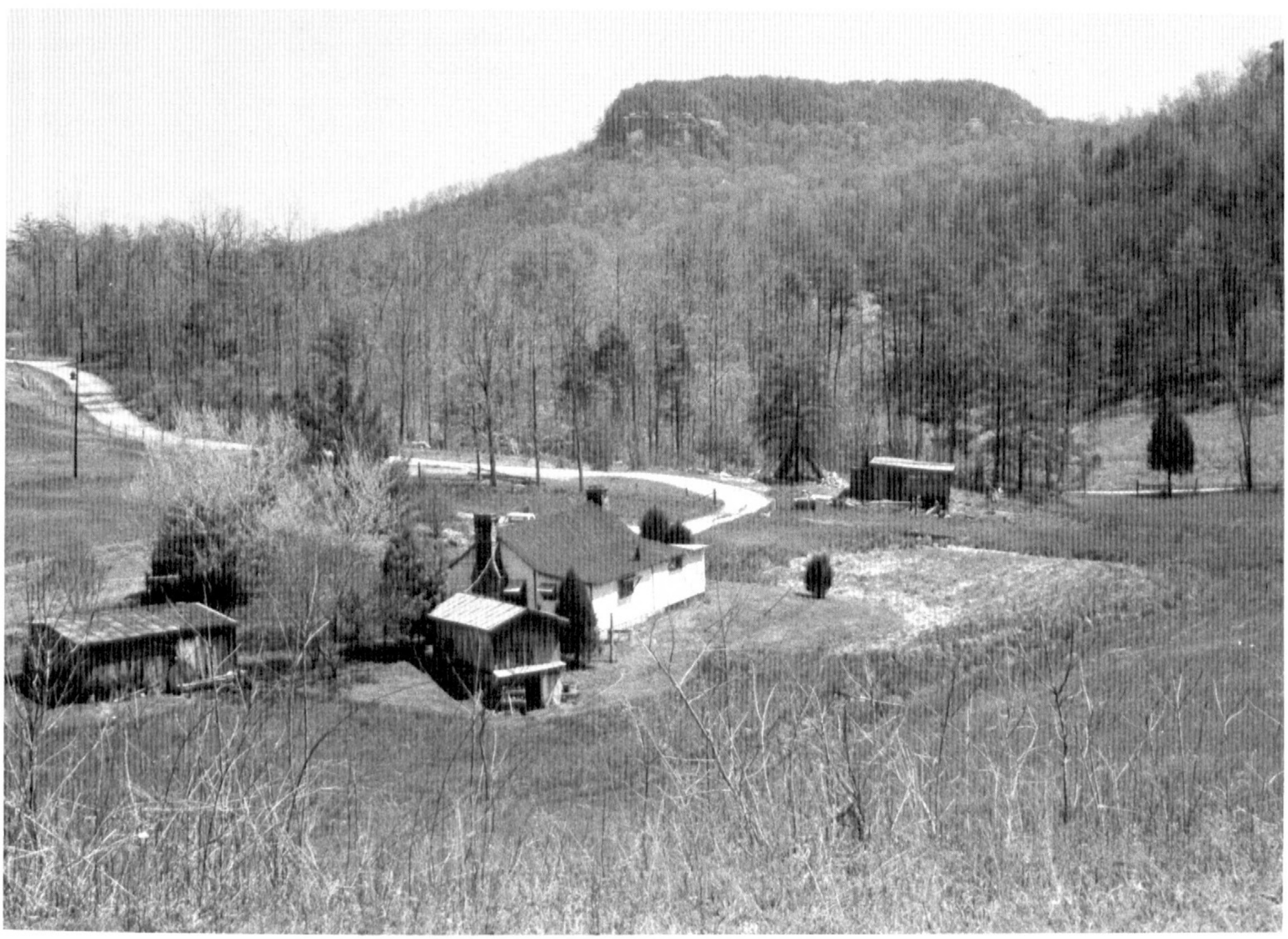
United States Department of Agriculture

Soil Conservation Service

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

Soil Survey of Wayne County, Kentucky



How To Use This Soil Survey

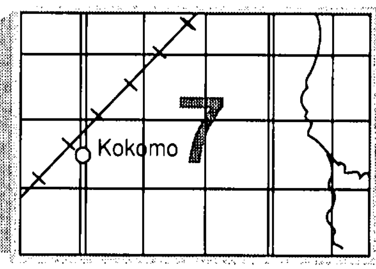
General Soil Map

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.

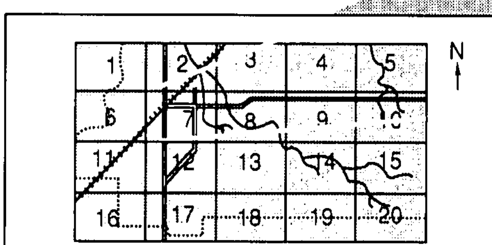
Detailed Soil Maps

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



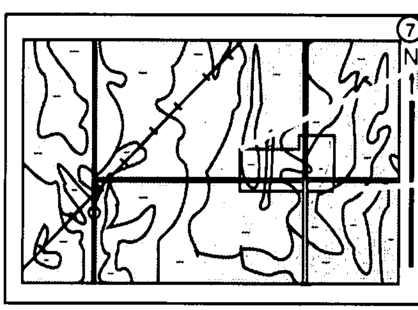
MAP SHEET

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.



INDEX TO MAP SHEETS

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.



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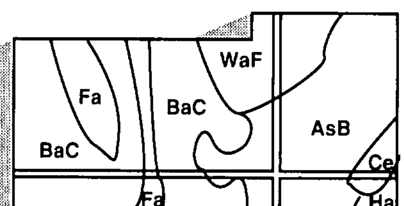

AREA OF INTEREST

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 1984. Soil names and descriptions were approved in 1985. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1985. This soil survey was made cooperatively by the Soil Conservation Service, the Kentucky Natural Resources and Environmental Protection Cabinet, and the Kentucky Agricultural Experiment Station. It is part of the technical assistance furnished to the Wayne County Conservation District.

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

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: This mountainous area is in the Rigley-Shelocta-Muse complex, steep. The small hay and pasture fields in the foreground are on Allen fine sandy loam.

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Soil Series

Issued March 1990

Index to Map Units

Summary of Tables

Foreword

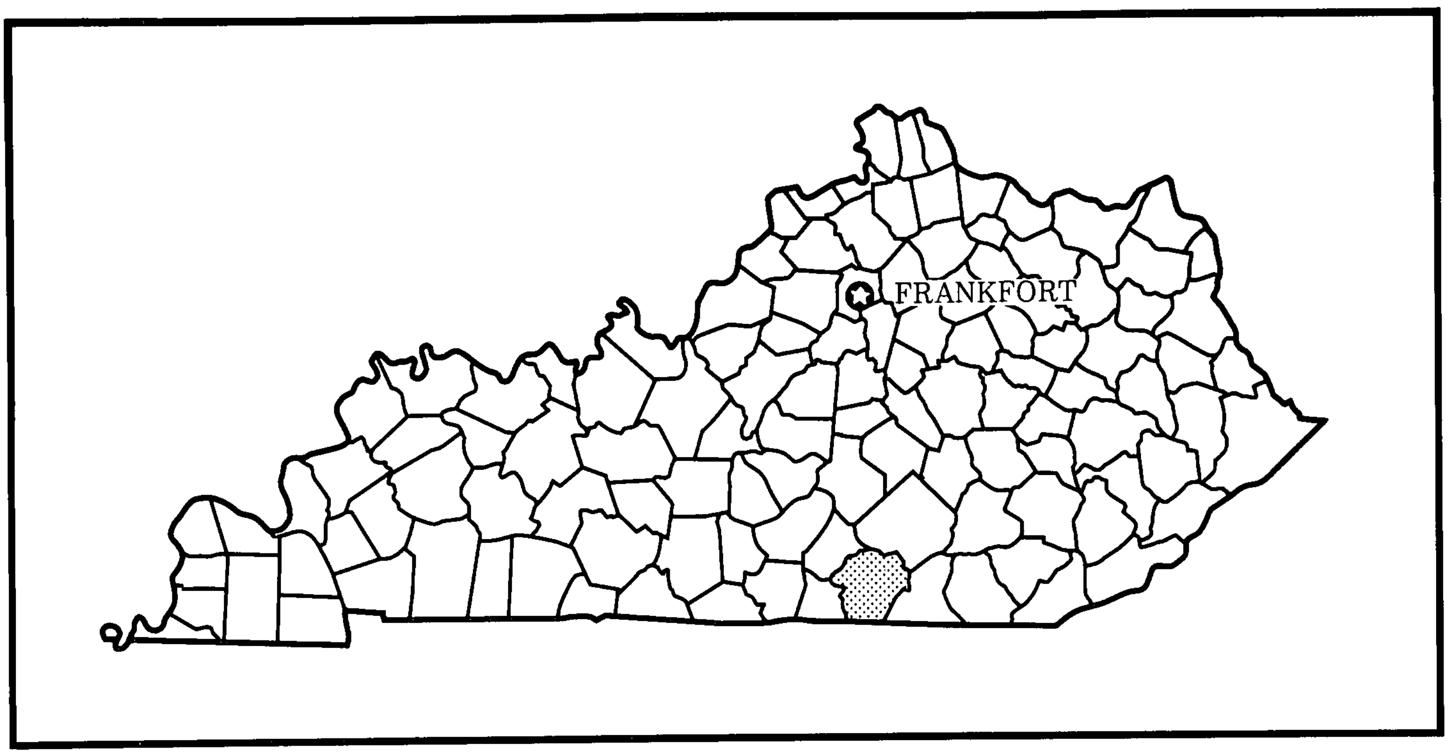
This soil survey contains information that can be used in land-planning programs in Wayne County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of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

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

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

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

Randall W. Giessler
State Conservationist
Soil Conservation Service



Location of Wayne County in Kentucky.

Soil Survey of Wayne County, Kentucky

By James P. Fehr, Soil Conservation Service

Soils surveyed by James P. Fehr, Harry S. Evans, Soil Conservation Service; Gerald A. Richardson, Kentucky Natural Resources and Environmental Protection Cabinet

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

WAYNE COUNTY is in the South Central part of Kentucky and has a population of 17,022. Monticello, the county seat, has a population of 5,677. The county has a land area of 285,498 acres, or approximately 446 square miles. Cumberland Lake is in the northern part of the county and has a water area of 24,230 acres.

The county is in the Highland Rim and Pennyroyal and the Cumberland Plateau and Mountains Land Resource Areas *(4)*. The northwestern part of the county is mainly rolling uplands with short hilly slopes and ridges with karst topography. The soils are moderately deep or deep and they are well drained. An area in the northeastern part of the county and a small area near the western boundary are nearly level to undulating. The soils are moderately well drained to poorly drained and some of them have fragipans. The central part of the county is undulating to hilly and is mostly karst topography. The soils are mostly well drained and have a red clay subsoil. The rest of the county is steep or very steep mountain side slopes, benches, and narrow ridgetops. The soils are shallow to deep and they are well drained.

General Nature of the County

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

Climate

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

In Wayne County, summers are hot in valleys and slightly cooler in the hills; winters are moderately cold. Rains are fairly heavy and well distributed throughout the year. Snow falls nearly every winter, but the snow cover generally lasts only a few days.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Monticello, Kentucky, in the period 1951 to 1980. 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 38 degrees F, and the average daily minimum temperature is 27 degrees. The lowest temperature on record, which occurred at Monticello on January 30, 1963, is -33 degrees. In summer the average temperature is 74 degrees, and the average daily maximum temperature is 86 degrees. The highest recorded temperature, which occurred at Monticello on August 10, 1980, is 101.

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 50 inches. Of this, 25 inches, or 50 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 4.28 inches at Monticello on September 29, 1964. Thunderstorms occur on about 47 days each year, and most occur in summer.

The average seasonal snowfall is 17 inches. The greatest snow depth at any one time during the period of record was 12 inches. On an average of 4 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 65 percent of the time possible in summer and 45 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 12 miles per hour, in spring.

History and Development

Wayne County was formed in 1800 from territory taken from Pulaski and Cumberland Counties. It was named in honor of General Anthony Wayne, the Revolutionary War hero.

Monticello, the county seat, was incorporated in 1810. The town was named in honor of Thomas Jefferson's home in Virginia.

In the early development of Wayne County, farming was the prime source of income. It is still a major source of income, although industry has located in the county in recent years. Tourism has been important since the completion of Lake Cumberland in 1949-1950.

A recreation park is in Monticello. Lake Cumberland extends across the northern boundary of the county and provides many recreational facilities (fig. 1). These facilities include Conley Bottom Resort, Beaver Lodge, and Fall Creek camping areas that provide cabins and camping facilities. Numerous boat launching ramps are available.

Transportation facilities include Kentucky Highway 90 that runs north and south and Kentucky Highway 92 that runs east and west. A network of state and county highways give access to nearly all parts of the county. The Wayne County Airport in Monticello has facilities for light and medium aircraft.

Relief and Drainage

The soils in Wayne County range from nearly level to very steep. Elevation ranges from about 720 feet to about 1,780 feet above sea level. The lowest elevation is where Cumberland Lake crosses the county line into Russell County, southwest of Camp Earl Wallace. The highest elevation is about 18 miles southwest of Monticello in the Sunnybrook community.

Most of the surface drainage flows into Cumberland Lake through Otter, Beaver, Sinking, Elk, and Meadow Creeks and the Little South Fork River.

Farming

Farming in Wayne County is diversified. About 1,082 farms are in the county and average about 129 acres each *(24)*. Tobacco, corn, soybeans, hay and pasture plants are the main crops. Tobacco is the main cash crop. In recent years, vegetable crops for both processing and fresh consumption have become important. Most of the forage and grain crops are fed locally to livestock. Dairy cattle, beef cattle, and hogs are the principal livestock enterprises.

Timber production also provides a source of farm income in Wayne County. About 150,948 acres are in woodland, most of which is privately owned.

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

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

Figure 1.—Cumberland Lake provides outstanding recreational facilities for boating, skiing, swimming, and fishing.

are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

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

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

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

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

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without 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, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

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

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or 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-Garmon

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

This map unit consists of soils on hillsides and ridges (fig. 2). The hillsides generally have short slopes and are highly dissected by small drainageways. The ridges have karst topography. Slopes range from about 6 to 75 percent.

This map unit makes up about 2 percent of the county. About 55 percent of the map unit is Waynesboro soils, 20 percent is Garmon soils, and the rest is soils of minor extent.

Waynesboro soils are on sloping side slopes and ridgetops at a higher elevation than the Garmon soils. Waynesboro soils are deep and well drained. They

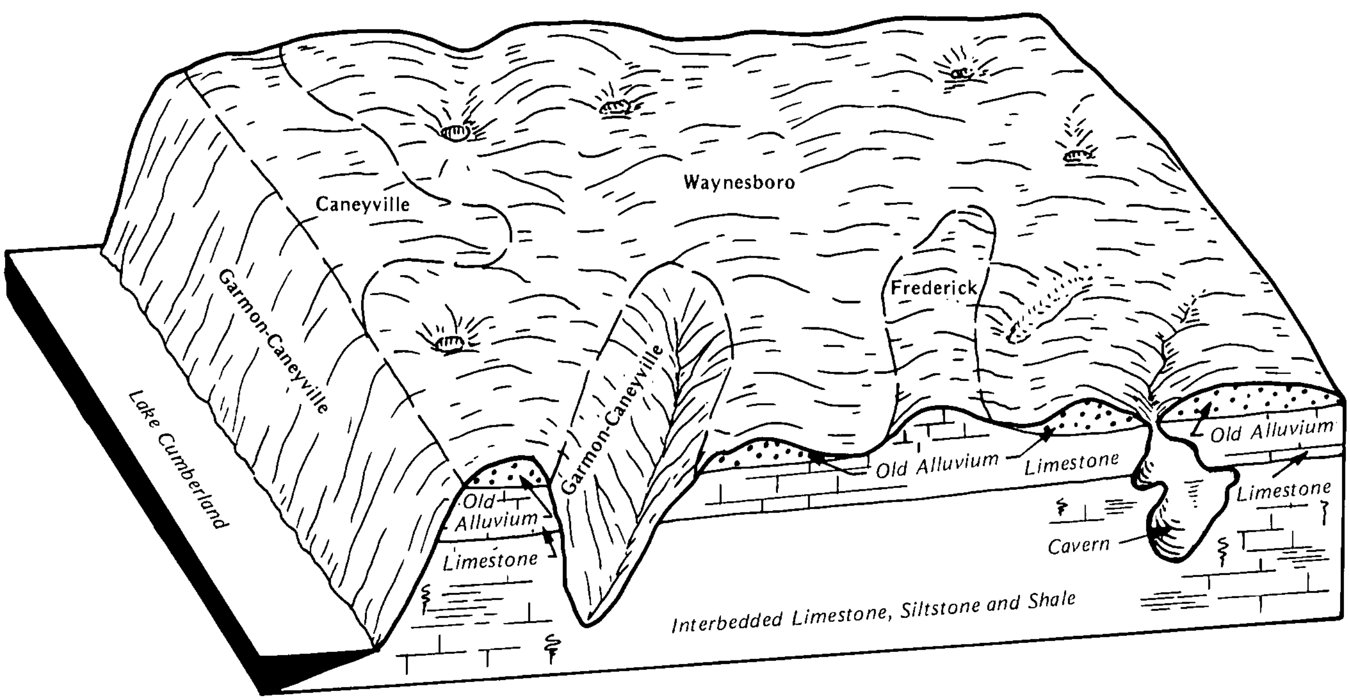


Figure 2.—The relationship of soils to topography and underlying material in the Waynesboro-Garmon general soil map unit.

formed in old alluvium underlain by material weathered from limestone. The surface layer is brown loam, and the subsoil is red and dark red clay loam.

Garmon soils are on steep or very steep side slopes. These soils are moderately deep and well drained. They formed in material weathered from limestone, siltstone, and shale. The surface layer is brown silt loam, and the subsoil is yellowish brown channery silt loam.

Of minor extent are Frederick soils on upper side slopes and ridges and Caneyville soils on side slopes and lower ridges.

The soils of this map unit are used mainly for hay or pasture. Some areas have not been cleared; most are on the steep hillsides.

These soils generally are suited to agricultural uses. The sloping soils on ridgetops are suited to cultivated crops. Erosion is a hazard, however, and erosion control practices are needed. Except for Garmon soils, these soils are well suited to hay crops and pasture.

The soils of this map unit are suited to use as woodland. Waynesboro soils are suited to most urban and recreational uses, but the shrink-swell potential and steepness of slope are limitations. The steep slopes and moderate depth to bedrock of Garmon soils are severe limitations for urban and recreational uses.

2. Frederick-Mountview

Deep, gently sloping to moderately steep, well drained soils that have a clayey or a loamy and clayey subsoil; formed in material weathered from limestone or in loess underlain by material weathered from limestone

This map unit consists of soils on ridges and side slopes (fig. 3). Some areas have karst topography. The ridges are long and narrow, and the side slopes are short and highly dissected by small streams. Much of the area within the map unit is drained by limestone sinks. Slopes range from about 2 to 20 percent.

This map unit makes up about 15 percent of the county. About 50 percent of the map unit is Frederick soils, 12 percent is Mountview soils, and the rest is soils of minor extent.

Frederick soils are on ridges and upper side slopes. They are deep and well drained. These soils formed in material weathered from limestone. The surface layer is brown silt loam, and the subsoil is yellowish red silty clay and clay.

Mountview soils are on broad ridges. They are deep and well drained. These soils formed in a silty mantle underlain by material weathered from limestone. The surface layer is brown silt loam. The upper part of the subsoil is yellowish brown silt loam and strong brown silty clay loam, and the lower part is yellowish red and red silty clay.

The soils of minor extent are Nolin and Newark soils on the flood plains, Dickson soils on the broader ridges, and Garmon and Caneyville soils on steep hillsides.

The soils of this map unit are used mainly for hay or pasture. Cultivated crops are on the ridges and more gentle slopes. Some areas are not cleared; most are on the steep hillsides.

These soils generally are well suited to agricultural uses. The soils on ridges are well suited to cultivated crops. Erosion is a hazard, however, and erosion control practices are needed. These soils are well suited to hay and pasture.

The soils of this map unit are suited to use as woodland. They generally are suited to most urban and recreational uses. The shrink-swell potential and steepness of slope are the main limitations.

3. Garmon-Caneyville

Moderately 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 hillsides and ridges (fig. 4). The hillsides generally have short slopes and are highly dissected by small drainageways and streams. The ridges are long and narrow and generally are uniform in elevation. Slopes range from about 6 to 75 percent.

This map unit makes up about 13 percent of the county. About 45 percent of the map unit is Garmon soils, 30 percent is Caneyville soils, and the rest is soils of minor extent.

Garmon soils are on very steep slopes and on ridges at a lower elevation than Caneyville soils. Garmon soils are moderately deep and well drained. They formed in material weathered from shaly limestone, siltstone, and shale. The surface layer is brown silt loam, and the subsoil is yellowish brown channery silt loam.

Caneyville soils are on upper side slopes and ridgetops. They are moderately deep and well drained. These soils formed in material weathered from limestone. The surface layer is brown silt loam. The upper part of the subsoil is yellowish brown silty clay loam, and the lower part is yellowish red and dark yellowish brown silty clay.

The soils of minor extent are Mountview and Frederick soils on upper side slopes and ridges.

The soils of this map unit are used mainly as woodland consisting of mixed hardwoods. Some areas are cleared. They generally are on the ridges and are used for hay or pasture.

These soils are generally not suited to agricultural uses because of steep slopes and moderate depth to bedrock. The soils on ridges and upper side slopes are moderately suited to hay and pasture.

The soils of this map unit are suited to use as woodland. They generally are poorly suited to most urban and recreational uses because of steep slopes and moderate depth to bedrock.

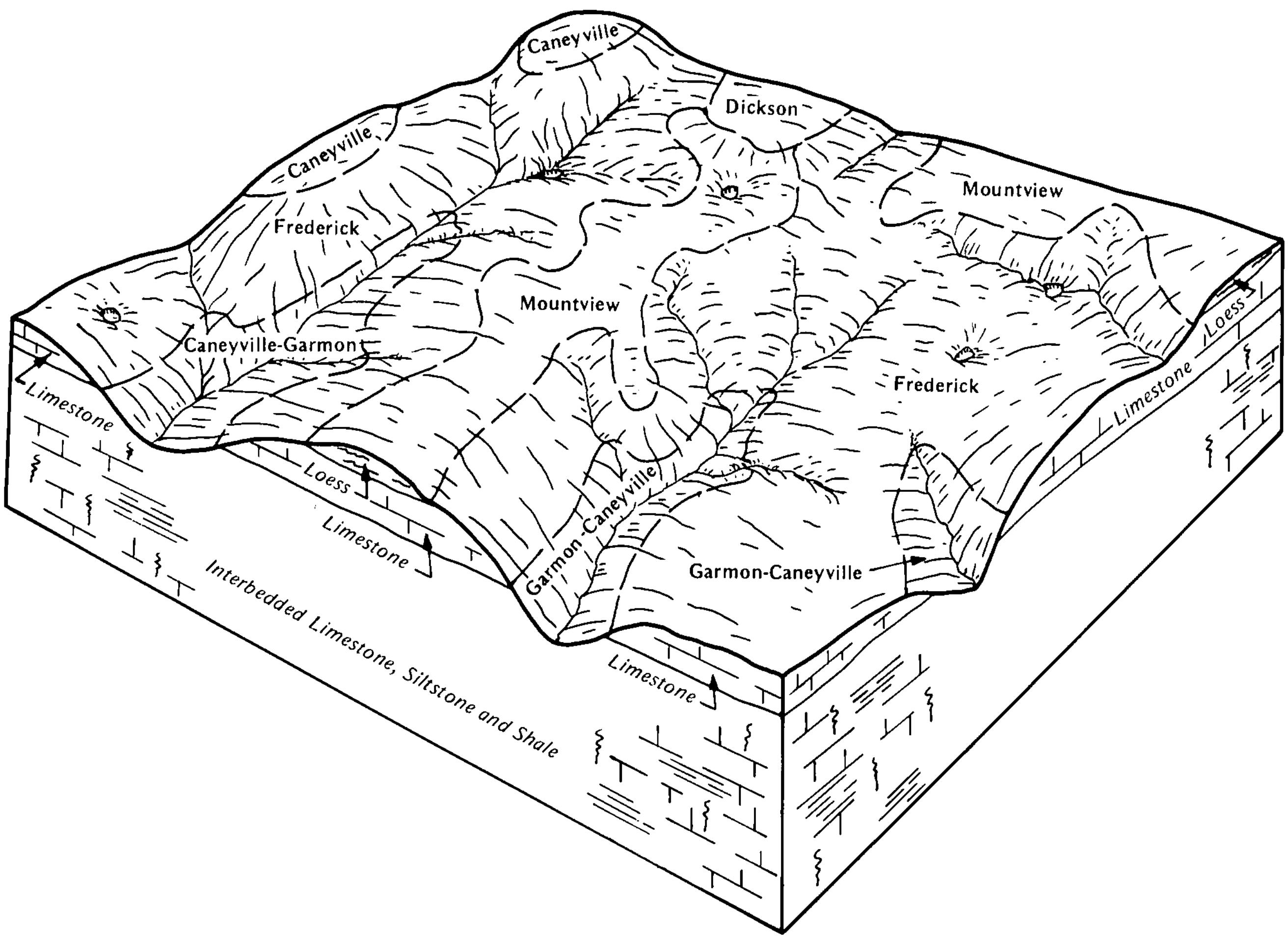


Figure 3.—THe relationship of soils to topography and underlying material in the Frederick-Mountview general soil map unit.

4. Melvin-Dunning-Lawrence

Deep, nearly level, very poorly drained to somewhat poorly drained soils that have a loamy or clayey subsoil; formed in mixed alluvium

This map unit consists of soils on long, narrow flood plains, in wet depressions, and on low stream terraces. The flood plains, depressions, and terraces are dissected by many small streams. Slopes range from about 1 to 2 percent.

This map unit makes up about 2 percent of the county. About 28 percent of the map unit is Melvin soils, 24 percent is Dunning soils, 16 percent is Lawrence soils, and the rest is soils of minor extent.

Melvin soils are on flood plains and in slight depressions. These soils are deep and poorly drained. The surface layer is dark grayish brown silt loam. The subsoil is gray silt loam, and the substratum is gray and dark gray silty clay loam.

Dunning soils are in depressed areas on flood plains. They are deep and very poorly drained. The surface layer is very dark gray silty clay loam. The subsoil and substratum are dark gray and gray silty clay.

Lawrence soils are on low stream terraces. They are deep and somewhat poorly drained. The surface layer is brown silt loam. The upper part of the subsoil is yellowish brown silt loam that has light brownish gray mottles, and the lower part is a compact and brittle fragipan that is light brownish gray silt loam and gray silty clay loam.

The soils of minor extent are the Nolin, Newark, and Rahm soils on flood plains and the Elk and Purdy soils on stream terraces.

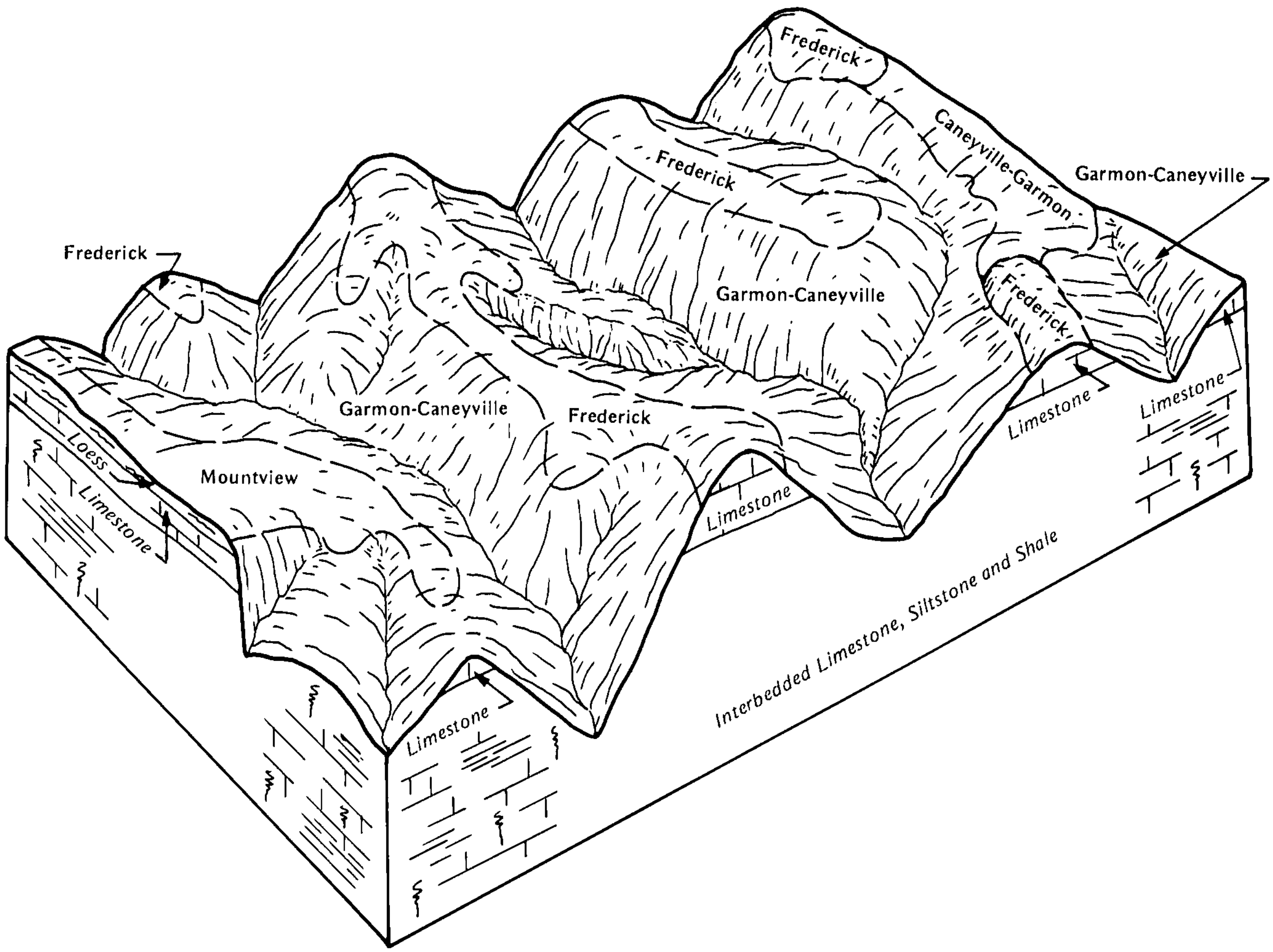


Figure 4.—The relationship of soils to topography and underlying material in the Garmon-Caneyville general soil map unit.

The soils of this map unit are used mainly for cultivated crops, hay, or pasture. Some areas are not cleared; most are in wet depressions and on streambanks.

These soils are suited to cultivated crops that can tolerate wetness and occasional flooding. Tile drains and open ditches can improve internal drainage.

The soils of this map unit are suited to use as woodland. They are poorly suited to most urban and recreational uses because of flooding and wetness.

5. Decatur-Bewleyville-Clarksville

Deep, gently sloping to moderately steep, well drained soils that have a clayey or a loamy and clayey subsoil; formed in material weathered from limestone or in loess underlain by material weathered from limestone

This map unit consists of soils on convex ridgetops and side slopes that have karst topography (fig. 5). The ridges are long and narrow, and the side slopes are short and dissected by small streams. Much of the area within the map unit is drained by limestone sinks. Slopes range from 6 to 20 percent.

This map unit makes up about 5 percent of the county. About 24 percent of the map unit is Decatur soils, 18 percent is Bewleyville soils, 15 percent is Clarksville soils, and the rest is soils of minor extent.

Decatur soils are on convex ridges and side slopes. The surface layer is dark reddish brown silt loam, and the subsoil is dark red clay.

Bewleyville soils are on gently sloping ridgetops. They formed in a silty mantle underlain by material weathered from limestone. The surface layer is brown silt loam. The

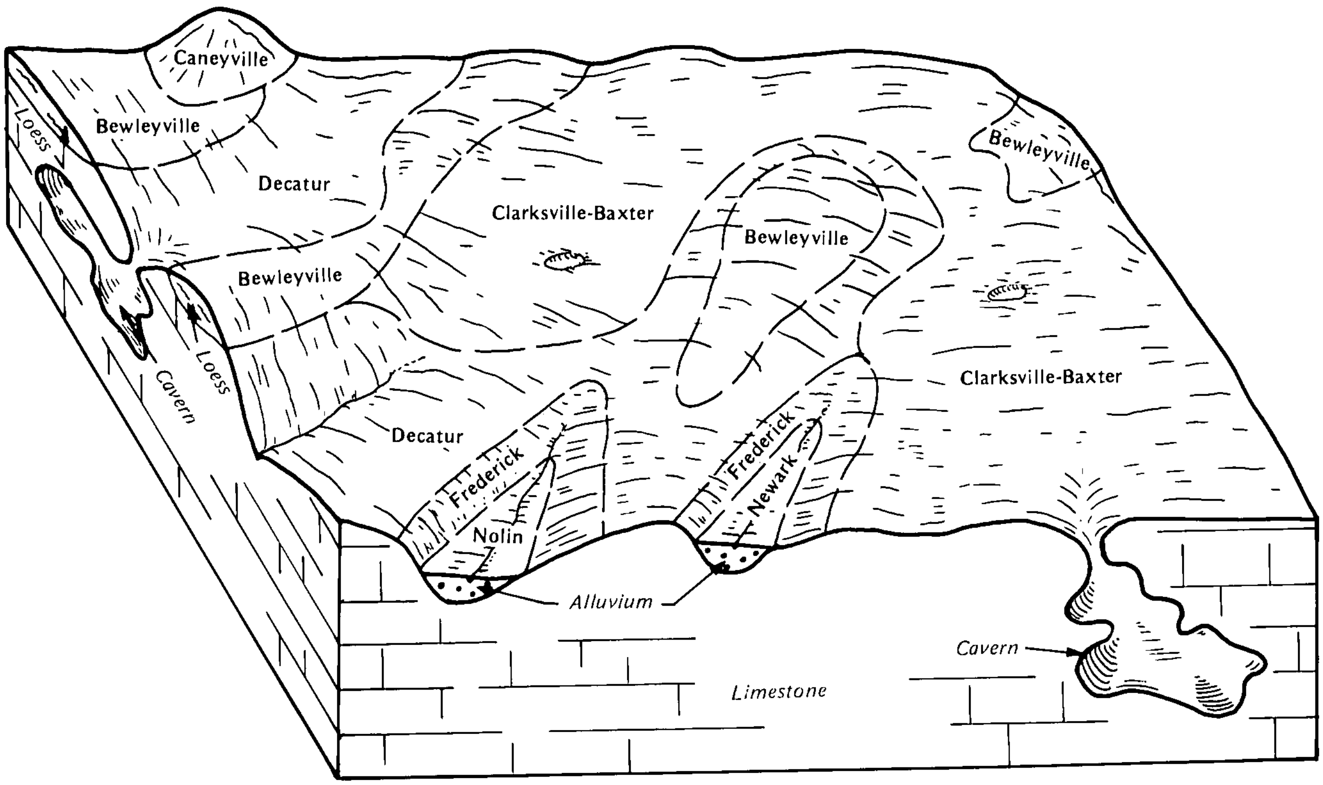


Figure 5.—The relationship of soils to topography and underlying material in the Decatur-Bewleyville-Clarksville general soil map unit.

upper part of the subsoil is reddish brown silt loam and yellowish red silty clay loam, and the lower part is dark red clay.

Clarksville soils are on ridges and side slopes. The surface layer is dark yellowish brown cobbly silt loam. The upper part of the subsoil is reddish yellow and yellowish red, very cobbly silt loam and very cobbly clay loam, and the lower part is yellowish red clay loam.

The soils of minor extent are Baxter and Frederick soils on ridgetops and side slopes, Caneyville soils on steep hillsides, and Nolin and Newark soils on flood plains.

The soils of this map unit are used mainly for cultivated crops. The side slopes are used for hay or pasture. Some areas are not cleared; most are on the steep hillsides.

These soils generally are suited to agricultural uses and are well suited to pasture and hay. The gently sloping and sloping soils are well suited to cultivated crops. Erosion is a hazard, however, and erosion control practices are needed.

The soils of this map unit are suited to use as woodland. They generally are suited to most urban and recreational uses. The shrink-swell potential, steepness of slope, and large stones are the main limitations.

6. Caneyville-Rock outcrop-Rigley-Shelocta

Moderately deep and deep, steep and very steep, well drained soils and areas of Rock outcrop; the soils have a clayey and loamy subsoil and formed in residuum and colluvium from limestone, shale, siltstone, and sandstone

This map unit consists of soils on very steep mountain slopes, benches, and ridgetops and in narrow valleys (fig. 6). The ridges are long and narrow, and the side slopes are long and highly dissected by small streams. Slopes range from 20 to 60 percent.

This map unit makes up about 63 percent of the county. About 16 percent of the map unit is Caneyville soils, about 14 percent is Rock outcrop, about 14 percent is Rigley soils, and about 11 percent is Shelocta soils. The rest is soils of minor extent.

Caneyville soils are on the lower side slopes. They are moderately deep and well drained. They formed in material weathered from limestone. The surface layer is brown silt loam. The upper part of the subsoil is

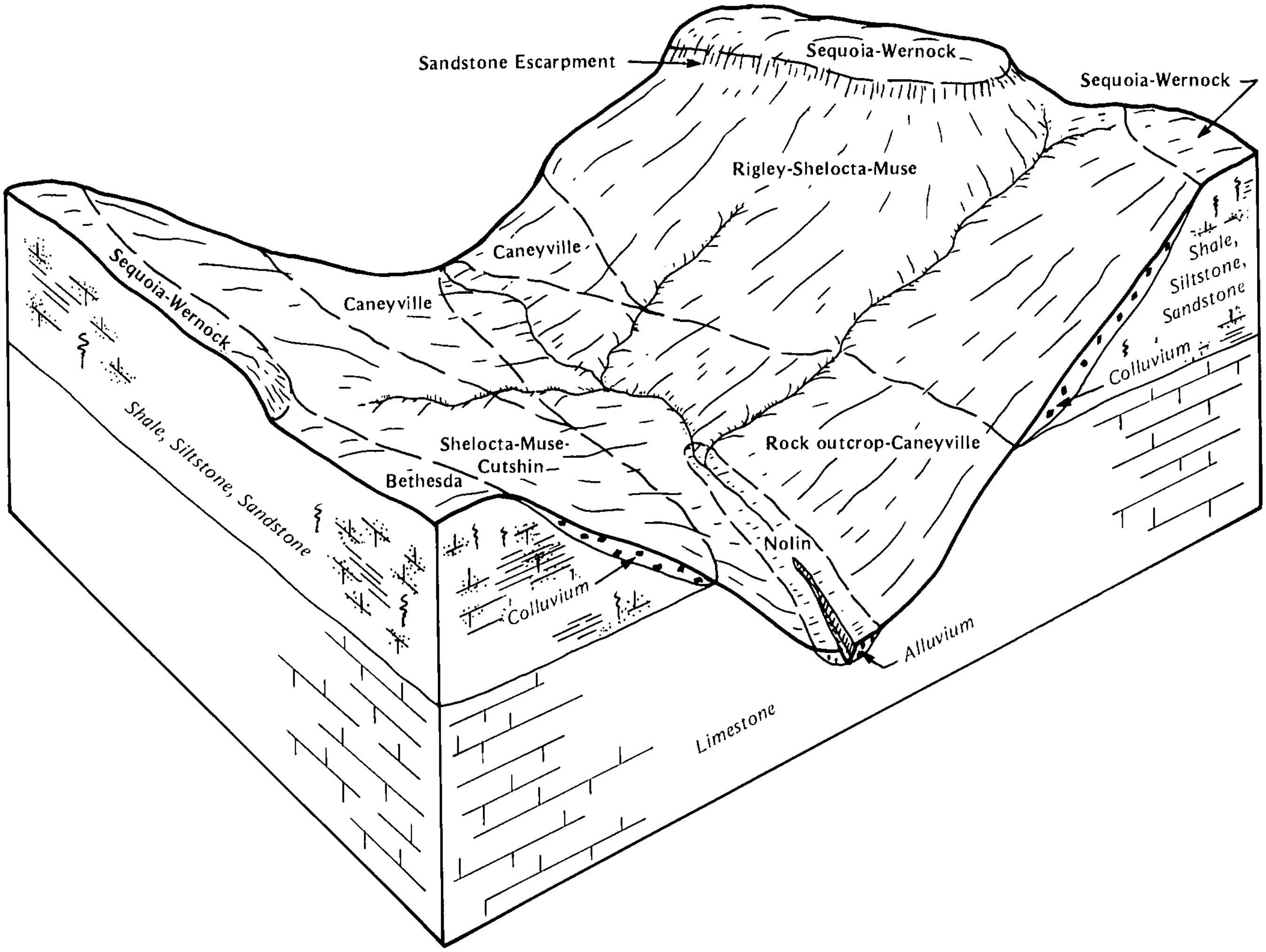


Figure 6.—The relationship of soils to topography and underlying material in the Caneyville-Rock outcrop-Rigley-Shelocta general soil map unit.

yellowish brown silty clay loam, and the lower part is yellowish red and dark yellowish brown silty clay.

Rock outcrop covers most of the lower one-third of the steep mountain side slopes and consists mostly of scattered rock outcrops and some continuous ledges.

Rigley soils are on the steep upper side slopes below massive sandstone cliffs. These soils are deep and well drained. They formed in colluvium from acid sandstone, siltstone, and shale. The surface layer is dark grayish brown loam, and the subsurface layer is brown fine sandy loam. The subsoil is yellowish brown sandy loam, and the substratum is yellowish brown gravelly sandy clay loam.

Shelocta soils are on steep side slopes. They are deep and well drained. These soils formed in colluvium from acid shale, siltstone, and sandstone. The surface layer is dark brown silt loam, and the subsurface layer is brown silt loam. The subsoil is yellowish brown gravelly silty clay loam and strong brown very gravelly silty clay loam. The substratum is yellowish brown very gravelly silty clay loam.

The soils of minor extent are Cutshin soils on cool aspects and in coves, Muse soils on steep side slopes, Sequoia and Wernock soils on narrow ridgetops, and Nolin and Allen soils in narrow stream valleys.

The soils of this map unit are used mainly as woodland. The soils on the ridges and more gentle slopes are used for cultivated crops, hay, or pasture.

These soils generally are not suited to agricultural uses. Steepness of slope is a severe limitation.

The soils of this map unit are suited to use as woodland. Steepness of slope and rock outcrop are severe limitations for most urban and recreational uses.

Detailed Soil Map Units

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, 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, Mountview silt loam, 2 to 6 percent slopes, is one of several phases in the Mountview 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. Shelocta-Muse-Cutshin complex, steep, 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. Garmon-Caneyville association, very 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 fine sandy loam, 2 to 6 percent slopes. This soil is deep, gently sloping, and well drained. It is on foot slopes. The mapped areas range from about 3 to 15 acres.

Typically, the surface layer is brown fine sandy loam about 6 inches thick. The upper part of the subsoil to a depth of about 28 inches is strong brown fine sandy loam and yellowish red sandy clay loam. The lower part to a depth of about 76 inches is red, firm, sandy clay and gravelly clay that is underlain by soft red and brown shale to a depth of about 106 inches.

This soil has moderate permeability. The available water capacity is high. The root zone is deep. The reaction is strongly acid or very strongly acid except where lime has been added. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Caneyville and Frederick soils. In places are a few small areas of soils that are similar to Allen soil but are less than 60 inches deep to bedrock. The included soils make up about 5 to 10 percent of this map unit.

In most areas, this Allen soil is used for cultivated crops, hay, or pasture. In a few areas, it is used as woodland.

This soil is well suited to corn, soybeans, small grains, and tobacco. The hazard of erosion is moderate if this soil is cultivated. A combination of crop rotation and erosion control practices is needed to slow runoff and control erosion. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

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

This soil is well suited to use as woodland. Yellow poplar, black walnut, and shortleaf pine are the preferred trees to plant. Equipment use restrictions and plant competition are concerns in woodland management.

This soil is well suited to most urban uses; however, moderate permeability and the content of clay are limitations. Low strength is a limitation for local roads and streets. Special design, planning, or maintenance is needed.

This Allen soil is in capability subclass IIe.

AnC—Allen fine sandy loam, 6 to 12 percent slopes. This soil is deep, sloping, and well drained. It is on foot slopes. The mapped areas range from about 5 to 40 acres.

Typically, the surface layer is brown fine sandy loam about 6 inches thick. The upper part of the subsoil to a depth of about 28 inches is strong brown fine sandy loam and yellowish red sandy clay loam. The lower part to a depth of about 76 inches is red, firm sandy clay and gravelly clay that is underlain by soft red and brown shale to a depth of about 106 inches.

This soil has moderate permeability. The available water capacity is high. The root zone is deep. The reaction is strongly acid or very strongly acid except where lime has been added. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Caneyville and Frederick soils. In places are a few small areas of soils that are similar to Allen soil but are less than 60 inches deep to bedrock. The included soils make up about 5 to 10 percent of this map unit.

In most areas, this Allen soil is used for cultivated crops, hay, or pasture. In a few areas, it is used as woodland.

This soil is well suited to corn, soybeans, small grains, and tobacco. The hazard of erosion is severe if this soil is cultivated. A combination of crop rotation and erosion control practices is needed to slow runoff and control erosion. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and growing grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

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

This soil is well suited to use as woodland. Yellow poplar, black walnut, and shortleaf pine are the preferred trees to plant. Equipment use restrictions and plant competition are concerns in woodland management.

This soil is suited to most urban uses; however, steepness of slope, moderate permeability, and content of clay are limitations. Low strength is a limitation for local roads and streets. Special design, planning, or maintenance is needed.

This Allen soil is in capability subclass IIIe.

AnD—Allen fine sandy loam, 12 to 20 percent slopes. This soil is deep, moderately steep, and well drained. It is on foot slopes. The mapped areas range from about 5 to 50 acres.

Typically, the surface layer is brown, fine sandy loam about 6 inches thick. The upper part of the subsoil to a depth of about 28 inches is strong brown fine sandy loam and yellowish red sandy clay loam. The lower part to a depth of about 76 inches is red, firm sandy clay and gravelly clay underlain by soft red and brown shale to a depth of about 106 inches.

This soil has moderate permeability. The available water capacity is high. The root zone is deep. The reaction is strongly acid or very strongly acid except where lime has been added. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Caneyville and Frederick soils. In places are a few small areas of soils that are similar to Allen soil; some are less than 60 inches to bedrock and some have slopes of more than 20 percent. The included soils make up about 5 to 10 percent of this map unit.

In most areas, this Allen soil is used for hay or pasture. In a few areas, it is used for cultivated crops or as woodland.

This soil is poorly suited to most cultivated crops because of steepness of slope. The hazard of erosion is very severe if this soil is cultivated. A combination of crop rotation and erosion control practices is needed to slow runoff and control erosion. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

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

This soil is well suited to use as woodland. Yellow poplar, black walnut, and shortleaf pine are the preferred trees to plant. Equipment use restrictions and plant competition are concerns in woodland management.

This soil is poorly suited to most urban uses because of steepness of slope and the content of clay. Low strength is a limitation for local roads and streets. Special design, planning, or maintenance is needed.

This Allen soil is in capability subclass IVe.

BeD—Bethesda channery silty clay loam, 12 to 60 percent slopes. This soil is deep, moderately steep to very steep, and well drained. It is on ridgetops and side slopes near the mountaintops in the southern and eastern parts of the county. It formed in reshaped spoil material from surface coal mining operations. The mapped areas range from about 25 to 100 acres.

Typically, the surface layer is strong brown, firm channery silty clay loam about 7 inches thick. The upper part of the underlying material to a depth of about 24 inches is strong brown very channery clay loam that has yellowish brown and light brownish gray mottles. The lower part to a depth of 60 inches or more is variegated strong brown, yellowish brown, and light brownish gray very channery clay loam.

This soil has moderately slow permeability. The available water capacity is low. The root zone is deep. This soil is somewhat difficult to till because of the coarse fragments. The reaction is strongly acid to extremely acid. Runoff is very rapid. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are a few small areas of Wernock, Sequoia, and Muse soils. As a result of surface coal mining operations, a few vertical highwalls and small ponded areas of soils that are similar to Bethesda soil are in places. The included soils make up about 10 to 20 percent of this map unit.

In most areas, this Bethesda soil has been reseeded to grasses and legumes. Plantings of black locust and pines are also common. Some areas of this soil have revegetated naturally.

This soil is not suited to cultivated crops. It is suited to most hay and pasture plants that are grown in the county; however, these soils need a quick growing and permanent protective plant cover. Before seeding, the soil should be graded smooth enough for the use of equipment (fig. 7). Fertilizer and lime are essential. Restricting use during wet periods, maintaining proper stocking, and rotating grazing help keep the pasture plants and soil in good condition.

This soil is suited to use as woodland. Eastern white pine, loblolly pine, white oak, and black locust are the preferred trees to plant. The hazard of erosion, equipment use restrictions, and plant competition are concerns in woodland management.

This soil is poorly suited to most urban uses because of unstable fill, steepness of slope, and moderately slow permeability. Special design, planning, or maintenance is needed.

This Bethesda soil is in capability subclass VIIe.

BwB—Bewleyville silt loam, 2 to 6 percent slopes. This soil is deep, gently sloping, and well drained. It is on convex ridgetops. The mapped areas range from about 15 to 90 acres.

Typically, the surface layer is brown silt loam about 10 inches thick. The upper part of the subsoil to a depth of about 38 inches is reddish brown silt loam and yellowish red silty clay loam. The lower part to a depth of 62 inches or more is dark red, firm clay.

This soil has moderate permeability. The available water capacity is high. The root zone is deep. This soil is easily tilled. The reaction is strongly acid or very strongly acid except where lime has been added. Runoff is medium. The shrink-swell potential is moderate. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Dickson, Mountview, Frederick, and Decatur soils. The included soils make up about 5 to 10 percent of this map unit.

In most areas, this Bewleyville soil is used for cultivated crops, hay, or pasture. In a few areas, it is used as woodland.

This soil is well suited to corn, soybeans, small grains, and tobacco. The hazard of erosion is moderate if this soil is cultivated. A combination of crop rotation and erosion control practices is needed to slow runoff and control erosion. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

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

This soil is well suited to use as woodland. Yellow poplar, black walnut, white ash, northern red oak, eastern white pine, shortleaf pine, and loblolly pine are the preferred trees to plant. Plant competition is a concern in woodland management.

This soil is well suited to most urban uses; however seepage, high content of clay, and shrink-swell potential are limitations. Low strength is a limitation for local roads and streets. Special design, planning, or maintenance is needed.

This Bewleyville soil is in capability subclass IIe.

Figure 7.—This strip mine spoil is being graded and prepared for seeding to grass and legumes.

CaC—Caneyville silt loam, 6 to 12 percent slopes. This soil is moderately deep, sloping, and well drained. It is on side slopes and ridgetops. The mapped areas range from about 5 to 40 acres.

Typically, the surface layer is brown silt loam about 8 inches thick. The upper part of the subsoil to a depth of about 18 inches is yellowish brown silty clay loam. The lower part to a depth of about 30 inches is yellowish red and dark yellowish brown, firm silty clay underlain by limestone bedrock.

This soil has moderately slow permeability. The available water capacity is moderate. The root zone is moderately deep. This soil is easily tilled except in areas where rock outcrop is on the surface. The reaction ranges from very strongly acid to neutral in the upper part of the soil and from medium acid to mildly alkaline in the lower part. Runoff is medium or rapid. The shrink-swell potential is moderate. Depth to bedrock is 20 to 40 inches.

Included with this soil in mapping are small areas of Baxter, Clarksville, and Frederick soils. Also included are small areas of rock outcrop. In places are areas of soils similar to Caneyville soil; some are more red throughout and some have slopes of more than 12 percent. The included soils make up about 10 to 15 percent of this map unit.

In most areas, this Caneyville soil is used for hay or pasture. In a few areas, it is used for cultivated crops or as woodland.

This soil is suited to cultivated crops, but the hazard of erosion is severe if this soil is cultivated. A combination of crop rotation and erosion control practices is needed to slow runoff and control erosion. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

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

This soil is suited to use as woodland. Virginia pine and eastern redcedar are the preferred trees to plant. Equipment use restrictions, seedling mortality, and plant competition are concerns in woodland management.

This soil is poorly suited to most urban uses because of depth to rock, moderately slow permeability, and the high content of clay. Special design, planning, or maintenance is needed.

This Caneyville soil is in capability subclass IIIe.

CeD—Caneyville silt loam, 6 to 20 percent slopes, rocky. This soil is moderately deep, sloping and moderately steep, and well drained. It is on side slopes and ridgetops. Limestone outcrops cover about 5 to 10 percent of the surface. The mapped areas range from about 10 to 75 acres.

Typically, the surface layer is brown silt loam about 8 inches thick. The upper part of the subsoil to a depth of about 18 inches is yellowish brown silty clay loam. The lower part to a depth of about 30 inches or more is yellowish red and dark yellowish brown, firm silty clay underlain by limestone bedrock.

This soil has moderately slow permeability. The available water capacity is moderate. The root zone is moderately deep. This soil is difficult to till because of the rock outcrops. The reaction is very strongly acid to neutral in the upper part of the soil and medium acid to mildly alkaline in the lower part. Runoff is medium or rapid. The shrink-swell potential is moderate. Depth to bedrock is 20 to 40 inches.

Included with this soil in mapping are Clarksville, Baxter, Decatur, and Frederick soils. Also included are small areas of rock outcrop, and in places are a few areas of soils that have slopes of more than 20 percent. The included soils make up about 5 to 10 percent of this map unit.

In most areas, this Caneyville soil is used for hay or pasture. In a few areas, it is used for cultivated crops or as woodland.

This soil is not suited to cultivated crops because of rock outcrops and steepness of slopes.

This soil is suited to hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and excessive runoff. Restricting use during wet periods, maintaining proper stocking, and rotating grazing help keep the pasture plants and soil in good condition.

This soil is suited to use as woodland. Virginia pine and eastern redcedar are the preferred trees to plant. The hazard of erosion, equipment use restrictions, seedling mortality, and plant competition are concerns in woodland management.

This soil is poorly suited to most urban uses because of steepness of slope, depth to bedrock, rock outcrop, moderately slow permeability, and the high content of clay. Special design, planning, or maintenance is needed.

This Caneyville soil is in capability subclass VIs.

CgD—Caneyville-Garmon association, steep. The soils in this map unit are moderately deep and well drained. The landscape is a series of steep side slopes and narrow, winding ridgetops. Caneyville soil formed in material weathered from hard limestone that caps the ridgetops and extends over the upper side slopes. Garmon soil formed in material weathered from shaly limestone, calcareous shale, and siltstone on lower side slopes. Limestone outcrop covers about 3 to 5 percent of the surface. The mapped areas range from about 10 to 75 acres. A few mapped areas have only one of these soils. The slopes range from 12 to 30 percent.

Caneyville soil makes up about 65 percent of the map unit and Garmon soil about 15 percent. The individual areas are large enough but were not mapped separately because of the present and predicted use of the soils.

Typically, the surface layer of Caneyville soil is brown silt loam about 8 inches thick. The upper part of the subsoil to a depth of about 18 inches is yellowish brown silty clay loam. The lower part to a depth of about 30 inches is yellowish red and dark yellowish brown, firm silty clay underlain by limestone bedrock.

Caneyville soil has moderately slow permeability. The available water capacity is moderate. The root zone is moderately deep. The reaction is very strongly acid to neutral in the upper part of the soil and medium acid to mildly alkaline in the lower part. Runoff is rapid. The shrink-swell potential is moderate. Depth to bedrock is 20 to 40 inches.

Typically, the surface layer of Garmon soil is brown silt loam about 1 inch thick. The subsurface layer to a depth of about 6 inches is brown silt loam. The subsoil to a depth of about 27 inches is yellowish brown channery silt loam. The substratum to a depth of about 32 inches is yellowish brown channery silt loam underlain by limestone bedrock.

Garmon soil has moderately rapid permeability. The available water capacity is moderate. The root zone is moderately deep. The reaction is very strongly acid to neutral. Runoff is rapid. Depth to bedrock is 20 to 40 inches.

Included in mapping are small areas of Waynesboro and Frederick soils and Rock outcrop. The included soils make up about 20 percent of this map unit.

In most areas, the soils in this association are used as woodland. Small areas of soils are used for cultivated crops or grass.

The soils in this association are not suited to cultivated crops because of rock outcrop and steepness of slope.

These soils are poorly suited to hay and pasture because of steepness of slope and depth to bedrock.

Caneyville soil is suited to use as woodland. White ash, yellow poplar, white oak, and eastern white pine are the preferred trees to plant on north slopes; eastern redcedar and Virginia pine are preferred on the south slopes. The hazard of erosion, equipment use restrictions, plant competition, and seedling mortality are woodland management concerns.

Garmon soil is suited to use as woodland. Northern red oak, yellow poplar, white ash, white oak, and eastern white pine are the preferred trees to plant on north slopes and Virginia pine, eastern red cedar, and white oak are preferred on south slopes. The hazard of erosion and equipment use restrictions are concerns in woodland management in addition to plant competition on north slopes and seedling mortality on south slopes.

This association is poorly suited to most urban uses because of depth to bedrock, steepness of slope, seepage, and high content of clay. Special design, planning, or maintenance is needed.

The soils in this association are in capability subclass VIs.

CkC—Clarksville extremely cobbly loam, 2 to 12 percent slopes, rubbly. This soil is deep, gently sloping and sloping, and somewhat excessively drained. It is on uplands. The mapped areas range from about 3 to 15 acres.

Typically, the surface layer is dark grayish brown extremely cobbly loam about 5 inches thick. The subsoil extends to a depth of about 69 inches. The upper part is dark yellowish brown extremely cobbly loam and silt loam. The middle part is light brown very cobbly silty clay loam. The lower part is red cobbly silty clay.

This soil has moderately rapid permeability in the upper part of the subsoil and moderate permeability in the lower part. The available water capacity is moderate. The root zone is deep. This soil is difficult to till because of the content of cobbles. The reaction is extremely acid to strongly acid except where lime has been added. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Baxter soils. The included soils make up about 5 to 10 percent of this map unit.

In most areas, this Clarksville soil is used as woodland. In a few areas, it is used for pasture.

This soil is not suited to cultivated crops, hay, or pasture because cobbles are throughout the soil.

This soil is well suited to use as woodland. White oak, yellow poplar, northern red oak, and white ash are the preferred trees to plant. Equipment use restrictions, seedling mortality, and plant competition are concerns in woodland management.

This soil is suited to most urban uses; however, cobbles, high content of clay, steepness of slope, and seepage are limitations. Special design, planning, or maintenance is needed.

This Clarksville soil is in capability subclass VIs.

CxC—Clarksville-Baxter cobbly silt loams, 4 to 12 percent slopes. These soils are deep, gently sloping and sloping, and well drained. They are on broad karst ridges and side slopes. The mapped areas range from 30 to 100 acres.

Clarksville soil makes up about 40 percent of this map unit and Baxter soil about 25 percent. Individual areas of these soils are too mixed or too small to map separately at the selected scale.

Typically, the surface layer of Clarksville soil is dark yellowish brown cobbly silt loam about 6 inches thick. The upper part of the subsoil to a depth of about 28 inches is reddish yellow and yellowish red very cobbly silt loam. The middle part to a depth of about 40 inches is yellowish red very cobbly clay loam. The lower part to a depth of about 72 inches is yellowish red clay loam.

Clarksville soil has moderately rapid permeability in the upper part of the subsoil and moderate permeability in the lower part. The available water capacity is moderate. The root zone is deep. This soil is difficult to till because of the content of cobbles. The reaction is extremely acid or very strongly acid except where lime has been added. Runoff is medium. Depth to bedrock is more than 60 inches.

Typically, the surface layer of Baxter soil is brown cobbly silt loam about 8 inches thick. The upper part of the subsoil to a depth of about 16 inches is yellowish brown cobbly silt loam. The lower part to a depth of about 72 inches is red, firm, gravelly, cobbly, and very cobbly silty clay.

Baxter soil has moderate permeability. The available water capacity is high. The root zone is deep. This soil is difficult to till because of the content of cobbles. The reaction is very strongly acid or strongly acid except where lime has been added. Runoff is medium. The shrink-swell potential is moderate. Depth to bedrock is more than 60 inches.

Included in mapping are small areas of Frederick, Caneyville, and Mountview soils. In places are small areas of soils similar to Baxter soil; some have less clay in the subsoil, and some have fewer cobbles. The included soils make up about 35 percent of this map unit.

In most areas, the soils in this complex are used for cultivated crops, hay, or pasture. In a few areas they are used as woodland.

The soils in this complex are suited to corn, soybeans, small grains, and tobacco. The hazard of erosion is severe if this soil is cultivated. A combination of crop rotation and erosion control practices is needed to slow runoff and control erosion. Cobbles in the surface layer interfere with tillage operations. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

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

This complex is well suited to use as woodland. Eastern white pine, white oak, northern red oak, shortleaf pine, white ash, loblolly pine, and yellow poplar are the preferred trees to plant on the Baxter soil; white oak, yellow poplar, northern red oak, and white ash are preferred on the Clarksville soil. Plant competition is a concern in woodland management on the Baxter soil and equipment use restrictions, plant competition and seedling mortality are concerns on the Clarksville soil.

This complex is suited to most urban uses; however, cobbles, high content of clay, moderate permeability, steepness of slope, and moderate shrink-swell potential are limitations. Special design, planning, or maintenance is needed.

This complex is in capability subclass IIIs.

CxD—Clarksville-Baxter cobbly silt loams, 12 to 20 percent slopes. These soils are deep, moderately steep, and well drained. They are on side slopes. Some areas have karst topography. The mapped areas range from 30 to 80 acres.

Clarksville soil makes up about 40 percent of this map unit and Baxter soil about 25 percent. The individual areas are too mixed or too small to map separately at the selected scale.

Typically, the surface layer of Clarksville soil is dark yellowish brown cobbly silt loam about 6 inches thick. The upper part of the subsoil to a depth of about 28 inches is reddish yellow and yellowish red very cobbly silt loam. The middle part to a depth of 40 inches is yellowish red very cobbly clay loam. The lower part to a depth of 72 inches is yellowish red clay loam.

Clarksville soil has moderately rapid permeability in the upper part of the subsoil and moderate permeability in the lower part. The available water capacity is moderate. The root zone is deep. The soil is difficult to till because of the content of cobbles. The reaction is extremely acid to strongly acid except where lime has been added. Runoff is medium. Depth to bedrock is more than 60 inches.

Typically, the surface layer of Baxter soil is brown cobbly silt loam about 8 inches thick. The upper part of the subsoil to a depth of about 16 inches is yellowish brown cobbly silt loam. The lower part to a depth of about 72 inches is red, firm, gravelly cobbly, and very cobbly silty clay.

Baxter soil has moderate permeability. The available water capacity is high. The root zone is deep. This soil is difficult to till because of the content of cobbles. The reaction is very strongly acid or strongly acid except where lime has been added. Runoff is medium or rapid. The Shrink-swell potential is moderate. Depth to bedrock is more than 60 inches.

Included in mapping are small areas of Frederick, Caneyville, and Mountview soils. In places are small areas of Baxter soils that have slopes of more than 20 percent, small areas of eroded soils that are similar to Baxter soil but have less clay in the subsoil, and soils similar to Clarksville soil but have fewer cobbles. The included soils make up about 35 percent of this map unit.

In most areas, the soils in this complex are used for hay or pasture. In a few areas, they are used for cultivated crops and as woodland.

The soils in this complex are poorly suited to most cultivated crops because of steepness of slope and the cobbly surface layer. The hazard of erosion is very severe if this complex is cultivated. A combination of crop rotation and erosion control practices is needed to slow runoff and control erosion. Cobbles in the surface layer interfere with tillage operations. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

This complex is suited to hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and excessive runoff. Restricting use during wet periods, maintaining proper stocking, and rotating grazing help keep the pasture plants and soil in good condition.

Clarksville soil is well suited to use as woodland. White oak, yellow poplar, northern red oak, and white ash are the preferred trees to plant. Equipment use restrictions, seedling mortality, and plant competition are concerns in woodland management.

Baxter soil is well suited to use as woodland. Eastern white pine, white oak, northern red oak, white ash, loblolly pine, shortleaf pine, and yellow poplar are the preferred trees to plant. The hazard of erosion, equipment use restrictions, and plant competition are woodland management concerns.

This complex is poorly suited to most urban uses because of steepness of slope, cobbles, and seepage. Special design, planning, or maintenance is needed.

This complex is in capability subclass IVs.

DeC—Decatur silt loam, 6 to 12 percent slopes. This soil is deep, sloping, and well drained. It is on upland side slopes and convex ridgetops. Most areas have karst topography. The mapped areas range from about 10 to 100 acres.

Typically, the surface layer is dark reddish brown silt loam about 6 inches thick. The upper part of the subsoil to a depth of about 14 inches is dark red silty clay loam. The middle part to a depth of about 62 inches is dark red, firm clay. The lower part to a depth of 80 inches is mottled dark red and yellowish brown clay.

This soil has moderate permeability. The available water capacity is high. The root zone is deep. This soil is easily tilled. The reaction is very strongly acid to medium acid except where lime has been added. Runoff is medium. The shrink-swell potential is moderate. Depth to bedrock is 60 inches or more.

Included with this soil in mapping are small areas of Frederick, Baxter, Clarksville, and Bewleyville soils. The included soils make up about 10 to 15 percent of this map unit.

In most areas, this Decatur soil is used for cultivated crops, hay, or pasture. In a few areas, it is used as woodland.

This soil is suited to corn, soybeans, small grains, and tobacco. The hazard of erosion is severe if this soil is cultivated. A combination of crop rotation and erosion control practices is needed to slow runoff and control erosion. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response of crops to lime and fertilizer is good.

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

This soil is well suited to use as woodland. Yellow poplar, eastern white pine, loblolly pine, and shortleaf pine are the preferred trees to plant. Plant competition is a concern in woodland management.

This soil is suited to most urban uses; however, the high content of clay, moderate shrink-swell potential, and steepness of slope are limitations. Low strength is a limitation for local roads and streets. Special design, planning, or maintenance is needed.

This Decatur soil is in capability subclass IIIe.

DkB—Dickson silt loam, 2 to 6 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is on ridgetops and stream terraces. The mapped areas range from about 5 to 50 acres.

Typically, the surface layer is brown silt loam about 7 inches thick. The upper part of the subsoil to a depth of about 26 inches is yellowish brown silty clay loam. The middle part to a depth of about 44 inches is a firm, compact, and brittle fragipan that is yellowish brown silt loam with light brownish gray mottles. The lower part to a depth of about 60 inches or more is strong brown, very firm clay with light brownish gray and reddish brown mottles.

This soil has moderate permeability above the fragipan and very slow permeability in the fragipan. The available water capacity is moderate. The root zone is moderately deep. The soil is easily tilled. The reaction is strongly acid or very strongly acid except where lime has been added. Runoff is slow. A seasonal high water table is at a depth of 2 to 3 feet. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Mountview, Elk, and Lawrence soils. In places are a few small areas of soils that are similar to Dickson soil but do not have definite characteristics of a fragipan. The included soils make up about 5 to 10 percent of this map unit.

In most areas, this Dickson soil is used for cultivated crops, hay, or pasture. In a few areas, it is used as woodland.

This soil is well suited to corn, soybeans, small grains, and tobacco. The hazard of erosion is moderate if this soil is cultivated. A combination of crop rotation and erosion control practices are needed to slow runoff and control erosion. Tillage operations can be delayed in spring because of wetness. In some places, diversions help control runoff and overwash from adjacent hills. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response of crops to lime and fertilizer is good.

This soil is well suited to most hay and pasture plants that are commonly grown in the county. Because of wetness, it is not well suited to alfalfa. Overgrazing or grazing when the soil is too wet causes soil compaction and excessive runoff. Restricting use during wet periods, maintaining proper stocking, and rotating grazing help keep the pasture plants and soil in good condition.

This soil is suited to use as woodland. Loblolly pine, eastern white pine, shortleaf pine, and yellow poplar are the preferred trees to plant. Plant competition is a concern in woodland management.

This soil is suited to urban uses; however, wetness and very slow permeability are limitations. Low strength is a limitation for local roads and streets. Special design, planning, or maintenance is needed.

This Dickson soil is in capability subclass IIe.

Du—Dunning silty clay loam, occasionally flooded. This soil is deep, nearly level, and very poorly drained. It is on flood plains. The slope ranges from 0 to 2 percent. The mapped areas range from about 10 to 300 acres.

Typically, the upper part of the surface layer to a depth of about 7 inches is very dark gray silty clay loam, and the lower part to a depth of about 12 inches is very dark gray, firm silty clay. The subsoil to a depth of about 33 inches is dark gray, firm silty clay that has olive mottles. The upper part of the substratum to a depth of about 47 inches is gray silty clay that has mottles in shades of brown. The lower part to a depth of 77 inches is gray silty clay loam that has brownish yellow mottles.

This soil has slow permeability. The available water capacity is high. The root zone is deep. This soil is easily tilled. The reaction ranges from medium acid to mildly alkaline. Runoff is slow to ponded. A seasonal high water table ranges from the surface to a depth of 0.5 foot. This soil is subject to occasional flooding. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Rahm, Purdy, Newark, and Melvin soils. The included soils make up about 5 to 10 percent of this map unit.

In most areas, this Dunning soil is used for pasture or as woodland. In few areas, it is used for cultivated crops or hay.

This soil is suited to cultivated crops that can tolerate wetness and occasional flooding. It is poorly suited to winter crops because of the seasonal high water table and flooding in winter and spring. Tillage operations are often delayed because of wetness. Tile drains and open ditches can improve internal drainage, and in some places, diversions help control runoff and overwash from adjacent soils. The effective growing season is lengthened where these drainage systems are installed. In addition, tillage operations are delayed for shorter periods, and the choice of suitable plants is better. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. Where this soil is drained, the response to lime and fertilizer is good.

This soil is suited to hay and pasture plants that tolerate wetness and can withstand flooding for brief periods. Where this soil is drained, it is well suited to many kinds of pasture plants. Overgrazing and grazing causes soil compaction and excessive runoff. Maintaining proper stocking, rotating grazing, and restricting use during wet periods help keep the pasture plants and soil in good condition.

This soil is suited to use as woodland. Pin oak, American sycamore, bald cypress, swamp white oak, and sweetgum are the preferred trees to plant. Equipment use restrictions, seedling mortality, and plant competition are concerns in woodland management.

This soil is poorly suited to most urban uses because of slow permeability, wetness, the hazard of flooding, and the high content of clay. Special design, planning, or maintenance is needed.

This Dunning soil is in capability subclass IIIw.

EkB—Elk silt loam, 2 to 6 percent slopes. This soil is deep, gently sloping, and well drained. It is on convex stream terraces. The mapped areas range from about 3 to 50 acres.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil to a depth of about 40 inches is strong brown and yellowish brown silty clay loam. The substratum to a depth of about 60 inches is yellowish brown silt loam.

This soil has moderate permeability. The available water capacity is high. The root zone is deep. This soil is easily tilled. Except where lime has been added, the reaction is very strongly acid to slightly acid in the surface layer and subsoil and strongly acid to slightly acid in the substratum. Runoff is medium. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Dickson, Bewleyville, and Allen soils. The included soils make up about 5 to 10 percent of this map unit.

In most areas, this Elk soil is used for cultivated crops, hay, or pasture. In a few areas, it is used as woodland.

This soil is well suited to corn, soybeans, small grains, and tobacco. The hazard of erosion is moderate if this soil is cultivated. A combination of crop rotation and erosion control practices is needed to slow runoff and control erosion. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

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

This soil is well suited to use as woodland. Eastern white pine, white ash, loblolly pine, northern red oak, yellow poplar, black walnut, white oak, cherrybark oak, and shortleaf pine are the preferred trees to plant. Plant competition is a concern in woodland management.

This soil is well suited to most urban uses; however, seepage is a limitation for some uses. Low strength is a limitation for local roads and streets. Special design, planning, or maintenance is needed.

This soil is in capability subclass IIe.

FrB—Frederick silt loam, 2 to 6 percent slopes. This soil is deep, gently sloping, and well drained. It is on convex ridgetops and side slopes. The mapped areas range from about 3 to 30 acres.

Typically, the surface layer is brown silt loam about 8 inches thick. The upper part of the subsoil to a depth of about 29 inches is yellowish red, firm silty clay. The lower part to a depth of about 65 inches or more is yellowish red, firm clay.

This soil has moderate permeability. The available water capacity is high. The root zone is deep. This soil is easily tilled. The reaction is very strongly acid to medium acid except where lime has been added. Runoff is medium. The shrink-swell potential is moderate. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are a few small areas of Mountview, Baxter, Caneyville, and Allen soils. The included soils make up about 5 to 10 percent of this map unit.

In most areas, this Frederick soil is used for cultivated crops, hay, or pasture. In a few areas, it is used as woodland.

This soil is well suited to corn, soybeans, small grains, and tobacco. The hazard of erosion is moderate if this soil is cultivated. A combination of crop rotation and erosion control practices is needed to slow runoff and control erosion. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

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

This soil is well suited to use as woodland. Eastern white pine, northern red oak, white oak, yellow poplar, and loblolly pine are the preferred trees to plant. Equipment use restrictions and plant competition are concerns in woodland management.

This soil is suited to most urban uses; however, moderate permeability, seepage, high content of clay, and moderate shrink-swell potential are limitations. Low strength is a limitation for local roads and streets. Special design, planning, or maintenance is needed.

This Frederick soil is in capability subclass IIe.

FrC2—Frederick silt loam, 6 to 12 percent slopes, eroded. This soil is deep, sloping, and well drained. It is on upland side slopes and convex ridgetops. The mapped areas range from about 5 to 150 acres. About 25 to 75 percent of the original surface layer has been eroded away.

Typically, the surface layer is brown silt loam about 8 inches thick. The upper part of the subsoil to a depth of about 29 inches is yellowish red, firm silty clay. The lower part to a depth of about 65 inches or more is yellowish red, firm clay.

This soil has moderate permeability. The available water capacity is high. The root zone is deep. This soil is easily tilled. The reaction is very strongly acid to medium acid except where lime has been added. Runoff is medium. The shrink-swell potential is moderate. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Mountview, Decatur, and Caneyville soils. In places are small areas of Frederick soils that are not eroded or are severely eroded. The included soils make up about 5 to 10 percent of the map unit.

In most areas, this Frederick soil is used for cultivated crops, hay, or pasture. In a few areas, it is used as woodland.

This soil is suited to corn, soybeans, small grains, and tobacco. The hazard of erosion is severe if this soil is cultivated. A combination of crop rotation and erosion control practices is needed to slow runoff and control erosion. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

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

This soil is well suited to use as woodland. Eastern white pine, northern red oak, white oak, yellow poplar, and loblolly pine are the preferred trees to plant. Equipment use restrictions and plant competition are concerns in woodland management.

This soil is suited to most urban uses; however, moderate permeability, high content of clay, moderate shrink-swell potential, and slope are limitations. Low strength is a limitation for local roads and streets. Special design or maintenance is needed.

The Frederick soil is in capability subclass IIIe.

FrD2—Frederick silt loam, 12 to 20 percent slopes, eroded. This soil is deep, moderately steep, and well drained. It is on side slopes. The mapped areas range from about 5 to 75 acres. About 25 to 75 percent of the original surface layer has been eroded away.

Typically, the surface layer is brown silt loam about 8 inches thick. The upper part of the subsoil to a depth of about 29 inches is yellowish red, firm silty clay. The lower part to a depth of 65 inches or more is yellowish red, firm clay.

This soil has moderate permeability. The available water capacity is high. The root zone is deep. This soil is easily tilled. The reaction is very strongly acid to medium acid except where lime has been added. Runoff is medium or rapid. The shrink-swell potential is moderate. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Decatur and Caneyville soils. In places are areas of Frederick soils that have slopes of more than 20 percent, are severely eroded, or have chert fragments in the surface layer. The included soils make up about 5 to 10 percent of this map unit.

In most areas, this Frederick soil is used for hay or pasture. In a few areas, it is used for cultivated crops or as woodland.

This soil is poorly suited to most cultivated crops because of steepness of slope. The hazard of erosion is very severe if this soil is cultivated. A combination of crop rotation and erosion control practices is needed to slow runoff and control erosion. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good or fair.

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

This soil is suited to use as woodland. Eastern white pine, white oak, and loblolly pine are the preferred trees to plant. The equipment use restrictions, hazard of erosion, and plant competition are concerns in woodland management.

This soil is poorly suited to most urban uses because of steepness of slope and moderate shrink-swell potential. Low strength is a limitation for local roads and streets. Special design, planning, or maintenance is needed.

This Frederick soil is in capability subclass IVe.

GcF—Garmon-Caneyville association, very steep. The soils in this map unit are moderately deep and well drained. They are on highly dissected, very steep hillsides and bluffs. Garmon soil formed in material weathered from shaly limestone, calcareous shale, and siltstone on very steep, lower side slopes. Caneyville soil formed in material weathered from hard limestone on the upper side slopes and on the points of narrow ridgetops. Limestone rock outcrop covers about 3 to 5 percent of the surface. The mapped areas range from about 100 to 3,000 acres. The individual areas of these soils range from 5 to 100 acres. A few mapped areas have only one of these soils. The slopes range from 30 to 75 percent.

Garmon soil makes up about 60 percent of the map unit and Caneyville soil about 25 percent. These soils are in a regular and repeating pattern. The individual areas are large enough but were not mapped separately because of the present and predicted use of the soils.

Typically, the surface layer of Garmon soil is brown silt loam about 1 inch thick. The subsurface layer to a depth of about 6 inches is brown silt loam. The subsoil to a depth of about 27 inches is yellowish brown channery silt loam. The substratum to a depth of about 32 inches is yellowish brown channery silt loam underlain by limestone bedrock.

Garmon soil has moderately rapid permeability. The available water capacity is moderate. The root zone is moderately deep. The reaction ranges from very strongly acid to neutral. Runoff is rapid. Depth to bedrock is 20 to 40 inches.

Typically, the surface layer of Caneyville soil is brown silt loam about 8 inches thick. The upper part of the subsoil to a depth of about 18 inches is yellowish brown silty clay loam. The lower part to a depth of about 30 inches is yellowish red and dark yellowish brown, firm silty clay underlain by limestone bedrock.

Caneyville soil has moderately slow permeability. The available water capacity is moderate. The root zone is moderately deep. The reaction ranges from very strongly acid to neutral in the upper part of the soil and medium acid to mildly alkaline in the lower part. Runoff is rapid. The shrink-swell potential is moderate. Depth to bedrock is 20 to 40 inches.

Included in mapping are small areas of Frederick and Waynesboro soils. Also included are small areas of rock outcrop and a few areas of well drained loamy and clayey soils that are less than 20 inches to bedrock. The included soils make up about 15 percent of this map unit.

In most areas, these Garmon and Caneyville soils are used as woodland. In some small areas, they are used as pasture.

These soils are not suited to cultivated crops, hay, or pasture because of very steep slopes and rock outcrops.

Garmon soil is suited to use as woodland. Yellow poplar, white ash, white oak, northern red oak, and eastern white pine are the preferred trees to plant on the north slopes; white oak, Virginia pine, and eastern red cedar are the preferred trees to plant on the south slopes. The hazard of erosion, equipment use restrictions, and plant competition are concerns in woodland management on the north slopes. The hazard of erosion, equipment use restrictions, and seedling mortality are management concerns on the south slopes.

Caneyville soil is suited to use as woodland. Yellow poplar, white ash, white oak, and eastern white pine are the preferred trees to plant on the north slopes and eastern redcedar and Virginia pine on the south slopes. The hazard of erosion, equipment use limitations, and plant competition are concerns in woodland management on the north slopes. The hazard of erosion, equipment use limitations, and seedling mortality are concerns on the south slopes.

These soils are poorly suited to most urban uses because of steepness of slope, depth to bedrock, the moderately slow permeability of Caneyville soil, seepage, and the high content of clay. Special design, planning, or maintenance is needed.

These Garmon and Caneyville soils are in capability subclass VIIe.

La—Lawrence silt loam. This soil is deep, nearly level, and somewhat poorly drained. It is on stream terraces and on broad, concave, upland flats. The mapped areas range from about 3 to 100 acres. The slopes range from 0 to 2 percent.

Typically, the surface layer is brown silt loam about 7 inches thick. The upper part of the subsoil to a depth of about 16 inches is yellowish brown silt loam. The middle part to a depth of about 26 inches is mottled yellowish brown and light brownish gray silt loam. The lower part to a depth of 60 inches or more is a firm, compact, and brittle fragipan. It is light brownish gray silt loam and gray silty clay loam.

This soil has slow permeability. The available water capacity is moderate. The root zone is moderately deep. This soil is easily tilled. The reaction is slightly acid to very strongly acid in the surface layer and the upper part of the subsoil except where lime has been added, and it is strongly acid or very strongly acid in the lower part. Runoff is slow. The seasonal high water table is at a depth of 1 foot to 2 feet. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Newark, Melvin, and Dickson soils. In places are small areas of a poorly drained loamy soil that has a fragipan and a few areas of soils that have slopes of 2 to 4 percent. The included soils make up about 5 to 10 percent of this map unit.

In most areas, this Lawrence soil is used for cultivated crops, hay or pasture. In a few areas, it is used as woodland.

This soil is suited to cultivated crops that can tolerate wetness. It is poorly suited to winter crops because of the seasonal high water table in winter and spring. Tillage operations are often delayed because of excessive wetness. Tile drainage generally is not effective because of the fragipan, but surface drainage can reduce wetness. In some places, diversions help control runoff and overwash from adjacent soils. The effective growing season is lengthened where these drainage systems are installed. In addition, tillage operations are delayed for shorter periods, and the choice of suitable plants is better. Tilth can be maintained or improved by returning crop residue to the soil, including green manure crops, using conservation tillage, and growing grasses and legumes in the cropping sequence. The response to lime and fertilizer is good or fair.

This soil is suited to hay and pasture plants that tolerate wetness. Overgrazing or grazing when the soil is too wet causes soil compaction and excessive runoff. Restricting use during wet periods, maintaining proper stocking, and rotating grazing help keep the pasture plants and soil in good condition.

This soil is suited to use as woodland. Yellow poplar, white ash, American sycamore, white oak, sweetgum, willow oak, and eastern white pine are the preferred trees to plant. Equipment use limitations, seedling mortality, and plant competition are concerns in woodland management.

This soil is poorly suited to most urban uses because of slow permeability and wetness. Low strength is a limitation for local roads and streets. Special design, planning, or maintenance is needed.

This Lawrence soil is in capability subclass IIIw.

Me—Melvin silt loam, frequently flooded. This soil is deep, nearly level, and poorly drained. It is on flood plains. The mapped areas range from about 3 to 200 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark grayish brown silt loam about 7 inches thick. The subsoil to a depth of about 20 inches is gray silt loam that has brown mottles. The substratum to a depth of about 60 inches is gray and dark gray silty clay loam that has brown mottles.

This soil has moderate permeability. The available water capacity is high. The root zone is deep. This soil is easily tilled. The reaction is medium acid to mildly alkaline. Runoff is slow to ponded. The seasonal high water table ranges from the surface to a depth of 1 foot. This soil is subject to frequent flooding. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Newark, Lawrence, and Dunning soils. In places are soils that are similar to Melvin soil but have more clay in the lower part of the subsoil The included soils make up about 5 to 10 percent of this map unit.

In most areas, this Melvin soil is used for pasture or as woodland. In a few areas, it is used for cultivated crops or hay.

This soil is suited to cultivated crops that can tolerate wetness and flooding. If not drained, it is more suited to hay and pasture. It is poorly suited to winter crops because of the seasonal high water table and flooding in winter and spring.

Tillage operations are often delayed because of wetness. Tile drains and open ditches can improve internal drainage, and in some places, diversions help control runoff and overwash from adjacent soils. The effective growing season is lengthened where these drainage systems are installed. In addition, tillage operations are delayed for shorter periods, and the choice of suitable plants is better. Tilth can be improved and the content of organic matter maintained by returning crop residue to the soil, growing green manure crops, using conservation tillage, and including grasses and legumes in the cropping sequence. Where drained, crops respond well to lime and fertilizer.

This soil is suited to hay and pasture plants that tolerate wetness and can withstand flooding for brief periods. Where drained, this soil is well suited to a wide range of pasture plants. Overgrazing and grazing when the soil is too wet causes soil compaction and excessive runoff. Restricting use during wet periods, maintaining proper stocking, and rotating grazing help keep the pasture plants and soil in good condition.

This soil is well suited to use as woodland. Pin oak, American sycamore, loblolly pine, eastern cottonwood, and sweetgum are the preferred trees to plant. Equipment use restrictions, seedling mortality, and plant competition are concerns in woodland management.

This soil is poorly suited to most urban uses because of flooding and wetness. Special design, planning, or maintenance is needed.

This Melvin soil is in capability subclass IIIw.

MoB—Mountview silt loam, 2 to 6 percent slopes. This soil is deep, gently sloping, and well drained. It is on convex ridgetops. The mapped areas range from about 3 to 100 acres.

Typically, the surface layer is brown silt loam about 8 inches thick. The upper part of the subsoil to a depth of about 29 inches is yellowish brown silt loam and strong brown silty clay loam. The lower part to a depth of 66 inches or more is yellowish red and red, firm silty clay.

This soil has moderate permeability. The available water capacity is high. The root zone is deep. This soil is easily tilled. The reaction is strongly acid or very strongly acid except where lime has been added. Runoff is medium. The shrink-swell potential is moderate. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Dickson, Frederick, and Waynesboro soils. In places are some small areas of soils that are similar to Mountview soil but are moderately deep to bedrock. The included soils make up about 5 to 10 percent of this map unit.

In most areas, this Mountview soil is used for cultivated crops, hay, or pasture. In a few areas, it is used as woodland.

This soil is well suited to corn, soybeans, small grains, and tobacco. The hazard of erosion is moderate if this soil is cultivated. A combination of crop rotation and erosion control practices is needed to slow runoff and to control erosion. Tilth can be maintained and improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

This soil is well suited to hay and pasture plants that are commonly grown in the county. Overgrazing and grazing when the soil is too wet causes soil compaction and excessive runoff. Restricting use during wet periods, maintaining proper stocking, and rotating grazing help keep the pasture plants and soil in good condition.

This soil is well suited to use as woodland. Shortleaf pine, black walnut, white oak, eastern white pine, loblolly pine, and yellow poplar are the preferred trees to plant. Plant competition is a concern in woodland management.

This soil is suited to most urban uses; however, shrink-swell potential and high content of clay are limitations. Low strength is a limitation for local roads and streets. Special design, planning, or maintenance is needed.

This Mountview soil is in capability subclass IIe.

MoC—Mountview silt loam, 6 to 12 percent slopes. This soil is deep, sloping, and well drained. It is on convex ridgetops and side slopes. The mapped areas range from about to 3 to 100 acres.

Typically, the surface layer is brown silt loam about 8 inches thick. The upper part of the subsoil to a depth of about 29 inches is yellowish brown silt loam and strong brown silty clay loam. The lower part to a depth of 66 inches or more is yellowish red and red, firm silty clay.

This soil has moderate permeability. The available water capacity is high. The root zone is deep. This soil is easily tilled. The reaction is strongly acid or very strongly acid except where lime has been added. Runoff is medium. The shrink-swell potential is moderate. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Dickson, Waynesboro, and Frederick soils. In places are some areas of soils that are similar to Mountview soil but are moderately deep to bedrock. The included soils make up 5 to 10 percent of this map unit.

In most areas, this Mountview soil is used for cultivated crops, hay, or pasture. In a few areas, it is used as woodland.

This soil is suited to corn, soybeans, small grains, and tobacco. The hazard of erosion is severe if this soil is cultivated. A combination of crop rotation and erosion control practices is needed to slow runoff and control erosion. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

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

This soil is well suited to use as woodland. Shortleaf pine, black walnut, white oak, eastern white pine, loblolly pine, and yellow poplar are the preferred trees to plant. Plant competition is a concern in woodland management.

This soil is suited to most urban uses; however, steepness of slope, high content of clay, and shrink-swell potential are limitations. Low strength is a limitation for local roads and streets. Special design, planning, or maintenance is needed.

This Mountview soil is in capability subclass IIIe.

Ne—Newark silt loam, occasionally flooded. This soil is deep, nearly level, and somewhat poorly drained.

It is on flood plains. The mapped areas range from about 3 to 100 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer is brown silt loam about 9 inches thick. The upper part of the subsoil to a depth of about 19 inches is brown silt loam that has light gray mottles. The lower part to a depth of about 38 inches is light brownish gray silt loam that has strong brown mottles. The substratum to a depth of about 60 inches is mottled light brownish gray and strong brown silt loam.

This soil has moderate permeability. The available water capacity is high. The root zone is deep. This soil is easily tilled. The reaction is medium acid to mildly alkaline. Runoff is slow. The seasonal high water table is at a depth of 0.5 foot to 1.5 feet. This soil is subject to occasional flooding. Depth to bedrock is more than than 60 inches.

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

This soil is used mainly for cultivated crops, hay, or pasture. In a few areas, it is used as woodland.

This soil is suited to cultivated crops that can tolerate wetness and occasional flooding. If this soil is not drained, it is better suited to hay and pasture. It is poorly suited to winter crops because of the seasonal high water table and flooding in winter and spring. Tillage operations are often delayed because of excessive wetness. Tile drains and open ditches can improve internal drainage, and in some places, diversions help control surface runoff and overwash from adjacent soils. The effective growing season is lengthened where artificial drainage systems are installed. In addition, tillage operations are delayed for shorter periods and the choice of suitable plants is better. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

This soil is suited to pasture plants that tolerate wetness and can withstand flooding for short periods. Where drained, this soil is suited to a wide range of pasture plants. Overgrazing or grazing when the soil is too wet causes soil compaction and excessive runoff. Restricting use during wet periods, maintaining proper stocking, and rotating grazing help keep pasture plants and the soil in good condition.

This soil is well suited to use as woodland. Eastern cottonwood, sweetgum, and American sycamore are the preferred trees to plant. Equipment use restrictions, seedling mortality, and plant competition are concerns in woodland management.

This soil is poorly suited to most urban uses because of flooding and wetness. Special design, planning, or maintenance is needed.

This Newark soil is in capability subclass IIw.

No—Nolin silt loam, occasionally flooded. This soil is deep, nearly level, and well drained. It is on flood plains. The mapped areas range from about 3 to 200 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil to a depth of about 45 inches is brown silt loam. The substratum to a depth of about 60 inches is brown silt loam.

This soil has moderate permeability. The available water capacity is high. The root zone is deep. This soil is easily tilled. The reaction is medium acid to moderately alkaline. Runoff is slow. The seasonal high water table is at a depth of 3 to 6 feet. This soil is subject to occasional flooding. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Newark and Melvin soils. In places are soils that are similar to Nolin soil; some have a dark brown surface layer, some have a sandy subsoil, and some are gravelly below a depth of 40 inches. The included soils make up about 10 to 15 percent of this map unit.

In most areas, this Nolin soil is used for cultivated crops or hay. In a few areas, it is used as pasture or woodland.

This soil is well suited to corn, soybeans, and small grains. Because of occasional flooding in winter and early in spring, tillage operations can be delayed. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

This soil is well suited to hay and pasture plants that can tolerate flooding for brief periods. Overgrazing or grazing when the soil is too wet causes soil compaction and excessive runoff. Restricting use during wet periods, maintaining proper stocking, and rotating grazing help keep the pasture plants and soil in good condition.

This soil is well suited to use as woodland. Black walnut, eastern white pine, eastern cottonwood, white ash, cherrybark oak, and yellow poplar are the preferred trees to plant. Plant competition is a concern in woodland management.

This soil is poorly suited to most urban uses because of flooding. Special design, planning, or maintenance is needed.

This Nolin soil is in capability subclass IIw.

Pt—Pits, quarries. Pits are open excavations from which the soil and underlying material have been removed and limestone rock or other material is exposed. This material supports little or no vegetation. The quarries are deep and have almost vertical walls.

Pits, quarries, is in capability subclass VIIIs.

Pu—Purdy silty clay loam, occasionally flooded. This soil is deep, nearly level, and poorly drained. It is on low stream terraces. The mapped areas range from about 5 to 200 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer is gray silty clay loam about 6 inches thick. The upper part of the subsoil to a depth of about 16 inches is grayish brown, firm silty clay that has reddish brown mottles. The lower part to a depth of about 40 inches is gray, very firm silty clay that has strong brown mottles. The substratum to a depth of about 60 inches is mottled gray and yellowish brown silty clay.

This soil has very slow permeability. The available water capacity is high. The root zone is deep. This soil is somewhat difficult to till because of the clay content. The reaction is strongly acid to extremely acid except where lime has been added. Runoff is very slow or ponded. The seasonal high water table ranges from the surface to a depth of 1 foot. This soil is subject to occasional flooding. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Dunning and Melvin soils. In places are a few small areas of soils that are similar to Purdy soil but have less clay. The included soils make up about 5 to 10 percent of this map unit.

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

This soil is suited only to cultivated crops that can tolerate long periods of wetness and occasional flooding. It is poorly suited to winter crops because of the seasonal high water table and flooding in winter and spring. Tillage operations are often delayed because of wetness. Tile drains and open ditches can improve internal drainage, and in some places, diversions help control runoff and overwash from adjacent soils. The effective growing season is lengthened where these drainage systems are installed. In addition, tillage operations are delayed for shorter periods, and the choice of suitable plants is better. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. Where this soil is drained, the response to lime and fertilizer is good.

This soil is suited to hay and pasture plants that tolerate long periods of wetness and can withstand flooding for brief periods. Where drained, this soil is well suited to a wide range of pasture plants. Overgrazing and grazing when this soil is too wet causes soil compaction and excessive runoff. Restricting use during wet periods, maintaining proper stocking, and rotating grazing help keep the pasture plants and soil in good condition.

This soil is suited to use as woodland. Sweetgum and loblolly pine are the preferred trees to plant. Equipment use restrictions, seedling mortality, and plant competition are concerns in woodland management.

This soil is poorly suited to most urban uses because of wetness, flooding, very slow permeability, and high content of clay. Special design, planning, or maintenance is needed.

This Purdy soil is in capability subclass IVw.

Ra—Rahm silt loam, rarely flooded. This soil is deep, nearly level, and somewhat poorly drained. It is on flood plains and in depressions. The mapped areas range from about 4 to 75 acres. The slopes range from 0 to 2 percent.

Typically, the surface layer is brown silt loam about 8 inches thick. The upper part of the subsoil to a depth of about 13 inches is brown silt loam that has yellowish brown mottles. The middle part to a depth of about 24 inches is gray silt loam that has strong brown mottles. The lower part to a depth of 60 inches or more is grayish brown, firm, silty clay that has yellowish brown mottles.

This soil has slow permeability and a high available water capacity. The root zone is deep. This soil is easily tilled. The reaction is slightly acid or neutral in the surface layer and the upper part of the subsoil and very strongly acid to medium acid in the lower part. Runoff is slow. The seasonal high water table is at a depth of 1 foot to 3 feet. This soil is subject to rare flooding. Depth to bedrock is more than 60 inches.

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

This soil is used mainly for cultivated crops, hay, or pasture. In a few areas, it is used as woodland.

This soil is suited to cultivated crops that can tolerate wetness and rare flooding. If this soil is not drained, it is better suited to hay and pasture. It is poorly suited to winter crops because of the seasonal high water table. Tillage operations are often delayed because of excessive wetness. Tile drains and open ditches can improve internal drainage and, in some places, diversions help control surface runoff and overwash from adjacent soils. The effective growing season is lengthened where artificial drainage systems are installed. In addition, tillage operations are delayed for shorter periods, and the choice of suitable plants is better. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

This soil is suited to pasture plants that tolerate wetness. Where drained, it is suited to a wide range of pasture plants. Overgrazing or grazing when the soil is too wet causes soil compaction and excessive runoff. Restricting use during wet periods, maintaining proper stocking, and rotating grazing help keep pasture plants and the soil in good condition.

This soil is well suited to use as woodland. Eastern cottonwood, eastern white pine, white oak, northern red oak, white ash, green ash, yellow poplar, and American sycamore are the preferred trees to plant. Plant competition is a concern in woodland management.

This soil is poorly suited to most urban uses because of slow permeability, flooding, and wetness. Special design, planning, or maintenance is needed.

This Rahm soil is in capability subclass IIw.

RMF—Rigley-Shelocta-Muse complex, steep. The soils in this complex are deep and well drained. They are on steep mountain slopes and benches on the warm south aspects. The mountains have vertical sandstone cliffs near the top. Rigley soil is on steep upper side slopes below the sandstone cliffs. Shelocta soil is on steep colluvial side slopes. Muse soil is on upper side slopes and benches. The mapped areas are 50 to 1,000 acres. The slopes range from 20 to 60 percent.

Rigley soil makes up about 40 percent of this map unit, Shelocta soil about 20 percent, and Muse soil about 15 percent. The individual areas are too mixed or too small to map separately at the selected scale.

Typically, the surface layer of Rigley soil to a depth of about 1 inch is dark grayish brown loam. The subsurface layer to a depth of about 12 inches is brown fine sandy loam. The subsoil to a depth of about 41 inches is yellowish brown sandy loam. The substratum to a depth of about 72 inches is yellowish brown gravelly sandy clay loam.

Rigley soil has moderately rapid permeability. The available water capacity is moderate. The root zone is deep. The reaction is strongly acid to extremely acid except where lime has been added. Runoff is medium or rapid. Depth to bedrock is more than 60 inches.

Typically, the surface layer of Shelocta soil to a depth of about 1 inch is dark brown silt loam. The subsurface layer to a depth of about 9 inches is brown silt loam. The upper part of the subsoil to a depth of about 24 inches is yellowish brown gravelly silty clay loam, and the lower part to a depth of about 42 inches is strong brown very gravelly silty clay loam. The substratum to a depth of 60 inches is yellowish brown very gravelly silty clay loam.

The Shelocta soil has moderate permeability. The available water capacity is high. The root zone is deep. The reaction is strongly acid or very strongly acid except where lime has been added. Runoff is medium or rapid. Depth to bedrock is more than 48 inches.

Typically, the surface layer of Muse soil to a depth of about 2 inches is dark grayish brown loam. The subsurface layer to a depth of about 7 inches is light yellowish brown loam. The subsoil to a depth of about 44 inches is very firm, yellowish red clay. It has pale olive and greenish gray mottles in the lower part. The substratum to a depth of 74 inches is greenish gray channery silty clay that has yellowish red mottles.

Muse soil has slow permeability. The available water capacity is high. The root zone is deep. The reaction is strongly acid or very strongly acid except where lime has been added. Runoff is medium. The shrink-swell potential is moderate. Depth to bedrock is more than 40 inches.

Included in mapping are small areas of Cutshin, Sequoia, and Wernock soils. The Sequoia and Wernock soils are on narrow ridgetops that have slopes of 6 to 20 percent. Also included are small areas of rock outcrop. In places are some well drained, loamy soils that have bedrock at a depth of less than 40 inches, other deep, loamy soils that have more silt in the subsoil than the major soils, some well drained soils that have a very gravelly or very channery subsoil, and some areas of the major soils that have slopes of more than 60 percent. The included soils and rock outcrop make up about 25 percent of this map unit.

In most areas, the soils in this complex are used as woodland. In some small areas, they are used for cultivated crops or grasses (fig. 8).

These soils are not suited to cultivated crops and are poorly suited to hay and pasture because of steepness of slope.

These soils are suited to use as woodland. White oak, eastern white pine, and shortleaf pine are the preferred trees to plant on Rigley and Shelocta soils. The hazard of erosion, equipment use restrictions, seedling mortality, and plant competition are concerns in woodland management. Shortleaf pine, eastern white pine, yellow poplar, northern red oak, and white oak are the preferred trees to plant on Muse soil. The hazard of erosion, equipment use restrictions, and plant competition are concerns in management.

These soils are poorly suited to most urban uses because of steepness of slope, seepage, depth to bedrock, and the slow permeability of Muse soil. Low strength is a limitation for local roads and streets.

These Rigley, Shelocta, and Muse soils are in capability subclass VIIe.

RoF—Rock outcrop-Caneyville complex, 20 to 50 percent slopes. Caneyville soil is moderately deep and well drained. It is on the lower mountain side slopes and in low saddles. Typically, Rock outcrop consists of random areas of exposed limestone. The mapped areas are 25 to 3,000 acres.

Caneyville soil makes up about 25 percent of this map unit and Rock outcrop about 40 percent. The individual areas are too mixed or too small to be mapped separately at the selected scale.

Typically, the surface layer of Caneyville soil is brown silt loam about 8 inches thick. The upper part of the subsoil to a depth of about 18 inches is yellowish brown silty clay loam. The lower part to a depth of about 30 inches is yellowish red and dark yellowish brown, firm, silty clay that is underlain by limestone bedrock.

Caneyville soil has moderately slow permeability. The available water capacity is moderate. The root zone is

Figure 8.—Most soils in the Rigley-Shelocta-Muse complex, steep, are used as woodland. The grassland in the foreground is Allen fine sandy loam, 6 to 12 percent slopes.

moderately deep. The reaction is very strongly acid to neutral in the upper part of the soil and medium acid to mildly alkaline in the lower part. Runoff is medium or rapid. The shrink-swell potential is moderate. Depth to bedrock is 20 to 40 inches.

Included with this complex in mapping are small areas of soils that are more acid and loamy in the upper part of the soil than the Caneyville soil. In places are small areas of soils that are similar to Caneyville soil but are more than 40 inches to bedrock, and near the areas of Rock outcrop are other similar soils that are less than 20 inches to bedrock.

In most areas, the soils in this complex are used as woodland. In some small areas, the soils are used for cultivated crops or grass.

The soils in this complex are not suited to cultivated crops because of Rock outcrop and steepness of slope.

These soils are poorly suited to hay and pasture because of Rock outcrop and steepness of slope.

The Caneyville soil is suited to use as woodland. Yellow poplar, white ash, white oak, and eastern white pine are the preferred trees to plant on the north slopes; and eastern redcedar and Virginia pine are preferred on the south slopes. The hazard of erosion, equipment use restrictions, seedling mortality, and plant competition are concerns in woodland management on all slopes.

This complex is poorly suited to most urban uses because of steepness of slope, moderately slow permeability, depth to bedrock, and high content of clay.

Rock outcrop is in capability subclass VIIIs. The Caneyville soil is in capability subclass VIIs.

SeD—Sequoia-Wernock silt loams, 6 to 20 percent slopes. The soils in this map unit are moderately deep and well drained. They are on ridges and upper side slopes of mountains. Sequoia soils formed in material weathered from acid shale and siltstone. These soils are on ridgetops in lower positions than Wernock soils. Wernock soils formed in material weathered from sandstone, siltstone, and shale. Relief is regular, and ridgetops average 600 to 800 feet above the valley floor. Most areas are narrow and elongated in shape and range from about 5 to 400 acres.

Sequoia soil makes up about 60 percent of this map unit and Wernock soil about 30 percent. The individual areas are too mixed or too small to map separately at the selected scale.

Typically, the surface layer of Sequoia soil is brown silt loam about 6 inches thick. The upper part of the subsoil to a depth of about 15 inches is yellowish brown silt loam. The lower part to a depth of about 39 inches is yellowish red, firm silty clay loam and very firm silty clay. The substratum to a depth of about 70 inches is interbedded soft shale and siltstone underlain by interbedded hard shale and siltstone.

Sequoia soil has moderately slow permeability. The available water capacity is moderate. The root zone is moderately deep. The reaction is very strongly acid or strongly acid except where lime has been added. Runoff is medium or rapid. The shrink-swell potential is moderate. Depth to soft shale is 20 to 40 inches. Depth to hard bedrock is more than 60 inches.

Typically, the surface layer of Wernock soil is brown silt loam about 3 inches thick. The subsurface layer to a depth of about 11 inches is yellowish brown silt loam. The subsoil to a depth of about 33 inches is strong brown silty clay loam and clay loam underlain by interbedded soft sandstone, siltstone, and shale.

Wernock soil has moderate permeability. The available water capacity is moderate. The root zone is moderately deep. The reaction is strongly acid to extremely acid except where lime has been added. Runoff is medium or rapid. Depth to soft sandstone, siltstone, or shale is 30 to 40 inches.

Included with this complex in mapping are small areas of moderately well drained soils that have a clayey subsoil and a few areas of well drained soils that have a clayey or loamy subsoil and are less than 20 inches to bedrock. Also included are areas of rock outcrop. In places are areas of Sequoia and Wernock soils that have slopes of less than 6 percent and more than 20 percent. The included soils make up about 20 percent of this map unit.

In most areas, the soils in this complex are used as woodland. In some small areas, the soils are used for cultivated crops or grass.

These soils are poorly suited to cultivated crops because of steep slopes and a very severe hazard of erosion. If this soil is cultivated, a combination of crop rotation and erosion control practices is needed to slow runoff and control erosion. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

The soils in this complex are suited to hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet causes soil compaction and excessive runoff. Restricting use during wet periods, maintaining proper stocking, and rotating grazing help keep the pasture plants and soil in good condition.

This complex is suited to use as woodland. Loblolly pine and shortleaf pine are the preferred trees to plant on the Sequoia soil. Eastern white pine, white oak, northern red oak, and shortleaf pine are preferred on the Wernock soil. Plant competition is a concern in woodland management.

This complex is poorly suited to most urban uses because of depth to bedrock, steepness of slope, moderately slow permeability, and high content of clay. Special design, planning, or maintenance is needed.

This complex is in capability subclass IVe.

SMF—Shelocta-Muse-Cutshin complex, steep. The soils of this map unit are deep and well drained. They are on steep and very steep mountain slopes and benches and in coves on the cool north aspects. The mountains have vertical sandstone cliffs near the top. Shelocta soil is on steep, colluvial side slopes. Cutshin soil is in most coves. Muse soil is on side slopes and benches. The mapped areas range from 10 to 500 acres. Slopes range from 20 to 60 percent.

Shelocta soil makes up about 25 percent of this map unit, Muse soil about 20 percent, and Cutshin soil about 15 percent. The individual areas of the soils of this map unit are too mixed or too small to map separately at the selected scale.

Typically, the surface layer of Shelocta soil is dark brown silt loam about 1 inch thick. The subsurface layer to a depth of about 9 inches is brown silt loam. The upper part of the subsoil to a depth of about 24 inches is yellowish brown gravelly silty clay loam. The lower part to a depth of about 42 inches is strong brown very gravelly silty clay loam. The substratum to a depth of about 60 inches is yellowish brown very gravelly silty clay loam.

Shelocta soil has moderate permeability. The available water capacity is high. The root zone is deep. The reaction is strongly acid or very strongly acid except where lime has been added. Runoff is medium or rapid. Depth to bedrock is more than 48 inches.

Typically, the surface layer of Muse soil is dark grayish brown loam about 2 inches thick. The subsurface layer to a depth of about 7 inches is light yellowish brown loam. The subsoil to a depth of about 44 inches is very firm, yellowish red clay, and in the lower part, it has pale olive and greenish gray mottles. The substratum to a depth of about 74 inches is greenish gray channery silty clay with yellowish red mottles.

Muse soil has slow permeability. The available water capacity is high. The root zone is deep. The reaction is strongly acid or very strongly acid except where lime has been added. Runoff is medium to rapid. The shrink-swell potential is moderate. Depth to bedrock is more than 40 inches.

Typically, the surface layer of Cutshin soil is very dark grayish brown loam about 6 inches thick. The subsurface layer to a depth of about 12 inches is dark brown loam. The upper part of the subsoil to a depth of about 20 inches is brown loam. The lower part to a depth of about 72 inches is dark yellowish brown loam.

The Cutshin soil has moderate permeability. The available water capacity is moderate. The root zone is deep. The reaction is very strongly acid or medium acid except where lime has been added. Runoff is medium or rapid. Depth to bedrock is more than 40 inches.

Included with this complex in mapping are small areas of rock outcrop. In places are some areas of the major soils that are on narrow benches that have slopes of less than 20 percent and on side slopes of more than 60 percent. Also in places are some well drained, loamy soils that are less than 40 inches to bedrock and other deep, loamy soils that have more silt or more sand in the subsoil than the major soils. In a few areas are well drained soils that have a very gravelly or very channery subsoil. The included soils make up about 40 percent of this map unit.

In most areas, the soils of this complex are used as woodland. In some small areas the soils are used for cultivated crops or grass.

These soils are not suited to cultivated crops and are poorly suited to hay and pasture because of steepness of slope.

These soils are suited to use as woodland (fig. 9). Eastern white pine, white oak, northern red oak, yellow poplar, black walnut, shortleaf pine, and white ash are the preferred trees to plant on the Shelocta soil. Shortleaf pine, northern red oak, white oak, yellow poplar, and eastern white pine are the preferred trees to plant on the Muse soil. Yellow poplar, black walnut, white ash, shortleaf pine, northern red oak, white oak, and eastern white pine are preferred on the Cutshin soil. The hazard of erosion, equipment use restrictions, and plant competition are concerns in woodland management.

This complex is poorly suited to most urban uses because of steepness of slope, slow permeability, and seepage.

This map unit is in capability subclass VIIe.

WaC—Waynesboro loam, 6 to 12 percent slopes. This soil is deep, sloping, and well drained. It is on upland side slopes and ridgetops, commonly in areas of karst topography. The mapped areas range from about 4 to 300 acres.

Typically, the surface layer is brown loam about 9 inches thick. The upper part of the subsoil to a depth of about 19 inches is red clay loam. The lower part to a depth of 65 inches or more is dark red clay loam.

This soil has moderate permeability. The available water capacity is high. The root zone is deep. This soil is easily tilled. The reaction is very strongly acid or strongly acid except where lime has been added. Runoff is medium. The shrink-swell potential is moderate. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Mountview, Frederick, and Caneyville soils. Also included are small areas of soils similar to Waynesboro but have less clay. The included soils make up about 5 to 10 percent of this map unit.

In most areas, this Waynesboro soil is used for cultivated crops, hay, or pasture. In a few areas, it is used as woodland.

This soil is suited to corn, soybeans, small grains, and tobacco. The hazard of erosion is severe if this soil is cultivated. A combination of crop rotation and erosion control practices is needed to slow runoff and control erosion. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

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

This soil is well suited to use as woodland. Yellow poplar, northern red oak, shortleaf pine, white oak, and loblolly pine are the preferred trees to plant. Plant competition is a concern in woodland management.

This soil is suited to most urban uses; however, steepness of slope, moderate permeability, high content of clay, and shrink-swell potential are limitations. Low strength is a limitation for local roads and streets. Special design, planning, or maintenance is needed.

This Waynesboro soil is in capability subclass IIIe.

WaD—Waynesboro loam, 12 to 20 percent slopes. This soil is moderately steep, deep, and well drained. It is on side slopes, commonly in areas of karst topography. The mapped areas range from about 4 to 300 acres.

Typically, the surface layer is brown loam about 9 inches thick. The upper part of the subsoil to a depth of about 19 inches is red clay loam. The lower part to a depth of 65 inches or more is dark red clay loam.

This soil has moderate permeability. The available water capacity is high. The root zone is deep. This soil is

Figure 9.—Because of steepness of slope, woodland is the best use of soils in the Shelocta-Muse-Cutshin complex, steep.

easily tilled. The reaction is very strongly acid or strongly acid except where lime has been added. Runoff is medium or rapid. The shrink-swell potential is moderate. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Frederick and Caneyville soils. In places are small areas of Waynesboro soils that have slopes of more than 20 percent or are eroded and small areas of soils similar to Waynesboro soil but have less clay. The included soils make up about 5 to 10 percent of this map unit.

In most areas, this Waynesboro soil is used for hay or pasture. In a few areas, it is used for cultivated crops or as woodland.

This soil is poorly suited to most cultivated crops because of steepness of slope. The hazard of erosion is very severe if this soil is cultivated. A combination of crop rotation and erosion control practices is needed to slow runoff and to control erosion. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, using conservation tillage, and including grasses and legumes in the cropping sequence. The response to lime and fertilizer is good.

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

This soil is well suited to use as woodland. Yellow poplar, northern red oak, shortleaf pine, white oak, and loblolly pine are the preferred trees to plant. Plant competition is a concern in woodland management.

This soil is poorly suited to most urban uses because of steepness of slope and high content of clay. Low strength is a limitation for local roads and streets. Special design, planning, or maintenance is needed.

This Waynesboro soil is in capability subclass IVe.

Prime Farmland

In this section, prime farmland is defined and discussed, and the prime farmland soils in Wayne County 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, must 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 producing food, feed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. The soils need only to be treated and managed using acceptable farming methods. The moisture supply, of course, must be adequate, and the growing season has to be sufficiently long. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be in use as cropland, pasture, or woodland, or they may be in other uses. They either are used for producing 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 get 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 subject to frequent flooding during the growing season. The slope ranges mainly from 0 to 6 percent.

The following map units, or soils, make up prime farmland in Wayne County. 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.

Soils that have limitations, such as a high water table or flooding, may qualify as prime farmland if these limitations are overcome by such measures as drainage or flood control. In the following list, the measures needed to overcome the limitations of a map unit, if any, are shown in parentheses after the map unit name. Onsite evaluation is necessary to determine if the limitations have been overcome by the corrective measures.

AnB—Allen fine sandy loam, 2 to 6 percent slopes
BwB—Bewleyville silt loam, 2 to 6 percent slopes
DkB—Dickson silt loam, 2 to 6 percent slopes
EkB—Elk silt loam, 2 to 6 percent slopes
FrB—Frederick silt loam, 2 to 6 percent slopes
La—Lawrence silt loam (where drained)
Me—Melvin silt loam, frequently flooded (where drained and not frequently flooded during the growing season)
MoB—Mountview silt loam, 2 to 6 percent slopes
Ne—Newark silt loam, occasionally flooded (where drained)
No—Nolin silt loam, occasionally flooded
Ra—Rahm silt loam, rarely flooded

Use and Management of the Soils

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

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis 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 recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature *(16)*.

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

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

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

More than 65,700 acres in the county was used for crops and pasture in 1982, according to the 1982 Census of Agriculture *(24)*. Of that total, 31,300 acres was used for permanent pasture; 21,200 acres for row crops, mainly corn, small grains, soybeans, and burley tobacco; and 11,000 acres for hay and pasture rotation. The rest was other cropland. Acreage in crops and pasture has gradually decreased as more land is used for urban development.

Soil erosion is the main concern on most of the cropland in Wayne County. If a soil has slope of more than 2 percent, erosion is a hazard. Allen, Bewleyville, Decatur, Elk, Frederick, Mountview, and Waynesboro soils have slopes of 2 to 12 percent.

Erosion of the surface layer is damaging because productivity is reduced and streams are polluted by sediment. The soil loses its productivity when the subsoil is incorporated into the plow layer. This is especially damaging to soils that have a clayey subsoil, such as Frederick and Waynesboro soils, or in soils that have a layer in or below the subsoil that limits the depth of the root zone. These layers include the fragipan in Dickson soils and the bedrock in Caneyville soils. Erosion control minimizes the pollution of streams by sediment and improves the quality of water for municipal use and recreation and for fish and wildlife.

In many sloping fields, tilling or preparing a good seedbed is difficult, especially in soils that have a clayey subsoil, because the original friable surface layer has been eroded away. Such areas are common in eroded Frederick soils.

Erosion control practices provide protective soil cover, reduce runoff, and increase infiltration. A cropping system that keeps vegetative cover on the soil for extended periods can hold soil erosion losses to levels that do not reduce the productive capacity of the soils.

Slopes are so short and irregular that contour tillage or terracing is not practical in many areas of sloping soils in Wayne County. A cropping sequence that provides substantial vegetative cover is required to control erosion unless conservation tillage is practiced. Minimizing tillage and leaving crop residue on the surface increase infiltration and reduce the hazards of runoff and erosion. These practices can be adapted to most soils in the county, but they are more difficult to use successfully on the eroded soils that have a clayey surface layer, such as the eroded Frederick soils. No-tillage for corn and soybeans is a practice that is effective in reducing erosion on sloping land and can be adapted to most soils in the county. No-tillage is more difficult on soils that have a clayey surface layer, but this is not a severe limitation.

Terraces and diversions reduce the length of slope and reduce runoff and erosion. They are practical on deep, well drained soils that have regular slopes. Other soils are less suitable for terraces and diversions because of irregular slopes, excessive wetness in the terrace channels, a clayey subsoil that would be exposed in terrace channels, or bedrock at a depth of less than 40 inches.

Contouring and contour stripcropping are better suited to soils that have smooth, uniform slopes.

Good soil tilth is an important factor in the germination of seeds and in the infiltration of water. Soils with good tilth are granular and porous. Most of the soils used for row crops have good tilth and a surface layer of silt loam that has a light color and moderate content of organic matter.

Field crops suited to the soils and climate of the county include many that are not commonly grown. Corn, soybeans, small grains, and burley tobacco are the common crops. Grain sorghum, sunflowers, potatoes, and similar crops can be grown if economic conditions are favorable.

Special crops grown commercially are small fruits, tree fruits, and vegetables (fig. 10). Small acreages throughout the county are used for strawberries, sweet corn, tomatoes, peppers, cabbage, and other vegetables and small fruits. In addition, large areas can be adapted to other special crops, such as blueberries, grapes, and other vegetables. Apples and peaches are the most important tree fruits grown in the county.

Latest information and suggestions for growing special crops can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Soil drainage is the major management need on about 2 percent of the acreage in the county. If not artificially drained, the poorly drained Dunning, Purdy, and Melvin soils and the somewhat poorly drained Lawrence, Newark, and Rahm soils are too wet for many crops.

The design of both surface and subsurface drainage systems varies with the kind of soil. A combination of surface drainage and tile drainage is needed in most areas of the poorly drained Melvin, Purdy, and Dunning soils. Drains must be more closely spaced in slowly permeable soils than in more permeable soils. Open ditch drainage is commonly more effective in the Lawrence soils, which have a fragipan.

Natural fertility is medium in most upland soils in the county, and they are naturally acid. If lime has never been added, application of ground limestone is required to raise the pH sufficiently for good growth. Available phosphorus and potash levels are naturally low in most of these soils. The soils on flood plains, such as Dunning, Melvin, Newark, Nolin, and Rahm soils, range from medium acid to mildly alkaline and are naturally higher in plant nutrients than most soils on uplands.

On all soils, additions of lime and fertilizer should be based on the results of soil tests, on the need of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

Pasture and Hayland

A successful livestock program is dependent on a forage program that will supply large quantities of homegrown feeds of adequate quality. Such a program can furnish up to 78 percent of the feed for beef and 66 percent for dairy cattle *(11)*.

The soils in Wayne County vary widely in their capabilities because of differences in depth to bedrock or limiting layers, internal drainage, ability to supply moisture, and many other properties. Grasses and legumes and grass-legume combinations vary widely in their ability to persist and produce on different soils. The plant species or mixture of species should be matched to the different soils for the highest yields along with maximum soil and water conservation.

The level to gently sloping, deep, well drained soils are better suited to the highest producing crops, such as corn silage, alfalfa, or alfalfa mixed with orchardgrass or timothy. The steeper soils should be maintained in sod-forming grasses, such as tall fescue or bluegrass, to minimize soil erosion. Alfalfa should be used with a cool-season grass where the soils are at least 2 feet deep and well drained. On soils that are less than 2 feet deep or that are not well drained, mixtures of clover and grass or a stand of pure grass can be used. Legumes can be established in grass-dominant sods through renovation.

Plants need to be adapted to the soil and also to the intended use. Selected plants should provide maximum quality and versatility in the forage program. Legumes generally produce higher quality feed than do grasses and should be used to the maximum extent possible. Taller legumes, such as alfalfa and red clover, are more versatile than a legume, such as white clover, which is used mainly for grazing. Grasses, such as orchardgrass, timothy, and tall fescue, are better adapted for hay and silage.

Tall fescue is a cool-season grass that is suited to a wide range of soil conditions. It is used for both pasture and hay. Growth from August to November is commonly

Figure 10.—Mountview silt loam, 2 to 6 percent slopes, is easily tilled and is well suited to specialty crops, such as cabbage.

permitted to accumulate in the field and is reserved for deferred grazing late in fall and in winter. Nitrogen fertilizer is one of the important keys for maximum production during this period. Desired production levels determine the rates of application.

Renovation can increase the yields of pasture and hay crops. In renovation, the sod is partly destroyed and the soil is limed, fertilized, and seeded to reestablish desirable forage plants. Adding legumes to pastures improves forage production and quality. Legumes have the ability to fix nitrogen by transforming atmospheric nitrogen to a form plants can use. Under growing conditions in Kentucky, alfalfa can fix 200 to 300 pounds of nitrogen per acre every year; red clover 100 to 200 pounds, and ladino clover 100 to 150 pounds. An acre of Korean lespedeza, vetch, and other annual forage legumes can fix 75 to 100 pounds of nitrogen a year *(12)*.

For additional information on pasture and hayland management, contact 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 yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that insures the smallest possible loss.

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

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

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for 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 rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs *(19)*.

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. No class I soils are recognized in Wayne County.

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. No class V soils are recognized in Wayne County.

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,* or *s,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is 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.

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, rangeland, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w* or *s*.

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 to prepare this section.

Commercial forest land covers about 66 percent of the land area in Wayne County, or approximately 186,600 acres *(22)*. The dominant forest types include oak-hickory on about 58 percent of the forest land, maple-beech-birch on 15 percent, and loblolly-shortleaf pine on 11 percent. The remaining 16 percent is oak-pine and elm-ash-red maple types.

Woodland tracts in the county generally are small private holdings of about 24 acres and are unmanaged. The Daniel Boone National Forest covers 642 acres along the eastern edge of the county. Most forest land is capable of producing 50 cubic feet or more of wood per acre per year, but actual production is 38 cubic feet. An obstacle in managing private forest lands is that woodland is part of the farm or tract owned by 30 percent of the landowners. Also, many stands are not well stocked with desirable high quality trees, and many tracts are owned less than 10 years.

Tree growth, stocking, and quality can be improved by removing low quality trees in fully stocked and understocked stands of all sizes and by regenerating sawtimber stands after harvest. Soil surveys are useful in identifying Kentucky's most productive forest lands, soil limitations for management, and preferred trees to plant.

The wood industry in Wayne County consists mainly of eight commercial sawmills and three log and bolt mills. Products produced are rough lumber, cross ties, fuel wood, chips, cants, dimension stock, and charcoal wood. Several mills in adjacent counties also buy logs or standing trees from the county.

Soils vary in their ability to produce trees. Depth, fertility, texture, and the available water capacity influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. Available water capacity and depth of the root zone are major influences of tree growth. 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 fertilization than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special efforts to reforest. In the section "Detailed Soil Map Units," each map unit in the survey area suitable for producing timber presents information about productivity, limitations for harvesting timber, and management concerns for producing timber. 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.

The first tree listed for each soil under the column "Common trees" 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.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation activities or harvesting operations 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 of harvesting and reforestation operations, or use of specialized 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, or 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 must be used. On the steepest slopes, even tracked equipment cannot operate; more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are steep enough that wheeled equipment cannot be operated safely across the slope, if soil wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts ground-based equipment, or if special equipment is needed to avoid or reduce soil compaction. The rating is *severe* if slopes are steep enough that tracked equipment cannot be operated safely across the slope, if soil wetness restricts equipment use for more than 6 months per year, if stoniness restricts ground-based equipment, or if special equipment is needed to avoid or reduce soil compaction. Ratings of *moderate* or *severe* indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management operations.

Ratings of *seedling mortality* refer to the probability of 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 and duration of the water table, rock fragments in the surface layer, rooting depth, and the aspect of the slope. Mortality generally is greatest 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 surface drainage, or 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* becomes 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 reduces adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants reduces 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*. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate.

The soils that are commonly used to produce timber have the yield predicted in cubic feet. The yield is predicted at the point where mean annual increment culminates.

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 *(5, 6, 7, 8, 9, 10, 13, 14, 15)*.

The *productivity* column indicates an expected volume that is 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, if suitable conditions exist, natural regeneration. They are suited to the soils and will produce a commercial wood crop. Desired product, topographic position (such as a low, wet area), and personal preference are three factors of many that can influence the choice of trees to use for 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 sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

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

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have 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. 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

William H. Casey, biologist, Soil Conservation Service, helped to prepare this section.

The wildlife population of Wayne County consists of about 41 species of mammals, 46 species of reptiles and amphibians, and 108 species of birds that are either summer or year-round residents. More than 200 other species of birds visit Kentucky each year and many are in Wayne County at other times during the year.

Wildlife is an important natural resource, especially the game species that offer opportunities for sport hunting. Furbearers are regularly taken by commercial trappers. Gaining in popularity are those species sought by birdwatchers and photographers. Also of concern, especially to scientists, are those species thought to be in danger of extinction.

The species most often hunted are the cottontail rabbit, gray squirrel, raccoon, red fox, white-tailed deer, bobwhite quail, and mourning dove. Those taken by trapping are the muskrat, raccoon, opossum, red fox, gray fox, mink, skunk, weasel, and occasionally, coyote. The species most popular with those who enjoy wildlife for purely esthetic reasons are those that visit the area only occasionally and those that are extremely shy and seldom seen. These include the bald eagle, sandhill crane, and bobcat. Seven species whose range include Wayne County have been declared by the U.S. Fish and Wildlife Service as either threatened or endangered. They are the Indiana bat, gray bat, Eastern cougar, bald eagle, American peregrine falcon, Arctic peregrine falcon, and red-cockaded woodpecker.

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. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

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

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

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

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

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

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

Coniferous plants furnish browse 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, rushes, sedges, and reeds.

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

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

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, 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. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet, and 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 must be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to: 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 the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. Depth to a high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, depth to 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, depth to a high water table, depth to bedrock or to a cemented pan, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and that 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, depth to 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, depth to a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, depth to a water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, and soil reaction affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant-available 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; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for 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 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, boulders, or organic matter. A high water table affects the amount of usable material. It also affects trafficability.

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

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of 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 erosion, low available water capacity, restricted rooting depth, 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 *(20)*. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

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

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GP, GM, GC, SP, SM, and SC; silty and clayey soils as ML, CL, MH, and CH. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest. 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, or component, 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 influence the soil's adsorption of cations, moisture retention, 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 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability *(17)* is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

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

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

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

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

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

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These 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 0.02 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 over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

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

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

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission. Group A soils are not recognized in Wayne County.

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 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 covering of the soil surface by flowing water, is caused by overflowing streams or by runoff from adjacent slopes. 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 to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (there is a near 0 to 5 percent chance of flooding in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (there is a 5 to 50 percent chance of flooding in any year). *Frequent* means that flooding occurs often under normal weather conditions (there is more than a 50 percent chance of flooding in any year). *Common* is used when classification as occasional or frequent does not affect interpretations. 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. November-May, for example, means that flooding can occur during the period November through May. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

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

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent;* and the months of the year that the water table commonly is highest. 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.

The two numbers in the "High water table-Depth" column 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 the water table exists 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 specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

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

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

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the 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 in the survey area 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 oven-dry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(23)*.

Coarse materials—(2-75 mm fraction) weight estimates of the percentages of all materials less than 75 mm (3B1).

Sand—(0.05-2.0 mm fraction) weight percentages of materials less than 2 mm (3A1).

Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all materials less than 2 mm (3A1).

Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of materials less than 2 mm (3A1).

Organic carbon—dichromate, ferric sulfate titration (6A1a).

Extractable cations (5A1)—ammonium acetate pH 7.0, uncorrected; calcium (6N2), magnesium (6O2), sodium (6P2), potassium (6Q2).

Extractable acidity—barium chloride-triethanolamine I (6H1a).

Cation-exchange capacity—ammonium acetate, pH 7.0 (5A1a).

Cation-exchange capacity—sum of cations (5A3a).

Base saturation—ammonium acetate, pH 7.0 (5C1).

Base saturation—sum of cations, TEA, pH 8.2 (5C3).

Reaction (pH)—1:1 water dilution (8C1a).

Reaction (pH)—potassium chloride (8C1c).

Aluminum—potassium chloride extraction (6G).

Available phosphorus (6S6; Bray No. 1) Kentucky Agricultural Experiment Station.

Calcium carbonate equivalent—procedure (236B) USDA Handbook 60, USDA Salinity Laboratory 1954 (6N7).

Field sampling—site selection (1A1).

Field sampling—pedon sampling (1A2).

Laboratory preparation—standard (air dry) material (1B1).

Data sheet symbols—(2B)

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 U.S. Department of Agriculture, Soil Conservation Service.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) *(1)* or the American Society for Testing and Materials (ASTM) *(2)*.

The tests and methods are: AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); Moisture density, Method A—T 99 (AASHTO); Specific gravity (particle index)—T 100 (AASHTO), D635 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(21)*. 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. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning udic moisture regime, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is not 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, mesic Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series. An example is the Wernock series, which is a member of the fine-silty, mixed, mesic Typic Hapludults.

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 (18)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (21)*. 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 deep, well drained soils. These soils are on foot slopes. They formed in colluvium weathered mostly from sandstone and shale. The slopes range from 2 to 20 percent but are dominantly 6 to 12 percent. These soils are fine-loamy, siliceous, thermic Typic Paleudults.

Allen soils are associated on the landscape with Caneyville, Frederick, and Nolin soils. Caneyville soils are on adjacent side slopes in higher and lower positions than Allen soils, and hard bedrock is at a depth of 20 to 40 inches. Frederick soils are on adjacent side slopes in lower positions and have more clay in the argillic horizon. Nolin soils are on stream bottoms in lower positions.

Typical pedon of Allen fine sandy loam, 6 to 12 percent slopes; 1 mile east of junction of Kentucky Highway 92 on Kentucky Highway 776, 0.8 mile southeast on gravel road, 1 mile southeast on dirt road; about 4.2 miles southeast of Monticello:

Ap—0 to 6 inches; brown (10YR 4/3) fine sandy loam; moderate fine and very fine granular structure; friable; many fine roots; 10 percent small sandstone fragments and quartzitic pebbles; slightly acid; clear smooth boundary.

B1—6 to 11 inches; strong brown (7.5YR 5/6) fine sandy loam; weak fine and medium subangular blocky structure; friable; common fine roots; 12 percent small quartzitic pebbles and sandstone fragments, 5 percent sandstone fragments larger than 3 inches; slightly acid; clear smooth boundary.

B21t—11 to 28 inches; yellowish red (5YR 5/6) sandy clay loam; moderate medium and fine subangular blocky structure; firm; few fine roots; continuous clay films on peds; 15 percent small quartzitic pebbles and sandstone fragments; slightly acid; diffuse smooth boundary.

B22t—28 to 40 inches; red (2.5YR 4/6) sandy clay; moderate fine and medium subangular and angular blocky structure; firm; few fine roots; continuous clay films; common brownish yellow (10YR 6/6) streaks and coatings; 3 percent small sandstone fragments and quartzitic pebbles; very strongly acid; clear smooth boundary.

B23t—40 to 57 inches; red (2.5YR 4/6) sandy clay; moderate medium angular blocky structure; firm; continuous clay films; common brownish yellow (10YR 6/6) streaks; 11 percent small sandstone fragments and quartzitic fragments; very strongly acid; clear wavy boundary.

B24t—57 to 76 inches; red (2.5YR 4/6) gravelly clay; moderate coarse angular blocky structure; firm; continuous clay films; common yellowish red (5YR 5/6) coatings and small pockets of brownish yellow (10YR 6/8) highly weathered sandstone and shale; 15 percent sandstone fragments of gravel size, 5 percent fragments more than 3 inches in diameter; very strongly acid; clear smooth boundary.

IICr—76 to 106 inches; variegated red (2.5YR 4/6) and light reddish brown (5YR 6/4) clayey shale; massive; firm; very strongly acid.

The thickness of the solum ranges from 60 to 80 inches or more. Depth to bedrock is more than 60 inches. The content of coarse fragments ranges from 0 to 15 percent. Reaction is strongly acid or very strongly acid except where liming has affected the surface layer and upper part of the subsoil.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 or 4. The texture is fine sandy loam.

The B1 horizon has hue of 10YR to 5YR, value of 4 or 5, and chroma of 4 to 8. The texture is fine sandy loam, loam, sandy clay loam, or clay loam.

The B2t horizon has hue of 5YR or 2.5YR, value of 4 to 6, and chroma of 6 or 8. The texture is loam, sandy clay loam, clay loam, sandy clay, or clay.

Baxter Series

The Baxter series consists of deep, well drained soils. These soils are on hillsides and ridgetops. Some areas have karst topography. They formed in residuum from cherty limestone. The slopes range from 4 to 20 percent but are dominantly 4 to 12 percent. These soils are fine, mixed, mesic Typic Paleudalfs.

Baxter soils are associated on the landscape with Clarksville, Caneyville, Decatur, and Bewleyville soils. Clarksville soils are in the same position on the landscape as Baxter soils but are loamy-skeletal. Caneyville and Decatur soils have less coarse fragments than Baxter soils. Caneyville soils are on adjacent side slopes in higher positions and are moderately deep. Decatur soils are in similar positions but are mostly at a lower elevation. Bewleyville soils are on adjacent ridgetops and are in a fine-silty family.

Typical pedon of Baxter cobbly silt loam, in an area of Clarksville-Baxter cobbly silt loams, 4 to 12 percent slopes; 1.4 miles west of junction of Kentucky Highway 90 and Kentucky Highway 1619, 1.1 miles south of Mill Springs; about 7.3 miles north of Monticello:

Ap—0 to 8 inches; brown (10YR 4/3) cobbly silt loam; weak fine granular structure; friable; common roots; 24 percent chert fragments, 60 percent of which is 3 to 8 inches in diameter; medium acid; clear smooth boundary.

B1—8 to 16 inches; yellowish brown (10YR 5/4) cobbly silt loam; weak fine subangular blocky structure; friable; common fine roots; 35 percent chert fragments, 60 percent of which is 3 to 10 inches in diameter; strongly acid; clear smooth boundary.

B21t—16 to 30 inches; red (2.5YR 5/6) gravelly silty clay; moderate medium angular blocky structure; firm; few fine roots; common thin clay films; 15 percent chert fragments 1 inch to 3 inches in diameter; strongly acid; gradual smooth boundary.

B22t—30 to 43 inches; red (2.5YR 5/6) cobbly silty clay; moderate fine angular blocky structure; firm; few fine roots; common thin clay films; 30 percent chert fragments, 40 percent of which is about 1 inch to 6 inches in diameter and 60 percent is more than 3 inches in diameter; common black concretions; strongly acid; gradual smooth boundary.

B23t—43 to 72 inches; red (2.5YR 4/6) very cobbly silty clay; moderate fine subangular blocky structure; very firm; few fine roots; common fine clay films; 40 percent chert fragments, 30 percent of which is 1 inch to 8 inches in diameter and 70 percent is more than 3 inches in diameter; many black concretions; strongly acid.

The thickness of the solum and depth to bedrock are more than 60 inches. Chert content ranges from 5 to 45 percent in the individual horizons, but the weighted average in the control section ranges from 15 to 35 percent. The reaction is strongly acid or very strongly acid except where lime has been added.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. The texture is cobbly silt loam.

The B1 horizon has hue of 10YR to 2.5YR, value of 4 to 6, and chroma of 4 to 6. The texture is silt loam or silty clay loam or their gravelly or cobbly analogs.

The B2t horizons have hue of 5YR to 10R, value of 4 or 5, and chroma of 4 to 8. The texture is silty clay, clay, or silty clay loam or their gravelly, cobbly, or very cobbly analogs.

Bethesda Series

The Bethesda series consists of deep, well drained soils. These soils are on ridgetops and outslopes of strip-mine areas. They formed in acid regolith from surface coal mining operations. The slopes range from 12 to 60 percent. These soils are loamy-skeletal, mixed, acid, mesic Typic Udorthents.

Bethesda soils are associated on the landscape with Cutshin, Muse, Rigley, Sequoia, Shelocta, and Wernock soils. The associated soils formed in residuum of shale, sandstone, and siltstone. Cutshin, Muse, Rigley, and Shelocta soils are in coves and on side slopes mostly in lower positions than Bethesda soils. Sequoia and Wernock soils are on the narrow ridges in higher positions.

Typical pedon of Bethesda channery silty clay loam, 12 to 60 percent slopes; 4.3 miles east on Kentucky Highway 1275 from junction of old Kentucky Highway 90 to gravel road, 0.7 mile east on gravel road, 100 yards south of road; 5.7 miles east of Monticello:

Ap—0 to 7 inches; strong brown (7.5YR 5/6) channery silty clay loam; common fine distinct light gray (7.5YR 7/0) mottles; weak medium granular structure; firm; common roots; 15 percent soft shale fragments; slightly acid; clear smooth boundary.

C1—7 to 24 inches; strong brown (7.5YR 5/6) very channery clay loam; common fine distinct yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; massive; firm; 50 percent sandstone and shale fragments; very strongly acid; gradual wavy boundary.

C2—24 to 60 inches; variegated strong brown (7.5YR 5/6); yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) very channery clay loam; massive; firm; 50 percent shale and sandstone fragments; very strongly acid.

Depth to bedrock is more than 60 inches. The reaction ranges from extremely acid to strongly acid except where lime has been added.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 1 to 8; or it is neutral and has value of 4 to 6. The texture is channery silty clay loam. The content of coarse fragments of sandstone, siltstone, and shale ranges from 15 to 35 percent.

The C horizon has hue of 7.5YR to 5Y, value of 3 to 6, and chroma of 1 to 8; or it is neutral and has value of 3 to 6. The texture is very channery analogs of silty clay loam, clay loam, silt loam, or loam. The content of coarse fragments of sandstone, siltstone, and shale ranges from 35 to 80 percent.

Bewleyville Series

The Bewleyville series consists of deep, well drained soils. These soils are on uplands. They formed in a silty mantle about 2 to 3 feet thick that is underlain by residuum weathered from limestone. The slopes range from 2 to 6 percent. These soils are fine-silty, siliceous thermic Typic Paleudults.

Bewleyville soils are associated on the landscape with Decatur, Elk, Baxter, and Clarksville soils. Decatur soils are on adjacent side slopes and have more clay in the solum than Bewleyville soils. Elk soils are on stream terraces. Baxter and Clarksville soils are on adjacent side slopes and have more coarse fragments. In addition, Baxter soils have more clay in the upper part of the subsoil.

Typical pedon of Bewleyville silt loam, 2 to 6 percent slopes; from the center of Monticello, 0.9 mile northwest on Kentucky Highway 92, 1 mile south on blacktop road to a stone house on top of ridge, 0.5 mile west of house; 1.5 miles west of Monticello:

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

B21t—10 to 16 inches; reddish brown (5YR 4/4) silt loam; weak fine subangular blocky structure; friable; few roots; few thin clay films; few small black concretions; strongly acid; clear smooth boundary.

B22t—16 to 27 inches; yellowish red (5YR 4/6) silty clay loam; moderate fine subangular blocky structure; friable; few roots; thin discontinuous clay films; common small black concretions; strongly acid; gradual smooth boundary.

B23t—27 to 38 inches; yellowish red (5YR 4/6) silty clay loam; moderate fine subangular blocky structure; firm; common small black concretions; thin discontinuous clay films; strongly acid; gradual smooth boundary.

IIB24t—38 to 62 inches; dark red (2.5YR 3/6) clay; moderate fine and medium subangular blocky structure; firm; thin discontinuous clay films; few small black concretions; strongly acid.

The thickness of the solum and depth to bedrock are more than 60 inches. The reaction is strongly acid or very strongly acid except where lime has been added.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. The texture is silt loam.

The B21t horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 or 6. The texture is silt loam or silty clay loam.

The B22t and B23t horizons have hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 to 8. The texture is silty clay loam or silt loam.

The IIB24t horizon has hue of 2.5YR or 5YR, value of 3 to 6, and chroma of 6 to 8. The texture is silty clay loam, clay loam, or clay.

Caneyville Series

The Caneyville series consists of moderately deep, well drained soils. These soils are on side slopes and ridgetops. They formed in clayey residuum from limestone. The slopes range from 6 to 35 percent but are dominantly 6 to 20 percent. These soils are fine, mixed, mesic Typic Hapludalfs.

Caneyville soils are associated on the landscape with Decatur, Frederick, Baxter, Clarksville, and Garmon soils. All except Garmon soils are deep to bedrock. In addition, Decatur soils are on convex ridgetops and side slopes in lower positions on the landscape than Caneyville soils. Frederick soils are mostly on ridgetops in higher positions. Baxter and Clarksville soils are on adjacent side slopes in lower positions. In addition, Clarksville soils are in a loamy-skeletal family. Garmon soils are on the same side slopes in lower positions and do not have an argillic horizon.

Typical pedon of Caneyville silt loam, 6 to 12 percent slopes; 3 miles north on Kentucky Highway 1546 from junction of Kentucky Highway 90, 1.25 miles northeast on blacktop road to end of road, 0.5 mile northwest to end of ridge; 5.1 miles west of Monticello:

Ap—0 to 8 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; common roots; strongly acid; abrupt smooth boundary.

B21t—8 to 18 inches; yellowish brown (10YR 5/6) silty clay loam; weak fine subangular blocky structure; firm; few roots; thin discontinuous clay films; strongly acid; clear smooth boundary.

B22t—18 to 23 inches; yellowish red (5YR 5/6) silty clay; common fine faint yellowish brown mottles; moderate medium subangular blocky structure; very firm; thin continuous clay films; strongly acid; gradual smooth boundary.

B23t—23 to 30 inches; dark yellowish brown (10YR 4/4) silty clay; moderate medium angular blocky structure; firm; thin continuous clay films; few roots; medium acid; abrupt smooth boundary.

R—30 inches; gray limestone.

The thickness of the solum and depth to bedrock range from 20 to 40 inches. The 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. Content of limestone, chert, or sandstone fragments ranges from 0 to 10 percent.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 6, and chroma of 2 to 4. Some pedons have an A1 horizon that has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 or 3. The texture is silt loam.

Some pedons have a B1 horizon that has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 6. The texture is silt loam or silty clay loam.

The B2t horizon has hue of 2.5YR to 10YR, value of 4 or 5, and chroma of 4 to 6 with a subhorizon that has hue of 5YR or is redder. The texture is silty clay loam, silty clay, or clay. Some pedons have mottles in shades of red, brown, or gray in the lower part of the B2t horizon.

Some pedons have a B3 horizon that has colors and textures similar to those of the B2t horizon.

Clarksville Series

The Clarksville series consists of deep, somewhat excessively drained soils. These soils are on uplands, and some areas have karst topography. They formed in residuum weathered from cherty limestone. The slopes range from 2 to 20 percent. These soils are loamy-skeletal, siliceous, mesic Typic Paleudults.

Clarksville soils are taxadjuncts to the Clarksville series because the base saturation at a depth of 56 inches is more than 35 percent, and these soils have clay loam texture in the lower part of the B horizon. This is outside the defined range for the series but does not affect the use and management of these soils.

Clarksville soils are associated on the landscape with Baxter, Caneyville, Decatur, and Bewleyville soils. Baxter soils have less cobbles than Clarksville soils and are in a fine family. Caneyville soils are on adjacent side slopes in higher positions than Clarksville soils, have less coarse fragments, are in a fine family, and are moderately deep. Decatur soils are in a clayey family. These soils are in similar or slightly lower positions and have less coarse fragments. Bewleyville soils are in a fine-silty family.

Typical pedon of Clarksville cobbly silt loam, in an area of Clarksville-Baxter cobbly silt loams, 4 to 12 percent slopes; 1 mile south of junction of Kentucky Highway 90 and old Kentucky Highway 90 to gravel road, 0.2 mile west on gravel road, 0.2 mile west on dirt road; about 8.5 miles north of Monticello:

Ap—0 to 6 inches; dark yellowish brown (10YR 4/4) cobbly silt loam; moderate fine granular structure; friable; many roots; 40 percent chert fragments, 50 percent of which is more than 3 inches in diameter; strongly acid; abrupt smooth boundary.

B21t—6 to 15 inches; reddish yellow (7.5YR 6/6) very cobbly silt loam; moderate medium angular blocky structure; firm; common fine roots; common thin clay films; 70 percent chert fragments, 50 percent of which is more than 3 inches in diameter; strongly acid; gradual wavy boundary.

B22t—15 to 28 inches; yellowish red (5YR 4/6) very cobbly silt loam; moderate coarse angular blocky structure; firm; common fine roots; common thin clay films; 80 percent chert fragments, 60 percent of which is more than 3 inches in diameter; strongly acid; gradual wavy boundary.

B23t—28 to 40 inches; yellowish red (5YR 4/6) very cobbly clay loam; moderate coarse angular blocky structure; firm; few fine roots; common fine clay films; 75 percent chert fragments, 50 percent of which is more than 3 inches in diameter; common black manganese concretions; strongly acid; clear wavy boundary.

B24t—40 to 72 inches; yellowish red (5YR 5/6) clay loam; moderate medium angular blocky structure; very firm; few fine roots; common fine clay films; 10 percent chert fragments; many black manganese concretions; strongly acid.

The thickness of the solum and depth to bedrock are more than 60 inches. The content of coarse fragments, mostly chert, ranges from 20 to 80 percent in individual horizons. The reaction is extremely acid to strongly acid except where lime has been added.

The Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. The texture is cobbly or extremely cobbly silt loam.

some pedons have a B1 horizon that has hue of 10YR, value of 4, and chroma of 4. The texture is cobbly or extremely cobbly analogs of loam or silt loam.

The B2t horizon has hue of 7.5YR to 2.5YR, value of 4 to 6, and chroma of 4 to 6. The texture of the upper part of the B2t horizon is cobbly, very cobbly, or extremely cobbly analogs of silt loam, silty clay loam, silty clay, or clay loam. The lower part has the same texture as the upper part, but may or may not be as cobbly.

Cutshin Series

The Cutshin series consists of deep, well drained soils. These soils are on concave side slopes, benches, and coves. They formed in colluvium from sandstone and siltstone. The slopes range from 20 to 60 percent. These soils are fine-loamy, mixed, mesic Typic Haplumbrepts.

Cutshin soils are taxadjuncts to the Cutshin series because they have siliceous mineralogy and have less than 10 percent coarse fragments in some parts of the soil. This is outside the defined range for the series but does not affect the use and management of these soils.

Cutshin soils are associated on the landscape with Muse and Shelocta soils. Muse and Shelocta soils have an argillic horizon and do not have a thick, dark surface layer. In addition, Muse soils have a more clayey subsoil than Cutshin soils.

Typical pedon of Cutshin loam, in an area of Shelocta-Muse-Cutshin complex, steep; 19.5 miles south on Kentucky Highway 167 from junction of Kentucky Highway 90, 275 yards west of Kentucky Highway 167, 1,520 yards north of the Tennessee State line; about 20 miles south of Monticello:

A11—0 to 6 inches; very dark grayish brown (10YR 3/2), dark brown (10YR 3/3) crushed loam; moderate fine granular structure; friable; common medium and coarse roots; 5 percent small sandstone fragments; slightly acid; clear smooth boundary.

A12—6 to 12 inches; dark brown (10YR 3/3), dark yellowish brown (10YR 3/4) crushed loam; moderate fine granular structure; friable; common fine roots; 3 percent small sandstone fragments; medium acid; clear wavy boundary.

B1—12 to 20 inches; brown (10YR 4/3) loam; weak fine and medium subangular blocky structure; friable; common fine roots; discontinuous dark brown organic coatings; many fine pores; 5 percent small sandstone fragments; medium acid; gradual smooth boundary.

B21—20 to 30 inches; dark yellowish brown (10YR 4/4) loam; weak fine and medium subangular blocky structure; friable; few fine roots; patchy dark yellowish brown stains; 3 percent small sandstone fragments; medium acid; gradual smooth boundary.

B22—30 to 43 inches; dark yellowish brown (10YR 4/4) loam; weak fine and medium subangular blocky structure; friable; few fine roots; very patchy very dark gray ped coatings; 9 percent sandstone fragments, 1 inch to 10 inches in diameter; medium acid; gradual smooth boundary.

B23—43 to 60 inches; dark yellowish brown (10YR 4/4) loam; weak fine and medium subangular blocky structure; friable; few fine roots; very patchy dark brown ped coatings; 3 percent sandstone fragments, 1 inch to 3 inches in diameter; medium acid; gradual smooth boundary.

B24—60 to 72 inches; dark yellowish brown (10YR 4/4) loam; weak medium and fine subangular blocky structure; friable; less than 2 percent sandstone fragments, 1 inch to 3 inches in diameter; strongly acid.

The thickness of the solum and depth to soft bedrock range from 40 to more than 80 inches. Subrounded and flat rock fragments, 0.5 inch to 15 inches across, range from 2 to 35 percent in individual horizons. The reaction ranges from medium acid to very strongly acid except where lime has been added.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 2 or 3. The texture is loam.

The B1 horizon has hue of 10YR, value of 4 to 6, and chroma of 3 to 6. The texture is loam.

The B2 horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. The texture is loam, sandy loam, clay loam, or sandy clay loam or their channery, flaggy, or gravelly analogs.

Some pedons have a C horizon that has colors and textures similar to those of the B2 horizon.

Decatur Series

The Decatur series consists of deep, well drained soils. These soils are on convex ridgetops and side slopes. They formed in old alluvium and residuum weathered from limestone. Most areas have karst topography. The slopes range from 6 to 12 percent. These soils are clayey, kaolinitic, thermic Rhodic Paleudults.

Decatur soils are associated on the landscape with Caneyville, Frederick, Bewleyville, Clarksville, and Baxter soils. Caneyville soils are moderately deep to bedrock and are on adjacent slopes in higher positions than Decatur soils. Frederick soils are on lower side slopes and do not have a dark red color in the subsoil. Bewleyville soils are on broad ridges in higher positions and have less clay in the subsoil. The Clarksville and Baxter soils have more coarse fragments than Decatur soils. In addition, Clarksville soils are in a loamy-skeletal family.

Typical pedon of Decatur silt loam, 6 to 12 percent slopes; 1.4 miles west on Kentucky Highway 92 from junction of Kentucky Highway 90 to blacktop road on left, 0.5 mile south, 200 feet east; about 1.9 miles west of Monticello:

Ap—0 to 6 inches; dark reddish brown (5YR 3/4) silt loam; moderate fine granular structure; friable; many fine roots; few pebbles; slightly acid; gradual smooth boundary.

B1—6 to 14 inches; dark red (2.5YR 3/6) silty clay loam; moderate fine and medium subangular blocky structure; friable; common fine roots; thin patchy clay films; few small pebbles; slightly acid; clear smooth boundary.

B21t—14 to 29 inches; dark red (2.5YR 3/6) clay; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; firm; common fine roots; thin continuous clay films; few black concretions; few rounded quartz pebbles; strongly acid; gradual smooth boundary.

B22t—29 to 44 inches; dark red (2.5YR 3/6) clay; moderate coarse subangular blocky structure parting to moderate medium and fine blocky; firm; few fine roots; thick continuous clay films; 3 percent rounded quartz pebbles; very strongly acid; gradual smooth boundary.

B23t—44 to 62 inches; dark red (2.5YR 3/6) clay; moderate fine and medium angular blocky structure; firm; few fine roots; thin continuous clay films; few weathered chert fragments and rounded quartz pebbles; very strongly acid; gradual smooth boundary.

B24t—62 to 80 inches; mottled dark red (2.5YR 3/6) and yellowish brown (10YR 5/6) clay; moderate medium angular blocky structure; firm; few rounded quartz pebbles; few black concretions; very strongly acid.

The thickness of the solum and depth to bedrock are more than 72 inches. The content of coarse fragments, mostly chert, ranges from 0 to 10 percent in each horizon. The reaction is very strongly acid to medium acid except where lime has been added.

The Ap horizon has hue of 5YR or 2.5YR, value of 2 or 3, and chroma of 2 to 4. The texture is silt loam.

The B1 and B2t horizons have hue of 2.5YR or 10R, value of 3, and chroma of 4 to 6. Some pedons have mottles in shades of brown, yellow, or red at a depth of more than 40 inches. The texture is silty clay loam, silty clay, or clay.

Dickson Series

The Dickson series consists of deep, moderately well drained soils with a fragipan. These soils are on broad smooth ridgetops and stream terraces. They formed in a silty mantle about 2 to 4 feet thick that is underlain by residuum from cherty and clayey limestone or old alluvium. They have a high water table at a depth of 2 to 3 feet late in winter and early in spring. The slopes range from 2 to 6 percent. These soils are fine-silty, siliceous, thermic Glossic Fragiudults.

Dickson soils are associated on the landscape with Elk, Mountview, and Lawrence soils. Elk and Mountview soils are well drained and do not have a fragipan. Elk soils are on stream terraces, and Mountview soils are on uplands. Lawrence soils are in slightly depressed areas in positions similar to those of Dickson soils. These soils are somewhat poorly drained.

Typical pedon of Dickson silt loam, 2 to 6 percent slopes; 1.3 miles west of Murl on Kentucky Highway

1546, 0.3 mile north on gravel road, 300 yards west of gravel road; 7 miles west of Monticello:

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common roots; neutral; abrupt smooth boundary.

B2—7 to 26 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; friable; few roots; few small soft brown concretions; strongly acid; clear smooth boundary.

B'x&A'2—26 to 32 inches; yellowish brown (10YR 5/6) silt loam; thin light brownish gray (10YR 6/2) coatings on ped surfaces; moderate medium platy structure parting to moderate fine subangular blocky; firm; few roots; thin patchy clay films; few small black concretions; strongly acid; clear smooth boundary.

B'x—32 to 44 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct light brownish gray (10YR 6/2) mottles; moderate medium platy structure parting to moderate fine subangular blocky; firm, compact and brittle; thin patchy clay films; very strongly acid; clear smooth boundary.

IIB2t—44 to 60 inches; strong brown (7.5YR 5/6) clay; common fine distinct light brownish gray (10YR 6/2) and reddish brown (5YR 5/4) mottles; very firm; thin patchy clay films; very strongly acid.

The thickness of the solum and depth to bedrock are more than 60 inches. Depth to the fragipan ranges from 24 to 36 inches. The reaction is strongly acid or very strongly acid except where lime has been added.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The texture is silt loam.

The B2 horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 4 to 6. The texture is silt loam or silty clay loam.

The B'x&A'2 horizon has colors similar to those of the B2 horizon, and it has mottles in shades of brown and gray. The texture is silt loam or silty clay loam.

The B'x horizon has hue of 10YR, value of 5 or 6, and chroma of 4, and it has mottles in shades of gray, yellow, or brown. The texture is silty clay loam or silt loam.

The IIB2t horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 6, and it has mottles in shades of gray, yellow, and brown. The texture is silty clay loam, silty clay, or clay.

Dunning Series

The Dunning series consists of deep, very poorly drained soils. These soils are in depressed areas on flood plains. They formed in alluvium from limestone. They have a high water table within a depth of 0.5 foot late in winter and early in spring and are subject to occasional flooding. The slopes range from 0 to 2 percent. These soils are fine, mixed, mesic Fluvaquentic Haplaquolls.

Dunning soils are taxadjuncts to the Dunning series because they have a montmorillonitic rather than a mixed mineralogy. They have a slightly lower content of organic matter at a depth of 50 inches. This is outside the defined range for the series but does not affect the use and management of these soils.

Dunning soils are associated on the landscape with Melvin, Purdy, Rahm, and Lawrence soils. The associated soils are in positions similar to those of Dunning soils but do not have a thick, dark color A horizon. All of these soils, except Purdy soils, have less than 35 percent clay in the subsoil. In addition, Lawrence soils have a fragipan.

Typical pedon of Dunning silty clay loam, occasionally flooded; 1.2 miles southeast on Kentucky Highway 1619 from junction of Kentucky Highway 90, 500 feet south in a cultivated field; about 9 miles northeast of Monticello:

Ap—0 to 7 inches; very dark gray (10YR 3/1) silty clay loam; moderate fine granular structure; firm; common very fine roots; few coarse fragments; slightly acid; abrupt smooth boundary.

Ag—7 to 12 inches; very dark gray (10YR 3/1) silty clay; few fine distinct dark grayish brown (2.5Y 4/2) mottles; moderate medium subangular blocky structure parting to moderate fine subangular and angular blocky; firm, sticky and plastic; common fine roots; few coarse fragments; slightly acid; clear smooth boundary.

Bg—12 to 33 inches; dark gray (N 4/0) silty clay; common fine distinct olive (5Y 4/4) mottles; moderate fine angular blocky and subangular blocky structure; firm, sticky and plastic; few fine roots; 5 percent coarse fragments; neutral; clear smooth boundary.

Cg—33 to 47inches; gray (N 5/0) silty clay; common medium distinct light olive brown (2.5Y 5/4) mottles; massive; firm, plastic and sticky; few fine roots; neutral; clear wavy boundary.

IICg—47 to 77 inches; gray (N 6/0) silty clay loam; many coarse prominent brownish yellow (10YR 6/6) mottles; massive; firm; few fine roots; few small subangular chert fragments and cobbles, 3 to 10 inches in diameter; neutral.

The thickness of the solum ranges from 30 to 50 inches. Depth to bedrock is more than 60 inches. The reaction is medium acid to mildly alkaline.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 3 or less. Mottles are in shades of red, brown, olive, or gray. The texture is silty clay loam.

The Ag horizon has colors similar to those of the Ap horizon. The texture is silty clay.

The Bg horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 1 to 2; or it is neutral and has value of 3 to 6. The texture is silty clay loam or silty clay.

The Cg and IICg horizons have colors and textures similar to those of the Bg horizon.

Elk Series

The Elk series consists of deep, well drained soils. They are on stream terraces. These soils formed in mixed old alluvium derived from limestone, siltstone, shale, and sandstone. The slopes range from 2 to 6 percent. These soils are fine-silty, mixed, mesic Ultic Hapludalfs.

Elk soils are associated with Nolin and Dickson soils. Nolin soils do not have an argillic horizon and are on adjacent flood plains. Dickson soils are moderately well drained. These soils have a fragipan and are in positions on the landscape similar to those of Elk soils.

Typical pedon of Elk silt loam, 2 to 6 percent slopes; 1 mile east of Monticello on Kentucky Highway 92, 1 mile north of highway:

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

B21t—8 to 23 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few roots; thin discontinuous clay films; few small black concretions; medium acid; clear smooth boundary.

B22t—23 to 40 inches; yellowish brown (10YR 5/6) silty clay loam; moderate, medium subangular blocky structure; firm; few roots; thin discontinuous clay films; few small black concretions; very strongly acid; gradual smooth boundary.

C—40 to 60 inches; yellowish brown (10YR 5/6) silt loam; few fine distinct pale brown (10YR 6/3) mottles; massive; friable; few small black concretions; strongly acid.

The thickness of the solum ranges from 40 to 60 inches. Depth to bedrock is more than 60 inches. The reaction ranges from slightly acid to very strongly acid in the solum except where lime has been added. The reaction is slightly acid to strongly acid 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 texture is silt loam.

The B2t horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The texture is silt loam or silty clay loam. In some pedons, mottles that have chroma of 2 or less are in the lower part.

The C horizon has colors similar to those of the B2t horizon. The texture is silt loam or silty clay loam. In some pedons, this horizon is stratified with layers of fine sandy loam, loam, or silty clay.

Frederick Series

The Frederick series consists of deep, well drained soils. These soils are on convex ridgetops and side slopes. They formed in clayey residuum from limestone. Some areas have karst topography. The slopes range from 2 to 20 percent but are dominantly 6 to 12 percent. These soils are clayey, mixed, mesic Typic Paleudults.

Frederick soils are associated on the landscape with Caneyville, Garmon, Decatur, Mountview, and Waynesboro soils. Caneyville and Garmon soils are moderately deep to bedrock and are on side slopes in lower positions than Frederick soils. Garmon soils are in a fine-loamy family. Decatur and Mountveiw soils are on ridgetops in higher positions. Decatur soils have a dark red subsoil, and Mountview soils are in a fine-silty family. Waynesboro soils are on adjacent high stream terraces.

Typical pedon of Frederick silt loam, 6 to 12 percent slopes, eroded; 6.7 miles north on Kentucky Highway 789 from intersection of Kentucky Highway 92, 30 yards northeast of road; 8.5 miles northwest of Monticello:

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

B21t—8 to 20 inches; yellowish red (5YR 5/6) silty clay; moderate fine subangular blocky structure; firm; few roots; thin continuous clay films; very strongly acid; gradual smooth boundary.

B22t—20 to 29 inches; yellowish red (5YR 4/6) silty clay; common medium distinct brownish yellow (10YR 6/6) mottles; moderate fine subangular blocky structure; firm; few roots; thin continuous clay films; very strongly acid; gradual smooth boundary.

B23t—29 to 52 inches; yellowish red (5YR 4/6) clay; many medium distinct brownish yellow (10YR 6/6) mottles; moderate fine subangular blocky structure; firm; few roots; thin continuous clay films; very strongly acid; gradual smooth boundary.

B24t—52 to 65 inches; yellowish red (5YR 4/6) clay; many medium distinct brownish yellow (10YR 6/6) and reddish brown (2.5YR 4/4) mottles; weak fine subangular blocky structure; firm; thin discontinuous clay films; few small chert fragments; strongly acid.

The thickness of the solum is more than 60 inches. Depth to bedrock is more than 72 inches. The reaction ranges from medium acid to very strongly acid unless lime has been added. The content of coarse fragments, mostly chert, ranges from 0 to 20 percent in the A horizon and from 0 to 15 percent in the Bt horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. The texture is silt loam.

The B2t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. The texture is silty clay loam, silty clay, or clay.

Garmon Series

The Garmon series consists of moderately deep, well drained soils. They are on highly dissected side slopes in the northern part of the county. These soils formed in residuum from shaly limestones, calcareous shales, and siltstones. The slopes range from 12 to 75 percent but are dominantly 30 to 75 percent. These soils are fine-loamy, mixed, mesic Dystric Eutrochrepts.

Garmon soils are associated on the landscape with Caneyville and Frederick soils. Caneyville and Frederick soils have more clay in the subsoil than Garmon soils. They are on side slopes and ridgetops in higher positions and have an argillic horizon. In addition, Frederick soils are deep to bedrock.

Typical pedon of Garmon silt loam, in an area of Garmon-Caneyville association, very steep; 7.2 miles north on Kentucky Highway 789 from intersection of Kentucky Highway 92 to Camp Earl Wallace, 300 yards west of camp office; 9.5 miles northwest of Monticello:

A1—0 to 1 inches, brown (10YR 4/3) silt loam; weak fine granular structure; friable; many roots; neutral; abrupt smooth boundary.

A2—1 to 6 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; many roots; few small shale fragments; neutral; clear smooth boundary.

B2—6 to 27 inches; yellowish brown (10YR 5/4) channery silt loam; weak fine subangular blocky structure; friable; common roots; 15 to 20 percent small shale and limestone fragments; slightly acid; gradual smooth boundary.

C—27 to 32 inches; yellowish brown (10YR 5/4) channery silt loam; massive; friable; few roots; 30 percent small shale and limestone fragments; slightly acid; clear smooth boundary.

R—32 inches; limestone.

The thickness of the solum and depth to bedrock range from 20 to 40 inches. The reaction ranges from very strongly acid to neutral. Coarse fragments of shale, siltstone, and limestone range from 2 to 45 percent in the individual horizons. The weighted average in the control section is 10 to 35 percent.

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

The B2 horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 6. The texture is loam, silt loam, or silty clay loam or their channery or very channery analogs.

The C horizon has colors and textures similar to those of the B2 horizon.

Lawrence Series

The Lawrence series consists of deep, somewhat poorly drained soils. These soils are on stream terraces and in concave upland areas. They formed in old mixed alluvium. They have a high water table at a depth of 1 foot to 2 feet in winter and early in spring. The slopes range from 0 to 2 percent. These soils are fine-silty, mixed, mesic Aquic Fragiudalfs.

Lawrence soils are associated on the landscape with Melvin, Newark, Dickson, and Mountview soils. Melvin and Newark soils are on flood plains and do not have a fragipan. Dickson and Mountview soils are in slightly higher positions than Lawrence soils and are better drained.

Typical pedon of Lawrence silt loam; 2.5 miles south on Kentucky Highway 1619 from junction of Kentucky Highway 90 at Touristville, 0.6 mile northeast to end of gravel road, 300 yards northeast of house at end of road; 8.5 miles northeast of Monticello:

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak, fine granular structure; friable; few roots; neutral; abrupt smooth boundary.

B21t—7 to 16 inches; yellowish brown (10YR 5/4) silt loam; common fine faint yellowish brown and light yellowish brown mottles; moderate medium angular and subangular blocky structure; friable; few roots; few soft brown concretions; thin discontinuous clay films; slightly acid; clear smooth boundary.

B22t—16 to 26 inches; mottled yellowish brown (10YR 5/4) and light brownish gray (10YR 6/2) silt loam; moderate medium angular and subangular blocky structure; friable; few roots; few soft brown concretions; thin clay films in pores; very strongly acid; clear smooth boundary.

Bx1—26 to 45 inches; light brownish gray (10YR 6/2) silt loam; common fine distinct yellowish brown (10YR 5/4) mottles; very coarse prismatic structure parting to moderate medium angular blocky; firm, compact and brittle; few soft brown concretions; very strongly acid; clear smooth boundary.

Bx2—45 to 60 inches; gray (10YR 6/1) silty clay loam; many medium distinct yellowish brown (10YR 5/4) mottles; very coarse prismatic structure parting to moderate medium angular blocky; firm, compact and brittle; many soft brown and black concretions; strongly acid.

The thickness of the solum ranges from 40 to 80 inches. Depth to the fragipan ranges from 20 to 32 inches. Depth to bedrock is more than 60 inches. The reaction is slightly acid to very strongly acid above the fragipan unless limed and strongly acid or very strongly acid in the fragipan. In some places, it ranges from very strongly acid to neutral below the fragipan.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The texture is silt loam.

The B2t horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6, and it has few to many mottles that have chroma of 1 or 2. The texture is silt loam or silty clay loam.

The Bx horizon has hue of 7.5YR to 2.5Y, value of 6 or 7, and chroma of 1 to 6; or it is neutral and has value of 6 or 7. In some pedons, this horizon is equally mottled in shades of brown and gray. The texture is silt loam or silty clay loam.

Some pedons have a B3 and a C horizon. These horizons have hue of 2.5Y to 5YR, value of 4 to 7, and chroma of 1 to 6; or they are neutral and have value of 4 to 7. The texture is silt loam, silty clay loam, or silty clay.

Melvin Series

The Melvin series consists of deep, poorly drained soils. These soils are on flood plains. They formed in mixed alluvium. These soils are in slight depressions and have a high water table at or near the surface in winter and early in spring. The slopes range from 0 to 2 percent. These soils are fine-silty, mixed, nonacid, mesic Typic Fluvaquents.

Melvin soils are associated on the landscape with Nolin, Newark, Rahm, Lawrence, Dunning, and Purdy soils. The Nolin, Newark, and Rahm soils are on the same flood plains as Melvin soils but are better drained. In addition, Rahm soils are underlain by clayey material at a depth of 20 to 36 inches. Lawrence soils are better drained than Melvin soils. They have a fragipan and are on adjacent stream terraces. Dunning soils are on flood plains, are very poorly drained, and have a mollic epipedon and a fine textured control section. Purdy soils are on low stream terraces and have a clayey control section.

Typical pedon of Melvin silt loam, frequently flooded; 0.6 mile west of Murl on Kentucky Highway 1546, 100 yards north of road; 6 miles west of Monticello:

Ap—0 to 7 inches; dark grayish brown (2.5Y 4/2) silt loam; weak fine granular structure; friable; many very fine roots; neutral; clear smooth boundary.

B2g—7 to 20 inches; gray (N 6/0) silt loam; common, fine, distinct light olive brown (2.5YR 5/6) mottles; weak fine angular blocky structure; friable; few very fine roots; neutral; clear smooth boundary.

C1g—20 to 30 inches; gray (N 5/0) silty clay loam; common fine distinct light olive brown (2.5Y 5/4) and light gray (2.5Y 7/2) mottles; massive; friable; few very fine roots; mildly alkaline; clear smooth boundary.

C2g—30 to 60 inches; dark gray (N 4/0) silty clay loam; common medium distinct brown (7.5YR 4/4) mottles; massive; firm; few soft black concretions; mildly alkaline.

The thickness of the solum ranges from 20 to 40 inches, and depth to bedrock is more than 60 inches. The reaction is medium acid to mildly alkaline.

The Ap horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 to 3. The texture is silt loam.

The B2g horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2; or it is neutral and has value of 4 to 7. Mottles are in shades of brown and red. The texture is silt loam or silty clay loam.

The Cg horizon has colors and textures similar to those of the B2g horizon.

Mountview Series

The Mountview Series consists of deep, well drained soils. These soils are on smooth convex ridgetops and side slopes. They formed in a silty mantle about 2 to 3 feet thick and are underlain by residuum from cherty limestone. The slopes range from 2 to 12 percent but are dominantly 2 to 6 percent. These soils are fine-silty, siliceous, thermic Typic Paleudults.

Mountview soils are associated on the landscape with Frederick, Dickson, and Lawrence soils. Frederick soils are on side slopes in lower positions than Mountview soils. They are more red and have more clay in the upper part of the solum. Dickson and Lawrence soils have a fragipan. They are on the broader, more level ridgetops. In addition, Lawrence soils are often in depressions.

Typical pedon of Mountview silt loam, 2 to 6 percent slopes; 2.5 miles west of Monticello on Kentucky Highway 90, 0.5 mile northeast on blacktop road, 100 feet southeast of road; about 3 miles west of Monticello:

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; moderate medium granular structure and weak fine subangular blocky; friable; many fine roots; few small chert fragments; neutral; abrupt smooth boundary.

B21t—8 to 20inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine roots; thin discontinuous clay films; few small chert fragments; strongly acid; gradual wavy boundary.

B22t—20 to 29 inches; strong brown (7.5YR 5/6) silty clay loam; few fine distinct yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; firm; few roots; thin continuous clay films; few small chert fragments; strongly acid; gradual wavy boundary.

IIB23t—29 to 41 inches; yellowish red (5YR 4/6) silty clay; common fine distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; thin continuous clay films; 5 percent chert fragments, 0.5 inch to 1.5 inches in diameter; strongly acid; gradual wavy boundary.

IIB24t—41 to 66 inches; red (2.5YR 4/6) silty clay; common fine distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; thin continuous clay films; 5 percent chert fragments, 0.25 inch to 1 inch in diameter; strongly acid; gradual wavy boundary.

The thickness of the solum and depth to bedrock are more than 60 inches. The upper part of the solum that formed in a silty mantle ranges from 22 to 36 inches. The lower part formed in residuum from cherty limestone. The content of chert and sandstone fragments ranges from 0 to 5 percent in the upper part of the solum and from 5 to 30 percent in the lower part. The reaction is strongly acid or very strongly acid except where lime has been added.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The texture is silt loam.

The B2t horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 to 8. The texture is silt loam or silty clay loam.

The IIB2t horizon has hue of 5YR or 2.5YR, value of 3 to 5, and chroma of 6. In some pedons, few or common mottles in shades of brown and gray are in the lower part of the IIB2t horizon. The texture is silty clay loam or silty clay or their gravelly analogs.

Muse Series

The Muse series consists of deep, well drained soils. These soils are on concave side slopes and benches. They formed in residuum or colluvium from acid shale and siltstone. The slopes range from 20 to 60 percent. These soils are clayey, mixed, mesic, Typic Hapludults.

Muse soils are associated on the landscape with Cutshin, Shelocta, and Rigley soils. The associated soils have less clay than the Muse soils. In addition, Cutshin soils have a darker A horizon, and Shelocta soils have more coarse fragments in the lower part of the solum.

Typical pedon of Muse loam, in an area of Shelocta-Muse-Cutshin complex, steep; 0.8 mile east on Kentucky Highway 776 from intersection of Kentucky Highway 92 to a subdivision entrance, 500 yards north of entrance, 300 yards west of road; about 3.5 miles west of Monticello:

A1—0 to 2 inches; dark grayish brown (10YR 4/2) loam; moderate medium granular structure; friable; many fine and medium roots; 10 percent sandstone and shale fragments; very strongly acid; abrupt smooth boundary.

A2—2 to 7 inches; light yellowish brown (10YR 6/4) loam; moderate medium granular structure; friable; common fine and few medium roots; 10 percent sandstone and shale fragments; very strongly acid; clear smooth boundary.

B21t—7 to 13 inches; yellowish red (5YR 5/6) clay; moderate medium subangular blocky structure; very firm, sticky and slightly plastic; common fine roots; brown (7.5YR 5/4) coatings on surfaces of peds; common clay films; 5 percent shale fragments; very strongly acid; clear wavy boundary.

B22t—13 to 28 inches; yellowish red (5YR 5/6) clay; moderate fine blocky structure; very firm, sticky and plastic; few fine roots; pale olive (5Y 6/3) coatings on surfaces of peds; greenish gray (5GY 6/1) coatings along old root channels; common clay films; 5 percent shale fragments; very strongly acid; gradual wavy boundary.

B23t—28 to 44 inches; yellowish red (5YR 5/6) clay; common medium distinct pale olive (5Y 6/3) and greenish gray (5GY 6/1) mottles; weak fine and medium blocky structure; very firm, sticky and plastic; few fine roots; 10 percent strong brown shale fragments; very strongly acid; gradual wavy boundary.

Cg—44 to 74 inches; greenish gray (5GY 6/1) channery silty clay; common medium distinct yellowish red (5YR 4/6) mottles; massive; very firm, sticky and plastic; 15 percent shale fragments; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. Depth to bedrock ranges from 40 to 80 inches. The content of shale or siltstone ranges from 0 to 35 percent in the solum and from 0 to 60 percent in the C horizon. The reaction is strongly acid or very strongly acid except where lime has been added.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 1 to 3. The A2 horizon has hue of 7.5YR to 10YR, value of 4 to 6, and chroma of 3 or 4. The texture of the A horizons is loam, silt loam, or silty clay loam or their channery analogs.

The B2t horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. The texture is silty clay loam, silty clay, or clay or their channery analogs.

The C horizon has matrix or mottles in shades of red, brown, yellow, or gray. The texture is silty clay or clay or their channery analogs.

Newark Series

The Newark series consists of deep, somewhat poorly drained soils. These soils are on flood plains. They formed in mixed alluvium and are subject to occasional flooding. The slopes range from 0 to 2 percent. These soils are fine-silty, mixed, nonacid, mesic Aeric Fluvaquents.

Newark soils are associated on the landscape with Nolin, Melvin, Rahm, and Lawrence soils. Nolin soils are well drained. Melvin soils are poorly drained. Rahm soils are underlain by clayey material at a depth of 20 to 36 inches. Lawrence soils are on stream terraces and have a fragipan.

Typical pedon of Newark silt loam, occasionally flooded; 500 yards southeast of Elk Springs Cemetery in Monticello:

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; few roots; neutral; abrupt smooth boundary.

B21—9 to 19 inches; brown (10YR 5/3) silt loam; common medium distinct light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable; few roots; slightly acid; clear smooth boundary.
B22g—19 to 38 inches; light brownish gray (10YR 6/2) silt loam; many medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few roots; slightly acid; clear smooth boundary.
Cg—38 to 60 inches; mottled light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) silt loam; massive; friable; few roots; neutral.

The thickness of the solum ranges from 22 to 44 inches. Depth to bedrock is more than 60 inches. The reaction ranges from medium acid to mildly alkaline.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. In some pedons, this horizon is mottled in shades of brown or gray. The texture is silt loam.

The B21 horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4, and it has mottles in shades of brown or gray. The texture is silt loam or silty clay loam.

The B22g horizon has hue of 2.5Y or 10YR, value of 4 to 7, and chroma of 1 or 2; or it is neutral and has value of 4 to 7. Mottles are in shades of brown. The texture is silt loam or silty clay loam.

The Cg horizon has colors and textures similar to those of the B22g horizon.

Nolin Series

The Nolin series consists of deep, well drained soils. These soils are on flood plains. They formed in mixed alluvium and are subject to occasional flooding. The slopes range from 0 to 2 percent. These soils are fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts.

Nolin soils are associated on the landscape with Elk, Melvin, Newark, Allen, and Rahm soils. Elk soils are on stream terraces and have an argillic horizon. Melvin and Newark soils are more poorly drained than Nolin soils but are in similar positions. Allen soils are on adjacent foot slopes and are in a fine-loamy family. Rahm soils are underlain by clayey material at a depth of 20 to 36 inches.

Typical pedon of Nolin silt loam, occasionally flooded; 1 mile east on Kentucky Highway 776 from junction of Kentucky Highway 92, 1.5 miles south on dirt road, 300 feet west of road, 0.3 mile west of house; 5 miles east of Monticello.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many roots; mildly alkaline; abrupt smooth boundary.
B2—8 to 45 inches; brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable; few roots; mildly alkaline; gradual smooth boundary.
C—45 to 60 inches; brown (10YR 4/3) silt loam; massive; friable; few roots; about 5 percent gravel; mildly alkaline.

The thickness of the solum is more than 40 inches, and depth to bedrock is more than 60 inches. The reaction is medium acid to moderately alkaline.

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

The B2 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. In some pedons, this horizon has few or common gray mottles at a depth of more than 30 inches. The texture is 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. The texture is silt loam, loam, or gravelly loam.

Purdy Series

The Purdy series consists of deep, poorly drained soils. These soils are on low stream terraces, mostly in the Meadow Creek area in the northeastern part of the county. They formed in clayey alluvium and are subject to occasional flooding. The slopes range from 0 to 2 percent. These soils are clayey, mixed, mesic Typic Ochraquults.

Purdy soils are a taxadjunct to the Purdy series because they are subject to occasional flooding of brief duration instead of ponding. This is outside the defined range for the series but does not affect the use and management of the soils.

Purdy soils are associated on the landscape with Dunning and Melvin soils. Dunning soils have a mollic epipedon that is more than 10 inches thick. These soils are very poorly drained. Melvin soils are in a slightly lower position on flood plains and have less clay than Purdy soils.

Typical pedon of Purdy silty clay loam, occasionally flooded; 2 miles south on Kentucky Highway 1619 from junction of Kentucky Highway 90 at Touristville, 400 yards northeast of road; 8 miles northeast of Monticello:

Ap—0 to 6 inches; gray (10YR 5/1) silty clay loam; few fine faint yellowish brown mottles; weak fine granular structure; friable; common roots; neutral; abrupt smooth boundary.
B21tg—6 to 16 inches; grayish brown (10YR 5/2) silty clay; common fine prominent reddish brown (5YR 5/4) mottles; weak fine angular and subangular blocky structure; firm; few roots; patchy clay films on faces of peds; strongly acid; clear smooth boundary.
B22tg—16 to 40 inches; gray (10YR 5/1) silty clay; common fine prominent strong brown (7.5YR 5/6) mottles; weak medium angular and subangular

blocky structure; very firm; few roots; patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.

Cg—40 to 60 inches; mottled gray (10YR 6/1) and yellowish brown (10YR 5/6) silty clay; massive; very firm; very strongly acid.

The thickness of the solum ranges from 30 to 50 inches. Depth to bedrock is more than 60 inches. The reaction is strongly acid to extremely acid except where lime has been added.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2; or it is neutral and has value of 4 or 5. The texture is silty clay loam. Some pedons have a thin A horizon that has value of 3.

The B2tg horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 1 or 2; or it is neutral and has value of 4 or 5. This horizon has mottles in shades of yellow and brown. The texture is silty clay or clay.

The Cg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 3 or less, and it has mottles in shades of yellow and brown. The texture is clay loam, silty clay, or clay.

Rahm Series

The Rahm Series consists of deep, somewhat poorly drained soils. These soils are on flood plains. They formed in mixed alluvium from limestone and are subject to rare flooding. The slopes range from 0 to 2 percent. These soils are fine-silty, mixed, nonacid, mesic Aeric Fluvaquents.

Rahm soils are associated on the landscape with Nolin, Melvin, Newark, and Dunning soils. Nolin soils are well drained. Melvin soils are poorly drained. Newark soils are not underlain by clayey material. Dunning soils are very poorly drained and have a mollic epipedon and a fine-textured control section.

Typical pedon of Rahm silt loam, rarely flooded; 9 miles south on Kentucky Highway 1619 from junction of Kentucky Highway 90, 0.5 mile south on farm lane to house at end of lane, 275 yards west of house; 7 miles northeast of Monticello:

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

B2—8 to 13 inches; brown (10YR 5/3) silt loam; common fine distinct yellowish brown (10YR 5/4) mottles; weak fine subangular blocky structure; friable; few roots; slightly acid; clear smooth boundary.

B2g—13 to 24 inches; gray (10YR 5/1) silt loam; few fine distinct strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; friable; few roots; few small soft black concretions; slightly acid; gradual smooth boundary.

IIB2tb—24 to 60 inches; grayish brown (10YR 5/2) silty clay; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium angular blocky structure; few thin discontinuous clay films; strongly acid.

The thickness of the solum is more than 40 inches. Depth to bedrock is more than 60 inches. The reaction is slightly acid or neutral in the upper part of the solum and ranges from very strongly acid to medium acid in the lower part. The thickness of the upper part of the solum ranges from 20 to 36 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The texture is silt loam.

The B2 horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 4. Mottles are in shades of brown or gray. The texture is silt loam or silty clay loam. In some pedons, subhorizons within 20 inches of the surface have a dominant chroma of 2 or less.

The IIB2tb horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 2 to 6. Mottles are in shades of brown or gray. The texture is silty clay loam or silty clay.

Rigley Series

The Rigley series consists of deep, well drained soils. These soils are on concave side slopes and benches below massive sandstone cliffs. They formed in colluvium from acid sandstone, siltstone, and shale. The slopes range from 20 to 60 percent. These soils are coarse-loamy, mixed, mesic Typic Hapludults.

Rigley soils are associated on the landscape with Muse and Shelocta soils. Muse soils have more clay than the Rigley soils. Shelocta soils have a fine-loamy control section.

Typical pedon of Rigley loam, in an area of Rigley-Shelocta-Muse complex, steep; 4 miles south on Kentucky Highway 1479 from junction of Kentucky Highway 92 to end of blacktop road, 2.6 miles south on dirt road, 500 feet northwest; 9.7 miles southeast of Monticello:

A1—0 to 1 inch; dark grayish brown (10YR 4/2) loam; weak fine granular structure; friable; many fine roots; strongly acid, abrupt smooth boundary.

A2—1 inch to 12 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; friable; many fine roots; strongly acid; clear smooth boundary.

B1—12 to 20 inches; yellowish brown (10YR 5/4) sandy loam; weak medium angular blocky structure; friable; common fine roots; 5 percent sandstone fragments; very strongly acid; clear smooth boundary.

B2t—20 to 41 inches; yellowish brown (10YR 5/6) sandy loam; moderate medium angular blocky structure; friable; common fine roots; thin discontinuous clay films in pores; 5 percent sandstone fragments; very strongly acid; clear smooth boundary.

C—41 to 72 inches; yellowish brown (10YR 5/6) gravelly sandy clay loam; massive; friable; 20 percent weathered sandstone fragments; extremely acid.

The thickness of the solum ranges from 40 to 60 inches. Depth to bedrock ranges from 60 to 100 inches or more. The content of coarse fragments ranges from 5 to 35 percent in the solum and from 20 to 70 percent in the C horizon. The reaction ranges from strongly acid to extremely acid except where lime has been added.

The A1 horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 or 3. The A2 horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The texture of the A horizon is sandy loam, fine sandy loam, or loam.

The B horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. The texture is sandy loam or loam or their gravelly or channery analogs.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. The texture is sandy loam, sandy clay loam, loam, or clay loam or their gravelly or channery analogs.

Sequoia Series

The Sequoia series consists of moderately deep, well drained soils. These soils are on ridgetops and upper side slopes. They formed in residuum from acid shale and siltstone. The slopes range from 6 to 20 percent. The Sequoia soils are clayey, mixed, mesic Typic Hapludults.

Sequoia soils are a taxadjunct to the Sequoia series because they have 3 percent less clay in the upper 20 inches of the argillic horizon. This is outside the defined range for the series. However, the clay content in the lower part of the subsoil is similar to that of the Sequoia series, and this difference does not affect the use and management of these soils.

Sequoia soils are associated on the landscape with Wernock soils. Wernock soils have less than 35 percent clay in the argillic horizon.

Typical pedon of Sequoia silt loam, in an area of Sequoia-Wernock silt loams, 6 to 20 percent slopes; 4.2 miles east on Kentucky Highway 1275 from junction of old Kentucky Highway 90, 0.5 mile north on gravel road, 50 feet north of road; 6.2 miles northeast of Monticello:

Ap—0 to 6 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; common fine roots; few shale fragments; slightly acid; abrupt smooth boundary.

B1—6 to 15 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; few fine roots; few brown (7.5YR 4/4) coatings on peds; few shale fragments; strongly acid; clear wavy boundary.

B21t—15 to 28 inches; yellowish red (5YR 5/6) silty clay loam; weak coarse subangular blocky structure parting to moderate fine subangular blocky; firm; few fine roots; common light yellowish brown (10YR 6/4) and yellowish red (5YR 5/s) streaks; continuous reddish brown (5YR 4/4) clay films; very strongly acid; diffuse wavy boundary.

B22t—28 to 39 inches; yellowish red (5YR 5/6) silty clay; moderate medium and coarse subangular blocky structure parting to moderate fine angular and subangular blocky; very firm; light yellowish brown (10YR 6/4) and yellowish red (5YR 5/8) streaks; few grayish brown (10YR 5/2) coatings on faces of peds; continuous clay films; few soft shale fragments; very strongly acid; gradual wavy boundary.

Cr—39 to 70 inches; strong brown (7.5YR 5/6), light gray (10YR 7/2), and red (2.5YR 5/6) thinly interbedded soft shale and siltstone.

R—70 inches; red, brown, and gray hard shale and siltstone.

The thickness of the solum and depth to soft shale range from 20 to 40 inches. Depth to hard shale is more than 60 inches. The reaction is strongly acid or very strongly acid except where lime has been added.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. The texture is silt loam.

The B1 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. The texture is silt loam or silty clay loam.

The B2t horizon has hue of 7.5YR to 2.5YR, value of 5, and chroma of 6 or 8. The texture is silty clay, clay, or silty clay loam.

Shelocta Series

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

Shelocta soils are associated on the landscape with Cutshin, Rigley, and Muse soils. Cutshin soils have a darker A horizon than Shelocta soils. Rigley soils have less clay in the B horizon. Muse soils have fewer coarse fragments in the lower part of the solum and have more clay in the upper part than Shelocta soils.

Typical pedon of Shelocta silt loam, in an area of Rigley-Shelocta-Muse complex, steep; 4 miles south on Kentucky Highway 1479 from junction of Kentucky Highway 92 to end of blacktop road, 0.5 mile south on dirt road, 100 feet east; 9 miles southeast of Monticello.

A1—0 to 1 inch; dark brown (10YR 3/3) silt loam; weak fine granular structure; friable; many roots; slightly acid; abrupt smooth boundary.

A2—1 inch to 9 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; many roots; 5 percent sandstone fragments; slightly acid; clear smooth boundary.
B21t—9 to 24 inches; yellowish brown (10YR 5/6) gravelly silty clay loam; moderate fine subangular blocky structure; friable; common roots; 15 percent sandstone fragments; thin discontinuous clay films; strongly acid; gradual smooth boundary.
B22t—24 to 42 inches; strong brown (7.5YR 5/6) very gravelly silty clay loam; many fine distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; firm; few roots; 45 percent sandstone fragments; thin continuous clay films; strongly acid; diffuse smooth boundary.
C—42 to 60 inches; yellowish brown (10YR 5/6) very gravelly silty clay loam; many fine distinct strong brown (7.5YR 5/6) mottles; massive; 60 percent sandstone fragments; strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. Depth to hard bedrock is more than 48 inches. Thin, flat or subrounded fragments of rock up to 15 inches in length range from few to 35 percent in the A horizon and from about 5 to 45 percent in the individual B horizons. The weighted average of these fragments is 15 to 35 percent. Coarse fragments range from few to 70 percent in the C horizon. The reaction is strongly acid or very strongly acid except where the surface layer has been limed.

The A1 horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. The A2 horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4. The texture of the A horizon is silt loam or loam or their gravelly or channery analogs.

The B2t horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. The texture is silty clay loam or silt loam or their gravelly or channery analogs.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. The texture is silt loam, silty clay loam, or loam or their gravelly or channery analogs.

Waynesboro Series

The Waynesboro series consists of deep, well drained soils. These soils are on high stream terraces. They formed in old alluvium that is underlain by residuum from limestone. The slopes range from 6 to 20 percent but are dominantly 6 to 12 percent. These soils are clayey, kaolinitic, thermic Typic Paleudults.

Waynesboro soils are associated on the landscape with Garmon and Frederick soils. Garmon and Frederick soils are in lower positions than Waynesboro soils and have more silt and less sand in the control section. In addition, Garmon soils are moderately deep to bedrock and are on steep side slopes.

Typical pedon of Waynesboro loam, 6 to 12 percent slopes; 250 yards west of Pulaski County line on Kentucky Highway 90, 0.5 mile north on gravel road, 30 yards south of road; 13.5 miles east of Monticello:

Ap—0 to 9 inches; brown (10YR 4/3) loam; weak fine granular structure; friable; medium acid; clear smooth boundary.
B21t—9 to 19 inches; red (2.5YR 4/6) clay loam; weak fine subangular blocky structure; friable; few thin discontinuous clay films; very strongly acid; gradual smooth boundary.
B22t—19 to 32 inches; dark red (2.5YR 3/6) clay loam; few fine distinct yellowish red (5YR 5/6) mottles; weak fine subangular blocky structure; friable; few thin discontinuous clay films; 1 percent rounded gravel; very strongly acid; gradual smooth boundary.
B23t—32 to 41 inches; dark red (2.5YR 3/6) clay loam; common medium distinct brown (7.5YR 4/4) mottles; weak fine subangular blocky structure; friable; thin discontinuous clay films; 2 percent small rounded gravel; very strongly acid; gradual smooth boundary.
B24t—41 to 65 inches; dark red (2.5YR 3/6) clay loam; yellowish red (5YR 5/8) mottles; weak fine subangular blocky structure; friable; thin discontinuous clay films; 2 percent rounded gravel; very strongly acid.

The thickness of the solum and depth to bedrock are more than 60 inches. The reaction is strongly acid or very strongly acid except where lime has been added.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. The texture is loam.

The upper part of the B2t horizon has hue of 10R to 5YR, value of 4 or 5, and chroma of 6 or 8. The lower part has hue of 10R to 5YR, value of 3, and chroma of 6 or 8. The texture is clay loam, sandy clay, or clay.

Wernock Series

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

Wernock soils are associated on the landscape with Sequoia soils. Sequoia soils have more clay in the lower part of the argillic horizon than Wernock soils.

Typical pedon of Wernock silt loam, in an area of Sequoia-Wernock silt loams, 6 to 20 percent slopes; on Chestnut flats; 2 miles east of Sandclift off Kentucky Highway 200, 0.5 mile north of the Tennessee State line; 15.5 miles southwest of Monticello:

A1—0 to 3 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; many roots; very strongly acid; abrupt smooth boundary.

A2—3 to 11 inches; yellowish brown (10YR 5/4) silt loam; weak fine angular blocky structure; friable; many roots; very strongly acid; clear smooth boundary.

B21t—11 to 22 inches; strong brown (7.5YR 5/6) silty clay loam; moderate fine subangular blocky structure; firm; common roots; thin discontinuous clay films; very strongly acid; gradual smooth boundary.

B22t—22 to 33 inches; strong brown (7.5YR 5/8) clay loam; moderate medium subangular blocky structure; firm; few roots; thin discontinuous clay films; extremely acid; gradual smooth boundary.

Cr—33 to 37 inches; interbedded strong brown soft sandstone, siltstone, and shale.

The thickness of the solum and depth to soft sandstone, siltstone, or shale range from 30 to 40 inches. The content of coarse fragments ranges from 0 to 10 percent to a depth of about 24 inches and 0 to 50 percent below that. The reaction ranges from strongly acid to extremely acid except where lime has been added.

The A1 horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 or 3. The texture is silt loam.

The A2 horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. The texture is silt loam.

The B2t horizon has hue of 10YR to 5YR, value of 4 to 6, and chroma of 4 to 8. The texture is silt loam, silty clay loam, or clay loam or their gravelly or channery analogs.

The Cr horizon is soft, weathered sandstone, siltstone, or shale. In some places, it is interbedded. Colors are in shades of brown, red, or gray.

Formation of the Soils

This section discusses the factors of soil formation, relates them to soils in the survey area, and explains the processes of soil formation.

Factors of Soil Formation

The characteristics of a soil at any given place on the landscape depend on the physical and chemical composition of parent material and on climate, relief, plant and animal life, and time. Soils form by 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.

In Wayne County, differences in relief and parent material greatly influence soil formation. Climate and plant and animal life do not vary greatly and thus are less important factors in differentiating soils within the county.

Because the interrelationships between the five factors are so complex, the effect of any one factor is difficult to determine.

Parent Material

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

In Wayne County, soils formed mostly from material weathered from rocks in place; from loess deposited by wind; from alluvium washed from uplands and deposited along steams or in depressions; and from colluvium moved relatively short distances from a higher to a lower position.

Most of the parent material in Wayne County weathered from rock formations in the Mississippian and Pennsylvanian Systems. These formations are composed of limestone, sandstone, shale, and siltstone. For example, Frederick and Caneyville soils developed in residuum weathered from limestone, and Sequoia and Wernock soils developed in residuum weathered from sandstone, siltstone, and shale. Bewleyville and Mountview soils developed in a shallow loess mantle over residuum weathered from limestone. Allen and Shelocta soils developed in colluvium. Elk, Nolin, and Melvin soils developed in alluvium, and Decatur and Waynesboro soils developed in old alluvium underlain by residuum weathered from limestone.

Climate

The climate in Wayne County is humid temperate. The average annual precipitation is 50 inches, and the soils are rarely completely dry. They are subject to leaching during most of the year. The average summer temperature is 74 degrees F, and the average winter temperature is 38 degrees.

In Wayne County, the soils that most indicate the influence of climate have a leached, acid Bt horizon that is finer textured than the surface layer. The well drained Frederick soils are an example. For more detailed information on climate, see the section "General Nature of the County."

Relief

The relief of the landscape influences soil formation mainly through its effect on drainage and erosion. Relief also influences the formation of soils through variations in exposure to the sun and wind, and it has an impact on soil temperature and plant cover.

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, such as Lawrence and Newark, which are somewhat poorly drained and have a seasonal water table because they are in nearly level areas on flood plains or low terraces. In areas of gently sloping soils on uplands, enough water moves downward to cause leaching and pronounced accumulation of clay in the subsoil. These soils are likely to be deep and have well defined profiles. In some places, wetness, such as mottling in the subsoil, is evident. A fragipan that restricts water and air movement can be present, such as in Dickson soils.

Local differences in soils of Wayne County are mostly the result of differences in relief and parent material.

Plant and Animal Life

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

Most of the soils in Wayne County formed under hardwood forests. These soils are characterized by a thin, dark surface layer and a brighter color subsoil. The surface layer has been greatly altered and the soil environment changed by the clearing of the forests and the plowing of the soil. The soil layers have been mixed, the soil has been moved from place to place, fertilizer and lime have been added, and new plants have been introduced. In places, accelerated erosion has removed most of the original surface layer and exposed the subsoil.

Time

A long period of time is required for distinct soil profiles to develop. The length of time required depends mainly on the nature of the parent material and the topography and climate. Plant and animal life have comparatively less influence on the rate of soil development. With the exception of soils formed in recent alluvium, enough time has elapsed for the soils in Wayne County to express the interaction of the factors of soil formation.

Soils formed in recent sediment have weak horizon development. The surface horizon may show a slight increase in organic matter content, and the subsoil may have weak structure. Such soils are said to be young; examples are Nolin and Newark soils. If there is no further addition of sediment, weathering proceeds, and over a long period of time, the color and structure of the subsoil may change. Elk soils are an example of 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 Wayne County are the Frederick and Mountview soils.

Process of Horizon Differentiation

The formation of a succession of layers, or horizons, is the result of one or more of the following processes: Accumulation of organic matter; leaching of carbonates and more soluble minerals; chemical weathering of primary materials into silicate clay minerals; translocation of the silicate clays from one horizon to another; and reduction and translocation of iron.

These processes have been active in the formation of most soils in Wayne County. The interaction of the first four factors is reflected in the strongly expressed horizons of Decatur and Frederick soils. All five processes have probably been active in the formation of the moderately well drained Dickson soils.

Some organic matter has accumulated in all of the soils to form the surface layer, or A1 horizon. Most of the soils in Wayne County contain moderate amounts of organic matter in the surface layer. When tilled, the A1 horizon becomes part of the Ap horizon and loses its identity.

The translocation of clay minerals is an important process in the horizon development of many soils in the county. Clay minerals are removed from the A horizon and immobilized in lower horizons, accumulating as clay films on ped faces, in pores, and in root channels in the B horizon.

A fragipan has formed in the B horizon of some of the moderately well drained and somewhat poorly drained soils on uplands and terraces in Wayne County. A fragipan is a dense, compact layer that is seemingly cemented. It is hard or very hard when dry, and it is brittle when moist. It tends to rupture suddenly when lateral pressure is applied, rather than deform slowly. It commonly is mottled, is slowly or very slowly permeable, and has few to many bleached vertical fracture planes that form polygons.

The reduction and transfer of iron has occurred in all soils that do not have good natural drainage. This process is known as gleying. Part of the iron may be reoxidized and segregated, forming yellowish brown, strong brown, and other bright color mottles in the gray matrix of the subsoil. Nodules or concretions of iron or manganese are commonly formed under these conditions.

As silicate clay forms from primary minerals, some iron is commonly transferred to hydrated oxide. These oxides are commonly red or brown and, even when present in small amounts, impart a brownish or reddish color to the soil material. Iron oxides are mainly responsible for the strong brown and yellowish brown colors that dominate the subsoil of many soils in Wayne County.

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Glossary

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

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

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

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

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

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.

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

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, i.e., 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.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

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

Complex, 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—

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.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Excess fines (in tables). Excess silt and clay are 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.

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

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

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

Forb. Any herbaceous plant that is not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

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

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

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

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

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

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

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an O or A 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 Roman numeral II precedes the letter C.

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

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

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

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

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

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 (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

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

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

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

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

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

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

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

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

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

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely 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.

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 degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

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

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

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

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

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

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

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

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

Sinkhole. A depression in the landscape where limestone has been dissolved.

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

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, 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.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

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

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in 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.

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.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data recorded in the period 1951-80 at Monticello, Kentucky]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	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----	44.9	24.8	34.9	71	-12	27	4.58	2.49	6.41	9	6.1
February---	48.9	26.6	37.8	75	-5	33	4.00	1.99	5.74	8	5.0
March------	58.9	35.6	47.3	82	10	135	5.33	3.17	7.25	9	2.3
April------	70.4	44.8	57.6	87	25	239	4.49	2.63	6.14	9	0.0
May--------	77.5	53.0	65.3	89	30	474	4.33	2.68	5.80	8	0.0
June-------	83.7	60.7	72.2	93	44	666	4.27	2.60	5.77	8	0.0
July-------	86.5	64.3	75.4	95	50	787	4.80	2.40	6.89	8	0.0
August-----	86.5	63.3	74.9	96	47	772	3.55	1.80	5.07	7	0.0
September--	81.0	57.7	69.4	94	39	582	3.90	2.03	5.54	6	0.0
October----	70.8	45.1	58.0	87	23	264	2.56	1.46	3.58	5	0.0
November---	58.9	36.4	47.7	80	13	59	3.77	2.35	5.04	7	1.2
December---	49.7	29.7	39.7	72	1	37	4.38	2.08	6.36	8	2.3
Yearly:											
Average--	68.1	45.2	56.7	---	---	---	---	---	---	---	---
Extreme--	---	---	---	97	-13	---	---	---	---	---	---
Total----	---	---	---	---	---	4,075	49.96	43.54	56.16	92	16.9

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

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data recorded in the period 1951-80 at Monticello, Kentucky]

Probability	Temperature		
	24 ^{o}F or lower	28 ^{o}F or lower	32 ^{o}F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 11	April 19	May 11
2 years in 10 later than--	April 5	April 14	May 5
5 years in 10 later than--	March 25	April 5	April 25
First freezing temperature in fall:			
1 year in 10 earlier than--	October 25	October 11	October 4
2 years in 10 earlier than--	October 30	October 17	October 8
5 years in 10 earlier than--	November 10	October 28	October 16

TABLE 3.--GROWING SEASON

[Data recorded in the period 1951-80 at Monticello, Kentucky]

Probability	Daily minimum temperature during growing season		
	Higher than 24 ^{o}F	Higher than 28 ^{o}F	Higher than 32 ^{o}F
	Days	Days	Days
9 years in 10	205	182	155
8 years in 10	213	190	161
5 years in 10	229	205	173
2 years in 10	244	219	185
1 year in 10	252	227	192

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

Map symbol	Soil name	Acres	Percent
AnB	Allen fine sandy loam, 2 to 6 percent slopes	870	0.3
AnC	Allen fine sandy loam, 6 to 12 percent slopes	4,630	1.6
AnD	Allen fine sandy loam, 12 to 20 percent slopes	1,870	0.7
BeD	Bethesda channery silty clay loam, 12 to 60 percent slopes	810	0.3
BwB	Bewleyville silt loam, 2 to 6 percent slopes	2,595	0.9
CaC	Caneyville silt loam, 6 to 12 percent slopes	3,100	1.1
CeD	Caneyville silt loam, 6 to 20 percent slopes, rocky	11,910	4.2
CgD	Caneyville-Garmon association, steep	5,290	1.9
CkC	Clarksville extremely cobbly loam, 2 to 12 percent slopes,rubbly	150	0.1
CxC	Clarksville-Baxter cobbly silt loams, 4 to 12 percent slopes	3,530	1.2
CxD	Clarksville-Baxter cobbly silt loams, 12 to 20 percent slopes	1,770	0.6
DeC	Decatur silt loam, 6 to 12 percent slopes	3,540	1.2
DkB	Dickson silt loam, 2 to 6 percent slopes	1,750	0.6
Du	Dunning silty clay loam, occasionally flooded	1,410	0.5
EkB	Elk silt loam, 2 to 6 percent slopes	1,350	0.5
FrB	Frederick silt loam, 2 to 6 percent slopes	710	0.2
FrC2	Frederick silt loam, 6 to 12 percent slopes, eroded	15,310	5.4
FrD2	Frederick silt loam, 12 to 20 percent slopes, eroded	7,930	2.8
GcF	Garmon-Caneyville association, very steep	29,035	10.2
La	Lawrence silt loam	960	0.3
Me	Melvin silt loam, frequently flooded	1,640	0.6
MoB	Mountview silt loam, 2 to 6 percent slopes	4,660	1.6
MoC	Mountview silt loam, 6 to 12 percent slopes	880	0.3
Ne	Newark silt loam, occasionally flooded	930	0.3
No	Nolin silt loam, occasionally flooded	5,600	2.0
Pt	Pits, quarries	48	*
Pu	Purdy silty clay loam, occasionally flooded	370	0.1
Ra	Rahm silt loam, rarely flooded	300	0.1
RMF	Rigley-Shelocta-Muse complex, steep	62,680	22.0
RoF	Rock outcrop-Caneyville complex, 20 to 50 percent slopes	63,560	22.2
SeD	Sequoia-Wernock silt loams, 6 to 20 percent slopes	12,590	4.4
SMF	Shelocta-Muse-Cutshin complex, steep	30,440	10.7
WaC	Waynesboro loam, 6 to 12 percent slopes	2,090	0.7
WaD	Waynesboro loam, 12 to 20 percent slopes	1,190	0.4
	Total land area	285,498	100.0
	Water	24,230	0.0
	Total	309,728	100.0

* Less than 0.1 percent.

TABLE 5.--LAND CAPABILITY CLASSES 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]

Map symbol and soil name	Land capability	Corn	Wheat	Soybeans	Tobacco	Grass-legume hay	Pasture
		Bu	Bu	Bu	Lbs	Ton	AUM*
AnB------------- Allen	IIe	90	50	35	2,500	3.5	6.5
AnC------------- Allen	IIIe	80	50	30	2,300	3.5	6.5
AnD------------- Allen	IVe	70	45	25	2,000	3.0	6.0
BeD------------- Bethesda	VIIe	---	---	---	---	2.0	4.0
BwB------------- Bewleyville	IIe	115	50	40	2,900	4.5	9.0
CaC------------- Caneyville	IIIe	75	---	25	2,200	4.0	7.5
CeD------------- Caneyville	VIs	---	---	---	---	---	5.5
CgD------------- Caneyville-Garmon	VIs	---	---	---	---	---	5.5
CkC------------- Clarksville	VIs	---	---	---	---	---	3.0
CxC------------- Clarksville-Baxter	IIIs	90	40	35	2,600	4.0	8.0
CxD------------- Clarksville-Baxter	IVs	75	30	25	1,600	3.5	7.0
DeC------------- Decatur	IIIe	120	55	35	2,700	4.0	8.0
DkB------------- Dickson	IIe	90	50	40	2,200	3.0	6.5
Du-------------- Dunning	IIIw	120	---	45	---	4.0	8.0
EkB------------- Elk	IIe	125	45	45	2,700	4.5	9.0
FrB------------- Frederick	IIe	110	50	35	2,400	4.0	8.0
FrC2------------ Frederick	IIIe	100	45	30	2,300	3.5	7.0
FrD2------------ Frederick	IVe	90	35	25	---	3.0	6.0

See footnote at end of table.

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

Map symbol and soil name	Land capability	Corn	Wheat	Soybeans	Tobacco	Grass-legume hay	Pasture
		Bu	Bu	Bu	Lbs	Ton	AUM*
GcF-------------- Garmon-Caneyville	VIIe	---	---	---	---	---	---
La-------------- Lawrence	IIIw	70	---	35	1,500	3.0	5.5
Me-------------- Melvin	IIIw	100	---	35	---	3.5	7.0
MoB------------- Mountview	IIe	110	55	40	2,600	4.0	8.0
MoC------------- Mountview	IIIe	90	50	35	2,400	3.5	7.0
Ne-------------- Newark	IIw	110	40	40	2,500	4.5	8.5
No-------------- Nolin	IIw	120	45	40	2,700	4.5	9.0
Pt-------------- Pits, quarries	VIIIs	---	---	---	---	---	---
Pu-------------- Purdy	IVw	80	---	25	---	3.0	6.0
Ra-------------- Rahm	IIw	120	40	40	2,500	4.5	8.5
RMF------------- Rigley-Shelocta-Muse	VIIe	---	---	---	---	---	---
RoF:							
Rock outcrop---	VIIIs	---	---	---	---	---	---
Caneyville-----	VIIs	---	---	---	---	---	---
SeD------------- Sequoia-Wernock	IVe	55	35	25	1,500	3.0	5.5
SMF------------- Shelocta-Muse-Cutshin	VIIe	---	---	---	---	---	---
WaC------------- Waynesboro	IIIe	100	35	40	2,200	3.5	7.0
WaD------------- Waynesboro	IVe	80	30	30	1,900	3.0	6.5

* 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.

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	---	---	---	---
II	18,765	11,935	6,830	---
III	37,090	29,550	4,010	3,530
IV	25,720	23,580	370	1,770
V	---	---	---	---
VI	17,350	---	---	17,350
VII	161,101	122,965	---	38,136
VIII	25,472	---	---	25,472

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]

Map symbol and soil name	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity*	
AnB, AnC, AnD--- Allen	Slight	Moderate	Slight	Severe	Yellow poplar-------	87	86	Yellow poplar, black walnut, loblolly pine, shortleaf pine.
					Shortleaf pine------	72	114	
BeD------------- Bethesda	Moderate	Moderate	--------	Moderate	Loblolly pine-------	69	86	Eastern white pine, white oak, black locust, loblolly pine.
					Eastern cottonwood--	---	---	
					Black oak-----------	73	57	
					Black locust--------	---	---	
					Sweetgum------------	---	---	
BwB------------- Bewleyville	Slight	Slight	Slight	Severe	Yellow poplar-------	95	100	Yellow poplar, eastern white pine, black walnut, white ash, loblolly pine, northern red oak, shortleaf pine.
					White oak-----------	73	57	
					Virginia pine-------	70	114	
					Loblolly pine-------	80	114	
CaC------------- Caneyville	Slight	Moderate	Slight	Slight	Black oak-----------	65	43	Virginia pine, eastern redcedar, white oak.
					White oak-----------	60	29	
					Sugar maple---------	---	---	
					Hickory-------------	---	---	
					Eastern redcedar----	36	43	
					Chinkapin oak-------	51	29	
					Scarlet oak---------	53	43	
CeD------------- Caneyville	Moderate	Moderate	Slight	Slight	Black oak-----------	65	43	Virginia pine, eastern redcedar, white oak.
					White oak-----------	60	29	
					Sugar maple---------	---	---	
					Hickory-------------	---	---	
					Eastern redcedar----	36	43	
					Chinkapin oak-------	51	29	
					Scarlet oak---------	53	43	
CgD:								
Caneyville----- (North aspect)	Moderate	Moderate	Moderate	Severe	Black oak-----------	71	57	White oak, yellow poplar, white ash, eastern white pine, northern red oak.
					White oak-----------	64	43	
					Sugar maple---------	---	---	
					Hickory-------------	---	---	
					White ash-----------	72	43	
					Eastern redcedar----	46	57	
					Yellow poplar-------	90	86	
Garmon--------- (North aspect)	Moderate	Moderate	Slight	Moderate	Yellow poplar-------	99	100	Yellow poplar, white ash, white oak, northern red oak, eastern white pine.
					White oak-----------	75	57	
					Northern red oak----	72	57	
					Hickory-------------	---	---	
					Sugar maple---------	---	---	
					Chestnut oak--------	65	43	
					Red maple-----------	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity*	
CqD:								
Caneyville----- (South aspect)	Moderate	Moderate	Moderate	Moderate	Black oak-----------	65	43	Virginia pine, eastern redcedar, white oak.
					White oak-----------	60	29	
					Sugar maple---------	---	---	
					Hickory-------------	---	---	
					Eastern redcedar----	36	43	
					Chinkapin oak-------	51	29	
					Scarlet oak---------	53	43	
CqD:								
Garmon--------- (South aspect)	Moderate	Moderate	Moderate	Slight	Chestnut oak--------	60	43	Virginia pine, eastern redcedar, white oak.
					White oak-----------	60	43	
					Black oak-----------	68	57	
					Hickory-------------	---	---	
					Eastern redcedar----	38	---	
					Sugar maple---------	---	---	
					Northern red oak----	62	43	
CkC------------- Clarksville	Slight	Moderate	Moderate	Moderate	Black oak-----------	91	73	White oak, yellow poplar, northern red oak, white ash.
					Yellow poplar-------	104	114	
					Hickory-------------	---	---	
					Black walnut--------	85	---	
					White oak-----------	79	61	
CxC:								
Clarksville----	Slight	Moderate	Moderate	Moderate	Black oak-----------	91	73	White oak, yellow poplar, norther red oak, white ash.
					Yellow poplar-------	104	114	
					Hickory-------------	---	---	
					Black walnut--------	85	---	
					White oak-----------	79	61	
Baxter---------	Slight	Slight	Slight	Severe	Black oak-----------	82	57	Yellow poplar, eastern white pine, shortleaf pine, white ash, white oak, northern red oak, loblolly pine.
					White oak-----------	74	57	
					Hickory-------------	---	---	
					White ash-----------	---	---	
					Sugar maple---------	---	---	
					Yellow poplar-------	93	100	
					Northern red oak----	73	57	
					Southern red oak----	71	57	
					Scarlet oak---------	76	57	
					Eastern redcedar----	---	---	
					Chestnut oak--------	---	---	
					Blackgum------------	---	---	
					Virginia pine-------	64	100	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity*	
CxD:								
Clarksville	Slight	Moderate	Moderate	Moderate	Black oak	91	73	White oak, yellow poplar, northern red oak, white ash.
					Yellow poplar	104	114	
					Hickory	---	---	
					Black walnut	85	---	
					White oak	79	61	
Baxter	Moderate	Moderate	Slight	Severe	Black oak	82	57	Yellow poplar, eastern white pine, shortleaf pine, white ash, white oak, northern red oak, loblolly pine.
					White oak	74	57	
					Hickory	---	---	
					White ash	---	---	
					Sugar maple	---	---	
					Yellow poplar	93	100	
					Northern red oak	73	57	
					Southern red oak	71	57	
					Scarlet oak	76	57	
					Eastern redcedar	---	---	
					Chestnut oak	---	---	
					Blackgum	---	---	
					Virginia pine	64	100	
DeC: Decatur	Slight	Slight	Slight	Severe	Shortleaf pine	66	100	Yellow poplar, loblolly pine, shortleaf pine, eastern white pine.
					Yellow poplar	90	86	
					Loblolly pine	80	114	
					Virginia pine	70	114	
					Eastern white pine	80	143	
DkB: Dickson	Slight	Slight	Slight	Severe	Yellow poplar	92	86	Loblolly pine, shortleaf pine, eastern white pine, yellow poplar.
					White oak	73	57	
					Loblolly pine	80	114	
					Shortleaf pine	70	114	
Du: Dunning	Slight	Severe	Severe	Severe	Pin oak	95	71	Pin oak, American sycamore, baldcypress, swamp white oak, sweetgum.
					Sweetgum	95	114	
					Eastern cottonwood	100	9	
					Red maple	---	---	
					American sycamore	---	---	
					Boxelder	---	---	
					Black willow	---	---	
					Swamp white oak	---	---	
EkB: Elk	Slight	Slight	Slight	Severe	Yellow poplar	91	86	Eastern white pine, yellow poplar, black walnut, loblolly pine, white oak, northern red oak, cherrybark oak, white ash, shortleaf pine.
					Cherrybark oak	95	57	
					Pin oak	96	57	
					Hackberry	---	---	
					Red maple	---	---	
					American sycamore	---	---	
					Black walnut	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity*	
FrB, FrC2: Frederick	Slight	Moderate	Slight	Severe	Northern red oak	76	51	Eastern white pine, yellow poplar, white oak, loblolly pine, northern red oak.
					Yellow poplar	86	86	
					Black locust	80	57	
					White oak	76	57	
					Black walnut	76	57	
FrD2: Frederick	Moderate	Moderate	Moderate	Severe	Northern red oak	66	43	Eastern white pine, white oak, loblolly pine.
					Yellow poplar	76	71	
					Black locust	70	43	
					White oak	66	43	
					Black walnut	66	43	
GcF:								
Garmon (North aspect)	Severe	Severe	Slight	Moderate	Yellow poplar	99	100	Yellow poplar, white ash, white oak, northern red oak, eastern white pine.
					White oak	75	57	
					Northern red oak	72	57	
					Hickory	---	---	
					Sugar maple	---	---	
					Chestnut oak	65	43	
					Red maple	---	---	
Caneyville (North aspect)	Severe	Severe	Slight	Severe	Black oak	71	57	White oak, yellow poplar, white ash, eastern white pine, northern red oak.
					White oak	64	43	
					Sugar maple	---	---	
					Hickory	---	---	
					White ash	72	43	
					Eastern redcedar	46	57	
					Yellow poplar	90	86	
GcF:								
Garmon (South aspect)	Severe	Severe	Severe	Moderate	Chestnut oak	60	43	Virginia pine, eastern redcedar, white oak.
					White oak	60	43	
					Black oak	68	57	
					Hickory	---	---	
					Eastern redcedar	38	---	
					Sugar maple	---	---	
					Northern red oak	62	43	
Caneyville (South aspect)	Severe	Severe	Severe	Severe	Black oak	65	43	Virginia pine, eastern redcedar, white oak.
					White oak	60	29	
					Sugar maple	---	---	
					Hickory	---	---	
					Eastern redcedar	36	43	
					Chinkapin oak	51	29	
					Scarlet oak	53	43	
La: Lawrence	Slight	Moderate	Moderate	Severe	Yellow poplar	85	86	Yellow poplar, white ash, American sycamore, white oak, sweetgum, willow oak, eastern white pine.
					Sweetgum	89	100	
					White oak	74	57	
					Black oak	78	57	
					Willow oak	76	---	
					Red maple	---	---	
					Pin oak	---	---	
					Hackberry	---	---	
					American beech	---	---	
					Southern red oak	---	---	
					Blackgum	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity*	
Me-------------- Melvin	Slight	Moderate	Severe	Severe	Pin oak-------------	99	57	Pin oak, American sycamore, sweetgum, loblolly pine, eastern cottonwood.
					Eastern cottonwood--	95	---	
					Sweetgum------------	92	114	
					Green ash-----------	---	---	
					Hackberry-----------	---	---	
					Hickory-------------	---	---	
					Red maple-----------	---	---	
					American elm--------	---	---	
MoB, MoC-------- Mountview	Slight	Slight	Slight	Severe	Yellow poplar-------	90	86	Shortleaf pine, eastern white pine, loblolly pine, yellow poplar, black walnut, white oak.
					White oak-----------	70	57	
					Shortleaf pine------	65	100	
					Loblolly pine-------	80	114	
					Virginia pine-------	62	100	
Ne-------------- Newark	Slight	Moderate	Moderate	Severe	Pin oak-------------	96	57	Eastern cottonwood, sweetgum, American sycamore.
					Eastern cottonwood--	89	---	
					Sweetgum------------	85	86	
					Green ash-----------	---	---	
					Cherrybark oak------	---	---	
					Shumard oak---------	---	---	
					Overcup oak---------	---	---	
No-------------- Nolin	Slight	Slight	Slight	Severe	Yellow poplar-------	107	114	Black walnut, yellow poplar, eastern white pine, eastern cottonwood, white ash, cherrybark oak.
					Sweetgum------------	92	114	
					Cherrybark oak------	97	143	
					Eastern cottonwood--	---	---	
					American sycamore---	---	---	
					River birch---------	---	---	
Pu-------------- Purdy	Slight	Severe	Severe	Severe	Pin oak-------------	85	57	Sweetgum, loblolly pine.
					Shortleaf pine------	75	114	
					Virginia pine-------	75	114	
					Yellow poplar-------	90	86	
					Sweetgum------------	85	86	
Ra-------------- Rahm	Slight	Slight	Slight	Severe	Yellow poplar-------	100	114	Eastern white pine, American sycamore, yellow poplar, white oak, northern red oak, white ash, green ash, eastern cottonwood.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity*	
RMF:								
Rigley---------- (South aspect)	Severe	Severe	Moderate	Moderate	White oak-----------	65	43	Eastern white pine, shortleaf pine, white oak.
					Black oak-----------	---	---	
					Hickory-------------	---	---	
					Scarlet oak---------	---	---	
					American beech------	---	---	
					Shortleaf pine------	---	---	
Shelocta-------- (South aspect)	Severe	Severe	Moderate	Moderate	Black oak-----------	70	57	Shortleaf pine, white oak, eastern white pine.
					White oak-----------	65	43	
					Scarlet oak---------	70	57	
					Yellow poplar-------	---	---	
					American beech------	---	---	
					Blackgum------------	---	---	
					Red maple-----------	---	---	
Muse------------ (South aspect)	Severe	Severe	Slight	Severe	Shortleaf pine------	79	129	Shortleaf pine, white oak, eastern white pine, yellow poplar, northern red oak.
					Virginia pine-------	67	100	
					White oak-----------	59	43	
					Red maple-----------	---	---	
					Yellow poplar-------	---	---	
					Black oak-----------	56	43	
					Chestnut oak--------	62	43	
RoF:								
Rock outcrop.								
Caneyville------ (North aspect)	Severe	Severe	Moderate	Severe	Black oak-----------	71	57	White oak, yellow poplar, white ash, eastern white pine, northern red oak.
					White oak-----------	64	43	
					Sugar maple---------	---	---	
					Hickory-------------	---	---	
					White ash-----------	72	43	
					Eastern redcedar----	46	57	
					Yellow poplar-------	90	86	
RoF:								
Rock outcrop.								
Caneyville------ (South aspect)	Severe	Severe	Moderate	Moderate	Black oak-----------	65	43	Virginia pine, eastern redcedar, white oak.
					White oak-----------	60	29	
					Sugar maple---------	---	---	
					Hickory-------------	---	---	
					Eastern redcedar----	36	43	
					Chinkapin oak-------	51	29	
					Scarlet oak---------	53	43	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity*	
SeD:								
Sequoia	Slight	Slight	Slight	Moderate	Northern red oak Loblolly pine Shortleaf pine Virginia pine	70 83 63 71	57 114 100 114	Loblolly pine, shortleaf pine.
Wernock	Slight	Slight	Slight	Severe	Shortleaf pine White oak Black oak Scarlet oak Chestnut oak Red maple Hickory Northern red oak Yellow poplar American beech	70 71 71 73 71 --- --- --- --- ---	114 57 57 57 57 --- --- --- --- ---	Eastern white pine, shortleaf pine, white oak, northern red oak.
SmF:								
Shelocta (North aspect)	Severe	Severe	Slight	Severe	Shortleaf pine Yellow poplar Cucumbertree American beech White oak Red maple Black oak	77 99 --- --- 72 --- 77	129 100 --- --- 57 --- 57	Yellow poplar, black walnut, eastern white pine, shortleaf pine, white ash, white oak, northern red oak.
Muse (North aspect)	Severe	Severe	Slight	Severe	Shortleaf pine Virginia pine White oak Red maple Yellow poplar Black oak Chestnut oak	79 67 59 --- --- 56 62	129 100 43 --- --- 43 43	Shortleaf pine, white oak, eastern white pine, yellow poplar, northern red oak.
SmF:								
Cutshin (North aspect)	Severe	Severe	Slight	Severe	Yellow poplar Northern red oak American beech Black walnut Cucumbertree Sweet birch Sugar maple American basswood Red maple White oak Black oak White ash Blackgum Eastern hemlock Hickory	108 --- --- --- --- --- --- --- --- 78 83 --- --- --- ---	114 --- --- --- --- --- --- --- --- 57 57 --- --- --- ---	Yellow poplar, black walnut, white ash, shortleaf pine, eastern white pine, northern red oak, white oak.
WaC, WaD Waynesboro	Slight	Slight	Slight	Severe	Yellow poplar White oak Loblolly pine Shortleaf pine Virginia pine	90 70 80 70 75	86 57 114 114 114	Yellow poplar, northern red oak, white oak, loblolly pine, shortleaf pine.

* Productivity 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.

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]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AnB: Allen	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
AnC: Allen	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
AnD: Allen	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
BeD: Bethesda	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: droughty, slope.
BwB: Bewleyville	Slight	Slight	Moderate: slope.	Slight	Slight.
CaC: Caneyville	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, depth to rock.
CeD: Caneyville	Moderate: percs slowly, slope.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Severe: 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.
CkC: Clarksville	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Moderate: large stones.	Severe: large stones.
CxC:					
Clarksville	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope, large stones.	Moderate: large stones.	Moderate: large stones, slope.
Baxter	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Moderate: large stones.	Moderate: large stones, slope.
CxD:					
Clarksville	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Moderate: slope.	Severe: slope.
Baxter	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: large stones, slope.	Severe: slope.
DeC: Decatur	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
DkB: Dickson	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: erodes easily.	Slight.
Du: Dunning	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Slight	Severe: wetness.
EkB: Elk	Slight	Slight	Moderate: slope.	Slight	Slight.
FrB: Frederick	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
FrC2: Frederick	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
FrD2: Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
GcF:					
Garmon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Caneyville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
La: Lawrence	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Slight	Moderate: wetness.
Me: Melvin	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
MoB: Mountview	Slight	Slight	Moderate: slope.	Slight	Slight.
MoC: Mountview	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Ne: Newark	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
No: Nolin	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
Pt. Pits, quarries					
Pu: Purdy	Severe: wetness, percs slowly, flooding.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ra-------------------- Rahm	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
RMF:					
Rigley---------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Shelocta-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Muse-----------------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope, erodes easily.	Severe: slope.
RoF: Rock outcrop.					
Caneyville-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
SeD:					
Sequoia--------------	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Wernock--------------	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
SMF:					
Shelocta-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Muse-----------------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope, erodes easily.	Severe: slope.
Cutshin--------------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
WaC------------------ Waynesboro	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
WaD------------------ Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

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]

Map symbol and soil name	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.
AnC------------------ Allen	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AnD------------------ Allen	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BeD------------------ Bethesda	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
BwB------------------ Bewleyville	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CaC------------------ Caneyville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CeD------------------ Caneyville	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CgD:										
Caneyville---------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Garmon-------------	Very poor.	Fair	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
CkC------------------ Clarksville	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CxC:										
Clarksville--------	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Baxter-------------	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CxD:										
Clarksville--------	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Baxter-------------	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
DeC------------------ Decatur	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DkB------------------ Dickson	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Du------------------- Dunning	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good
EkB------------------ Elk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	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
FrB: Frederick	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FrC2: Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FrD2: Frederick	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GcF:										
Garmon	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Caneyville	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
La: Lawrence	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
Me: Melvin	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good
MoB: Mountview	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor
MoC: Mountview	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor
Ne: Newark	Fair	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair
No: Nolin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Pt. Pits, quarries										
Pu: Purdy	Poor	Fair	Fair	Fair	Good	Good	Good	Fair	Fair	Good
Ra: Rahm	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
RMF: Rigley-Shelocta-Muse	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
RoF: Rock outcrop.										
Caneyville	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	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.

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	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
SMF-----------------Shelocta-Muse-Cutshin	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
WaC-----------------Waynesboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WaD-----------------Waynesboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

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; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AnB: Allen	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
AnC: Allen	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
AnD: Allen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BeD: Bethesda	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: droughty, slope.
BwB: Bewleyville	Moderate: too clayey.	Slight	Moderate: shrink-swell.	Moderate: slope.	Severe: low strength.	Slight.
CaC: Caneyville	Severe: depth to rock.	Moderate: shrink-swell, slope.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
CeD: Caneyville	Severe: depth to rock.	Moderate: depth to rock, shrink-swell, slope.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: depth to rock, 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.
CkC: Clarksville	Moderate: too clayey, large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones.
CxC:						
Clarksville	Moderate: too clayey, slope, large stones.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope, large stones.	Moderate: slope, large stones.	Moderate: large stones, slope.
Baxter	Moderate: too clayey, large stones, slope.	Moderate: shrink-swell, slope, large stones.	Moderate: slope, shrink-swell, large stones.	Severe: slope.	Severe: low strength.	Moderate: large stones, slope.
CxD:						
Clarksville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CxD:						
Baxter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
DeC Decatur	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
DkB Dickson	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.	Slight.
Du Dunning	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
EkB Elk	Slight	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
FrB Frederick	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
FrC2 Frederick	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
FrD2 Frederick	Severe: slope.	Severe: slope.	Severe: 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.
La Lawrence	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
Me Melvin	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
MoB Mountview	Moderate: too clayey.	Slight	Moderate: shrink-swell.	Moderate: slope.	Severe: low strength.	Slight.
MoC Mountview	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Ne Newark	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
No Nolin	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
Pt. Pits, quarries						
Pu Purdy	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, low strength, flooding.	Severe: wetness.
Ra Rahm	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength.	Moderate: wetness.
RMF: Rigley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
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.
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: droughty, slope.
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.
WaC Waynesboro	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
WaD Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

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; it does not eliminate the need for onsite investigation]

Map symbol and soil name	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.
AnC: Allen	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
AnD: Allen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
BeD: Bethesda	Severe: percs slowly, slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.
BwB: Bewleyville	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
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.
CeD: 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.
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, thin layer, depth to rock.
CkC: Clarksville	Moderate: slope, large stones.	Severe: seepage, slope.	Moderate: too clayey, slope, large stones.	Severe: seepage.	Poor: large stones.
CxC:					
Clarksville	Moderate: slope, large stones.	Severe: seepage, slope.	Moderate: slope, too clayey, large stones.	Severe: seepage.	Poor: large stones.
Baxter	Moderate: percs slowly, slope, large stones.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack, large stones.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CxD:					
Clarksville	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: seepage, slope.	Poor: large stones, slope.
Baxter	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, large stones.
DeC: Decatur	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
DkB: Dickson	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
Du: Dunning	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
EkB: Elk	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
FrB: Frederick	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
FrC2: Frederick	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
FrD2: Frederick	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, 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, thin layer, 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.
La: Lawrence	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Me: Melvin	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MoB-----------------Mountview	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
MoC-----------------Mountview	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Ne------------------Newark	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
No------------------Nolin	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey.
Pt. Pits, quarries					
Pu------------------Purdy	Severe: wetness, percs slowly, flooding.	Severe: wetness, flooding.	Severe: wetness, too clayey, flooding.	Severe: wetness, flooding.	Poor: wetness, too clayey, hard to pack.
Ra------------------Rahm	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
RMF:					
Rigley--------------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Shelocta------------	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	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.
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.
SeD:					
Sequoia-------------	Severe: depth to rock, percs slowly, slope.	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.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SMF:					
Shelocta	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	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.
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.

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; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
AnB, AnC: Allen	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
AnD: Allen	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
BeD: Bethesda	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
BwB: Bewleyville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
CaC: Caneyville	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CeD: Caneyville	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
CgD:				
Caneyville	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Garmon	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
CkC: Clarksville	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
CxC:				
Clarksville	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Baxter	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
CxD:				
Clarksville	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Baxter	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
DeC------------------- Decatur	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
DkB------------------- Dickson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Du-------------------- Dunning	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
EkB------------------- Elk	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
FrB, FrC2------------- Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
FrD2------------------ Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
GcF:				
Garmon----------------	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Caneyville------------	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
La-------------------- Lawrence	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Me-------------------- Melvin	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MoB------------------- Mountview	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, area reclaim.
MoC------------------- Mountview	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, area reclaim, slope.
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.	Good.
Pt. Pits, quarries				
Pu-------------------- Purdy	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, too clayey.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
Ra: Rahm	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
RMF:				
Rigley	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Shelocta	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Muse	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
RoF:				
Rock outcrop.				
Caneyville	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
SeD:				
Sequoia	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
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.
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: area reclaim, slope.
WaC: Waynesboro	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
WaD: Waynesboro	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
AnB-------------- Allen	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
AnC, AnD--------- Allen	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
BeD-------------- Bethesda	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, large stones, slippage.	Large stones, slope, droughty.
BwB-------------- Bewleyville	Moderate: seepage.	Moderate: piping, hard to pack.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
CaC-------------- Caneyville	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
CeD-------------- Caneyville	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Severe: no water.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
CgD:						
Caneyville-------	Severe: slope.	Severe: thin layer, hard to pack.	Severe: no water.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Garmon-----------	Severe: seepage, slope.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
CkC-------------- Clarksville	Severe: seepage.	Moderate: large stones.	Severe: no water.	Deep to water	Large stones---	Large stones, droughty.
CxC, CxD:						
Clarksville------	Severe: seepage.	Moderate: large stones.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
Baxter-----------	Moderate: seepage.	Moderate: large stones.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope.
DeC-------------- Decatur	Moderate: seepage.	Moderate: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
DkB-------------- Dickson	Moderate: seepage.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
Du--------------- Dunning	Slight---------	Severe: wetness.	Severe: slow refill.	Percs slowly, flooding.	Wetness, percs slowly.	Wetness, percs slowly.
EkB-------------- Elk	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable------	Favorable.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
FrB-- Frederick	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Favorable	Favorable.
FrC2, FrD2-- Frederick	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope	Slope.
GcF:						
Garmon	Severe: seepage, slope.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
Caneyville	Severe: slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
La-- Lawrence	Slight	Severe: piping.	Severe: no water.	Percs slowly	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
Me-- Melvin	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding	Erodes easily, wetness.	Wetness, erodes easily.
MoB-- Mountview	Moderate: seepage.	Moderate: hard to pack.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
MoC-- Mountview	Moderate: seepage.	Moderate: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Ne-- Newark	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding	Erodes easily, wetness.	Wetness, erodes easily.
No-- Nolin	Severe: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Erodes easily	Erodes easily.
Pt. Pits, quarries						
Pu-- Purdy	Slight	Moderate: piping, hard to pack, wetness.	Severe: slow refill.	Percs slowly, flooding.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Ra-- Rahm	Slight	Severe: wetness.	Severe: slow refill.	Percs slowly	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
RMF:						
Rigley	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
Shelocta	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
Muse	Severe: slope.	Moderate: hard to pack, thin layer.	Severe: slow refill.	Deep to water	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
RoF:						
Rock outcrop.						
Caneyville	Severe: slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
SeD:						
Sequoia	Moderate: slope.	Moderate: hard to pack.	Severe: no water.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, droughty.
Wernock	Moderate: seepage, depth to rock.	Severe: piping.	Severe: no water.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
SMF:						
Shelocta	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
Muse	Severe: slope.	Moderate: hard to pack, thin layer.	Severe: slow refill.	Deep to water	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
Cutshin	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
WaC, WaD: Waynesboro	Moderate: seepage.	Moderate: piping.	Severe: no water.	Deep to water	Slope	Slope.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	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	
AnB, AnC, AnD---- Allen	0-6	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4	0-5	90-100	75-100	65-98	40-80	<26	NP-10
	6-28	Clay loam, sandy clay loam, loam.	CL-ML, CL, SC	A-4, A-6, A-7-6	0-10	80-100	75-100	65-98	40-80	20-43	4-19
	28-76	Clay loam, sandy clay loam, clay.	CL-ML, CL, SC, SM-SC	A-4, A-6, A-7-6	0-10	80-100	70-98	60-95	45-80	21-48	5-22
BeD-------------- Bethesda	0-7	Channery silt clay loam.	CL, SC, GC	A-6, A-7	5-25	65-90	50-80	45-80	35-75	35-50	12-24
	7-60	Very channery clay loam, very gravelly silty clay loam.	GM, GC, ML, CL	A-4, A-6, A-7, A-2	10-30	40-80	25-65	20-65	18-60	24-50	3-23
BwB-------------- Bewleyville	0-16	Silt loam--------	ML, CL-ML	A-4	0	100	95-100	95-100	85-100	20-30	2-7
	16-38	Silty clay loam, silt loam.	CL	A-6, A-7	0	95-100	95-100	90-100	85-100	30-45	11-22
	38-62	Clay, clay loam, silty clay loam.	CL, ML, MH, CH	A-6, A-7	0-5	75-100	75-100	70-95	60-95	35-65	12-32
CaC, CeD--------- Caneyville	0-8	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	8-18	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	18-30	Clay, silty clay	CH	A-7	0-3	90-100	85-100	75-100	65-100	50-75	30-45
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CqD: Caneyville------	0-8	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	8-18	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	18-30	Clay, silty clay	CH	A-7	0-3	90-100	85-100	75-100	65-100	50-75	30-45
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Garmon----------	0-6	Silt loam--------	CL, CL-ML	A-4, A-6	0	75-95	75-95	65-95	55-90	20-35	5-15
	6-32	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
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CkC-------------- Clarksville	0-12	Extremely cobbly loam.	GC, SC, SM-SC, GP-GC	A-2-4, A-2-6, A-1-A	5-30	30-70	10-60	5-50	5-35	20-40	5-15
	12-48	Very cobbly silty clay loam, extremely cobbly silty clay loam.	GC, SC, SP-SC, GP-GC	A-2-6, A-6	5-20	30-70	10-60	10-50	5-45	30-40	11-25
	48-69	Very cobbly silty clay, very cobbly clay, extremely cobbly silty clay.	GC, SC, GP-GC, SP-SC	A-7, A-2-7	5-20	30-70	10-60	10-50	10-45	55-75	35-55

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	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	
CxC, CxD:											
Clarksville-----	0-6	Cobbly silt loam	GM-GC, GC, SC, SM-SC	A-4, A-6	5-20	65-95	60-85	55-80	40-50	20-35	5-15
	6-28	Very cobbly silty clay loam, extremely cobbly silty clay loam.	GC, SC, SP-SC, GP-GC	A-2-6, A-6	5-20	30-70	10-60	10-50	5-45	30-40	11-25
	28-72	Very cobbly silty clay, very cobbly clay, extremely cobbly silty clay.	GC, SC, GP-GC, SP-SC	A-7, A-6, A-2	5-20	30-70	10-60	10-50	10-45	30-50	11-25
Baxter----------	0-8	Cobbly silt loam	ML, GM	A-4	10-30	60-90	55-85	55-75	45-65	25-35	3-10
	8-16	Very cobbly silt loam, gravelly silty clay loam.	ML, GM, CL, GM-GC	A-4, A-6	10-40	60-85	55-80	50-70	45-65	25-40	5-15
	16-72	Cobbly silty clay, very cobbly silty clay, gravelly silty clay.	CL, CH, GC	A-6, A-7	5-30	60-90	55-85	50-80	45-70	40-60	20-35
DeC-------------- Decatur	0-6	Silt loam--------	CL, ML, CL-ML	A-4, A-6	0-3	90-100	90-98	85-98	65-80	<32	NP-12
	6-14	Silty clay loam, silty clay, clay.	ML, CL	A-7, A-4, A-6, A-5	0-3	90-100	90-100	88-99	78-92	30-49	8-22
	14-80	Clay-------------	CL, ML, MH, CH	A-7, A-6	0-3	90-100	90-100	88-98	75-90	37-60	11-28
DkB-------------- Dickson	0-7	Silt loam--------	CL-ML, ML	A-4	0	100	95-100	90-100	75-95	20-28	2-7
	7-26	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	95-100	95-100	85-95	25-38	5-17
	26-44	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	80-95	25-42	7-20
	44-60	Clay, gravelly silty clay loam, gravelly clay.	MH, ML, GC, CL	A-6, A-7	0	70-100	60-100	55-100	45-95	35-65	12-30
Du--------------- Dunning	0-7	Silty clay loam	CL	A-6, A-7	0	100	95-100	90-100	85-95	34-42	15-22
	7-77	Silty clay, clay, silty clay loam.	CH, CL	A-7, A-7-6	0-5	90-100	70-100	60-100	60-100	45-70	20-40
EkB-------------- Elk	0-8	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	70-95	25-35	3-10
	8-40	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
	40-60	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
FrB, FrC2, FrD2-- Frederick	0-8	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-5	80-100	75-100	75-95	75-90	<35	NP-15
	8-29	Silty clay loam, silty clay, clay.	CH, MH	A-7	0-5	80-100	75-100	70-95	60-90	50-70	20-40
	29-65	Clay, silty clay	CH	A-7	0-5	90-100	85-100	70-100	60-95	60-85	30-55

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
GcF:											
Garmon----------	0-6	Silt loam--------	CL, CL-ML	A-4, A-6	0	75-95	75-95	65-95	55-90	20-35	5-15
	6-32	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
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Caneyville------	0-8	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	8-18	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	18-30	Clay, silty clay	CH	A-7	0-3	90-100	85-100	75-100	65-100	50-75	30-45
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
La--------------- Lawrence	0-7	Silt loam--------	ML	A-4	0	100	95-100	90-100	80-100	25-35	2-10
	7-26	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	80-100	25-42	5-20
	26-60	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	80-100	25-42	5-20
Me--------------- Melvin	0-7	Silt loam--------	CL, CL-ML, ML	A-4	0	95-100	90-100	80-100	80-95	25-35	4-10
	7-20	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	80-95	25-40	5-20
	20-60	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	85-100	80-100	70-100	60-95	25-40	5-20
MoB, MoC--------- Mountview	0-8	Silt loam--------	ML, CL-ML	A-4	0	100	95-100	95-100	80-96	20-30	2-7
	8-29	Silt loam, silty clay loam.	CL	A-6, A-7	0	95-100	95-100	90-100	80-96	30-43	10-20
	29-66	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	0-9	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	90-100	80-100	55-95	<32	NP-10
	9-38	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	70-98	22-42	3-20
	38-60	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-3	75-100	70-100	65-100	55-95	22-42	3-20
No--------------- Nolin	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	8-45	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
	45-60	Loam, silt loam, gravelly loam.	ML, CL, CL-ML, GM	A-4, A-6	0-10	50-100	50-100	40-95	35-95	<30	NP-15
Pt. Pits, quarries											
Pu--------------- Purdy	0-6	Silty clay loam	ML, CL	A-4, A-6, A-7	0	95-100	90-100	90-100	90-100	25-50	4-20
	6-40	Silty clay, clay, clay loam.	CL, CH, MH	A-6, A-7	0	95-100	90-100	85-100	75-85	30-65	11-30
	40-60	Silty clay, clay loam, clay.	CL, CH, MH	A-6, A-7	0	95-100	90-100	85-100	70-95	30-65	11-30

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ra: Rahm	0-8	Silt loam	CL	A-6	0	100	100	90-100	75-95	25-40	10-20
	8-24	Silty clay loam, silt loam.	CL	A-6	0	100	100	90-100	85-95	25-40	10-20
	24-60	Silty clay loam, silty clay.	CL	A-6, A-7	0	100	100	95-100	85-95	30-45	10-20
RMF: Rigley	0-12	Loam	SM, ML, SM-SC, CL-ML	A-2, A-4	0-10	80-95	75-90	55-80	25-65	<30	NP-7
	12-41	Gravelly sandy loam, gravelly loam, sandy loam.	SM, ML, GM, GM-GC	A-2, A-4, A-1	0-10	65-95	60-90	40-75	20-60	<30	NP-7
	41-72	Gravelly sandy loam, gravelly loam, gravelly clay loam.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	55-80	45-70	30-60	15-50	<35	NP-15
Shelocta	0-9	Silt loam	ML, CL-ML	A-4	0-5	80-95	75-95	60-95	55-90	<35	NP-10
	9-24	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
	24-60	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	35-70	25-70	20-65	20-40	3-20
Muse	0-7	Loam	ML, CL, CL-ML	A-4, A-6	0	80-100	70-100	60-100	55-95	20-40	2-20
	7-44	Silty clay loam, clay, channery silty clay.	CL, CH	A-7, A-6	0	70-100	65-100	60-100	55-100	35-75	15-40
	44-74	Channery silty clay, channery clay, clay.	MH, CH, CL, GC	A-7, A-2	0	50-100	40-95	35-95	30-95	40-75	20-40
RoF: Rock outcrop.											
Caneyville	0-8	Silt loam	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	8-18	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	18-30	Clay, silty clay	CH	A-7	0-3	90-100	85-100	75-100	65-100	50-75	30-45
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
SeD: Sequoia	0-6	Silt loam	CL, CL-ML	A-4, A-6	0	95-100	95-100	85-100	80-95	23-35	5-15
	6-39	Silty clay, clay, silty clay loam.	CL, MH, CH	A-7	0	70-100	65-100	60-100	55-95	43-74	20-40
	39-70	Weathered bedrock	---	---	---	---	---	---	---	---	---

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
SeD:											
Wernock---------	0-11	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	90-100	85-100	75-95	55-90	25-35	4-11
	11-22	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	4-22
	22-33	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	4-22
	33	Weathered bedrock	---	---	---	---	---	---	---	---	---
SMF:											
Shelocta--------	0-9	Silt loam--------	ML, CL-ML	A-4	0-5	80-95	75-95	60-95	55-90	<35	NP-10
	9-24	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
	24-60	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	35-70	25-70	20-65	20-40	3-20
Muse-----------	0-7	Loam------------	ML, CL, CL-ML	A-4, A-6	0	80-100	70-100	60-100	55-95	20-40	2-20
	7-44	Silty clay loam, clay, channery silty clay.	CL, CH	A-7, A-6	0	70-100	65-100	60-100	55-100	35-65	15-35
	44-74	Channery silty clay, channery clay, clay.	MH, CH, CL, GC	A-7, A-2	0	50-100	40-95	35-95	30-95	40-75	20-40
Cutshin---------	0-12	Loam------------	ML, CL-ML	A-4, A-6	0-5	85-100	80-95	75-90	55-90	20-40	3-15
	12-72	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	20-40	3-15
WaC, WaD--------- Waynesboro	0-9	Loam------------	ML, CL-ML, CL, SM	A-4	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	9-19	Clay loam, loam, sandy clay loam.	CL, ML, SC	A-4, A-6, A-7	0-5	90-100	85-100	75-95	45-75	30-41	9-17
	19-65	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

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]

Map symbol and soil name	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, AnC, AnD----	0-6	6-25	1.30-1.50	0.6-2.0	0.14-0.19	4.5-6.5	Low----------	0.28	5	.5-3
Allen	6-28	15-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-6.5	Low----------	0.20		
	28-76	20-45	1.40-1.60	0.6-2.0	0.10-0.17	4.5-5.5	Low----------	0.20		
BeD--------------	0-7	27-35	1.45-1.65	0.2-0.6	0.05-0.16	3.6-5.5	Low----------	0.32	5	<.5
Bethesda	7-60	18-35	1.60-1.90	0.2-0.6	0.04-0.10	3.6-5.5	Low----------	0.32		
BwB--------------	0-16	15-27	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.5	Low----------	0.43	5	1-3
Bewleyville	16-38	22-35	1.35-1.55	0.6-2.0	0.18-0.20	4.5-5.5	Low----------	0.37		
	38-62	35-50	1.30-1.50	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.37		
CaC, CeD---------	0-8	10-27	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low----------	0.43	3	2-4
Caneyville	8-18	36-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.3	Moderate-----	0.28		
	18-30	40-60	1.35-1.60	0.2-0.6	0.12-0.18	5.6-7.8	Moderate-----	0.28		
	30	---	---	---	---	---	-------------	----		
CgD:										
Caneyville------	0-8	10-27	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low----------	0.43	3	2-4
	8-18	36-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.3	Moderate-----	0.28		
	18-30	40-60	1.35-1.60	0.2-0.6	0.12-0.18	5.6-7.8	Moderate-----	0.28		
	30	---	---	---	---	---	-------------	----		
Garmon----------	0-6	7-27	1.20-1.40	2.0-6.0	0.14-0.20	4.5-7.3	Low----------	0.32	3	<3
	6-32	18-34	1.20-1.50	2.0-6.0	0.05-0.16	4.5-7.3	Low----------	0.28		
	32	---	---	---	---	---	-------------	----		
CkC--------------	0-12	14-20	1.30-1.60	2.0-6.0	0.07-0.12	3.6-6.0	Low----------	0.15	2	1-2
Clarksville	12-48	25-35	1.40-1.65	2.0-6.0	0.06-0.10	3.6-5.5	Low----------	0.20		
	48-69	40-75	1.40-1.80	0.6-2.0	0.05-0.08	3.6-5.5	Low----------	0.10		
CxC, CxD:										
Clarksville-----	0-6	15-25	1.30-1.50	2.0-6.0	0.12-0.17	3.6-6.0	Low----------	0.20	2	1-2
	6-28	25-35	1.40-1.65	2.0-6.0	0.06-0.10	3.6-5.5	Low----------	0.20		
	28-72	40-75	1.40-1.80	0.6-2.0	0.05-0.08	3.6-5.5	Low----------	0.10		
Baxter----------	0-8	12-27	1.20-1.40	0.6-2.0	0.12-0.17	4.5-6.5	Low----------	0.28	5	2-4
	8-16	18-35	1.20-1.40	0.6-2.0	0.10-0.15	4.5-5.5	Low----------	0.28		
	16-72	40-60	1.30-1.50	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.24		
DeC--------------	0-6	15-27	1.25-1.55	0.6-2.0	0.18-0.20	4.5-6.0	Low----------	0.32	5	.5-2
Decatur	6-14	35-60	1.20-1.55	0.6-2.0	0.14-0.17	4.5-6.0	Moderate-----	0.28		
	14-80	35-60	1.20-1.50	0.6-2.0	0.12-0.16	4.5-6.0	Moderate-----	0.24		
DkB--------------	0-7	15-26	1.30-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Low----------	0.43	3	.5-2
Dickson	7-26	18-30	1.35-1.55	0.6-2.0	0.18-0.20	4.5-5.5	Low----------	0.43		
	26-44	20-32	1.55-1.75	<0.06	0.05-0.11	4.5-5.5	Low----------	0.43		
	44-60	35-50	1.35-1.55	0.2-0.6	0.02-0.04	4.5-5.5	Moderate-----	0.28		
Du---------------	0-7	27-40	1.20-1.40	0.6-2.0	0.19-0.23	5.6-7.8	Moderate-----	0.32	5	2-10
Dunning	7-77	35-60	1.40-1.65	0.06-0.2	0.14-0.18	5.6-7.8	Moderate-----	0.28		
EkB--------------	0-8	10-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-6.5	Low----------	0.37	5	.5-3
Elk	8-40	18-34	1.20-1.50	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.28		
	40-60	15-40	1.20-1.50	0.6-2.0	0.14-0.20	5.1-6.5	Low----------	0.28		
FrB, FrC2, FrD2--	0-8	13-27	1.25-1.50	2.0-6.0	0.16-0.24	4.5-6.0	Low----------	0.32	4	1-2
Frederick	8-29	35-75	1.20-1.50	0.6-2.0	0.12-0.18	4.5-6.0	Moderate-----	0.24		
	29-65	40-80	1.20-1.50	0.6-2.0	0.10-0.18	4.5-6.0	Moderate-----	0.24		

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

Map symbol and soil name	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:										
Garmon----------	0-6	7-27	1.20-1.40	2.0-6.0	0.14-0.20	4.5-7.3	Low----------	0.32	3	<3
	6-32	18-34	1.20-1.50	2.0-6.0	0.05-0.16	4.5-7.3	Low----------	0.28		
	32	---	---	---	---	---	-------------	----		
Caneyville------	0-8	10-27	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low----------	0.43	3	2-4
	8-18	36-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.3	Moderate-----	0.28		
	18-30	40-60	1.35-1.60	0.2-0.6	0.12-0.18	5.6-7.8	Moderate-----	0.28		
	30	---	---	---	---	---	-------------	----		
La--------------- Lawrence	0-7	12-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-6.5	Low----------	0.43	3	1-4
	7-26	18-35	1.40-1.60	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.37		
	26-60	18-35	1.50-1.70	0.06-0.2	0.08-0.12	4.5-5.5	Low----------	0.43		
Me--------------- Melvin	0-7	12-17	1.20-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43	5	.5-3
	7-20	12-35	1.30-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43		
	20-60	7-35	1.40-1.70	0.6-2.0	0.16-0.23	5.6-7.8	Low----------	0.43		
MoB, MoC--------- Mountview	0-8	15-25	1.35-1.55	0.6-2.0	0.18-0.22	4.5-5.5	Low----------	0.43	5	1-3
	8-29	20-35	1.40-1.60	0.6-2.0	0.17-0.20	4.5-5.5	Low----------	0.43		
	29-66	35-55	1.30-1.50	0.6-2.0	0.10-0.15	4.5-5.5	Moderate-----	0.32		
Ne--------------- Newark	0-9	7-27	1.20-1.40	0.6-2.0	0.15-0.23	5.6-7.8	Low----------	0.43	5	1-4
	9-38	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43		
	38-60	12-40	1.30-1.50	0.6-2.0	0.15-0.22	5.6-7.8	Low----------	0.43		
No--------------- Nolin	0-8	12-35	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43	5	2-4
	8-45	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43		
	45-60	10-30	1.30-1.55	0.6-6.0	0.10-0.23	5.6-8.4	Low----------	0.43		
Pt. Pits, quarries										
Pu--------------- Purdy	0-6	18-35	1.30-1.50	<0.06	0.18-0.24	3.6-5.5	Moderate-----	0.43	3	2-4
	6-40	35-50	1.30-1.60	<0.2	0.12-0.18	3.6-5.5	Moderate-----	0.32		
	40-60	35-50	1.30-1.60	<0.2	0.10-0.16	3.6-5.5	Moderate-----	0.32		
Ra--------------- Rahm	0-8	22-34	1.30-1.45	0.6-2.0	0.21-0.23	6.1-7.3	Low----------	0.37	3	1-3
	8-24	24-34	1.40-1.60	0.6-2.0	0.18-0.22	6.1-7.3	Low----------	0.37		
	24-60	30-42	1.40-1.60	0.06-0.2	0.13-0.18	4.5-6.0	Moderate-----	0.37		
RMF:										
Rigley----------	0-12	7-18	1.20-1.40	2.0-6.0	0.09-0.15	4.5-7.3	Low----------	0.24	4	.5-3
	12-41	7-18	1.30-1.60	2.0-6.0	0.09-0.15	3.6-5.5	Low----------	0.17		
	41-72	7-40	1.30-1.60	2.0-6.0	0.07-0.15	3.6-5.5	Low----------	0.17		
Shelocta--------	0-9	10-25	1.15-1.30	0.6-2.0	0.16-0.22	4.5-5.5	Low----------	0.32	4	.5-5
	9-24	18-34	1.30-1.55	0.6-2.0	0.10-0.20	4.5-5.5	Low----------	0.28		
	24-60	15-34	1.30-1.55	0.6-6.0	0.08-0.16	4.5-5.5	Low----------	0.17		
Muse------------	0-7	7-27	1.20-1.40	0.6-2.0	0.16-0.22	4.5-5.5	Low----------	0.37	3	1-3
	7-44	28-60	1.20-1.65	0.06-0.2	0.10-0.16	4.5-5.5	Moderate-----	0.28		
	44-74	40-60	1.40-1.65	0.06-0.2	0.08-0.14	4.5-5.5	Moderate-----	0.28		
RoF: Rock outcrop.										
Caneyville------	0-8	10-27	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low----------	0.43	3	2-4
	8-18	36-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.3	Moderate-----	0.28		
	18-30	40-60	1.35-1.60	0.2-0.6	0.12-0.18	5.6-7.8	Moderate-----	0.28		
	30	---	---	---	---	---	-------------	----		

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

Map symbol and soil name	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
SeD:										
Sequoia---------	0-6	15-27	1.30-1.50	0.6-2.0	0.17-0.20	4.5-5.5	Low----------	0.37	3	.5-2
	6-39	35-60	1.35-1.55	0.2-0.6	0.08-0.16	4.5-5.5	Moderate-----	0.24		
	39-70	---	---	---	---	---	-------------	----		
Wernock---------	0-11	12-27	1.20-1.40	0.6-2.0	0.19-0.23	3.6-7.3	Low----------	0.37	3	.5-4
	11-22	18-35	1.30-1.50	0.6-2.0	0.18-0.22	3.6-5.5	Low----------	0.32		
	22-33	18-35	1.30-1.50	0.6-2.0	0.12-0.18	3.6-5.5	Low----------	0.28		
	33	---	---	---	---	---	-------------	----		
SMF:										
Shelocta--------	0-9	10-25	1.15-1.30	0.6-2.0	0.16-0.22	4.5-5.5	Low----------	0.32	4	.5-5
	9-24	18-34	1.30-1.55	0.6-2.0	0.10-0.20	4.5-5.5	Low----------	0.28		
	24-60	15-34	1.30-1.55	0.6-6.0	0.08-0.16	4.5-5.5	Low----------	0.17		
Muse------------	0-7	7-27	1.20-1.40	0.6-2.0	0.16-0.22	4.5-5.5	Low----------	0.37	3	1-3
	7-44	28-60	1.20-1.65	0.06-0.2	0.10-0.16	4.5-5.5	Moderate-----	0.28		
	44-74	40-60	1.40-1.65	0.06-0.2	0.08-0.14	4.5-5.5	Moderate-----	0.28		
Cutshin---------	0-12	12-30	1.20-1.40	0.6-2.0	0.08-0.16	5.6-7.3	Low----------	0.28	4	3-7
	12-72	12-30	1.20-1.40	0.6-2.0	0.08-0.16	4.5-6.0	Low----------	0.28		
WaC, WaD--------- Waynesboro	0-9	10-30	1.40-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low----------	0.28	5	.5-2
	9-19	23-35	1.40-1.55	0.6-2.0	0.12-0.16	4.5-5.5	Moderate-----	0.28		
	19-65	35-50	1.40-1.55	0.6-2.0	0.10-0.15	4.5-5.5	Moderate-----	0.28		

TABLE 16.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
AnB, AnC, AnD----- Allen	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
BeD--------------- Bethesda	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
BwB--------------- Bewleyville	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
CaC, CeD---------- Caneyville	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
CgD:											
Caneyville--------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
Garmon-----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	Moderate.
CkC--------------- Clarksville	B	None--------	---	---	>6.0	---	---	>60	---	Low------	High.
CxC, CxD:											
Clarksville------	B	None--------	---	---	>6.0	---	---	>60	---	Low------	High.
Baxter-----------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
DeC--------------- Decatur	B	None--------	---	---	>6.0	---	---	>72	---	High-----	Moderate.
DkB--------------- Dickson	C	None--------	---	---	2.0-3.0	Perched	Jan-Apr	>60	---	Moderate	Moderate.
Du---------------- Dunning	D	Occasional	Brief-----	Jan-Apr	0-0.5	Apparent	Jan-Apr	>60	---	High-----	Moderate.
EkB--------------- Elk	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
FrB, FrC2, FrD2--- Frederick	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
GcF:											
Garmon-----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	Moderate.
Caneyville-------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
La---------------- Lawrence	C	None--------	---	---	1.0-2.0	Perched	Dec-Apr	>60	---	High-----	High.
Me---------------- Melvin	D	Frequent----	Brief-----	Dec-May	0-1.0	Apparent	Dec-May	>60	---	High-----	Low.
MoB, MoC---------- Mountview	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Ne---------------- Newark	C	Occasional	Brief-----	Jan-Apr	0.5-1.5	Apparent	Dec-May	>60	---	High-----	Low.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	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			
No----------------- Nolin	B	Occasional	Brief-----	Feb-May	3.0-6.0	Apparent	Feb-Mar	>60	---	Low------	Moderate.
Pt. Pits, quarries											
Pu----------------- Purdy	D	Occasional	Brief-----	Feb-May	0-1.0	Apparent	Nov-Jun	>60	---	High-----	High.
Ra----------------- Rahm	C	Rare--------	---	---	1.0-3.0	Apparent	Nov-May	>60	---	High-----	High.
RMF: Rigley-----------	B	None--------	---	---	>6.0	---	---	>60	---	Low------	High.
Shelocta---------	B	None--------	---	---	>6.0	---	---	>48	Hard	Low------	High.
Muse-------------	C	None--------	---	---	>6.0	---	---	>40	Soft	High-----	High.
RoF: Rock outcrop.											
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--------	---	---	>6.0	---	---	>40	Soft	High-----	High.
Cutshin----------	B	None--------	---	---	>6.0	---	---	>40	Soft	Low------	Low.
WaC, WaD---------- Waynesboro	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.

TABLE 17.--PHYSICAL ANALYSES OF SELECTED SOILS

[Absence of an entry indicates material was not detected. ND indicates no determination was made. Soils sampled are the typical pedons for the series. See the section "Soil Series and Their Morphology" for location of pedon sample]

Soil name, sample number, horizon, and depth (in inches)	Total			Particle-size distribution								Coarse fragments		
				Sand										
	Sand (2-0.05 mm)	Silt (0.05-0.002 mm)	Int. IV Clay (< 0.002 mm)	Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Sand coarser than very fine (2-0.1 mm)	Very fine sand plus silt (0.1-0.002 mm)	Textural class	2 mm	2-19 mm	19-76 mm
	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct
Allen fine sandy loam: * (81KY-231-8)														
Ap - - - - 0-6	54.8	32.0	13.2	4.6	5.7	8.7	22.3	13.5	41.3	45.5	fsl	16.1	13.8	2.3
B1 - - - - 6-11	65.5	18.9	15.6	5.7	8.3	11.8	26.4	13.3	52.2	32.2	fsl	20.8	11.1	9.7
B21t - - - - 11-28	51.1	14.9	34.0	4.8	6.8	8.1	21.1	10.3	40.8	25.2	scl	26.8	11.2	15.6
B22t - - - - 28-40	45.0	17.7	37.3	1.3	4.1	8.9	19.9	10.8	34.2	28.5	sc	4.6	1.7	2.9
B23t - - - - 40-57	49.8	5.0	45.2	4.6	5.1	11.0	19.3	9.8	40.0	14.8	sc	18.7	9.8	8.9
B24t - - - - 57-76	37.3	16.3	46.4	3.6	3.9	5.3	14.5	10.0	27.3	26.3	c	23.2	4.8	18.4
Clarksville cobbly silt loam: (81KY-231-2)														
Ap - - - 0-6	11.2	64.9	23.9	1.9	1.4	1.2	4.6	2.1	9.1	67.0	sil	25.0	4.4	20.6
B21t - - - 6-15	13.3	59.9	26.8	2.8	1.7	1.0	5.0	2.8	10.5	62.7	sil	43.3	9.0	34.3
B22t - - - 15-28	20.6	54.2	25.2	4.7	2.6	1.7	7.5	4.1	16.5	58.3	sil	59.3	10.1	49.2
B23t - - - 28-40	29.7	42.4	27.9	6.4	4.3	2.9	11.1	5.0	24.7	47.4	cl	48.3	16.7	31.6
B24t - - - 40-72	20.4	40.6	39.0	3.2	2.2	1.6	7.7	5.7	14.7	46.3	cl	12.0	10.4	1.6
Cutshin loam: (81KY-231-7)														
A11 - - - - 0-6	44.8	34.0	21.2	2.0	1.7	2.6	24.7	13.8	31.0	47.8	l	6.9	4.0	2.9
A12 - - - - 6-12	45.7	35.9	18.4	1.7	1.7	2.5	24.0	15.8	29.9	51.7	l	3.0	3.0	---
B1 - - - - 12-20	46.3	34.1	19.6	1.9	2.0	2.8	25.1	14.5	31.8	48.6	l	5.9	2.7	3.2
B21 - - - - 20-30	45.2	34.8	20.0	2.3	2.2	2.7	23.7	14.3	30.9	49.1	l	3.1	3.1	---
B22 - - - - 30-43	41.3	36.3	22.4	1.6	2.3	2.5	21.4	13.5	27.8	49.8	l	8.7	8.7	---
B23 - - - - 43-60	34.4	40.4	25.2	1.2	2.0	2.4	19.1	9.7	24.7	50.1	l	5.1	3.3	1.8
B24 - - - - 60-72	39.6	34.1	26.3	2.9	2.8	2.9	20.5	10.5	29.1	44.6	l	0.9	0.9	---
Decatur silt loam: (81KY-231-6)														
Ap - - - - 0-6	19.4	53.9	26.7	1.2	2.6	2.2	7.2	6.2	13.2	60.1	sil	4.1	4.1	---
B1 - - - - 6-14	15.0	52.0	33.0	1.3	1.9	1.6	5.6	4.6	10.4	56.6	sicl	2.9	2.9	---
B21t - - - - 14-29	14.0	35.1	50.9	1.0	1.2	1.4	5.4	5.0	9.0	40.1	c	1.4	1.4	---
B22t - - - - 29-44	13.7	30.9	55.4	1.1	1.1	1.4	6.1	4.0	9.7	34.9	c	7.2	7.2	---
B23t - - - - 44-62	15.5	20.9	63.6	1.4	1.1	1.5	6.0	5.5	10.0	26.4	c	1.4	1.4	---
B24t - - - - 62-80	26.1	22.9	51.9	1.9	2.3	2.8	9.8	9.3	16.8	31.3	c	1.5	1.5	---

See footnotes at end of table.

TABLE 17.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name, sample number, horizon, and depth (in inches)	Particle-size distribution: Total												Coarse fragments		
	Total			Sand					Sand coarser than very fine (2-0.1 mm)	Very fine sand plus silt (0.1-0.002 mm)	Textural class	2 mm	2-19 mm	19-76 mm
	Sand (2-0.05 mm)	Silt (0.05-0.002 mm)	Int. IV Clay (< 0.002 mm)	Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)						
	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct
Dunning silty clay loam:														
(81KY-231-3)														
Ap - - - - 0-7	8.1	56.1	35.8	0.6	0.6	0.6	3.1	3.2	4.9	59.3	sicl	6.0	6.0	---
Ag - - - - 7-12	8.9	49.8	41.3	0.4	0.4	0.4	3.2	4.5	4.4	54.3	sic	6.9	6.9	---
Bg - - - - 12-22 **	7.6	45.2	47.2	0.5	0.5	0.6	2.8	3.2	4.4	48.4	sic	15.4	15.4	---
Bg - - - - 22-33 **	4.7	54.8	40.5	0.9	0.3	0.2	1.6	1.7	3.0	56.5	sic	4.5	4.5	---
Cg - - - - 33-47	6.9	49.0	44.1	0.2	0.2	0.2	2.3	4.0	2.9	53.0	sic	4.1	4.1	---
IICg - - - - 47-77	16.2	52.3	31.5	0.4	0.4	0.4	5.6	9.4	6.8	61.7	sicl	2.2	2.2	---
Muse loam:														
(81KY-231-5)														
A1 - - - - 0-2	38.3	42.6	19.1	1.7	1.8	2.3	15.7	16.8	21.5	59.4	l	---	---	---
A2 - - - - 2-7	47.7	38.1	14.2	3.1	1.9	2.1	19.8	20.8	26.9	58.9	l	---	---	---
B21t - - - - 7-13	11.1	39.3	49.6	0.7	0.5	0.6	4.6	4.7	6.4	44.0	c	---	---	---
B22t - - - - 13-28	5.4	28.7	65.9	0.4	0.4	0.3	1.7	2.6	2.8	31.3	c	---	---	---
B23t - - - - 28-44	4.0	36.2	59.8	0.5	0.5	0.3	0.7	2.0	2.0	38.2	c	---	---	---
Cg - - - - 44-60 **	1.0	45.7	53.3	0.1	0.2	0.1	0.3	0.3	0.7	46.0	sic	---	---	---
Cg - - - - 60-74 **	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sequola silt loam:														
(81KY-231-4)														
Ap - - - - 0-6	20.1	60.0	19.9	0.6	0.7	1.1	8.8	8.9	11.2	68.9	sil	5.5	5.5	---
B1 - - - - 6-15	22.8	51.3	25.9	0.4	0.3	0.4	8.4	13.3	9.5	64.6	sil	6.0	6.0	---
B21t - - - - 15-28	18.1	52.2	29.7	0.6	0.3	0.3	5.4	11.5	6.6	63.7	sicl	1.6	1.6	---
B22t - - - - 28-39	6.6	48.7	44.7	0.3	0.1	0.1	2.1	4.0	2.6	52.7	sic	4.9	4.9	---
Cr - - - - 39-70	9.5	49.9	40.6	0.6	0.3	0.1	0.7	7.8	1.7	57.7	sic	8.0	8.0	---

* Allen soils in this county often have more than 15 percent, by volume, coarse fragments in some subhorizons. Also, the laboratory data show the control section to have 3 percent less silt than typical for the series. These differences are in the range of normal laboratory error and field observation and the soils are not considered taxadjuncts.

** Horizon subdivided for sampling purposes.

TABLE 18.--CHEMICAL ANALYSES OF SELECTED SOILS

[Absence of an entry indicates the element was not detected. TR indicates trace. Soils sampled are the typical pedons for the soil series. See the section "Soil Series and Their Morphology" for location of pedon sample]

Soil name, sample number, horizon, and depth (in inches)	Reaction		Extractable cations					Cation-exchange capacity		Ex-tract-able acid-ity	Alum-inum	Base saturation		Organ-ic matter	Calcium car-bonate equiv-alent	Phos-pho-rus
	H_2O (1:1)	KCl 1N (1:1)	Ca	Mg	K	Na	Total	Ammonium acetate	Sum of cat-ions			Ammonium acetate	Sum of cat-ions			
			-----Milliequivalents per 100 grams of soil--------									Pct	Pct	Pct	Pct	Ppm
Allen fine sandy loam: 1/																
Ap - - 0-6	6.2	5.4	4.5	0.6	0.3	0.1	5.5	6.9	9.9	4.4	0.1	79.7	55.5	2.88	0.2	15.0
B1 - - 6-11	6.3	5.3	2.6	0.2	0.3	0.1	3.2	4.5	4.9	1.7	0.1	71.1	65.3	0.65	0.3	2.0
B21t - - 11-28	6.1	5.7	5.4	1.0	0.2	0.1	6.7	9.4	11.1	4.4	0.1	71.3	60.4	0.22	0.4	1.5
B22t - - 28-40	4.8	3.9	2.4	1.4	0.2	0.1	4.1	12.1	13.8	9.7	0.1	33.9	29.7	0.03	0.3	1.0
B23t - - 40-57	4.8	3.8	1.4	1.1	0.2	0.1	2.8	12.0	14.0	11.2	---	23.3	20.0	0.19	0.5	0.5
B24t - - 57-76	4.7	3.8	1.6	0.8	0.3	0.1	2.8	13.5	14.9	12.1	---	20.7	18.8	0.15	0.4	0.5
Clarksville cobbly silt loam: (81KY-231-2)																
Ap - - 0-6	5.5	4.8	3.7	0.6	0.6	0.1	5.0	10.6	16.9	11.9	0.2	47.2	29.5	2.87	0.4	27.0
B21t - - 6-15	5.4	4.7	3.4	0.6	0.4	0.1	4.5	7.9	8.5	4.0	---	57.0	52.9	0.61	0.2	3.0
B22t - - 15-28	5.5	4.5	3.6	0.6	0.4	0.1	4.7	8.4	9.7	5.0	0.1	55.9	48.4	0.46	0.1	2.0
B23t - - 28-40	5.5	4.6	5.2	0.6	0.3	0.1	6.2	9.2	11.2	5.0	0.1	67.4	55.4	0.23	0.1	2.0
B24t - - 40-72	5.2	4.1	7.5	0.6	0.3	0.1	8.5	14.4	16.2	7.7	0.2	59.0	52.5	0.30	0.1	1.0
Cutshin loam: (81KY-231-7)																
A11 - - 0-6	6.1	5.6	5.7	1.5	0.5	0.1	7.8	10.9	14.5	6.7	0.1	71.6	53.8	4.26	0.5	4.0
A12 - - 6-12	6.0	5.2	2.6	1.1	0.4	0.1	4.2	7.4	11.5	7.3	0.1	56.8	36.5	2.21	0.1	2.5
B1 - - 12-20	5.9	4.9	2.3	0.6	0.1	0.1	3.1	6.1	14.4	11.3	0.1	50.8	21.5	0.58	0.2	1.5
B21 - - 20-30	5.9	5.1	3.0	0.6	0.1	0.1	3.8	6.3	10.2	6.4	0.1	60.3	37.2	0.41	0.6	1.5
B22 - - 30-43	5.7	4.9	3.3	1.2	0.2	0.1	4.8	8.1	10.5	5.7	0.2	59.3	45.7	0.30	0.3	1.0
B23 - - 43-60	5.8	4.3	2.6	2.8	0.3	0.3	6.0	10.1	12.3	6.3	0.4	59.4	48.8	0.10	0.3	1.5
B24 - - 60-72	5.1	4.0	1.5	2.0	0.3	0.1	3.9	10.8	12.1	8.2	0.1	36.1	32.2	0.19	0.3	1.5
Decatur silt loam: (81KY-231-6)																
Ap - - 0-6	6.1	5.5	8.4	1.0	0.4	0.1	9.9	12.7	16.7	6.8	0.2	77.9	59.3	4.09	0.1	9.0
B1 - - 6-14	6.4	5.6	5.9	0.5	0.2	0.1	6.7	10.4	12.3	5.6	0.1	64.4	54.5	0.60	0.2	1.0
B21t - - 14-29	5.3	4.3	5.2	1.2	0.3	0.1	6.8	14.5	17.4	10.6	0.4	46.9	39.1	0.28	0.1	1.0
B22t - - 29-44	5.0	3.9	2.7	1.9	0.3	0.1	5.0	14.3	17.0	12.0	0.3	35.0	29.4	0.21	0.1	1.0
B23t - - 44-62	4.8	3.8	0.8	1.1	0.3	0.1	2.3	14.8	17.9	15.6	0.2	15.5	12.8	0.17	0.1	1.0
B24t - - 62-80	4.7	3.8	0.5	0.6	0.2	0.1	1.4	12.8	14.3	12.9	---	10.9	9.8	0.11	0.1	1.5

See footnotes at end of table.

TABLE 18.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name, sample number, horizon, and depth (in inches)	Reaction		Extractable cations					Cation-exchange capacity		Ex-tract-able acid-ity	Alum-inum	Base saturation		Organ-ic matter	Calcium car-bonate equiv-alent	Phos-pho-rus
	H_2O (1:1)	KCl 1N (1:1)	Ca	Mg	K	Na	Total	Ammonium acetate	Sum of cat-ions			Ammonium acetate	Sum of cat-ions			
			-----Milliequivalents per 100 grams of soil--------									Pct	Pct	Pct	Pct	Ppm
Dunning silty clay loam:																
(81KY-231-3)																
Ap - - 0-7	6.3	5.9	25.3	1.5	0.3	0.4	27.5	32.2	36.2	8.7	0.1	85.4	75.9	6.80	0.1	7.5
Ag - - 7-12	6.4	5.7	23.2	0.7	0.2	0.4	24.5	30.2	30.5	6.0	TR	81.1	80.3	3.72	0.1	2.0
Bg - - 12-22 2/	6.8	5.9	23.8	0.4	0.2	0.4	24.8	28.5	29.3	4.5	TR	87.0	84.6	1.75	0.1	1.0
Bg - - 22-33 2/	6.8	5.9	19.8	0.4	0.2	0.4	20.8	23.5	24.4	3.6	TR	88.5	85.2	1.01	0.2	1.5
Cg - - 33-47	6.6	5.6	20.9	0.7	0.3	0.3	22.2	28.4	26.6	4.4	0.1	78.2	83.5	0.99	0.1	0.5
IICg - - 47-77	6.6	5.6	14.2	0.7	0.2	0.4	15.5	18.8	20.1	4.6	0.1	82.4	77.1	0.23	0.1	1.5
Muse loam: 3/																
(81KY-231-5)																
A1 - - 0-2	4.4	4.2	5.6	2.6	0.7	0.5	9.4	21.7	24.4	15.0	1.2	43.3	38.5	15.40	0.2	53.0
A2 - - 2-7	4.7	3.8	0.5	0.5	0.2	0.1	1.3	6.81	9.9	8.6	0.2	17.6	13.1	1.33	0.2	4.0
B21t - - 7-13	4.6	3.7	1.6	2.6	0.4	0.1	4.6	23.4	24.6	20.0	2.3	19.7	18.7	1.22	0.1	2.0
B22t - - 13-28	4.6	3.7	1.5	3.2	0.5	0.1	5.3	27.5	30.2	24.9	0.1	19.3	17.5	0.66	0.1	1.0
B23t - - 28-44	4.4	3.7	0.7	2.9	0.5	0.1	4.2	27.5	28.8	24.6	7.5	15.3	14.6	0.36	0.1	1.0
Cg - - 44-60 2/	4.6	3.6	1.3	0.2	0.6	0.3	2.4	27.2	25.9	23.5	5.6	8.8	9.3	0.30	0.3	2.0
Cg - - 60-74 2/	4.6	3.5	2.2	0.2	0.6	0.4	3.4	29.3	24.0	20.6	0.6	11.6	14.2	0.27	0.3	1.0
Sequoia silt loam: 4/																
(81KY-231-4)																
Ap - - 0-6	6.3	5.8	5.8	0.2	0.5	0.1	6.5	7.7	8.7	2.2	0.1	84.4	74.7	1.48	0.6	96.0
B1 - - 6-15	5.2	4.0	3.3	0.2	0.2	0.1	3.8	7.8	10.4	6.6	0.4	48.7	36.5	0.23	0.1	2.0
B21t - - 15-28	4.4	3.7	0.5	0.6	0.3	0.1	1.5	12.3	15.2	13.7	0.5	12.2	9.9	0.11	0.3	1.5
B22t - - 28-39	4.4	3.1	0.2	0.7	0.3	0.4	1.6	16.4	20.2	18.6	1.4	9.7	7.9	0.28	0.4	1.0
Cr - - 39-70	4.3	3.4	0.3	0.8	0.3	0.1	1.5	16.2	21.0	19.5	1.5	9.2	7.1	0.31	0.5	0.5

1/ Laboratory data show the B1 and B21t horizons to be slightly less acid than defined for the series. These differences are believed to be the result of liming.

2/ Horizon subdivided for sampling purposes.

3/ The H_2O pH values less than 4.5 are slightly lower than defined for the Muse series, but are within the range of normal laboratory error and field observation.

4/ The H_2O pH values less than 4.5 are slightly lower than defined for the Sequoia series, but are within the range of normal laboratory error and field observation.

TABLE 19.--ENGINEERING INDEX TEST DATA

[Soils sampled are the typical pedons for the soil series. See the section "Soil Series and Their Morphology" for the location of the pedon sample]

Soil name, sample number, horizon, and depth (in inches)	Classification		Grain-size distribution											Liquid limit	Plasticity index	Moisture density		Specific gravity
			Percentage passing sieve--								Percentage smaller than--							
	AASHTO	Unified	3 inch	2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			Max-dry density	Optimum moisture	
														Pct		Lb/ft^3	Pct	
Allen fine sandy loam: (81KY-231-8)																		
B21t - - - - 11-28	A-6(3)	SC	100	100	91	86	82	75	69	40	35	30	22	38	18	113	19	2.75
Clarksville cobbly silt loam: * (81KY-231-2)																		
B21t & B22t 6-28	A-2-6(0)	GC	100	78	46	40	37	34	33	29	22	10	10	31	11	107	17	2.68
B23t & B24t 28-72	A-6(1)	GC	100	88	64	57	53	49	47	38	33	21	15	35	13	106	19	2.72
Dunning silty clay loam: (81KY-231-3)																		
Bg - - - - 12-33	A-7-6(31)	CH	100	100	100	100	100	100	100	94	72	50	37	51	30	103	22	2.67
Cg - - - - 33-47	A-7-6(31)	CH	100	100	100	100	100	100	100	88	75	50	37	53	33	105	22	2.68
Muse loam: (81KY-231-5)																		
B21t & B22t 7-28	A-7-6(45)	CH	100	100	100	100	100	100	100	94	82	69	54	72	40	96	26	2.73
B23t 28-44	A-7-6(35)	CH	100	100	100	100	100	100	100	94	82	63	47	60	32	101	24	2.76

* Grain-size distribution data expressed as percent of less than 3-inch material.

TABLE 20.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Allen	Fine-loamy, siliceous, thermic Typic Paleudults
Baxter	Fine, mixed, mesic Typic Paleudalfs
Bethesda	Loamy-skeletal, mixed, acid, mesic Typic Udorthents
Bewleyville	Fine-silty, siliceous, thermic Typic Paleudults
Caneyville	Fine, mixed, mesic Typic Hapludalfs
*Clarksville	Loamy-skeletal, siliceous, mesic Typic Paleudults
*Cutshin	Fine-loamy, mixed, mesic Typic Haplumbrepts
Decatur	Clayey, kaolinitic, thermic Rhodic Paleudults
Dickson	Fine-silty, siliceous, thermic Glossic Fragiudults
*Dunning	Fine, mixed, mesic Fluvaquentic Haplaquolls
Elk	Fine-silty, mixed, mesic Ultic Hapludalfs
Frederick	Clayey, mixed, mesic Typic Paleudults
Garmon	Fine-loamy, mixed, mesic Dystric Eutrochrepts
Lawrence	Fine-silty, mixed, mesic Aquic Fragiudalfs
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
*Purdy	Clayey, mixed, mesic Typic Ochraquults
Rahm	Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents
Rigley	Coarse-loamy, mixed, mesic Typic Hapludults
*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

* The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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