----------- Garmon-Caneyville	VIIe	---	---	---	---	---	---	---
GpB------------- Gilpin	IIe	90	2,200	40	40	2.5	3.0	5.5
GpC------------- Gilpin	IIIe	85	2,100	30	35	2.0	2.5	4.5
Gr-------------- Grigsby	I	120	2,700	45	40	3.0	---	6.5

See footnotes at end of table.

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

Soil name and map symbol	Land capability	Corn	Tobacco	Soybeans	Wheat	Grass-legume hay	Alfalfa hay	Pasture
		Bu	Lb	Bu	Bu	Ton	Ton	AUM*
Me-------------- Melvin	Vw	---	---	---	---	---	---	2.5
MoB------------- Mountview	IIe	100	2,700	45	55	3.5	4.5	6.5
Ne-------------- Newark	IIw	95	---	35	35	3.5	---	6.5
No-------------- Nolin	IIw	125	3,200	45	45	3.5	4.5	7.0
Pt**------------ Pits, quarries	VIIIs	---	---	---	---	---	---	---
RoF:								
Rock outcrop---	VIIIs	---	---	---	---	---	---	---
Caneyville-----	VIIs	---	---	---	---	---	---	---
SeD------------- Sequoia-Wernock	IVe	55	1,500	25	30	2.5	---	4.5
SmF------------- Shelocta-Muse-Cutshin	VIIe	---	---	---	---	---	---	---
SsF------------- Shelocta-Sequoia-Muse	VIIe	---	---	---	---	---	---	---
WaC------------- Waynesboro	IIIe	80	2,200	35	45	2.5	3.5	6.0
WaD------------- Waynesboro	IVe	65	1,900	25	35	2.0	3.0	5.0

* 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. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	321	---	---	---
II	14,232	9,439	4,793	---
III	26,496	26,496	---	---
IV	22,423	22,423	---	---
V	1,189	---	1,189	---
VI	15,668	861	---	14,807
VII	38,174	33,517	---	4,657
VIII	7,065	---	---	7,065

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	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
AnB, AnC2: Allen	Slight	Slight	Slight	Severe	Yellow-poplar	89	88	Yellow-poplar, black walnut, loblolly pine, white oak, shortleaf pine, eastern white pine.
					Shortleaf pine	66	101	
					White oak	67	49	
					Black oak	74	56	
					Hickory	---	---	
AnD2: Allen (warm aspect)	Moderate	Moderate	Moderate	Severe	Southern red oak	60	43	Shortleaf pine, loblolly pine.
					Shortleaf pine	60	88	
					Virginia pine	60	91	
AnD2: Allen (cool aspect)	Moderate	Moderate	Slight	Severe	Yellow-poplar	89	88	Yellow-poplar, black walnut, loblolly pine, white oak, shortleaf pine, eastern white pine.
					Shortleaf pine	66	101	
					White oak	67	49	
					Black oak	74	56	
					Hickory	---	---	
BeF: Bethesda	Moderate	Moderate	Moderate	Moderate	Shortleaf pine	63	95	Eastern white pine, loblolly pine, black locust, white oak.
					Loblolly pine	77	105	
					Yellow-poplar	95	98	
					Black locust	91	---	
CaC: Caneyville	Moderate	Moderate	Slight	Severe	Black oak	71	53	Eastern white pine, white oak, white ash, yellow-poplar.
					White oak	64	47	
					Sugar maple	---	---	
					Hickory	---	---	
					Eastern redcedar	46	54	
					White ash	78	---	
					Yellow-poplar	90	90	
CcD3: Caneyville	Severe	Moderate	Moderate	Severe	Black oak	65	47	Virginia pine, eastern redcedar, white oak.
					White oak	60	43	
					Hickory	---	---	
					Eastern redcedar	36	38	
CdD**:								
Caneyville	Severe	Moderate	Moderate	Severe	Black oak	65	47	Virginia pine, eastern redcedar, white oak.
					White oak	60	43	
					Sugar maple	---	---	
					Hickory	---	---	
					Eastern redcedar	36	38	
					Chinkapin oak	49	29	
					Scarlet oak	50	34	
Dewey	Moderate	Moderate	Slight	Severe	Yellow-poplar	87	84	Yellow-poplar, loblolly pine, eastern white pine, shortleaf pine, northern red oak, white oak.
					White oak	70	52	
					Black oak	77	59	
					Virginia pine	74	114	
					Hickory	---	---	
					Eastern redcedar	41	44	
					Black walnut	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
CgD**:								
Caneyville----- (warm aspect)	Severe	Moderate	Moderate	Severe	Black oak-----------	65	47	Virginia pine, eastern redcedar, white oak.
					White oak-----------	60	43	
					Sugar maple---------	---	---	
					Hickory-------------	---	---	
					Eastern redcedar----	36	38	
					Chinkapin oak-------	44	29	
					Scarlet oak---------	50	34	
Garmon--------- (warm aspect)	Moderate	Moderate	Moderate	Moderate	Chestnut oak--------	60	43	Virginia pine, eastern redcedar, white oak.
					White oak-----------	60	43	
					Black oak-----------	68	50	
					Hickory-------------	---	---	
					Eastern redcedar----	38	40	
					Sugar maple---------	---	---	
CgD**:								
Caneyville----- (cool aspect)	Severe	Moderate	Slight	Severe	Black oak-----------	71	53	White oak, yellow-poplar, white ash, eastern white pine.
					White oak-----------	64	47	
					Sugar maple---------	---	---	
					Hickory-------------	---	---	
					White ash-----------	72	---	
					Eastern redcedar----	46	54	
					Yellow-poplar-------	90	90	
Garmon--------- (cool aspect)	Moderate	Moderate	Slight	Moderate	Northern red oak----	72	54	Yellow-poplar, white ash, white oak, northern red oak, eastern white pine.
					Yellow-poplar-------	99	105	
					White oak-----------	75	57	
					Hickory-------------	---	---	
					Sugar maple---------	---	---	
					Chestnut oak--------	65	47	
					Red maple-----------	---	---	
DeC2------------ Dewey	Slight	Slight	Slight	Severe	Yellow-poplar-------	87	84	Yellow-poplar, loblolly pine, eastern white pine, shortleaf pine, northern red oak, white oak.
					White oak-----------	70	52	
					Black oak-----------	77	59	
					Hickory-------------	---	---	
					Virginia pine-------	74	114	
					Black walnut--------	---	---	
					Eastern redcedar----	41	44	
DeD2------------ Dewey	Moderate	Moderate	Slight	Severe	Yellow-poplar-------	87	84	Yellow-poplar, loblolly pine, eastern white pine, shortleaf pine, northern red oak, white oak.
					White oak-----------	70	52	
					Black oak-----------	77	59	
					Hickory-------------	---	---	
					Virginia pine-------	74	114	
					Eastern redcedar----	41	44	
					Black walnut--------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
EkB, EkC-------- Elk	Slight	Slight	Slight	Severe	Yellow-poplar-------	91	92	Eastern white pine, yellow-poplar, black walnut, loblolly pine, white oak, northern red oak, white ash, shortleaf pine.
					Pin oak------------	96	93	
					Hackberry----------	---	---	
					Red maple----------	---	---	
					American sycamore---	---	---	
					Black walnut--------	---	---	
FaE2------------ Faywood	Moderate	Moderate	Slight	Moderate	Northern red oak----	70	52	White oak, white ash, eastern white pine.
					Eastern redcedar----	---	---	
					White oak----------	60	43	
					White ash----------	---	---	
					Hickory------------	---	---	
					Black cherry--------	---	---	
					Chinkapin oak-------	---	---	
					Sugar maple---------	---	---	
					Scarlet oak---------	72	54	
GcF**:								
Garmon--------- (cool aspect)	Severe	Severe	Slight	Moderate	Northern red oak----	72	54	Yellow-poplar, white ash, white oak, northern red oak, eastern white pine.
					Yellow-poplar-------	99	105	
					White oak----------	75	57	
					Hickory------------	---	---	
					Sugar maple---------	---	---	
					Chestnut oak--------	65	47	
					Red maple----------	---	---	
Caneyville----- (cool aspect)	Severe	Severe	Slight	Severe	Black oak----------	71	53	White oak, yellow-poplar, white ash, eastern white pine.
					White oak----------	64	47	
					Sugar maple---------	---	---	
					Hickory------------	---	---	
					White ash----------	72	---	
					Eastern redcedar----	46	54	
					Yellow-poplar-------	90	90	
GcF**:								
Garmon--------- (warm aspect)	Severe	Severe	Severe	Moderate	Chestnut oak--------	60	43	Virginia pine, eastern redcedar, white oak.
					White oak----------	60	43	
					Black oak----------	68	50	
					Hickory------------	---	---	
					Eastern redcedar----	38	40	
					Sugar maple---------	---	---	
Caneyville----- (warm aspect)	Severe	Severe	Severe	Severe	Black oak----------	65	47	Virginia pine, eastern redcedar, white oak.
					White oak----------	60	43	
					Sugar maple---------	---	---	
					Hickory------------	---	---	
					Eastern redcedar----	36	38	
					Chinkapin oak-------	44	29	
					Scarlet oak---------	50	34	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
GpB, GpC-------- Gilpin	Slight	Slight	Slight	Moderate	Black oak-----------	80	62	Shortleaf pine, eastern white pine, yellow-poplar, white oak.
					Yellow-poplar-------	90	90	
					White oak-----------	75	57	
					Scarlet oak---------	76	58	
					Chestnut oak--------	80	62	
					Shortleaf pine------	70	110	
					Virginia pine-------	71	110	
Gr-------------- Grigsby	Slight	Slight	Moderate	Severe	Yellow-poplar-------	110	124	Yellow-poplar, black walnut, eastern white pine, shortleaf pine, white oak, northern red oak, white ash.
					Northern red oak----	85	67	
					White oak-----------	85	67	
					Black walnut--------	---	---	
					American sycamore---	---	---	
					Sweetgum------------	---	---	
					Red maple-----------	---	---	
					Hickory-------------	---	---	
Me-------------- Melvin	Slight	Moderate	Moderate	Severe	Pin oak-------------	100	98	Sweetgum, pin oak, American sycamore, willow oak, green ash.
					Red maple-----------	---	---	
					Hickory-------------	---	---	
					Hackberry-----------	---	---	
					American sycamore---	---	---	
					Black willow--------	---	---	
MoB------------- Mountview	Slight	Slight	Slight	Severe	White oak-----------	71	53	Loblolly pine, black walnut, shortleaf pine, yellow-poplar, white ash, eastern white pine.
					Yellow-poplar-------	90	90	
					Virginia pine-------	64	98	
					Black oak-----------	85	67	
Ne-------------- Newark	Slight	Moderate	Moderate	Severe	Pin oak-------------	100	98	Eastern cottonwood, sweetgum, American sycamore, green ash.
					Eastern cottonwood--	94	113	
					Sweetgum------------	85	93	
					Green ash-----------	---	---	
No-------------- Nolin	Slight	Slight	Moderate	Severe	Sweetgum------------	92	112	Eastern cottonwood, black walnut, yellow-poplar, sweetgum, eastern white pine.
					Eastern cottonwood--	---	---	
					River birch---------	---	---	
					Black willow--------	---	---	
					American sycamore---	---	---	
					Yellow-poplar-------	107	119	
RoF**: Rock outcrop.								
Caneyville----- (warm aspect)	Severe	Severe	Severe	Severe	Black oak-----------	65	47	Virginia pine, eastern redcedar, white oak.
					White oak-----------	60	43	
					Sugar maple---------	---	---	
					Hickory-------------	---	---	
					Eastern redcedar----	36	38	
					Chinkapin oak-------	44	29	
					Scarlet oak---------	50	34	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
RoF**: Rock outcrop.								
Caneyville (cool aspect)	Severe	Severe	Slight	Severe	Black oak	71	53	White oak, yellow-poplar, white ash, eastern white pine.
					White oak	64	47	
					Sugar maple	---	---	
					Hickory	---	---	
					White ash	75	---	
					Eastern redcedar	46	54	
					Yellow-poplar	90	90	
SeD**: Sequoia	Slight	Slight	Slight	Severe	Northern red oak	70	52	Loblolly pine, shortleaf pine, eastern white pine, white ash.
					Shortleaf pine	63	95	
					Virginia pine	71	110	
Wernock	Slight	Slight	Slight	Severe	White oak	74	56	Eastern white pine, shortleaf pine, white oak.
					Black oak	72	54	
					Scarlet oak	73	55	
					Chestnut oak	71	53	
					Red maple	---	---	
					Hickory	---	---	
SmF**: Shelocta	Severe	Severe	Slight	Severe	White oak	79	61	Yellow-poplar, black walnut, eastern white pine, shortleaf pine, white ash, white oak, northern red oak.
					Yellow-poplar	102	110	
					Cucumbertree	---	---	
					American beech	---	---	
					Shortleaf pine	77	124	
					Red maple	---	---	
					Black oak	79	61	
Muse	Severe	Severe	Slight	Severe	Shortleaf pine	81	132	Shortleaf pine, white oak, eastern white pine, yellow-poplar.
					Virginia pine	64	98	
					White oak	62	45	
					Red maple	---	---	
					Yellow-poplar	110	124	
					Black oak	58	41	
Cutshin	Severe	Severe	Slight	Severe	Yellow-poplar	106	117	Yellow-poplar, black walnut, white ash, shortleaf pine, eastern white pine, northern red oak, white oak.
					Northern red oak	85	67	
					American beech	---	---	
					Black walnut	---	---	
					Cucumbertree	---	---	
					Sweet birch	---	---	
					Sugar maple	---	---	
					American basswood	---	---	
					Red maple	---	---	
					White oak	78	60	
					Black oak	83	65	
					White ash	---	---	
					Blackgum	---	---	
					Eastern hemlock	---	---	
					Hickory	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
SsF**:								
Shelocta	Severe	Severe	Severe	Severe	White oak	65	47	Shortleaf pine, white oak, eastern white pine.
					Black oak	70	52	
					Scarlet oak	68	50	
					Yellow-poplar	90	6	
					American beech	---	---	
					Blackgum	---	---	
					Red maple	55	---	
Sequoia	Severe	Severe	Severe	Severe	Northern red oak	70	52	Loblolly pine, shortleaf pine, eastern white pine.
					Virginia pine	71	110	
					Shortleaf pine	63	95	
Muse	Severe	Severe	Slight	Severe	Shortleaf pine	81	132	Shortleaf pine, white oak, eastern white pine, yellow-poplar.
					Virginia pine	64	98	
					White oak	62	45	
					Red maple	---	---	
					Yellow-poplar	---	---	
					Black oak	58	41	
WaC: Waynesboro	Slight	Slight	Slight	Severe	Yellow-poplar	85	81	Yellow-poplar, shortleaf pine, loblolly pine, eastern white pine, white oak.
					Southern red oak	---	---	
					White oak	75	57	
					Virginia pine	76	117	
					Black oak	---	---	
WaD: Waynesboro (warm aspect)	Moderate	Moderate	Moderate	Severe	Southern red oak	60	43	Shortleaf pine, loblolly pine, white oak.
					Loblolly pine	70	93	
					Shortleaf pine	60	88	
WaD: Waynesboro (cool aspect)	Moderate	Moderate	Slight	Severe	Yellow-poplar	90	90	Yellow-poplar, shortleaf pine, loblolly pine, eastern white pine, white oak.
					Southern red oak	70	52	
					White oak	70	52	
					Loblolly pine	80	110	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** 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
AnB------------------- Allen	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
AnC2------------------ Allen	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
AnD2------------------ Allen	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
BeF------------------- Bethesda	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
CaC------------------- Caneyville	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, depth to rock.
CcD3------------------ Caneyville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
CdD*:					
Caneyville-----------	Moderate: percs slowly, slope.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: depth to rock, slope.
Dewey----------------	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
CgD*:					
Caneyville-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Garmon---------------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
DeC2------------------ Dewey	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
DeD2------------------ Dewey	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
EkB------------------- Elk	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
EkC------------------- Elk	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
FaE2------------------ Faywood	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
GcF*:					
Garmon---------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
GcF*:					
Caneyville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
GpB Gilpin	Slight	Slight	Moderate: small stones, slope.	Slight	Moderate: depth to rock.
GpC Gilpin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, depth to rock.
Gr Grigsby	Slight	Slight	Slight	Slight	Slight.
Me Melvin	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
MoB Mountview	Slight	Slight	Moderate: slope.	Slight	Slight.
Ne Newark	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
No Nolin	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Pt*. Pits, quarries					
RoF*: Rock outcrop.					
Caneyville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
SeD*:					
Sequoia	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, depth to rock.
Wernock	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope, depth to rock.
SmF*:					
Shelocta	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Muse	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Cutshin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
SsF*:					
Shelocta	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sequoia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Muse	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
WaC: Waynesboro	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
WaD: Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

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

TABLE 9.--WILDLIFE HABITAT

(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
AnB---------------- Allen	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AnC2--------------- Allen	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AnD2--------------- Allen	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BeF---------------- Bethesda	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
CaC---------------- Caneyville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CcD3--------------- Caneyville	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
CdD*:										
Caneyville---------	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Dewey--------------	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CgD*:										
Caneyville---------	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Garmon-------------	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
DeC2--------------- Dewey	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DeD2--------------- Dewey	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
EkB---------------- Elk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EkC---------------- Elk	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FaE2--------------- Faywood	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GcF*:										
Garmon-------------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Caneyville---------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
GpB---------------- Gilpin	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
GpC: Gilpin	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Gr: Grigsby	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Me: Melvin	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
MoB: Mountview	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ne: Newark	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
No: Nolin	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Fair	Very poor.
Pt*. Pits, quarries										
RoF*: Rock outcrop.										
Caneyville	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
SeD*: Sequoia	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Wernock	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
SmF*: Shelocta	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Muse	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Cutshin	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
SsF*: Shelocta	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Sequoia	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Muse	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
WaC: Waynesboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WaD: Waynesboro	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

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

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AnB--------------- Allen	Slight---------	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
AnC2-------------- Allen	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
AnD2-------------- Allen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BeF--------------- Bethesda	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope.
CaC--------------- Caneyville	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
CcD3-------------- Caneyville	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
CdD*:						
Caneyville-------	Severe: depth to rock.	Moderate: depth to rock, slope, shrink-swell.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: depth to rock, slope.
Dewey------------	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
CgD*:						
Caneyville-------	Severe: depth to rock, slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Garmon-----------	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
DeC2-------------- Dewey	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
DeD2-------------- Dewey	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
EkB--------------- Elk	Slight---------	Slight---------	Slight---------	Moderate: slope.	Severe: low strength.	Slight.

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
EkC: Elk	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
FaE2: Faywood	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
GcF*:						
Garmon	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
Caneyville	Severe: depth to rock, slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
GpB: Gilpin	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Slight	Moderate: depth to rock.
GpC: Gilpin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.	Moderate: slope, depth to rock.
Gr: Grigsby	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Slight	Slight.
Me: Melvin	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding.
MoB: Mountview	Slight	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
Ne: Newark	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
No: Nolin	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
Pt*. Pits, quarries						
RoF*: Rock outcrop.						
Caneyville	Severe: depth to rock, slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
SeD*:						
Sequoia	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.

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
SeD*:						
Wernock----------	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
SmF*:						
Shelocta---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Muse-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Cutshin----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
SsF*:						
Shelocta---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sequoia----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Muse-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
WaC--------------- Waynesboro	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
WaD--------------- Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

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

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AnB: Allen	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
AnC2: Allen	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
AnD2: Allen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
BeF: Bethesda	Severe: percs slowly, slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.
CaC: Caneyville	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
CcD3: Caneyville	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.
CdD*:					
Caneyville	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: too clayey, depth to rock.
Dewey	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
CgD*:					
Caneyville	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.
Garmon	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage, slope.	Severe: slope, seepage, depth to rock.	Poor: slope, depth to rock.
DeC2: Dewey	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
DeD2: Dewey	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	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
EkB----------------- Elk	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
EkC----------------- Elk	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
FaE2---------------- Faywood	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.
GcF*:					
Garmon-------------	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage, slope.	Severe: slope, seepage, depth to rock.	Poor: slope, depth to rock.
Caneyville---------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.
GpB----------------- Gilpin	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
GpC----------------- Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Gr------------------ Grigsby	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Good.
Me------------------ Melvin	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
MoB----------------- Mountview	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
Ne------------------ Newark	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
No------------------ Nolin	Severe: flooding.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey.
Pt*. Pits, quarries					
RoF*: Rock outcrop.					
Caneyville---------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SeD*:					
Sequoia	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
Wernock	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
SmF*:					
Shelocta	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, depth to rock.	Severe: slope.	Poor: slope.
Muse	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, wetness, slope.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Cutshin	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
SsF*:					
Shelocta	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, depth to rock.	Severe: slope.	Poor: slope.
Sequoia	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey. slope.
Muse	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, wetness, slope.	Severe: slope.	Poor: too clayey, hard to pack, slope.
WaC: Waynesboro	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
WaD: Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

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

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AnB, AnC2------------- Allen	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
AnD2------------------ Allen	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
BeF------------------- Bethesda	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
CaC------------------- Caneyville	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CcD3------------------ Caneyville	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
CdD*:				
Caneyville-----------	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, depth to rock.
Dewey----------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CgD*:				
Caneyville-----------	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope, depth to rock.
Garmon---------------	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, depth to rock.
DeC2------------------ Dewey	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
DeD2------------------ Dewey	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
EkB------------------- Elk	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
EkC------------------- Elk	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
FaE2: Faywood	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
GcF*:				
Garmon	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, depth to rock.
Caneyville	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope, depth to rock.
GpB, GpC: Gilpin	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Gr: Grigsby	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
Me: Melvin	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MoB: Mountview	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Ne: Newark	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
No: Nolin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, area reclaim.
Pt*. Pits, quarries				
RoF*: Rock outcrop.				
Caneyville	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope, depth to rock.
SeD*:				
Sequoia	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Wernock	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
SmF*:				
Shelocta	Poor: 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
SmF*:				
Muse	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Cutshin	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
SsF*:				
Shelocta	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Sequoia	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Muse	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
WaC: Waynesboro	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
WaD: Waynesboro	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, 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 "moderate" and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
AnB: Allen	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Favorable.
AnC2, AnD2: Allen	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Slope.
BeF: Bethesda	Severe: slope.	Severe: piping.	Deep to water	Slope, large stones, slippage.	Large stones, slope, droughty.
CaC: Caneyville	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
CcD3: Caneyville	Severe: slope.	Severe: hard to pack, thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
CdD*:					
Caneyville	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
Dewey	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope.
CgD*:					
Caneyville	Severe: slope.	Severe: thin layer, hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
Garmon	Severe: seepage, slope.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
DeC2, DeD2: Dewey	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope.
EkB: Elk	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Favorable.
EkC: Elk	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Slope.
FaE2: Faywood	Severe: slope.	Severe: hard to pack, thin layer.	Deep to water	Slope, depth to rock, percs slowly.	Slope, depth to rock, percs slowly.
GcF*:					
Garmon	Severe: seepage, slope.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
GcF*:					
Caneyville	Severe: slope.	Severe: thin layer, hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
GpB Gilpin	Moderate: seepage, depth to rock.	Severe: thin layer.	Deep to water	Depth to rock	Depth to rock.
GpC Gilpin	Moderate: seepage.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
Gr Grigsby	Severe: seepage.	Severe: piping.	Deep to water	Favorable	Favorable.
Me Melvin	Moderate: seepage.	Severe: piping, ponding.	Ponding, flooding.	Erodes easily, ponding.	Wetness, erodes easily.
MoB Mountview	Moderate: seepage.	Moderate: seepage.	Deep to water	Erodes easily	Erodes easily.
Ne Newark	Moderate: seepage.	Severe: piping, wetness.	Flooding	Erodes easily, wetness.	Wetness, erodes easily.
No Nolin	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
Pt*. Pits, quarries					
RoF*:					
Rock outcrop.					
Caneyville	Severe: slope.	Severe: thin layer, hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
SeD*:					
Sequoia	Moderate: depth to rock.	Severe: hard to pack, thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
Wernock	Moderate: seepage, depth to rock.	Severe: piping, thin layer.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
SmF*:					
Shelocta	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope.
Muse	Severe: slope.	Moderate: hard to pack, thin layer.	Deep to water	Slope, percs slowly.	Slope, percs slowly.
Cutshin	Severe: slope.	Severe: piping.	Deep to water	Slope, large stones.	Large stones, slope.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
SsF*:					
Shelocta	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope.
Sequoia	Severe: slope.	Severe: hard to pack, thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
Muse	Severe: slope.	Moderate: hard to pack, thin layer.	Deep to water	Slope, percs slowly.	Slope, percs slowly.
WaC, WaD Waynesboro	Moderate: seepage.	Moderate: piping, hard to pack.	Deep to water	Slope	Slope.

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

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
AnB, AnC2, AnD2-- Allen	0-7	Loam-------------	ML, CL-ML, SM, SM-SC	A-4	0-5	90-100	75-100	65-98	40-80	<26	NP-10
	7-33	Clay loam, sandy clay loam, loam.	CL-ML, CL, SC	A-4, A-6, A-7-6	0-10	85-100	75-100	65-98	40-80	20-43	4-19
	33-72	Clay loam, sandy clay loam, clay.	CL-ML, CL, SC, SM-SC	A-4, A-6, A-7-6	0-10	85-100	75-100	60-95	45-80	21-48	5-22
BeF-------------- Bethesda	0-6	Channery silty clay loam.	GC, SC, CL	A-6, A-7	5-20	65-90	50-80	45-75	35-75	35-50	12-24
	6-62	Very channery clay loam, very channery silty clay loam, channery clay loam.	GM-GC, ML, CL, GM	A-4, A-6, A-7, A-2	10-30	45-80	25-60	25-60	20-60	24-50	3-23
CaC-------------- Caneyville	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	6-18	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	18-29	Clay, silty clay	CH	A-7	0-15	90-100	60-100	60-100	60-100	50-75	30-45
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CcD3------------- Caneyville	0-6	Silty clay loam	CL	A-7, A-6	0-3	90-100	85-100	75-100	65-100	35-50	20-35
	6-18	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	18-29	Clay, silty clay	CH	A-7	0-15	90-100	60-100	60-100	60-100	50-75	30-45
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CdD*:											
Caneyville------	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	6-18	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	18-29	Clay, silty clay	CH	A-7	0-3	90-100	60-100	60-100	60-100	50-75	30-45
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Dewey-----------	0-7	Loam-------------	CL-ML, CL	A-4, A-6	0	90-100	75-100	75-95	65-85	24-30	5-11
	7-24	Clay, silty clay, silty clay loam.	CL	A-6	0	90-100	75-100	75-100	70-85	27-43	12-25
	24-70	Clay, silty clay	CH, CL, MH, ML	A-6, A-7	0-2	85-100	75-100	70-100	65-85	38-68	12-34
CgD*:											
Caneyville------	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	6-18	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	18-29	Clay, silty clay	CH	A-7	0-3	90-100	60-100	60-100	60-100	50-75	30-45
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
CgD*:											
Garmon----------	0-13	Silt loam--------	CL, CL-ML	A-4, A-6	0	75-95	75-95	65-95	55-90	20-35	5-15
	13-25	Loam, channery silt loam, channery silty clay loam.	GM-GC, CL-ML, CL, SM-SC	A-4, A-6	0-15	60-85	50-85	45-80	36-70	20-40	5-20
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
DeC2, DeD2------- Dewey	0-7	Loam-------------	CL-ML, CL	A-4, A-6	0	90-100	75-100	75-95	65-85	24-30	5-11
	7-24	Clay, silty clay, silty clay loam.	CL	A-6, A-7	0	90-100	75-100	75-100	70-85	27-43	12-25
	24-70	Clay, silty clay	CH, CL, MH, ML	A-6, A-7	0-2	85-100	75-100	70-100	65-85	38-68	12-34
EkB, EkC--------- Elk	0-8	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	70-95	25-35	3-10
	8-45	Silty clay loam, silt loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	75-100	25-40	5-15
	45-62	Silty clay loam, silt loam, silty clay.	ML, CL, CL-ML, SM-SC	A-4, A-6	0	75-100	50-100	45-100	40-95	25-40	5-15
FaE2------------- Faywood	0-5	Silty clay loam	CL, CH, MH	A-7	0-15	90-100	90-100	85-100	80-100	45-60	20-30
	5-31	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-15	90-100	90-100	85-100	75-100	42-70	20-45
	31	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GcF*:											
Garmon----------	0-13	Silt loam--------	CL, CL-ML	A-4, A-6	0	75-95	75-95	65-95	55-90	20-35	5-15
	13-25	Loam, channery silt loam, channery silty clay loam.	GM-GC, CL-ML, CL, SM-SC	A-4, A-6	0-15	60-85	50-85	45-80	36-70	20-40	5-20
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Caneyville------	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	6-18	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	18-29	Clay, silty clay	CH	A-7	0-3	90-100	60-100	60-100	60-100	50-75	30-45
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GpB, GpC--------- Gilpin	0-12	Loam-------------	CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	12-36	Channery loam, channery silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Gr--------------- Grigsby	0-7	Fine sandy loam	SM, SM-SC	A-2, A-4	0	95-100	95-100	50-95	25-50	<20	NP-5
	7-40	Loam, fine sandy loam, silt loam.	ML, SM, SC, CL	A-2, A-4	0	95-100	95-100	70-100	30-70	<25	NP-10
	40-62	Fine sandy loam, loam, sandy loam.	SM, SM-SC, ML	A-2, A-1, A-4	0	95-100	95-100	50-100	20-70	<20	NP-5

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Me---------------- Melvin	0-9	Silt loam--------	CL, CL-ML, ML	A-4	0	95-100	95-100	80-100	80-95	25-35	4-10
	9-34	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	80-100	80-95	25-40	5-20
	34-62	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	70-100	60-95	25-40	5-20
MoB--------------- Mountview	0-9	Silt loam--------	ML, CL-ML	A-4	0	100	95-100	95-100	80-96	20-30	2-7
	9-24	Silt loam, silty clay loam.	CL	A-6, A-7	0	95-100	95-100	90-100	80-96	30-43	10-23
	24-75	Clay, gravelly clay, gravelly silty clay loam.	CL, ML, MH, CH	A-6, A-7	0-20	75-100	65-100	60-98	50-96	35-65	11-32
Ne---------------- Newark	0-7	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	90-100	80-100	55-95	<32	NP-10
	7-42	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	75-100	75-100	70-100	22-42	3-20
	42-62	Silt loam, gravelly silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-3	75-100	50-100	50-100	50-95	22-42	3-20
No---------------- Nolin	0-10	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	10-44	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	85-100	75-100	25-46	5-23
	44-62	Loam, silt loam, gravelly loam.	ML, GM, CL, CL-ML	A-4, A-6	0-5	50-100	50-100	40-95	35-95	<30	NP-15
Pt*. Pits, quarries											
RoF*: Rock outcrop.											
Caneyville-------	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	6-18	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	18-29	Clay, silty clay	CH	A-7	0-3	90-100	60-100	60-100	60-100	50-75	30-45
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
SeD*: Sequoia----------	0-10	Silt loam--------	CL, CL-ML	A-4, A-6	0	95-100	85-100	85-100	80-95	23-35	5-15
	10-35	Silty clay, clay, channery silty clay.	CL, MH, CH	A-7	0	70-100	65-100	60-100	55-95	43-74	20-40
	35-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Wernock----------	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	90-100	85-100	75-95	55-90	25-35	3-11
	6-10	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	90-100	85-100	75-100	55-95	25-45	3-22
	10-38	Silt loam, silty clay loam, channery clay loam.	ML, CL, CL-ML, GC	A-4, A-6, A-7	0-20	55-100	50-100	45-95	40-95	25-45	3-22
	38-42	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
SmF*:											
Shelocta--------	0-10	Silt loam--------	ML, CL-ML	A-4	0-5	80-95	75-95	60-95	55-90	<35	NP-10
	10-50	Silty clay loam, silt loam, channery silty clay loam.	CL, CL-ML, GC, SC	A-6, A-4	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	50-60	Channery silt loam, channery silty clay loam, very channery clay loam.	GM, GC, ML, CL	A-4, A-6, A-2, A-1-b	0-15	40-85	35-75	25-70	20-65	20-40	3-20
Muse------------	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	80-100	75-100	60-100	55-95	20-40	2-20
	7-29	Silty clay loam, clay, channery silty clay.	CL, CH	A-7, A-6	0	70-100	50-100	50-100	50-100	35-65	15-35
	29-42	Channery silty clay, very channery clay, clay.	MH, CH, CL, GC	A-7, A-2	0	50-100	50-95	35-95	30-95	40-75	20-40
	42-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
Cutshin---------	0-17	Channery loam----	ML, CL-ML, GM, SM	A-4, A-6, A-7, A-5	0-20	55-85	50-80	40-75	30-60	20-45	3-15
	17-42	Channery loam, gravelly loam, flaggy clay loam.	CL, ML, GC, SC	A-4, A-6, A-2, A-5	0-20	55-85	50-80	40-75	30-60	20-45	3-15
	42-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
SsF*:											
Shelocta--------	0-10	Silt loam--------	ML, CL-ML	A-4	0-5	80-95	75-95	60-95	55-90	<35	NP-10
	10-50	Silty clay loam, silt loam, channery silty clay loam.	CL, CL-ML, GC, SC	A-6, A-4	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	50-60	Channery silt loam, channery silty clay loam, very channery clay loam.	GM, GC, ML, CL	A-4, A-6, A-2, A-1-b	0-15	40-85	35-75	25-70	20-65	20-40	3-20
Sequoia---------	0-10	Silt loam--------	CL, CL-ML	A-4, A-6	0	95-100	85-100	85-100	80-95	23-35	5-15
	10-35	Silty clay, clay, channery silty clay.	CL, MH, CH	A-7	0	70-100	65-100	60-100	55-95	43-74	20-40
	35-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Muse------------	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	80-100	75-100	60-100	55-95	20-40	2-20
	7-29	Silty clay loam, clay, channery silty clay.	CL, CH	A-7, A-6	0	70-100	50-100	50-100	50-100	35-65	15-35
	29-42	Channery silty clay, very channery clay, clay.	MH, CH, CL, GC	A-7, A-2	0	50-100	50-95	35-95	30-95	40-75	20-40
	42-50	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
WaC, WaD--------- Waynesboro	0-9	Loam-------------	ML, CL-ML, CL, SM	A-4	0-5	85-100	85-100	70-95	43-70	18-30	2-9
	9-18	Clay loam, loam, sandy clay loam.	CL, ML, SC	A-4, A-6, A-7	0-5	90-100	80-100	75-95	45-75	30-41	9-17
	18-78	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	35-68	9-32

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

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

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. 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 K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
AnB, AnC2, AnD2--Allen	0-7	7-27	1.30-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low-----------	0.28	5	.5-3
	7-33	18-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Low-----------	0.20		
	33-72	20-45	1.40-1.60	0.6-2.0	0.10-0.17	4.5-5.5	Low-----------	0.20		
BeF--------------Bethesda	0-6	27-35	1.45-1.65	0.2-0.6	0.05-0.16	3.6-5.5	Low-----------	0.28	5	<.5
	6-62	18-35	1.60-1.90	0.2-0.6	0.04-0.10	3.6-5.5	Low-----------	0.32		
CaC--------------Caneyville	0-6	10-27	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low-----------	0.43	3	2-4
	6-18	36-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.3	Moderate------	0.28		
	18-29	40-60	1.35-1.60	0.2-0.6	0.12-0.18	5.6-7.8	Moderate------	0.28		
	29	---	---	---	---	---	--------------	----		
CcD3-------------Caneyville	0-6	27-40	1.25-1.50	0.2-0.6	0.17-0.20	4.5-7.3	Moderate------	0.37	2	<2
	6-18	36-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.3	Moderate------	0.28		
	18-29	40-60	1.35-1.60	0.2-0.6	0.12-0.18	5.6-7.8	Moderate------	0.28		
	29	---	---	---	---	---	--------------	----		
CdD*:										
Caneyville------	0-6	10-27	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low-----------	0.43	3	2-4
	6-18	36-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.3	Moderate------	0.28		
	18-29	40-60	1.35-1.60	0.2-0.6	0.12-0.18	5.6-7.8	Moderate------	0.28		
	29	---	---	---	---	---	--------------	----		
Dewey-----------	0-7	7-27	1.35-1.50	0.6-2.0	0.18-0.20	5.1-7.3	Low-----------	0.32	5	2-4
	7-24	35-50	1.45-1.55	0.6-2.0	0.12-0.18	5.1-7.3	Moderate------	0.24		
	24-70	40-60	1.45-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Moderate------	0.24		
CgD*:										
Caneyville------	0-6	10-27	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low-----------	0.43	3	2-4
	6-18	36-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.3	Moderate------	0.28		
	18-29	40-60	1.35-1.60	0.2-0.6	0.12-0.18	5.6-7.8	Moderate------	0.28		
	29	---	---	---	---	---	--------------	----		
Garmon----------	0-13	7-27	1.20-1.40	2.0-6.0	0.14-0.20	4.5-7.3	Low-----------	0.32	3	<3
	13-25	18-34	1.20-1.50	2.0-6.0	0.05-0.16	4.5-7.3	Low-----------	0.28		
	25	---	---	---	---	---	--------------	----		
DeC2, DeD2-------Dewey	0-7	7-27	1.35-1.50	0.6-2.0	0.18-0.20	5.1-7.3	Low-----------	0.32	5	1-4
	7-24	35-50	1.45-1.55	0.6-2.0	0.12-0.18	5.1-7.3	Moderate------	0.24		
	24-70	40-60	1.45-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Moderate------	0.24		
EkB, EkC---------Elk	0-8	10-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-6.5	Low-----------	0.37	5	2-3
	8-45	18-34	1.20-1.50	0.6-2.0	0.18-0.22	4.5-6.5	Low-----------	0.28		
	45-62	15-40	1.20-1.50	0.6-2.0	0.14-0.20	5.1-6.5	Low-----------	0.28		
FaE2-------------Faywood	0-5	27-40	1.30-1.60	0.2-0.6	0.14-0.18	5.1-7.8	Moderate------	0.32	2	<2
	5-31	40-60	1.35-1.60	0.06-0.6	0.12-0.17	5.1-7.8	Moderate------	0.28		
	31	---	---	---	---	---	--------------	----		
GcF*:										
Garmon----------	0-13	7-27	1.20-1.40	2.0-6.0	0.14-0.20	5.6-7.3	Low-----------	0.32	3	2-3
	13-25	18-34	1.20-1.50	2.0-6.0	0.05-0.16	5.6-7.3	Low-----------	0.28		
	25	---	---	---	---	---	--------------	----		

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 K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
GcF*:										
Caneyville------	0-6	10-27	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low----------	0.43	3	2-4
	6-18	36-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.3	Moderate-----	0.28		
	18-29	40-60	1.35-1.60	0.2-0.6	0.12-0.18	5.6-7.8	Moderate-----	0.28		
	29	---	---	---	---	---	-------------	----		
GpB, GpC--------- Gilpin	0-12	10-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Low----------	0.32	3	2-4
	12-36	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.24		
	36	---	---	---	---	---	-------------	----		
Gr--------------- Grigsby	0-7	5-10	1.20-1.50	2.0-6.0	0.08-0.14	5.6-7.3	Low----------	0.28	5	1-4
	7-40	5-18	1.20-1.50	0.6-6.0	0.10-0.20	5.6-7.3	Low----------	0.28		
	40-62	5-10	1.20-1.50	2.0-6.0	0.03-0.16	5.1-7.3	Low----------	0.28		
Me--------------- Melvin	0-9	7-27	1.20-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43	5	2-4
	9-34	18-35	1.30-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43		
	34-62	7-35	1.40-1.70	0.6-2.0	0.16-0.23	5.6-7.8	Low----------	0.43		
MoB-------------- Mountview	0-9	7-27	1.35-1.55	0.6-2.0	0.18-0.22	5.1-7.3	Low----------	0.43	5	2-3
	9-24	18-35	1.40-1.60	0.6-2.0	0.17-0.20	5.1-7.3	Low----------	0.43		
	24-75	27-65	1.30-1.50	0.6-2.0	0.10-0.15	4.5-5.5	Moderate-----	0.32		
Ne--------------- Newark	0-7	7-27	1.20-1.40	0.6-2.0	0.15-0.23	5.6-7.8	Low----------	0.43	5	2-4
	7-42	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43		
	42-62	12-40	1.30-1.50	0.6-2.0	0.15-0.22	5.6-7.8	Low----------	0.43		
No--------------- Nolin	0-10	12-35	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43	5	2-4
	10-44	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43		
	44-62	7-35	1.30-1.55	0.6-6.0	0.10-0.23	5.6-8.4	Low----------	0.37		
Pt*. Pits, quarries										
RoF*:										
Rock outcrop.										
Caneyville------	0-6	10-27	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low----------	0.43	3	2-4
	6-18	36-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.3	Moderate-----	0.28		
	18-29	40-60	1.35-1.60	0.2-0.6	0.12-0.18	5.6-7.8	Moderate-----	0.28		
	29	---	---	---	---	---	-------------	----		
SeD*:										
Sequoia---------	0-10	15-30	1.30-1.50	0.6-2.0	0.17-0.20	4.5-5.5	Low----------	0.37	3	.5-2
	10-35	35-60	1.35-1.55	0.2-0.6	0.08-0.16	4.5-5.5	Moderate-----	0.24		
	35-60	---	---	---	---	---	-------------	----		
Wernock---------	0-6	12-27	1.20-1.40	0.6-2.0	0.19-0.23	3.6-7.3	Low----------	0.37	3	.5-2
	6-10	18-35	1.30-1.50	0.6-2.0	0.18-0.22	3.6-5.5	Low----------	0.32		
	10-38	18-35	1.30-1.50	0.6-2.0	0.12-0.18	3.6-5.5	Low----------	0.28		
	38-42	---	---	---	---	---	-------------	----		
SmF*:										
Shelocta--------	0-10	10-27	1.15-1.30	0.6-2.0	0.16-0.22	4.1-6.5	Low----------	0.32	4	2-4
	10-50	18-34	1.30-1.55	0.6-2.0	0.10-0.20	4.1-5.5	Low----------	0.28		
	50-60	15-34	1.30-1.55	0.6-6.0	0.08-0.16	4.1-5.5	Low----------	0.17		
Muse------------	0-7	7-27	1.20-1.40	0.6-2.0	0.16-0.22	4.5-7.3	Low----------	0.37	3	1-3
	7-29	35-60	1.20-1.65	0.06-0.2	0.10-0.16	4.5-5.5	Moderate-----	0.28		
	29-42	35-60	1.40-1.65	0.06-0.2	0.08-0.14	4.5-5.5	Moderate-----	0.28		
	42-50	---	---	---	---	---	-------------	----		

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 K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
SmF*:										
Cutshin----------	0-17	12-27	1.20-1.40	0.6-2.0	0.10-0.18	5.6-7.3	Low-----------	0.32	4	4-7
	17-42	12-35	1.20-1.40	0.6-2.0	0.08-0.16	4.5-6.0	Low-----------	0.28		
	42-65	---	---	---	---	---	-------------	----		
SsF*:										
Shelocta---------	0-10	10-27	1.15-1.30	0.6-2.0	0.16-0.22	4.1-6.5	Low-----------	0.32	4	2-4
	10-50	18-34	1.30-1.55	0.6-2.0	0.10-0.20	4.1-5.5	Low-----------	0.28		
	50-60	15-34	1.30-1.55	0.6-6.0	0.08-0.16	4.1-5.5	Low-----------	0.17		
Sequoia----------	0-10	15-30	1.30-1.50	0.6-2.0	0.17-0.20	4.5-5.5	Low-----------	0.37	3	.5-2
	10-35	35-60	1.35-1.55	0.2-0.6	0.08-0.16	4.5-5.5	Moderate------	0.24		
	35-60	---	---	---	---	---	-------------	----		
Muse-------------	0-7	7-27	1.20-1.40	0.6-2.0	0.16-0.22	4.5-7.3	Low-----------	0.37	3	1-3
	7-29	35-60	1.20-1.65	0.06-0.2	0.10-0.16	4.5-5.5	Moderate------	0.28		
	29-42	35-60	1.40-1.65	0.06-0.2	0.08-0.14	4.5-5.5	Moderate------	0.28		
	42-50	---	---	---	---	---	-------------	----		
WaC, WaD---------- Waynesboro	0-9	10-27	1.40-1.55	0.6-2.0	0.15-0.21	4.5-5.5	Low-----------	0.28	5	2-4
	9-18	20-35	1.40-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low-----------	0.28		
	18-78	35-50	1.40-1.55	0.6-2.0	0.13-0.18	4.5-5.5	Low-----------	0.28		

* 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 "frequent," "brief," and "apparent" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
AnB, AnC2, AnD2--- Allen	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
BeF--------------- Bethesda	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
CaC, CcD3--------- Caneyville	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
CdD*:											
Caneyville-------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
Dewey------------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
CgD*:											
Caneyville-------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
Garmon-----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	Moderate.
DeC2, DeD2-------- Dewey	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
EkB, EkC---------- Elk	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
FaE2-------------- Faywood	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
GcF*:											
Garmon-----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	Moderate.
Caneyville-------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
GpB, GpC---------- Gilpin	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High.
Gr---------------- Grigsby	B	None--------	---	---	3.5-6.0	Apparent	Jan-Apr	>60	---	Low------	Low.
Me---------------- Melvin	D	Frequent----	Very long	Sep-Jun	+2-0.5	Apparent	Jan-Dec	>60	---	High-----	Low.
MoB--------------- Mountview	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Ne---------------- Newark	C	Frequent----	Brief-----	Jan-Apr	0.5-1.5	Apparent	Dec-May	>60	---	High-----	Low.
No---------------- Nolin	B	Frequent----	Brief-----	Feb-May	3.0-6.0	Apparent	Feb-Mar	>60	---	Low------	Moderate.
Pt*. Pits, quarries											
RoF*: Rock outcrop.											

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
RoF*:											
Caneyville	C	None	---	---	>6.0	---	---	20-40	Hard	High	Moderate.
SeD*:											
Sequoia	C	None	---	---	>6.0	---	---	20-40	Soft	High	Moderate.
Wernock	B	None	---	---	>6.0	---	---	30-40	Soft	Moderate	High.
SmF*:											
Shelocta	B	None	---	---	>6.0	---	---	>48	Hard	Low	High.
Muse	C	None	---	---	>4.0	Apparent	Jan-Apr	>40	Soft	High	High.
Cutshin	B	None	---	---	>6.0	---	---	>40	Soft	Low	Low.
SsF*:											
Shelocta	B	None	---	---	>6.0	---	---	>48	Hard	Low	High.
Sequoia	C	None	---	---	>6.0	---	---	20-40	Soft	High	Moderate.
Muse	C	None	---	---	>4.0	Apparent	Jan-Apr	>40	Soft	High	High.
WaC, WaD Waynesboro	B	None	---	---	>6.0	---	---	>60	---	High	High.

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

TABLE 17.--PHYSICAL ANALYSIS OF SELECTED SOILS

(Dashes indicate that the material was not detected. The pedons for the soils listed are typical of the series in the survey area. For the location of the pedons, see the section "Soil Series and Their Morphology")

Soil name, report number, horizon, and depth in inches	Total: Sand (2-0.05 mm)	Total: Silt (0.05-0.002 mm)	Total: Clay (<0.002 mm)	Sand: Very coarse (2-1)	Sand: Coarse (1-0.5)	Sand: Medium (0.5-0.25)	Sand: Fine (0.25-0.1)	Sand: Very fine (0.1-0.05)	Sand coarser than very fine (2-0.1)	Very fine sand plus silt (0.1-0.002)	Textural class	Coarse fragments >2 mm
	Pct <2 mm											Pct
Allen loam:												
(89KY-053-5)												
Ap------ 0 to 7	35.1	40.6	24.3	14.6	4.1	5.0	4.3	7.1	28.0	47.7	Loam	5
Bt1----- 7 to 15	30.0	35.0	35.0	1.5	0.7	11.6	12.7	3.5	26.5	38.5	Clay loam	5
Bt2-----15 to 23	30.3	37.8	31.9	1.1	0.3	12.4	13.2	3.3	27.0	41.1	Clay loam	5
Bt3-----23 to 33	24.5	45.1	30.4	1.4	0.2	9.4	9.0	4.4	20.0	49.5	Clay loam	9
Bt4-----33 to 45	34.1	33.0	32.9	1.9	0.3	13.1	12.6	6.2	27.9	39.2	Clay loam	15
Bt5-----45 to 56	38.5	28.4	33.1	2.7	0.5	15.2	16.9	3.1	35.3	31.5	Clay loam	18
Bt6-----56 to 72	44.0	22.0	34.0	4.5	0.8	18.2	18.7	2.0	42.2	24.0	Clay loam	23
Dewey loam:												
(89KY-053-1)												
Ap------ 0 to 7	28.8	47.5	23.7	1.9	3.8	5.2	11.3	6.7	22.2	54.2	Loam	---
Bt1----- 7 to 13	22.0	37.8	40.2	1.0	1.8	3.6	8.8	6.9	15.2	44.7	Clay	---
Bt2-----13 to 24	21.6	32.3	46.1	0.8	1.4	3.0	8.8	7.7	14.0	40.0	Clay	---
Bt3-----24 to 37	26.7	15.0	58.3	1.0	1.3	2.8	11.4	10.3	16.5	25.3	Clay	---
Bt4-----37 to 49	35.6	15.5	48.9	0.2	1.7	4.3	16.0	13.4	22.2	28.9	Clay	---
Bt5-----49 to 60	38.4	14.3	47.3	1.0	1.8	4.7	16.4	14.6	23.9	28.9	Clay	4
Bt6-----60 to 70	40.0	14.3	45.7	0.6	1.6	5.5	17.8	14.5	25.5	28.8	Clay	---
Mountview silt loam:												
(89KY-053-2)												
Ap------ 0 to 9	17.1	63.8	19.1	4.0	1.8	6.3	4.6	0.4	16.7	64.2	Silt loam	---
Bt1----- 9 to 15	15.2	60.7	24.1	3.7	1.5	5.2	4.2	0.6	14.6	61.3	Silt loam	---
Bt2-----15 to 24	19.1	57.3	23.6	5.7	1.6	5.8	5.8	0.2	18.9	57.5	Silt loam	---
2Bt3----24 to 33	18.0	49.9	32.1	2.4	1.7	6.4	6.7	0.8	17.2	50.7	Silty clay loam	---
2Bt4----33 to 43	17.2	46.7	36.1	2.1	1.5	6.5	6.3	0.8	16.4	47.5	Silty clay loam	---
2Bt5----43 to 60	17.3	43.5	39.2	1.7	1.2	6.7	6.2	1.5	15.8	45.0	Silty clay loam	2
2Bt6----60 to 75	12.7	23.5	63.8	1.0	0.9	4.4	5.2	1.1	11.5	24.6	Clay	2
Nolin silt loam:												
(89KY-053-4)												
Ap------ 0 to 10	12.9	64.3	22.8	2.2	0.7	4.0	5.1	0.9	12.0	65.2	Silt loam	---
A-------10 to 16	22.1	56.8	21.1	1.2	1.0	8.9	9.4	1.6	20.5	58.4	Silt loam	---
Bw1-----16 to 29	24.6	52.1	23.3	1.2	0.8	8.9	11.0	2.6	21.9	54.7	Silt loam	---
Bw2-----29 to 44	30.0	48.3	21.7	2.8	1.0	10.5	11.8	3.9	26.1	52.2	Loam	---
C-------44 to 62	35.0	40.5	24.5	6.9	2.3	12.8	11.2	1.8	33.2	42.3	Loam	35

TABLE 18.--CHEMICAL ANALYSIS OF SELECTED SOILS

(Dashes indicate that the determination was not made. The pedons for the soils listed are typical of the series in the survey area. For the location of the pedons, see the section "Soil Series and Their Morphology")

Soil name, report number, horizon, and depth in inches	pH (H_2O 1:1)	Extractable cations: Ca	Mg	K	Na	Total (TEC)	Cation-exchange capacity: Ammonium acetate	Sum of cations	Extractable acidity	Base saturation: Ammonium acetate	Sum of cations	Organic matter	Calcium carbonate equivalent	Phosphorus	Potassium
		-----Milliequivalents per 100 grams of soil------								Pct	Pct	Pct	Pct	p/m	p/m
Allen loam:															
(89KY-053-5)															
Ap------- 0 to 7	5.3	2.1	0.5	0.1	0.2	2.9	7.7	10.9	8.0	38	27	2.8	0.1	2	101
Bt1------ 7 to 15	5.0	1.2	0.4	0.1	0.4	2.1	8.9	11.8	9.7	24	18	1.0	0.1	1	110
Bt2------15 to 23	5.2	0.6	0.4	0.2	0.7	1.9	8.2	11.7	9.8	23	16	0.4	0.1	1	155
Bt3------23 to 33	5.2	0.3	0.3	0.1	0.3	1.0	7.3	12.2	11.2	14	8	0.2	0.2	1	127
Bt4------33 to 45	4.9	0.2	0.1	0.1	0.3	0.7	7.1	11.4	10.7	10	6	0.1	0.2	1	98
Bt5------45 to 56	5.0	0.2	0.1	0.1	0.3	0.7	6.4	10.9	10.2	11	6	0.1	0.1	1	110
Bt6------56 to 72	5.0	0.2	0.6	0.1	0.1	1.0	7.8	---	---	12	---	---	---	---	---
Dewey loam:															
(89KY-053-1)															
Ap------- 0 to 7	6.5	3.5	0.4	0.5	0.8	5.2	5.5	14.1	8.9	94	37	3.4	0.2	12	408
Bt1------ 7 to 13	6.7	4.7	0.4	0.2	0.8	6.1	7.0	16.0	9.9	87	38	1.2	0.4	6	165
Bt2------13 to 24	6.7	4.9	0.5	0.2	0.8	6.4	8.0	17.0	10.6	80	38	0.6	0.6	7	111
Bt3------24 to 37	5.4	2.1	1.3	0.4	0.9	4.7	9.1	19.0	14.3	52	25	0.5	0.2	8	253
Bt4------37 to 49	5.5	0.9	0.8	0.3	0.9	2.9	6.4	16.0	13.1	45	18	0.1	0.2	8	225
Bt5------49 to 60	5.5	0.5	0.5	0.3	0.8	2.1	6.2	18.5	16.4	34	11	0.1	0.4	12	185
Bt6------60 to 70	5.5	0.4	0.4	0.2	1.7	2.7	6.3	17.8	15.1	43	15	0.3	0.2	10	169
Mountview silt loam:															
(89KY-053-2)															
Ap------- 0 to 9	6.1	4.2	0.3	0.1	0.1	4.7	7.9	13.3	8.6	59	35	2.7	0.4	23	82
Bt1------ 9 to 15	6.0	3.7	0.3	0.1	0.1	4.2	6.8	9.3	5.1	62	45	0.5	0.2	9	76
Bt2------15 to 24	6.2	3.4	0.4	0.1	0.3	4.2	7.9	11.7	7.5	53	36	0.6	0.2	6	94
2Bt3-----24 to 33	5.2	1.9	0.5	0.1	0.4	2.9	7.9	14.4	11.5	37	20	0.3	0.4	7	105
2Bt4-----33 to 43	5.1	0.8	0.5	0.1	0.8	2.2	7.9	14.6	12.4	28	15	0.3	0.4	7	109
2Bt5-----43 to 60	5.0	0.8	0.6	0.2	0.3	1.9	8.3	16.3	14.4	23	12	0.1	0.2	6	135
2Bt6-----60 to 75	5.0	0.8	0.7	0.3	0.3	2.1	10.7	16.6	14.5	20	13	0.2	0.2	6	173
Nolin silt loam:															
(89KY-053-4)															
Ap------- 0 to 10	5.7	10.3	0.4	0.5	0.3	11.5	5.4	19.4	7.9	100	59	2.3	0.1	114	387
A--------10 to 16	5.8	2.1	0.5	0.4	0.5	3.5	6.6	7.3	3.8	53	48	1.7	0.2	26	280
Bw1------16 to 29	5.9	2.7	0.4	0.4	0.1	3.6	5.7	9.1	5.5	63	39	0.5	0.1	1	269
Bw2------29 to 44	5.7	2.4	0.4	0.3	0.2	3.3	6.4	6.8	3.5	51	48	0.5	0.9	8	285
C--------44 to 62	5.6	2.0	0.5	0.4	0.3	3.2	6.1	7.9	4.7	52	40	0.2	0.2	3	255

TABLE 19.--ENGINEERING INDEX TEST DATA

(The pedons for the soils listed are typical of the series in the survey area. For the location of the pedons, see the section "Soil Series and Their Morphology")

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution											Liquid limit	Plasticity index
			Percentage passing sieve--								Percentage smaller than--				
	AASHTO	Unified	3 in.	2 in.	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm	Pct	
Dewey loam:															
(89KY-053-1)															
Bt2------13 to 24	A-7-6(20)	CL	100	100	100	100	100	100	98	82	71	50	43	43	25
Bt4------37 to 49	A-7-5(16)	MH	100	100	100	100	100	100	99	74	65	55	49	50	20
Mountview silt loam:															
(89KY-053-2)															
Bt2------15 to 24	A-6(15)	CL	100	100	100	100	100	100	96	86	71	38	27	35	18
2Bt5-----43 to 60	A-7-6(22)	MH	100	100	100	100	100	100	98	89	76	50	50	50	21

TABLE 20.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Allen	Fine-loamy, siliceous, thermic Typic Paleudults
Bethesda	Loamy-skeletal, mixed, acid, mesic Typic Udorthents
Caneyville	Fine, mixed, mesic Typic Hapludalfs
Cutshin	Fine-loamy, mixed, mesic Typic Haplumbrepts
Dewey	Clayey, kaolinitic, thermic Typic Paleudults
Elk	Fine-silty, mixed, mesic Ultic Hapludalfs
Faywood	Fine, mixed, mesic Typic Hapludalfs
Garmon	Fine-loamy, mixed, mesic Dystric Eutrochrepts
Gilpin	Fine-loamy, mixed, mesic Typic Hapludults
Grigsby	Coarse-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
Melvin	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Mountview	Fine-silty, siliceous, thermic Typic Paleudults
Muse	Clayey, mixed, mesic Typic Hapludults
Newark	Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents
*Nolin	Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Sequoia	Clayey, mixed, mesic Typic Hapludults
Shelocta	Fine-loamy, mixed, mesic Typic Hapludults
Waynesboro	Clayey, kaolinitic, thermic Typic Paleudults
Wernock	Fine-silty, mixed, mesic Typic Hapludults

☆ U.S. GOVERNMENT PRINTING OFFICE : 1994—300-438/00513/SCS

NRCS Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.