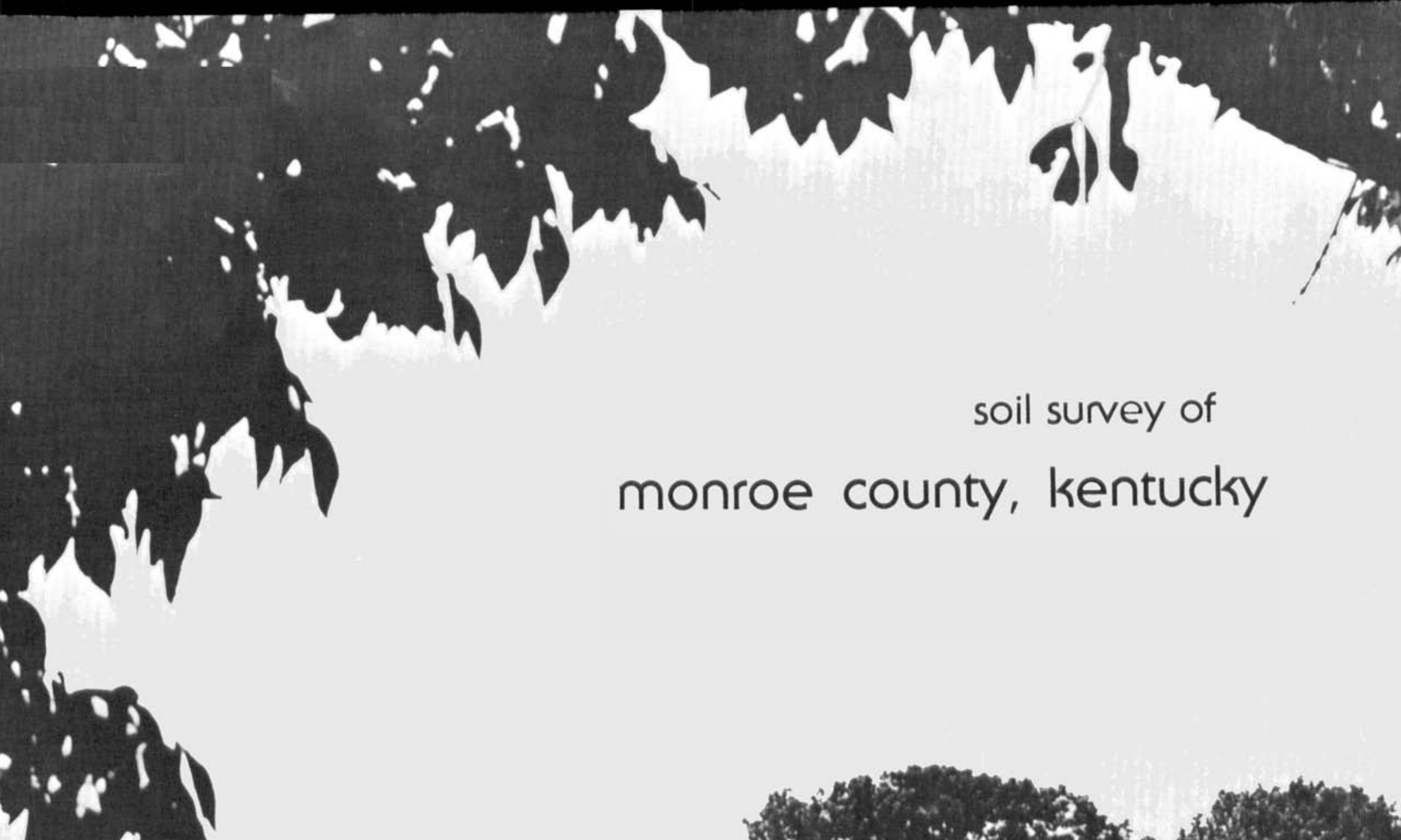
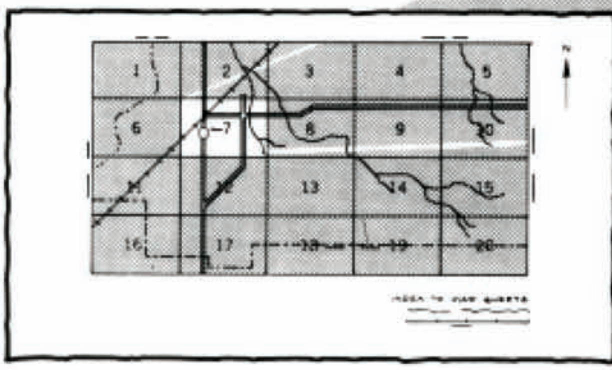
soil survey of
monroe county, kentucky

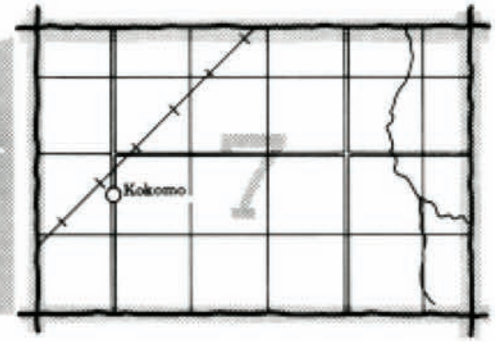


United States Department of Agriculture, Soil Conservation Service
in cooperation with
Kentucky Department for Natural Resources and Environmental Protection
Kentucky Agricultural Experiment Station

HOW TO USE

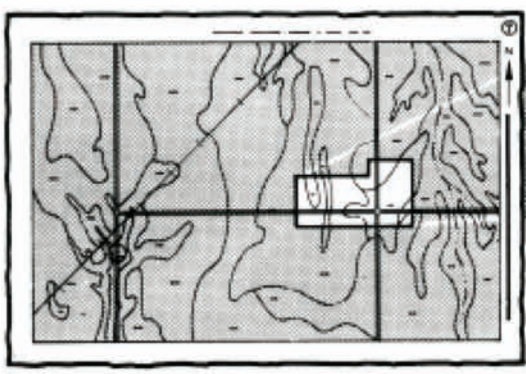
1. Locate your area of interest on the "Index to Map Sheets"

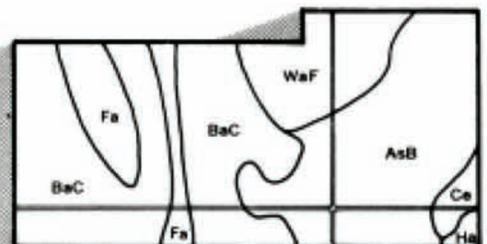




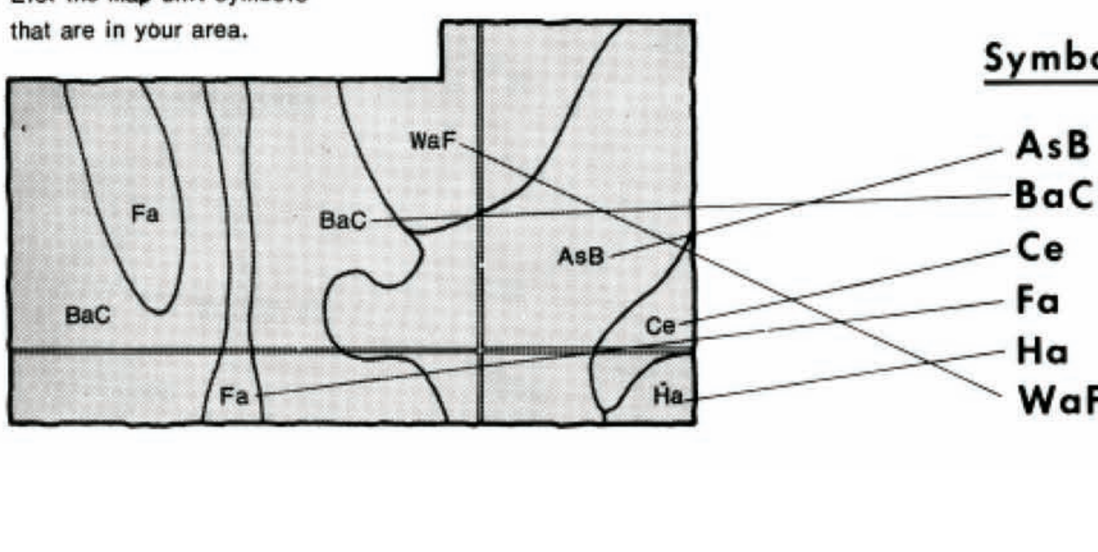
2. Note the number of the map sheet and turn to that sheet.

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





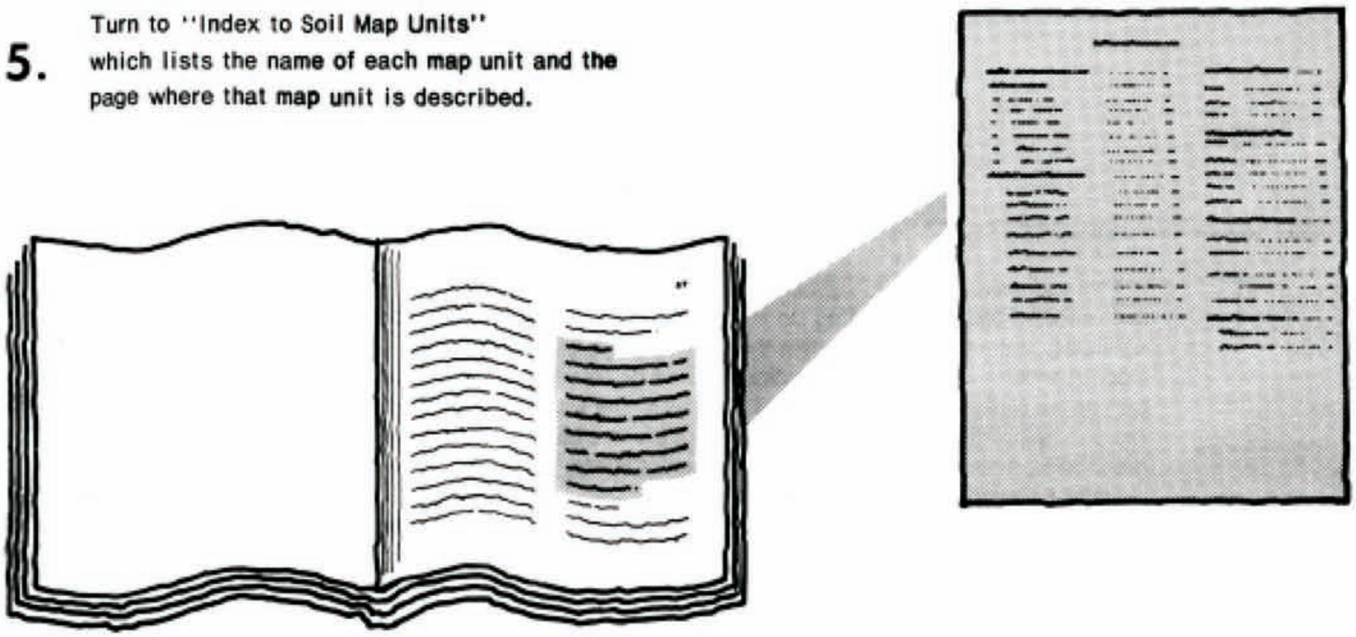
4. List the map unit symbols that are in your area.



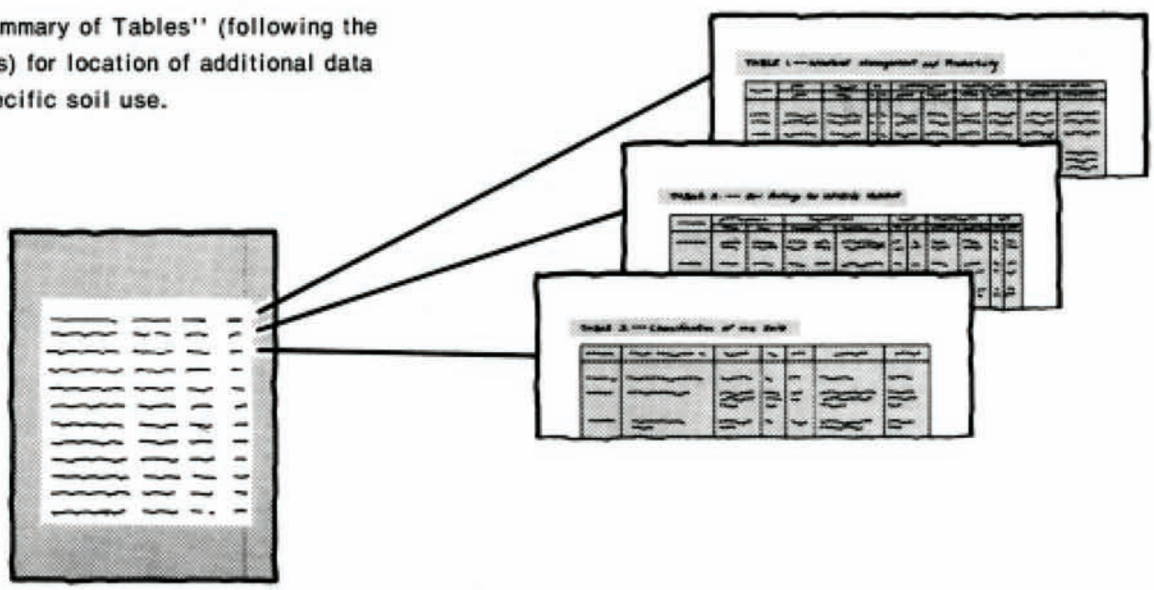
Symbols

THIS SOIL SURVEY

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



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



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

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

Major fieldwork for this soil survey was performed in the period 1967 to 1972. Soil names and descriptions were approved in 1977. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1977. This survey was made cooperatively by the Soil Conservation Service, the Kentucky Department for Natural Resources and Environmental Protection, and the Kentucky Agricultural Experiment Station. It is part of the technical assistance furnished to the Monroe 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.

Cover: Farming is the main source of income in the survey area, and much of the farmland is used as pasture. The pasture in the foreground is on Huntington silt loam. The homestead is on Waynesboro loam, 6 to 12 percent slopes.

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soil series

Issued May 1982

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foreword

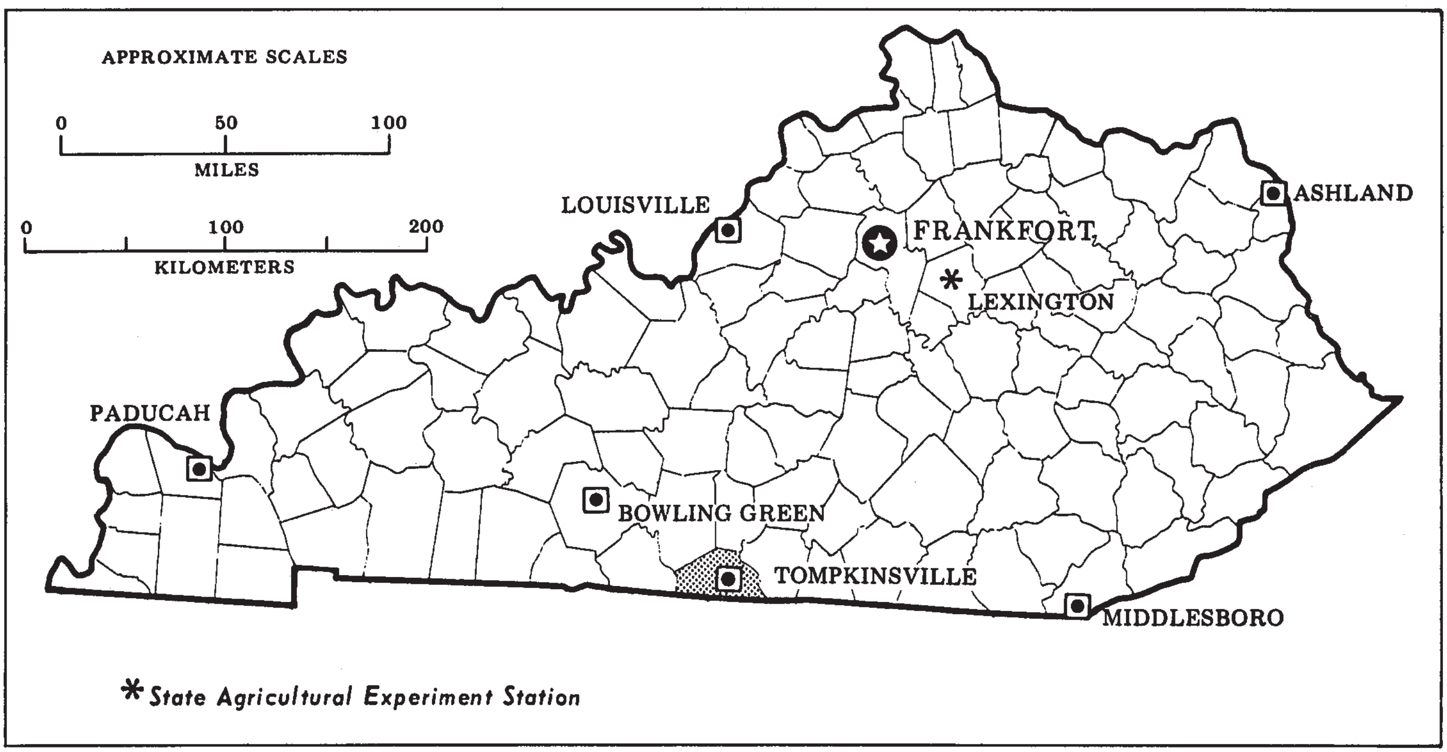
This soil survey contains information that can be used in land-planning programs in Monroe County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact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

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to 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.

Glen E. Murray
State Conservationist
Soil Conservation Service



Location of Monroe County in Kentucky.

soil survey of
Monroe County, Kentucky

By Michael J. Mitchell and Earle E. Latham, Soil Conservation Service

Fieldwork by Arlin J. Barton, James W. Dye, Paul Williams, and
Earle E. Latham, Soil Conservation Service

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

MONROE COUNTY is in the south-central part of Kentucky. It has an area of 213,700 acres, or 333.9 square miles. In 1970 the population of Monroe County was 11,642 and that of Tompkinsville, the county seat, was 2,207.

The soils generally are deep and have a loamy surface layer and a clayey or loamy subsoil. The eastern one-third of the county is highly dissected by streams and drainageways; it has characteristically rough terrain with steep side slopes. The western, southern, and central parts of the county consist of steep side slopes and moderately wide ridges. Small, narrow valleys are common along streams. The northern part of the county consists of undulating to hilly limestone uplands. In places on these uplands there are sinkholes and depressions characteristic of a karst landscape. The elevation ranges from 540 to 1,100 feet.

The climate is generally temperate and humid and is favorable for farming, the main enterprise in the county. It is favorable for raising beef and dairy cattle; however, in winter, the cold and snow can hamper the feeding and caring of the cattle. The growing season is favorable for a variety of crops, especially corn, tobacco, and soybeans.

General nature of the survey area

climate

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

In Monroe County, summers are hot, and winters are moderately cold. Rain is fairly heavy throughout the year. Snow falls nearly every winter, but the snow cover usually lasts only a few days.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Scottsville in the period 1951 to 1976. 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 39 degrees F, and the average daily minimum temperature is 30 degrees. The lowest temperature on record, which occurred at Scottsville on January 24, 1963, is -20 degrees. In summer the average temperature is 76 degrees, and the average daily maximum temperature is 87 degrees. The highest recorded temperature, which occurred on July 27, 1952, is 108 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 51 inches. Of this, 25 inches, or about 50 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 9.68 inches at Scottsville on June 23, 1969. Thunderstorms occur on about 60 days each year, and most occur in summer.

Average seasonal snowfall is 14 inches. The greatest snow depth at any one time during the period of record was 10 inches. On an average of 6 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 90 percent. The sun shines 70 percent of the time possible in summer and 40 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 10 miles per hour, in March.

settlement

The earliest recorded exploration of the survey area was by Martier Chartier, a French Canadian, who accompanied LaSalle in exploring the Mississippi Valley. More than 70 years later, Daniel Boone and many other hunters and pioneers from Kentucky explored part of the survey area near the Cumberland River. There were few permanent settlers until after the Revolutionary War. The earliest settlements were Fountain Run, Flippen, Meshack Creek, and Tompkinsville.

The earliest settlers raised small herds of cattle and sheep and grew cotton and flax. Many of these settlers found the deep, clayey, loamy, and heavily forested soils difficult to farm.

Until about 1855, these settlers tapped large quantities of sap from the numerous sugar maple trees in the area. The sap was made into sugar and syrup at refineries called sugar camps (*5*). This industry disappeared as new settlers cleared the land for corn and tobacco.

Monroe County was organized on January 19, 1820. It was carved from Barren and Cumberland Counties, and it was named for James Monroe, the fifth President of the United States. The present county boundaries were fixed in 1860. In 1940, the population was 14,070; in 1970 it was 11,642.

physiography, drainage, topography, and geology

Monroe County lies in the Eastern Pennyroyal physiographic region of the Mississippian Plateau. The region is characterized as a rolling upland plain.

The drainage pattern throughout most of the county is that of stream-cut topography. The eastern one-third of the county is highly dissected; it has rougher terrain and a more highly developed drainage pattern than other parts of the county. In places in the northern part of the county the drainage pattern is that of karst topography. The western and southern parts of the county are characterized by steep side slopes and long, meandering ridges that are moderately wide. The valleys between the ridges are narrow and winding.

The topography ranges from nearly level to steep. The elevation ranges from 540 to 1,100 feet.

The eastern, central, and southern parts of the county are drained by the Cumberland and Barren Rivers. The extreme northern part of the county is drained by Skaggs Creek and Peters Creek, which flow into the Barren River.

The geology consists of formations of the Mississippian, Devonian, and Ordovician periods (*4, 10*). Mississippian limestones of the St. Louis, Salem, and Warsaw formations underlie most of the survey area. Thin, interbedded, shaly limestone, siltstone, and shale of the Mississippian Fort Payne formation underlie the highly dissected eastern part of the county. The older Devonian and Ordovician rocks underlie the soils at the base of foot slopes along narrow and winding drainageways in the Cumberland River watershed; some outcrop.

farming

Farm products are the main source of income in Monroe County. In 1974, about 80 percent of the survey area was farmland (*9*). There were 1,283 farms, and the average farm size was 134 acres. A large number of these farms were family owned and operated.

Much of the farmland is used as pasture or hayland. Alfalfa and lespedeza are the most important forage crops. Burley tobacco, corn, soybeans, wheat and other small grains, and hay are the major cash crops. Tobacco, the most important cash crop, is grown on most farms.

The rolling and hilly topography is ideal for grassland and pasture. Most grasses and legumes grow well on the deep clayey and loamy soils even though the natural fertility of these soils is rated medium. Plant response to lime and fertilizer is excellent.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

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

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

general soil map units

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

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

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

The soils in the survey area vary widely in their potential for major land uses. In the descriptions that follow, general ratings of the potential of each map unit, in relation to that of the other map units, are given for major land uses. Soil potential ratings are based on the practices commonly used in the survey area to overcome soil limitations. These ratings reflect the ease of overcoming the limitations. They also reflect the problems that will persist even if such practices are used.

soil descriptions

1. Waynesboro-Crider-Bewleyville

Deep, gently sloping to steep, well drained soils that have a clayey or loamy subsoil; on ridges and side slopes

The soils in this map unit are on long and broad, undulating to steep ridges and side slopes (fig. 1). The side slopes are irregularly shaped. Karst topography, characterized by depressions and sinkholes, is common in some areas. The areas of this map unit are drained by a few small meandering streams and, in some karst areas, by the sinkholes and depressions. The slope ranges from 2 to 30 percent.

This map unit makes up about 24 percent of the survey area. Waynesboro soils make up 57 percent of this map unit; Crider soils, 18 percent; Bewleyville soils, 16 percent; and minor soils 9 percent.

The Waynesboro soils are on side slopes. The Crider soils and the Bewleyville soils are on ridges and side slopes. The Waynesboro soils are sloping to steep and moderately permeable. They have a loamy surface layer and a clayey subsoil. The Crider soils and the Bewleyville soils are gently sloping to sloping and moderately permeable. They have a loamy surface layer and subsoil. They differ mainly in the color of the upper part of the subsoil and in the kind of parent material. The Bewleyville soils are more yellow and less brown in the upper part of the subsoil than Crider soils. The Bewleyville soils formed in part in residuum of brecciated sandstone, and the Crider soils formed mostly in residuum of limestone.

Of minor extent in this map unit are the moderately well drained Bedford soils on upland flats and the well drained Nolin and Huntington soils, moderately well drained Lindside soils, and somewhat poorly drained Newark soils in depressions and drainageways and on flood plains.

The soils in this map unit are used mainly for pasture. In small areas they are used for tobacco, small grains, and soybeans and as hayland. About 20 percent of the acreage is woodland, brushland, or idle land.

The potential for most cultivated crops is fair. Cultivated crops are grown on the rolling to hilly soils. Because of the steepness of slope, erosion is a severe to very severe hazard; therefore, minimum tillage and other tillage systems that prevent erosion are needed. The potential for pasture and hayland is good. The potential for specialty crops is good. The potential for woodland is fair. The potential for most urban uses is fair. The steepness of slope and the shrink-swell potential of the soils are limitations to these uses. The potential is fair for intensive recreation uses and good for extensive recreation uses.

2. Garmon

Moderately deep, sloping to steep, well drained soils that have a shaly and loamy subsoil; on ridges and hillsides

The soils in this map unit are on ridges and hillsides, which are highly dissected by many meandering streams (fig. 2). On some hillsides there are sheer cliffs and, at the uppermost reaches of the slope, outcrops of limestone bedrock. Most of the soils on hillsides, especially those adjacent to drainageways, have convex slopes. Narrow areas of soils that formed in alluvium are

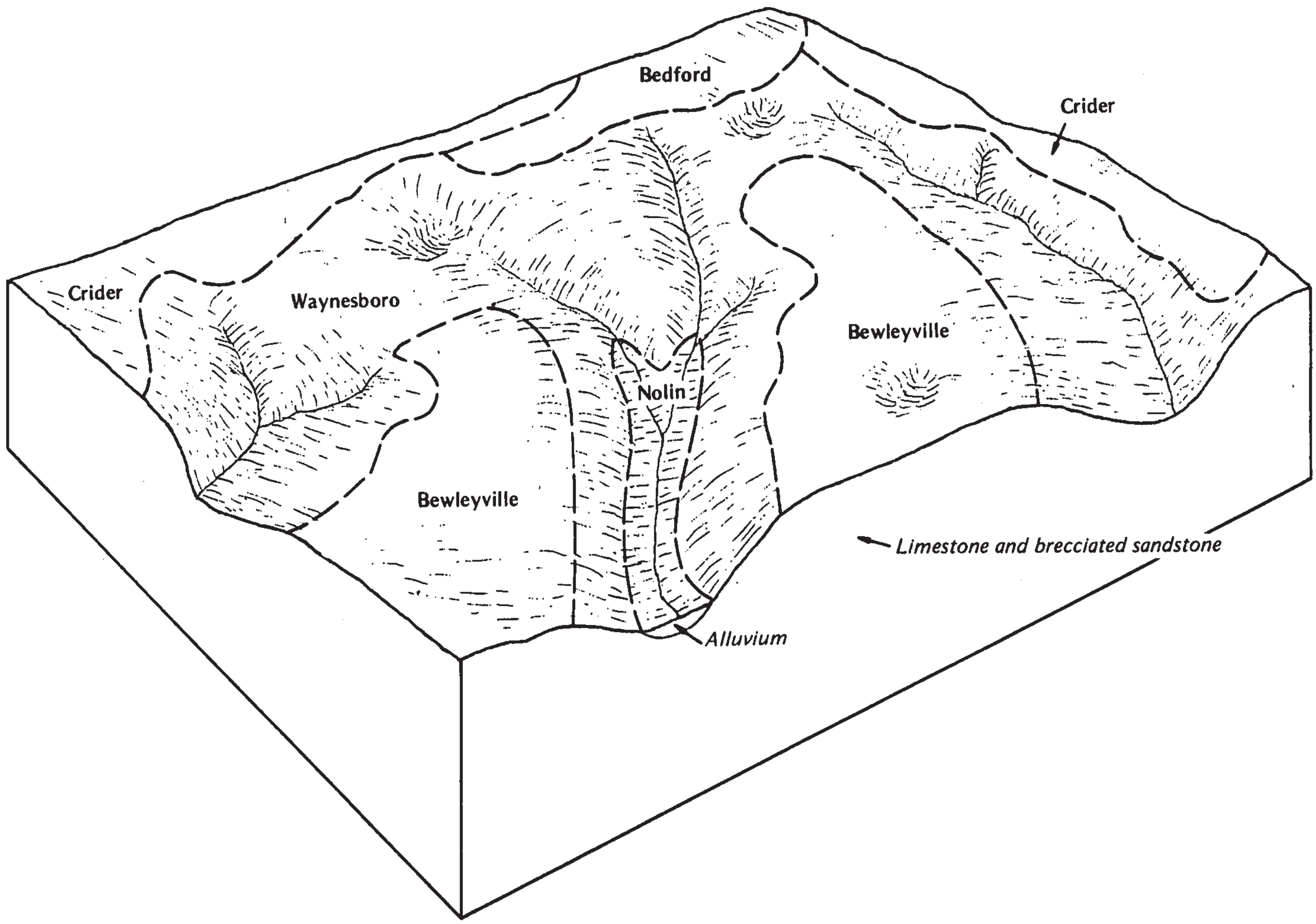


Figure 1.—Relationship of soils to topography and the underlying material in the Waynesboro-Crider-Bewleyville map unit.

along streams between the hills. These areas of alluvial soils increase in width as the tributaries wind their way into the Cumberland River. The slope ranges from 6 to 60 percent.

This map unit makes up about 28 percent of the survey area. Garmon soils make up about 65 percent of this map unit, and minor soils make up the rest.

The Garmon soils are moderately deep and moderately rapidly permeable. They have a loamy and shaly surface layer and subsoil, and they are underlain by shaly limestone, siltstone, or shale at a depth of 20 to 40 inches. These soils are sloping on the ridges and sloping to steep on the hillsides.

Of minor extent in this map unit are Waynesboro, Lowell, Crider, Nolin, Nolin Variant, Huntington, Lindside, Egam, Bedford, Newark, Lawrence, and Melvin soils. The Waynesboro, Lowell, and Crider soils are on ridges, side slopes, and foot slopes. They are deep and well drained. The Nolin, Nolin Variant, and Huntington soils are on flood plains. They are well drained. The Lindside, Egam, Newark, and Melvin soils are on flood plains. The Lawrence soils are on terraces. The Lindside and Egam soils are moderately well drained; the Newark and Lawrence soils are somewhat poorly drained; and the Melvin soils are poorly drained.

Most of the acreage of this map unit is woodland. About 30 percent of the acreage is used for cultivated crops, especially corn and soybeans, and as pasture and hayland. Crops are grown mainly on the soils of minor extent on the flood plains and stream terraces along the Cumberland River (fig. 3). Flooding and wetness are the main limitations to the use of these soils as cropland. The hazard of flooding has been reduced by the construction of Wolf Creek Dam on the Cumberland River.

The potential is poor for cultivated crops, specialty crops, most urban uses, and intensive recreation uses because of the steepness of slope, a very severe hazard of erosion, and depth to bedrock. The potential for woodland is fair to poor. The potential for extensive recreation uses is good.

3. Trimble-Garmon-Bewleyville

Deep or moderately deep, gently sloping to steep, well drained soils that have a loamy subsoil that is mainly cherty or shaly; on ridges and side slopes

The soils in this map unit are on ridges and side slopes (fig. 4). The broadest ridges are smooth, undulating, and generally uniform in elevation. Narrow ridges are complex and winding. The side slopes are fairly straight and short. Along the Barren River there are sheer cliffs and outcrops of limestone bedrock. The areas of this map unit are drained mainly by the Barren River and by small, meandering streams. The slope ranges from 2 to 30 percent.

This map unit makes up about 46 percent of the survey area. Trimble soils make up about 48 percent of the map unit; Garmon soils, 15 percent; Bewleyville soils, 7 percent; and minor soils, 30 percent.

Most Trimble soils are on narrow ridges and on side slopes above the Garmon soils, which are mainly on the steeper side slopes. The Bewleyville soils are on the broadest ridges. The Trimble soils are deep, gently sloping to steep, and moderately permeable. They have a cherty, loamy surface layer and subsoil, and they are underlain by cherty limestone. The Garmon soils are moderately deep, sloping to steep, and moderately rapidly permeable. They have a shaly, loamy surface layer and subsoil, and they are underlain by shaly limestone, siltstone, and shale. The Bewleyville soils are gently sloping to sloping, deep, and moderately permeable. They have a loamy surface layer and subsoil, and they are underlain by sandstone, shale, or limestone.

Of minor extent in this map unit are Bedford, Frederick, Tarklin, and Waynesboro soils on uplands and Melvin, Nolin, Nolin Variant, and Sensabaugh soils on flood plains.

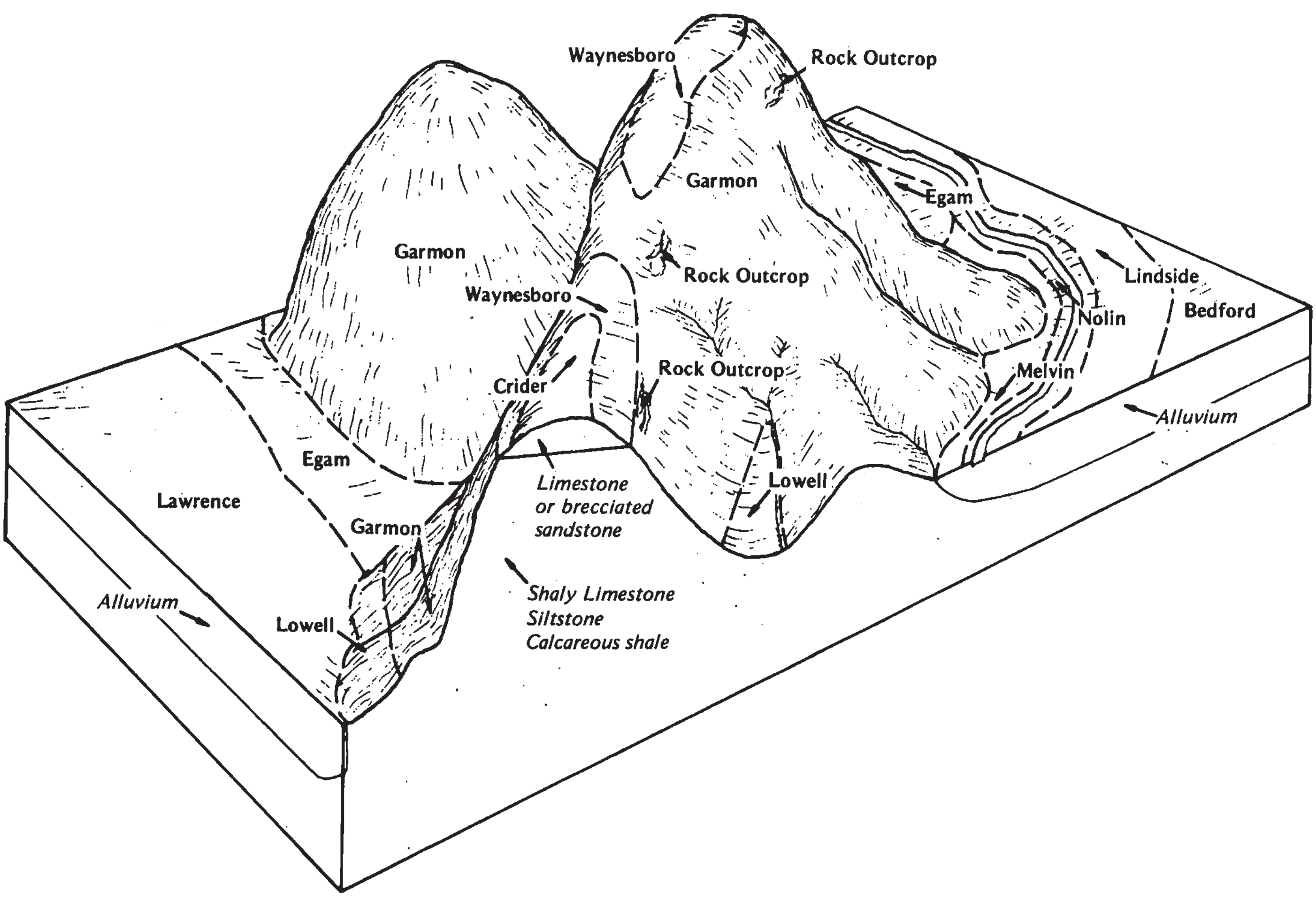


Figure 2.—Relationship of soils to topography and the underlying material in the Garmon map unit.

Figure 3.—In the Garmon map unit, crops are grown mainly on flood plains and stream terraces.

The soils in this map unit are used mainly for pasture, hay, and cultivated crops such as tobacco and corn (fig. 5). About 40 percent of the acreage is mostly woodland or idle land. Most of this acreage is on the steeper slopes that are highly dissected by drainageways.

The potential for cultivated crops is fair. The steepness of slope and a severe hazard of erosion are limitations to the use of these soils as cropland. The potential for woodland use and for most urban uses is fair. Slope and depth to bedrock are limitations to these uses. The potential for intensive recreation uses is fair. The potential for extensive recreation uses and for pasture is good.

4. Frederick-Bedford-Trimble

Deep, gently sloping to steep, well drained or moderately well drained soils that have a dominantly clayey subsoil or a loamy or loamy and cherty subsoil; on ridges and side slopes

The soils in this map unit are on nearly level to rolling ridges that are irregular in shape and vary in elevation, and on side slopes that are short and generally uniform in length (fig. 6). In some areas there are limestone sinkholes and depressions. The areas of this map unit are drained by a few meandering streams and by the sinkholes. The slope ranges from 2 to 30 percent.

This map unit makes up about 2 percent of the survey area. Frederick soils make up about 45 percent of this map unit; Bedford soils, 18 percent; Trimble soils, 15 percent; and minor soils, 22 percent.

Frederick soils are on the upper part of side slopes, on narrow ridges, and around the rim of depressions. Bedford soils are on the broadest, less sloping ridges. Trimble soils are mostly on side slopes, below Frederick and Bedford soils. Frederick soils are gently sloping to moderately steep and moderately permeable. They are cherty and loamy in the surface layer and in the upper part of the subsoil and clayey in the lower part of the subsoil. Bedford soils are gently sloping to sloping. They have a loamy surface layer and subsoil and a very slowly permeable fragipan at a depth of about 26 inches. Trimble soils are gently sloping to steep and moderately permeable. They have a cherty, loamy surface layer and subsoil. All these soils formed in residuum of limestone.

Of minor extent in this map unit are Bewleyville, Crider, and Waynesboro soils on uplands and Lindside, Skidmore, Newark, Nolin, and Melvin soils in sinks and depressions and on narrow stream bottoms.

The soils in this map unit are used mainly as pasture and hayland. In some small tracts the soils are cultivated to corn, tobacco, and small grains. About 20 percent of the acreage of this map unit is woodland or brushland.

The potential is fair for most cultivated crops and specialty crops. The Bedford soils are limited for use as cropland by very slow permeability and wetness. The Frederick and Trimble soils are limited for this use by small chert fragments in the plow layer and a severe hazard of erosion. The potential is good for pasture and fair for woodland. The potential is fair for intensive recreation uses and good for extensive recreation uses. The potential for urban uses is fair. The major limitations to urban uses are excessive wetness and very slow permeability in the Bedford soils and a hazard of shrinking and swelling in Frederick soils. Urban structures can be designed to offset some of these limitations.

broad land use considerations

Cultivated cropland makes up approximately 27 percent of the survey area (*7*). Cropland is scattered throughout the survey area, but most is in areas of map units 1, 3, and 4. The soils in these map units have fair potential for use as cultivated cropland. They are on ridges, side slopes, and hillsides, and slope and a hazard of erosion are the main limitations to the use of these soils as cultivated cropland. In map unit 4, wetness is an additional limitation to this use because of the slow permeability of the Bedford soils.

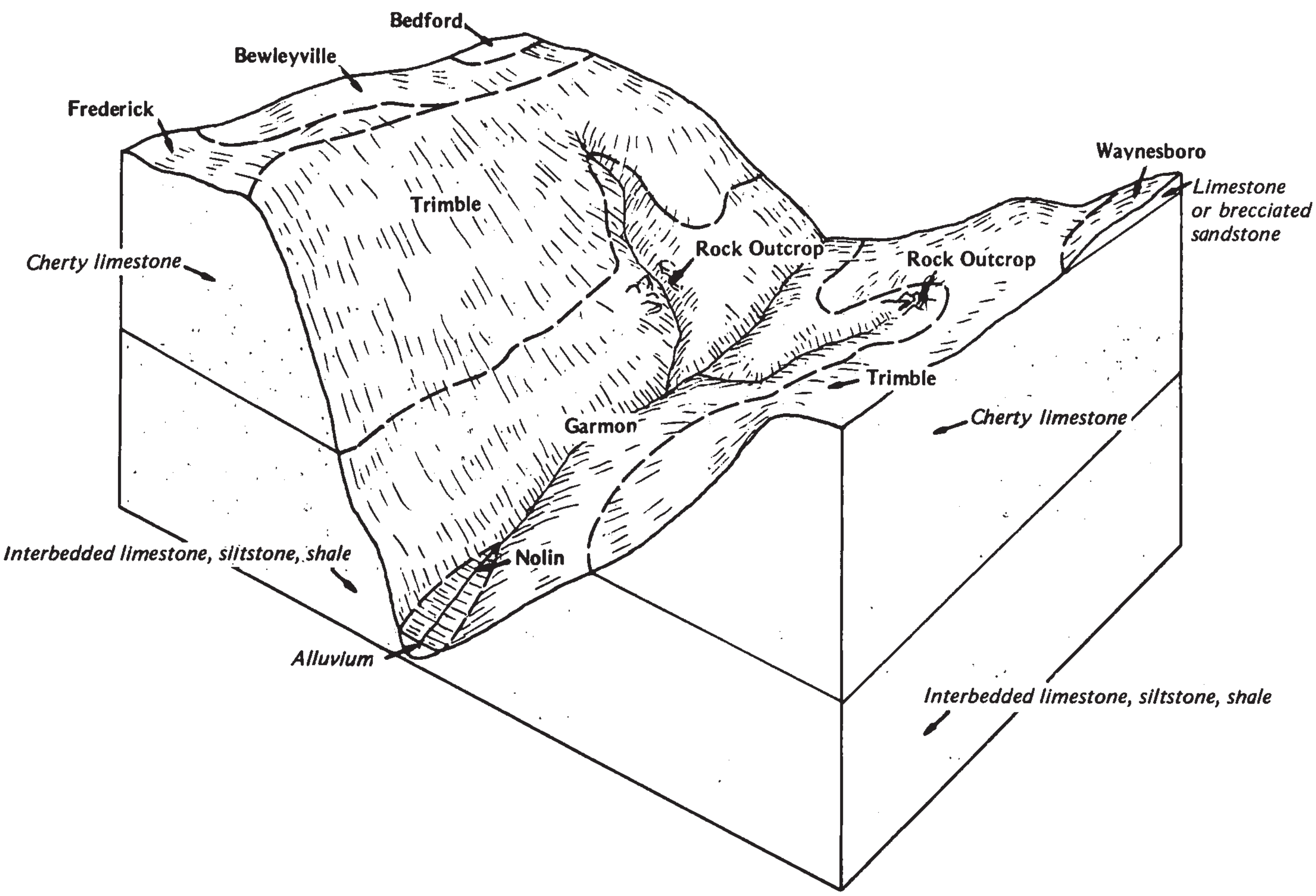


Figure 4.—Relationship of soils to topography and the underlying material in the Trimble-Garmon-Bewleyville map unit.

Figure 5.—Typical landscape in an area of the Trimble-Garmon-Bewleyville map unit.

Pasture makes up approximately 23 percent of the survey area. The soils in map units 1, 3, and 4 have good potential for this use.

Woodland makes up approximately 46 percent of the survey area. The soils in map units 1, 3, and 4 have fair potential for this use, and the soils in map unit 2 have fair to poor potential. Some of these soils have a moderate or severe equipment limitation, which can be offset by using special equipment.

About 4,089 acres in the county is classified as urban or built-up land. In general, the gently sloping to sloping Bewleyville and Crider soils have good potential for urban uses. These soils are mainly in map unit 1. Smaller areas of Bewleyville soils are in map unit 3. The Garmon soils in

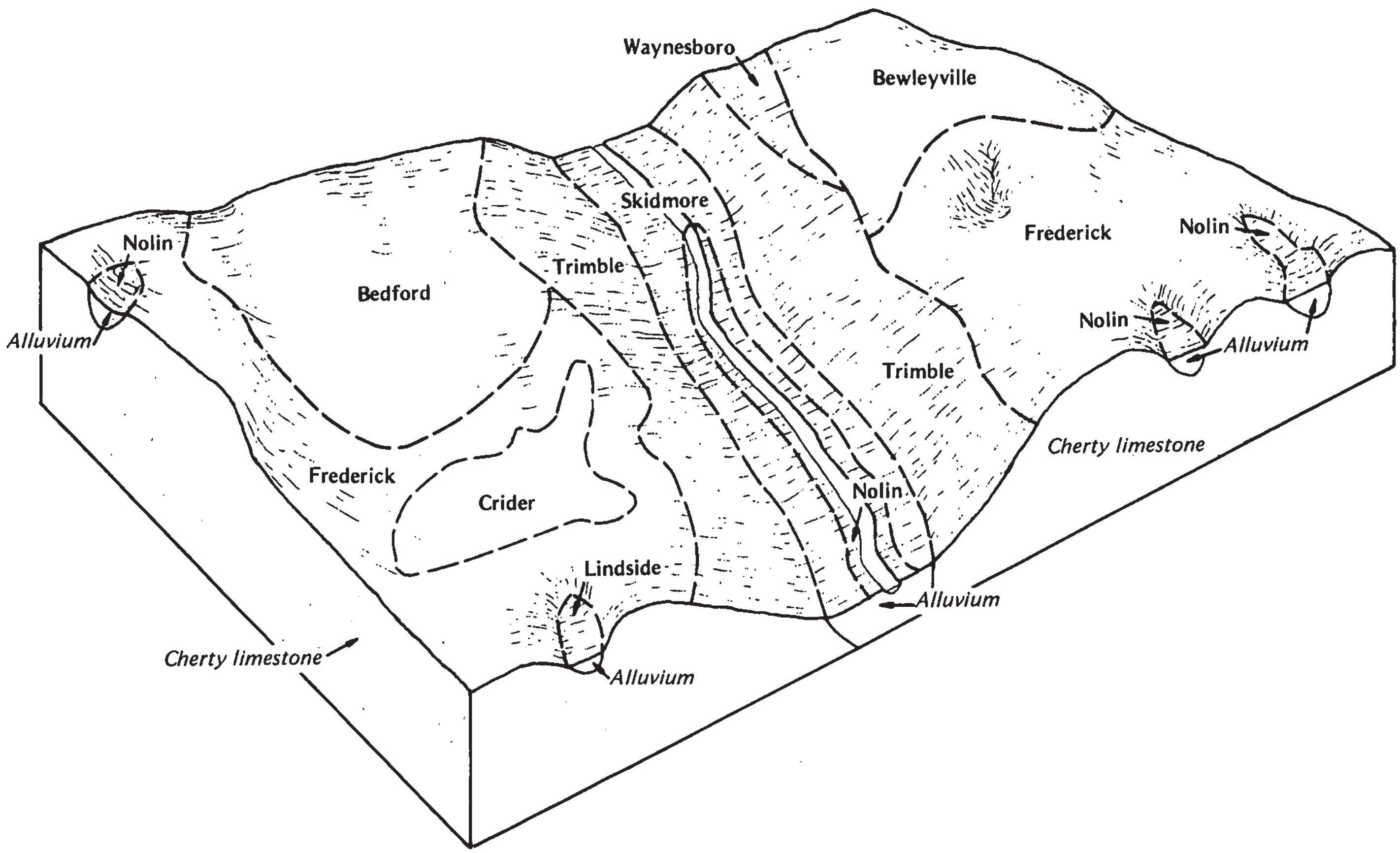


Figure 6.—Relationship of soils to topography and the underlying material in the Frederick-Bedford-Trimble map unit.

map unit 2 have poor potential for urban uses because of the steepness of slope and the moderate depth to bedrock. Low strength, wetness, and steepness of slope are limitations to these uses in all the map units. Sites that are suitable for houses or small commercial buildings, however, are generally available in this survey area.

The potential for recreation uses ranges from good to poor, depending on the intensity of the expected uses. The soils in map units 1, 3, and 4 have fair potential for intensive recreation uses. The soils in map unit 2 have poor potential for these uses because of the steepness of slope; however, in some small areas the soils are suitable for these uses. The potential for extensive recreation uses is good in map units 1, 2, and 4 and fair in map unit 3.

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, Waynesboro loam, 2 to 6 percent slopes, is one of several phases in the Waynesboro 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 major soils or one or more soils and a miscellaneous area (an area having little or no soil material and supporting little or no vegetation). The soils making up a complex, and the miscellaneous area if included, occur 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 and miscellaneous area are somewhat similar in all areas. Caneyville silt loam-Rock outcrop complex, 6 to 30 percent slopes, is an example.

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

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

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

soil descriptions

BeB—Bedford silt loam, 2 to 6 percent slopes. This is a deep, moderately well drained, gently sloping soil. It is on broad and narrow ridges. Areas of this soil range from 2 acres to more than 50 acres in size. Most are small and irregularly shaped. Larger areas are in the western part of the county, where the ridges are broader.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil to a depth of 26 inches is yellowish brown silt loam. From 26 to 38 inches it is a yellowish brown silty loam fragipan that has mottles of light brownish gray, pale brown, and brown. And from 38 to 61 inches it is mottled, yellowish red silty clay loam.

This soil is medium in natural fertility and low in content of organic matter. Reaction is very strongly acid to extremely acid in unlimed areas. Permeability is moderate above the fragipan and very slow in the fragipan. The available water capacity is moderate. Tilth is good. A seasonal water table is at a depth of 2 to 4 feet. The root zone is moderately deep; the fragipan restricts root growth. The shrink-swell potential is moderate.

Included in mapping are small areas of eroded Bedford soils and small areas of similar soils on stream terraces and foot slopes. Also included are small areas of Bewleyville and Crider soils and, along Turkey Neck Bend on the Cumberland River, a soil that does not have a well defined fragipan and has a higher content of sand than this Bedford soil.

Most of the acreage of this soil is used for cultivated crops and pasture. This soil has good potential for cultivated crops. Erosion is a moderate hazard if cultivated crops are grown. No-tillage, minimum tillage, and the use of grasses and legumes in the cropping system can help to reduce runoff and control erosion. This soil also has good potential for use as pasture and hayland. However, the fragipan and the wetness of the soil material above the fragipan restrict the growth of deep-rooted grasses and legumes.

This soil has fair potential for use as woodland. It has no significant limitation to this use. Yellow-poplar, eastern white pine, white ash, and shortleaf pine are some of the important trees to plant for commercial production.

This soil has good potential for use as habitat for openland wildlife. It also has good potential for use as habitat for woodland wildlife; however, only a small acreage is wooded.

This soil has fair potential for most urban uses. The wetness of the soil material above the fragipan is the major limitation to these uses. However, for most urban uses this limitation can be offset by good design.

This map unit is in capability subclass IIe and woodland suitability group 3o.

BeC—Bedford silt loam, 6 to 12 percent slopes. This is a deep, moderately well drained, sloping soil. It is on broad ridges. Areas of this soil range in size from 5 acres to more than 20 acres.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil to a depth of 26 inches is yellowish brown silt loam. From 26 to 38 inches it is a yellowish brown silt loam fragipan that has mottles of light brownish gray and pale brown. And from 38 to 61 inches it is mottled, yellowish red silty clay loam.

This soil is medium in natural fertility and low in content of organic matter. Reaction is very strongly acid to extremely acid in unlimed areas. Permeability is moderate above the fragipan and very slow in the fragipan. The available water capacity is moderate. Tilth is good. A seasonal water table is at a depth of 2 to 4 feet. The root zone is moderately deep; the fragipan restricts root growth. The shrink-swell potential is moderate.

Included in mapping are small areas of eroded Bedford soils and small areas of similar soils on stream terraces and foot slopes. Also included are small areas of Bewleyville and Crider soils.

Most of the acreage of this soil is used for cultivated crops and pasture. This soil has fair potential for cultivated crops. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, no-tillage, the use of crop residue, and the use of grass and legumes and other cover crops in the cropping system can help reduce runoff and control erosion. This soil has good potential for use as pasture and hayland. However, the fragipan and the wetness of the soil material above the fragipan restrict the growth of deep rooted grasses and legumes.

This soil has fair potential for use as woodland. It has no significant limitation to this use. Yellow-poplar, eastern white pine, white ash, and shortleaf pine are some of the important trees to plant for commercial production.

This soil has good potential for use as habitat for openland wildlife. It also has good potential for use as habitat for woodland wildlife; however, only a small acreage is wooded.

This soil has fair potential for most urban uses. Wetness and slope are limitations to these uses. For some urban uses these limitations can be offset by good design.

This map unit is in capability subclass IIIe and woodland suitability group 3o.

BvB—Bewleyville silt loam, 2 to 6 percent slopes. This is a deep, well drained, gently sloping soil. It is on broad and narrow ridges. Areas are about 2 to 40 acres in size.

Typically, the surface layer is yellowish brown silt loam about 8 inches thick. The subsoil to a depth of 28 inches is yellowish red silt loam. From 28 to 40 inches it is yellowish red silty clay loam. And from 40 to 65 inches it is dark red silty clay loam.

This soil is high in natural fertility and low in content of organic matter. Reaction is very strongly acid or strongly acid in unlimed areas. Permeability is moderate, and the available water capacity is high. Tilth is good. The root zone is deep and is easily penetrated by the roots. The shrink-swell potential is moderate below a depth of 40 inches.

Included in mapping are small areas of similar soils on stream terraces and foot slopes. Also included are a few spots of eroded Bewleyville soils and a few small areas of Trimble, Crider, and Bedford soils.

This soil is used mainly for cultivated crops and pasture. It has good potential for cultivated crops. High yields can be obtained if the soil is well managed. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, no-tillage, the use of crop residue, and the use of grasses and legumes and other cover crops in the cropping system can help reduce runoff and control erosion. Incorporating crop residue in the soil is an easy way to maintain tilth. This soil also has good potential for use as pasture and hayland (fig. 7). Under a high level of management most of the commonly grown grasses and legumes are long lived.

This soil has fair potential for use as woodland. It has no significant limitation to this use. It is used as woodland in only a few areas. It is well suited to yellow-poplar, black walnut, loblolly pine, and eastern redcedar.

This soil has good potential for use as habitat for woodland wildlife or for openland wildlife.

Figure 7.—This hayland is on Bewleyville silt loam, 2 to 6 percent slopes.

This soil has good potential for most urban uses. Low strength is a limitation to the use of this soil as sites for local roads and streets. This limitation can be offset by good design.

This map unit is in capability subclass IIe and woodland suitability group 3o.

BvC—Bewleyville silt loam, 6 to 12 percent slopes. This is a deep, well drained, sloping soil. It is on broad and narrow ridges and on side slopes. Most areas range in size from 4 to 80 acres.

Typically, the surface layer is yellowish brown silt loam about 8 inches thick. The subsoil to a depth of 28 inches is yellowish red silt loam. From 28 to 40 inches it is yellowish red silty clay loam. And from 40 to 65 inches it is dark red silty clay loam.

This soil is high in natural fertility and low in content of organic matter. Reaction in the solum is very strongly acid or strongly acid in unlimed areas. Permeability is moderate, and the available water capacity is high. Tilth is good. The root zone is deep and is easily penetrated by the roots. The shrink-swell potential is moderate below a depth of 40 inches.

Included in mapping are small areas of similar soils on terraces and foot slopes. Also included are a few spots of eroded Bewleyville soils and a few areas of Trimble and Crider soils.

This soil is used mainly for cultivated crops and pasture. It has fair potential for cultivated crops. High yields can be obtained if the soil is well managed. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, no-tillage, the use of crop residue, and the use of grasses and legumes and other cover crops in the cropping system can help reduce runoff and control erosion. Incorporating crop residue in the soil is an easy way to maintain tilth. This soil has good potential for use as pasture and hayland. Under a high level of management most of the commonly grown grasses and legumes are long lived.

This soil has fair potential for use as woodland. It has no significant limitation to this use. It is used as woodland in only a few areas. It is well suited to yellow-poplar, black walnut, eastern redcedar, and loblolly pine.

This soil has good potential for use as habitat for woodland wildlife or openland wildlife.

This soil has fair potential for most urban uses. Slope is the most significant limitation to these uses. Low strength is a limitation to the use of this soil as sites for local roads and streets. The limitations can be offset by good design.

This map unit is in capability subclass IIIe and woodland suitability group 3o.

CaD—Caneyville silt loam-Rock outcrop complex, 6 to 30 percent slopes. This complex consists of small areas of Caneyville silt loam and small areas of Rock outcrop that are so intermingled that they could not be separated in mapping at the scale used. This complex is on uplands.

Caneyville silt loam, 6 to 30 percent slopes, makes up about 60 to 90 percent of the complex. It is a sloping to steep, well drained, moderately deep, clayey soil. Areas of this soil are about 1 to 3 acres in size. Typically, the surface layer is brown silt loam about 5 inches thick. The subsoil to a depth of 10 inches is dark brown silt loam. From 10 to 39 inches it is yellowish red clay. Hard limestone bedrock underlies the subsoil.

This soil is low in natural fertility and in content of organic matter. Reaction is very strongly acid to medium acid in the upper part of the soil in unlimed areas. In the lower part of the soil, reaction is medium acid to slightly acid. Permeability is moderately slow, and the available water capacity is moderate. The plow layer is easily tilled. The shrink-swell potential is moderate. The root zone is moderately deep. Bedrock is at a depth of 20 to 40 inches.

Rock outcrop makes up about 10 to 40 percent of the complex. Typically, it is on ridgetops, points of ridges, slope breaks, and foot slopes. In areas of this complex along the western edge of the survey area the outcrops are widely spaced and are single or in band-shaped clusters (fig. 8). In some of these areas the outcrops are slightly rounded and are generally less than 1 foot high. In other areas of this complex the outcrops are large, closely spaced clusters or blocks. On the more highly dissected landscapes in these areas, the outcrops are bluffs and ledges several feet high. Active or abandoned rock quarries are common in these areas.

Figure 8.—This Rock outcrop is in an area of Caneyville silt loam-Rock outcrop complex, 6 to 30 percent slopes, in the western part of the survey area. The Caneyville soil is used as pasture and woodland.

Included in mapping are small areas of Waynesboro, Frederick, and Garmon soils. Also included are small spots of severely eroded Caneyville soils and soils that are similar to Caneyville soils except that they have bedrock at a depth of less than 20 inches.

The Caneyville soil is used mainly as pasture and woodland. It has poor potential for most cultivated crops and for hay and pasture because of the Rock outcrop and the steepness of slope. In some areas, however, the percentage of Rock outcrop is low enough that the soil has some value as pasture.

The Caneyville soil has fair potential for use as woodland. The most significant limitations to this use are the steepness of slope and the Rock outcrop. Eastern redcedar, Virginia pine, eastern white pine, and shortleaf pine are some of the important trees to plant or favor for commercial production.

The Caneyville soil has good potential for use as habitat for woodland wildlife and fair potential for use as habitat for openland wildlife.

The Caneyville soil has poor potential for most urban uses. The steepness of slope, the high content of clay, the depth to bedrock, and the Rock outcrop are the most significant limitations to these uses.

This complex is in capability subclass VIs and woodland suitability group 3c.

CrB—Crider silt loam, 2 to 6 percent slopes. This is a deep, well drained, gently sloping soil. It is on moderately broad ridges. Areas are about 2 to 20 acres in size.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil to a depth of 24 inches is brown silty clay loam. From 24 to 36 inches it is reddish brown silty clay loam. And from 36 to 65 inches it is yellowish red silty clay loam.

This soil is high in natural fertility and low in content of organic matter. Reaction is slightly acid to strongly acid in the upper part of the soil in unlimed areas. In the lower part of the soil, reaction is medium acid to very strongly acid. Permeability is moderate, and the available water capacity is high. Tilth is good. The shrink-swell potential is moderate below a depth of 36 inches. The root zone is deep and is easily penetrated by the roots.

Included in mapping are a few spots of eroded Crider soils and a few small areas of similar soils on stream terraces. Also included are small areas of Bedford, Bewleyville, and Waynesboro soils.

Most of the acreage of this soil is used for cultivated crops and pasture. This soil has good potential for cultivated crops. High yields can be obtained if the soil is well managed. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, no-tillage, the use of crop residue, and the use of grasses and legumes and other cover crops in the cropping system can help to reduce runoff and control erosion. Incorporating crop residue in the soil is an easy way to maintain tilth. This soil also has good potential for hay and pasture. Under a high level of management most of the commonly grown grasses and legumes are long lived.

This soil has good potential for use as woodland. It has no significant limitation to this use. It is used as woodland in only a few areas. It is well suited to eastern white pine, yellow-poplar, black walnut, loblolly pine, American sycamore, and white ash.

This soil has good potential for use as habitat for woodland wildlife or openland wildlife.

This soil has good potential for most urban uses. Low strength is a limitation for local roads and streets. This limitation can be offset by good design.

This map unit is in capability subclass IIe and woodland suitability group 1o.

CrC—Crider silt loam, 6 to 12 percent slopes. This is a deep, well drained, sloping soil. It is on narrow ridges and side slopes. Areas vary in width and length. They range in size from about 3 to 50 acres.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil to a depth of 24 inches is brown silty clay loam. From 24 to 36 inches it is reddish brown silty clay loam. And from 26 to 65 inches it is yellowish red silty clay loam.

This soil is high in natural fertility and low in content of organic matter. Reaction is slightly acid to very strongly acid in the upper part of the soil in unlimed areas. In the lower part, reaction is medium acid to very strongly acid. Permeability is moderate and the available water capacity is high. Tilth is good. The shrink-swell potential is moderate below a depth of 38 inches. The root zone is deep and is easily penetrated by the roots.

Included in mapping are a few spots of eroded Crider soils and small areas of Bedford, Bewleyville, and Waynesboro soils.

Most of the acreage of this soil is used for cultivated crops and pasture. This soil has fair potential for cultivated crops. High yields can be obtained if the soil is well managed. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, no-tillage, the use of crop residue, and the use of grasses and legumes and other cover crops in the cropping system can help to reduce runoff and control erosion. Incorporating crop residue in the soil is an easy way to maintain tilth. This soil has good potential for hay and pasture. Under a high level of management most of the commonly grown grasses and legumes are long lived.

This soil has good potential for use as woodland. It has no significant limitation to this use. It is used as woodland in only a few areas. It is well suited to eastern white pine, yellow-poplar, black walnut, loblolly pine, American sycamore, and white ash.

This soil has good potential for use as habitat for woodland wildlife or openland wildlife.

This soil has good potential for most urban uses. Low strength is a limitation for local roads and streets. This limitation can be offset by good design.

This map unit is in capability subclass IIIe and woodland suitability group 1o.

Eg—Egam silty clay loam. This is a deep, moderately well drained, nearly level soil. It is on flood plains along the Cumberland River and its tributaries. Areas range in size from 2 to 110 acres. The slope ranges from 0 to 2 percent.

Typically, the surface layer is dark brown silty clay loam about 8 inches thick. The subsoil to a depth of 20 inches is dark brown silty clay loam. From 20 to 36 inches it is dark grayish brown silty clay. And from 36 to 64 inches it is dark brown silty clay.

This soil is high in natural fertility and moderate in content of organic matter. Reaction is medium acid to neutral throughout. Permeability is moderately slow, and the available water capacity is high. Tilth is good only within a narrow range in moisture content. A seasonal water table is at a depth of 3 to 4 feet. Most areas of this soil are subject to flooding, especially in winter and early in spring. Some areas along the Cumberland River are protected from flooding by Wolf Creek Dam. The shrink-swell potential is moderate. The root zone is deep. In most years this soil forms cracks one-half inch or more in width and 12 to 20 inches in depth.

Included in mapping are small areas of Lindside, Nolin, and Huntington soils. These included soils make up less than 5 percent of this map unit. Individual areas of these soils are generally less than 3 acres.

Most of the acreage of this soil is used as cultivated cropland. This soil has good potential for cultivated crops. High yields can be obtained if the soil is well managed. Incorporating crop residue in the soil is an easy way to maintain tilth. Flooding seldom occurs during the growing season. This soil also has good potential for use as pasture and hayland. In most areas, it is best suited to those varieties of pasture plants and hay crops that can tolerate the occasional flooding. The use of surface and subsurface drainage systems can make this soil suitable for a greater variety of plants and can increase yield potential.

This soil has good potential for use as woodland. It has no significant limitation to this use. It is well suited to yellow-poplar, black walnut, and loblolly pine.

This soil has good potential for use as habitat for woodland wildlife or openland wildlife.

This soil has poor potential for most urban uses. The hazard of flooding and the moderately slow permeability are the most significant limitations to these uses.

This map unit is in capability subclass IIw and woodland suitability group 2o.

FrB—Frederick cherty silt loam, 2 to 6 percent slopes. This is a deep, well drained, gently sloping soil. It is mainly on the broader ridges. Areas are 2 to 10 acres in size. They vary in width and length.

Typically, the surface layer is brown cherty silt loam about 6 inches thick. The subsoil to a depth of 22 inches is strong brown cherty silty clay loam and yellowish red silty clay loam. From 22 to 62 inches it is mottled red clay. The substratum to a depth of 70 inches is clay that is mottled in shades of brown, red, and gray.

This soil is medium in natural fertility and low in content of organic matter. Reaction is medium acid to very strongly acid in the upper part of the soil and very strongly acid to medium acid in the lower part. Permeability is moderate, and the available water capacity is high. The chert fragments in the surface layer hinder cultivation. The shrink-swell potential is moderate. The root zone is deep.

Included in mapping are a few spots of eroded Bedford soils, where material from the surface layer and material from the subsoil are intermingled. Also included are small areas of Bewleyville and Crider soils.

Most of the acreage of this soil is used as pasture or is idle. This soil has good potential for hay and pasture. It is very well suited to most of the commonly grown grasses and legumes.

This soil has fair potential for use as cultivated cropland. The size and location of the mapped areas and the cherty fragments in the surface layer are limitations to this use. If cultivated crops are grown, erosion is a moderate hazard. No-tillage, minimum tillage, the use of crop residue, and the use of grasses and legumes and other cover crops in the cropping system can help reduce runoff and control erosion.

This soil has good potential for use as woodland. It has no significant limitation to this use. It is well suited to yellow-poplar, eastern white pine, black walnut, white ash, and northern red oak.

This soil has good potential for use as habitat for woodland wildlife or openland wildlife.

This soil has fair potential for most urban uses. The high content of clay, the coarse fragments, and the shrink-swell potential are limitations to these uses. Low strength is a limitation to the use of this soil as sites for local roads and streets. The limitations can be offset by good design.

This map unit is in capability subclass IIIe and woodland suitability group 2c.

FrC—Frederick cherty silt loam, 6 to 12 percent slopes. This is a deep, well drained, sloping soil. It is mainly on ridges and side slopes. Areas range from 4 to 40 acres in size and are extremely variable in shape. Sinkholes and depressions are in some areas.

Typically, the surface layer is brown cherty silt loam about 6 inches thick. The subsoil to a depth of 22 inches is strong brown cherty silty clay loam and yellowish red silty clay loam. From 22 to 62 inches it is mottled red clay. The substratum to a depth of 70 inches is clay that is mottled in shades of brown, red, and gray.

This soil is medium in natural fertility and low in content of organic matter. Reaction is medium acid to very strongly acid in the upper part of the soil and very strongly acid to medium acid in the lower part. Permeability is moderate, and the available water capacity is high. The chert fragments in the surface layer hinder cultivation. The shrink-swell potential is moderate. The root zone is deep.

Included in mapping are a few spots of eroded Bedford soils, where material from the surface layer and material from the subsoil are intermingled. Also included are small areas of Trimble and Waynesboro soils.

Most of the acreage of this soil is used as pasture or hayland or is idle. This soil has good potential for hay and pasture. It is well suited to most of the commonly grown grasses and legumes.

This soil has fair potential for use as cultivated cropland. The slope, the size of the mapped areas, and the chert fragments in the surface layer are limitations to this use. If cultivated crops are grown, erosion is a severe hazard. No-tillage, minimum tillage, the use of crop residue, and the use of grasses and legumes and other cover crops in the cropping system can help reduce runoff and control erosion.

This soil has good potential for use as woodland. The only significant limitation to this use is the high content of clay, which limits the use of heavy equipment on the soil in wet seasons. This soil is well suited to yellow-poplar, eastern white pine, black walnut, and northern red oak.

This soil has good potential for use as habitat for openland and woodland wildlife.

This soil has fair potential for most urban uses. The high content of clay, the coarse fragments, the shrink-swell potential, and the slope are limitations to these uses. Low strength is a limitation to the use of this soil as sites for local roads and streets. The limitations can be offset by good design.

This map unit is in capability subclass IIIe and woodland suitability group 2c.

FrD—Frederick cherty silt loam, 12 to 20 percent slopes. This is a deep, well drained, moderately steep soil. It is on side slopes that are commonly short. Areas are irregular in shape and 5 to 40 acres in size.

Typically, the surface layer is brown cherty silt loam 6 inches thick. The subsoil to a depth of 22 inches is strong brown cherty silty clay loam and yellowish red silty clay loam. From 22 to 62 inches it is mottled red clay. The substratum to a depth of 70 inches is red clay that is mottled in shades of brown, red, and gray.

This soil is medium in natural fertility and low in content of organic matter. Reaction is medium acid to very strongly acid in the upper part of the soil and very strongly acid to medium acid in the lower part. Permeability is moderate, and the available water capacity is high. The chert fragments in the surface layer hinder cultivation. The shrink-swell potential is moderate. The root zone is deep.

Included in mapping are small areas of eroded Frederick soils. Also included are small spots of Trimble and Waynesboro soils.

Most of the acreage of this soil is used as pasture or hayland or is idle. The potential for hay and pasture is fair under a high level of management.

This soil has poor potential for most cultivated crops. Erosion is a very severe hazard if cultivated crops are grown. No-tillage, the use of crop residue, and the use of grasses and legumes and other cover crops in the cropping system can help to reduce runoff and control erosion.

This soil has good potential for use as woodland. Yellow-poplar, black walnut, eastern white pine, white ash, and northern red oak are some of the important trees to plant or favor for commercial production. The high content of clay and the steepness of slope limit the use of heavy equipment, especially during wet seasons. The hazard of erosion increases if this soil is disturbed by timber-harvesting equipment.

This soil has good potential for use as habitat for woodland wildlife and fair potential for use as habitat for openland wildlife.

This soil has poor potential for most urban uses. The high content of clay, the coarse fragments, the moderate shrink-swell potential, and the steepness of slope are limitations to these uses. Low strength is a limitation to the use of this soil as sites for local roads and streets. Some of the limitations can be offset by good design.

This map unit is in capability subclass IVe and woodland suitability group 2c.

FtD3—Frederick cherty silty clay loam, 12 to 20 percent slopes, severely eroded. This is a deep, well drained, moderately steep soil. It is on side slopes that commonly are short and moderately wide. Areas are irregular in shape and 2 to 6 acres in size. Erosion has removed much of the original surface layer and in places has exposed the subsoil. Shallow gullies have developed in some areas.

Typically, the surface layer is yellowish red cherty silty clay loam about 3 inches thick. The subsoil extends to a depth of 60 inches. It is mottled red clay. The substratum to a depth of 70 inches is red clay that is mottled in shades of brown, red, and gray.

This soil is medium in natural fertility and low in content of organic matter. Reaction is medium acid to very strongly acid in the upper part of the soil and very strongly acid to medium acid in the lower part. Permeability is moderate, and the available water capacity is high. The plow layer is difficult to till because of the high content of clay and the chert fragments. The root zone is deep. The shrink-swell potential is moderate.

Included in mapping are areas of a similar soil that has slope of 6 to 12 percent. Also included are small areas of Trimble and Waynesboro soils.

Most of the acreage of this soil is used as unimproved pasture or is idle. This soil has fair potential for pasture. It is suited to most of the grasses and legumes commonly grown in the survey area.

This soil has poor potential for cultivated crops. Erosion is a severe hazard if cultivated crops are grown. Because of the hazard of erosion, this soil should have a permanent vegetative cover.

This soil has good potential for use as woodland. Yellow-poplar, black walnut, white ash, eastern white pine, and northern red oak are some of the important trees to plant or favor for commercial production. The high content of clay and the steepness of slope limit the use of heavy equipment for timber harvesting or planting. The hazard of erosion increases if this soil is disturbed by the heavy equipment.

This soil has good potential for use as habitat for woodland wildlife and fair potential for use as habitat for openland wildlife.

This soil has poor potential for most urban uses because of the steepness of slope. For some uses this limitation can be offset by good design. Low strength is a limitation to the use of this soil as sites for local roads and streets. This limitation can be offset by good design.

This map unit is in capability subclass VIe and woodland suitability group 2c.

GaC—Garmon shaly silt loam, 6 to 12 percent slopes. This is a moderately deep, well drained, sloping soil. It is generally on ridges and side slopes. Most areas are irregular in shape and 10 to 45 acres in size.

Typically, the surface layer is brown shaly silt loam about 7 inches thick. The subsoil is yellowish brown shaly silt loam, and it extends to a depth of 26 inches. Shaly limestone bedrock is below that depth.

This soil is low in natural fertility and in content of organic matter. Reaction is medium acid to neutral throughout. Permeability is moderately rapid, and the available water capacity is low. The shaly limestone fragments in the surface layer hinder cultivation. The shrink-swell potential is low. The root zone is moderately deep. Bedrock is at a depth of 20 to 40 inches.

Included in mapping are small areas where the soils are eroded and material from the surface layer and material from the subsoil are intermingled. Also included are small areas where the soils are less than 20 inches deep to bedrock. In some mapped areas, there are spots of Trimble and Bewleyville soils. In other areas, the content of shale in the surface layer is less than 15 percent, by volume.

Most of the acreage of this soil is used as woodland. A small acreage is used for cultivated crops and pasture.

This soil has poor potential for cultivated crops because it has a shaly surface layer and is mainly in small, isolated areas that are adjacent to areas of steeper soils. Erosion is a severe hazard if cultivated crops are grown. The potential for hay and pasture is fair.

This soil has fair potential for use as woodland. It has no significant limitations to this use. Shortleaf pine, eastern redcedar, eastern white pine, and Virginia pine are some of the important trees to plant or favor for commercial production.

This soil has fair potential for use as habitat for openland wildlife and good potential for use as habitat for woodland wildlife.

This soil has fair potential for most urban uses. The use of this soil as septic tank absorption fields, as sites for houses with basements, and as sites for shallow excavations is limited primarily by depth to bedrock and by slope.

This map unit is in capability subclass IVe and woodland suitability group 4o.

GaD—Garmon shaly silt loam, 12 to 20 percent slopes. This is a moderately deep, moderately steep soil. It is mainly on the upper part of hillsides. In some areas, it is adjacent to alluvial soils along small streams. Most areas are long, narrow, and very irregular in shape and 4 to more than 90 acres in size.

Typically, the surface layer is brown shaly silt loam about 7 inches thick. The subsoil is yellowish brown shaly silt loam, and it extends to a depth of 26 inches. Shaly limestone bedrock is below that depth.

This soil is low in natural fertility and in content of organic matter. Reaction is medium acid to neutral throughout. Permeability is moderately rapid, and the available water capacity is low. The shaly limestone fragments in the surface layer hinder cultivation. The shrink-swell potential is low. The root zone is moderately deep. Bedrock is at a depth of 20 to 40 inches.

Included in mapping are small areas where the soils are eroded and material from the surface layer and material from the subsoil are intermingled. Also included are small areas where the soils are less than 20 inches deep to bedrock. In the vicinity of Turkey Neck Bend and Kettle Creek some areas of flaggy clay soils that developed in phosphatic limestone are included. In some areas, angular chert fragments are mixed with shaly material.

Most of the acreage of this soil is used as woodland. A small acreage is used as pasture.

This soil has poor potential for most cultivated crops because of the slope and the shaly limestone fragments in the surface layer. If cultivated crops are grown, erosion is a very severe hazard. The potential for hay or pasture is fair.

This soil has fair potential for use as woodland. Woodland is difficult to manage because of the slope of the soil and the shape and location of the areas. The steepness of slope and the hazard of erosion limit the use of equipment generally needed in woodland management and harvesting. Shortleaf pine, eastern redcedar, eastern white pine, and Virginia pine are some of the important trees to plant or favor for commercial production.

This soil has fair potential for use as habitat for openland wildlife and good potential for use as habitat for woodland wildlife.

This soil has poor potential for most urban uses. The depth to bedrock and the steepness of slope are the main limitations to these uses.

This map unit is in capability subclass VIe and woodland suitability group 4r.

GRF—Garmon association, steep. This map unit consists of well drained, dominantly steep soils that formed in material that weathered from shaly limestone, calcareous shale, and siltstone. These soils are on moderately wide to wide hillsides between deeply entrenched streams and broad uplands. Areas of this map unit form an almost continuous band. These areas range from 12 to 1,000 acres in size, but most areas in the eastern part of the survey area are more than 500 acres. The slope ranges from 20 to 60 percent.

This association is 60 to 80 percent Garmon soils, 1 to 30 percent soils that are similar to Garmon soils except that they are less than 20 inches deep to bedrock, and 1 to 20 percent soils that are similar to Garmon soils except that they are 40 to 60 inches deep to bedrock. The composition of this map unit is more variable than that of others in the survey area, but mapping was detailed well enough to allow interpretations for the expected uses.

Typically, the surface layer of Garmon soils is brown shaly silt loam 7 inches thick. The subsoil is yellowish brown shaly silt loam, and it extends to a depth of 26 inches. Shaly limestone bedrock is below that depth.

The Garmon soils are low in natural fertility and in content of organic matter. Reaction is medium acid to neutral throughout. Permeability is moderately rapid, and the available water capacity is low. Shaly limestone fragments up to 6 inches in length are throughout the surface layer. The shrink-swell potential is low. The root zone is moderately deep. Bedrock is at a depth of 20 to 40 inches.

The similar soils that are less than 20 inches deep to bedrock are low in natural fertility and in content of organic matter. Permeability is moderately rapid, and the available water capacity is low. Shaly limestone fragments up to 6 inches in length are throughout the surface layer. The shrink-swell potential is low. The root zone is shallow.

The similar soils that are 40 to 60 inches deep to bedrock are low in natural fertility and in content of organic matter. Permeability is moderately rapid, and the available water capacity is moderate. Shaly limestone fragments up to 6 inches in length are throughout the surface layer. The shrink-swell potential is low. The root zone is deep.

Included in mapping are small areas of shallow, clayey soils that formed in material that derived from gray shale and black shale. Also included, near Turkey Neck Bend and along Kettle Creek, are small areas of shallow, flaggy soils that formed in material that derived from phosphatic limestone. Also included and making up as much as 15 percent of this association are areas of Rock outcrop.

The soils in this association have poor potential for cultivated crops, pasture, and hay because of the steepness of slope, a very severe hazard of erosion, and the shallowness to bedrock.

Most of the acreage of this association is used as woodland. Most of the woodland in the survey area is in areas of this association. The potential for woodland use is fair. Droughtiness limits production. The steepness of slope and the hazard of erosion severely limit the use of equipment generally needed in woodland management and harvesting. Shortleaf pine, eastern redcedar, eastern white pine, and Virginia pine are some of the important trees to plant or favor for commercial production.

The soils in this association have poor potential for use as habitat for openland wildlife and fair potential for use as habitat for woodland wildlife.

These soils have poor potential for most urban uses because of the shallowness to bedrock and the steepness of slope.

This association is in capability subclass VIIe and woodland suitability group 4r.

Hu—Huntington silt loam. This is a deep, nearly level, well drained soil. It is in depressions and on flood plains along intermittent drainageways and major streams. The areas range from 2 to 22 acres in size. The largest are along the Cumberland River. The slope ranges from 0 to 2 percent.

Typically, the surface layer is dark brown silt loam 10 inches thick. The subsoil to a depth of 36 inches is dark brown silt loam. From 36 to 61 inches it is brown silt loam that has a few light yellowish brown mottles.

This soil is high in natural fertility and moderate in content of organic matter. Reaction is medium acid to mildly alkaline throughout. Permeability is moderate, and the available water capacity is high. The plow layer is easily tilled within a wide range in moisture content. A seasonal water table is at a depth of 3 to 6 feet. The shrink-swell potential is low. Most areas of this soil are subject to flooding, especially in winter and early in spring, in most years. Some areas along the Cumberland River are protected from flooding by Wolf Creek Dam. The root zone is deep and is easily penetrated by the roots.

Included in mapping are Lindside, Egam, and Nolin soils. Also included, in depressions, are soils that have a moderately coarse textured surface layer.

Most of the acreage of this soil is used as cultivated cropland or pasture. This soil has good potential for most cultivated crops. High yields can be obtained if the soil is well managed. Incorporating crop residue in the soil is an easy way to maintain tilth. Erosion is a slight hazard if cultivated crops are grown. Flooding seldom occurs during the growing season. This soil also has good potential for hay and pasture. It is well suited to most of the commonly grown grasses and legumes.

This soil has good potential for use as woodland. It has no significant limitation to this use. It is well suited to yellow-poplar, black walnut, eastern white pine, white ash, and American sycamore.

This soil has good potential for use as habitat for openland wildlife and woodland wildlife.

This soil has poor potential for most urban uses because of flooding.

This map unit is in capability class I and woodland suitability group 1o.

La—Lawrence silt loam. This is a deep, somewhat poorly drained, nearly level soil. It is on stream terraces and in upland areas throughout the survey area. Areas of this map unit range from 5 to 60 acres in size. The slope ranges from 0 to 2 percent.

Typically, the surface layer is grayish brown silt loam about 6 inches thick. The subsoil to a depth of 25 inches consists of yellowish brown silt loam and of silty clay loam that has gray mottles. From 25 to 62 inches it is a fragipan of mottled yellowish brown silty clay loam.

This soil is medium in natural fertility and low in content of organic matter. Reaction is strongly acid or very strongly acid to the substratum and very strongly acid through neutral in the substratum. Tilth is good. Permeability is slow, and the available water capacity is moderate. The fragipan is at a depth of 25 inches on the average. It restricts root growth and the movement of water through the soil. A seasonal perched water table is at a depth of 1 to 2 feet. The shrink-swell potential is low.

Included in mapping on stream terraces are soils that have a clayey subsoil and do not have a fragipan. Also included are small areas of Bedford, Crider, and Melvin soils.

This soil is used mainly for cultivated crops and pasture. It has fair potential for cultivated crops. It is best suited to shallow-rooted plants because of the perched water table. The use of open drainage ditches can increase crop yield and lengthen the time field operations are possible. Incorporating crop residue in the soil is an easy way to maintain tilth. This soil has fair potential for use as hayland and pasture. In undrained areas it should be seeded only to grasses and legumes that are tolerant of excessive wetness. If open drainage ditches are constructed it can be seeded to a wider variety of plants.

This soil has good potential for use as woodland. Wetness is the main limitation to the use of equipment generally needed in woodland management or harvesting. This limitation can be offset by using special equipment or by harvesting when the soil is dry. Red oak, yellow-poplar, green ash, eastern white pine, and American sycamore are some of the important trees to plant or favor for commercial production.

This soil has good potential for use as habitat for openland wildlife and woodland wildlife.

This soil has poor potential for most urban uses because of low strength, wetness, and slow permeability. It is subject to rare flooding in a few areas on the stream terraces. Wetness can be reduced by constructing open ditches and by controlling surface runoff from adjacent soils.

This map unit is in capability subclass IIIw and woodland suitability group 2w.

Ln—Lindside silt loam. This is a deep, moderately well drained, nearly level soil. It is on flood plains and in upland depressions. Most areas are less than 1,000 feet wide, and they average 6 acres in size. The slope ranges from 0 to 2 percent.

Typically, the surface layer is brown silt loam about 10 inches thick. The subsoil to a depth of 21 inches is brown silt loam. From 21 to 34 inches it is brown silt loam that has gray and brown mottles. The substratum to a depth of 64 inches is light brownish gray silt loam that has brown mottles.

This soil is high in natural fertility and low in content of organic matter. Reaction is strongly acid to slightly acid in the upper part of the soil and medium acid to neutral in the lower part. Permeability is moderate, and the available water capacity is high. Tilth is good. This soil can be worked within a wide range of moisture content without crusting or clodding. A seasonal water table is at a depth of 18 to 36 inches. In most areas this soil is subject to flooding in winter and early in spring. Some areas along the Cumberland River are protected from flooding by Wolf Creek Dam. The root zone is deep and is easily penetrated by the roots. The shrink-swell potential is low.

Included in mapping are a few areas of Nolin, Nolin Variant, and Newark soils.

This soil is used mainly as cultivated cropland and hayland. It has good potential for most cultivated crops. High yields can be obtained if the soil is well managed. Wetness is the most significant limitation to the use of this soil as cropland. The wetness can be reduced by using subsurface drainage systems and by controlling surface runoff from adjacent soils. Incorporating crop residue in the soil is an easy way to maintain tilth. Erosion is a slight hazard if cultivated crops are grown. Flooding seldom occurs during the growing season. This soil also has good potential for hay and pasture. It is well suited to most of the grasses and legumes commonly grown in the survey area.

This soil has good potential for use as woodland. The only significant limitation to this use is wetness, which restricts the use of equipment generally needed in woodland management or harvesting. This soil is used as woodland in only a few areas. Yellow-poplar, eastern white pine, white ash, and sweetgum are some of the important trees to plant or favor for commercial production.

This soil has good potential for use as habitat for openland wildlife and woodland wildlife.

This soil has poor potential for urban uses. Flooding is the most significant limitation to these uses.

This map unit is in capability class I and woodland suitability group 1w.

LoB—Lowell silt loam, 2 to 6 percent slopes. This is a deep, gently sloping, well drained soil. It is on narrow ridgetops and long, narrow foot slopes. Most areas are irregular in shape and average about 4 acres in size. Slopes are short.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil to a depth of 14 inches is dark brown silty clay loam. From 14 to 48 inches it is yellowish brown silty clay. The substratum extends to a depth of 68 inches. It is mottled clay.

This soil is high in natural fertility and low in content of organic matter. Reaction is strongly acid to neutral above the substratum and medium acid to neutral in the substratum. Permeability is moderately slow, and the available water capacity is high. Tilth is good. The shrink-swell potential is moderate. The root zone is deep.

Included in mapping are spots of eroded soils that have a less friable, finer textured, and lighter colored surface layer than this Lowell soil. Also included are small areas of similar soils that are less than 40 inches deep to bedrock and small areas of Garmon, Bewleyville, and Trimble soils.

Most of the acreage of this soil is used as pasture. A small acreage is used for cultivated crops such as tobacco. This soil has good potential for most cultivated crops; however, it is limited for use as cropland because the areas are small and the slopes of the adjacent soils are steep. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, no-tillage, the use of crop residue, and the use of grasses and legumes and other cover crops in the cropping system can help reduce runoff and control erosion. Incorporating crop residue in the soil is an easy way to maintain tilth. This soil also has good potential for use as pasture and hayland. It is well suited to most of the grasses and legumes that are commonly grown in the survey area.

This soil has fair potential for use as woodland. The high content of clay limits the use of heavy equipment, especially during wet seasons. Yellow-poplar, eastern white pine, loblolly pine, Virginia pine, and shortleaf pine are some of the important trees to plant or favor for commercial production.

This soil has good potential for use as habitat for openland wildlife and woodland wildlife.

This soil has fair potential for most urban uses. The high content of clay, moderately slow permeability, and moderate shrink-swell potential are limitations to these uses. These limitations can be offset by good design. Low strength is a limitation to the use of this soil as sites for local roads and streets. This limitation, too, can be offset by good design. The clayey subsoil has moderately slow permeability, which is a severe limitation to the use of this soil as septic tank absorption fields. This limitation can be offset by increasing the size of the filter field.

This map unit is in capability subclass IIe and woodland suitability group 3c.

LoC—Lowell silt loam, 6 to 12 percent slopes. This is a deep, well drained, sloping soil. It is on moderately wide ridgetops and foot slopes. Areas are long, broad, and irregular in shape. They range in size from 10 acres to more than 20 acres.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil to a depth of 14 inches is dark brown silty clay loam. From 14 to 48 inches it is yellowish brown silty clay and clay. The substratum extends to a depth of 68 inches. It is mottled clay.

This soil is high in natural fertility and low in content of organic matter. Reaction is strongly acid to neutral above the substratum and medium acid to neutral in the substratum. Permeability is moderately slow, and the available water capacity is high. Tilth is good. The shrink-swell potential is moderate. The root zone is deep.

Included in mapping are spots of eroded soils that have a less friable, finer textured, and lighter colored surface layer than this Lowell soil. Also included are small areas of soils that are less than 40 inches deep to bedrock and small areas of Bewleyville soils.

Most of the acreage of this soil is used as pasture or is idle. This soil has fair potential for use as pasture and hayland. It also has fair potential for use as cultivated cropland. The smallness of some areas and the slope are the main limitations to the use of this soil as cropland. Erosion is a hazard if cultivated crops are grown. Minimum tillage, no-tillage, the use of crop residue, and the use of grasses and legumes and other cover crops in the cropping system can help reduce runoff and control erosion. Incorporating crop residue in the soil can help maintain tilth.

This soil has fair potential for use as woodland. The slickness of the soil when it is wet and the slope are limitations to the use of equipment generally needed in woodland management or harvesting. Yellow-poplar, eastern white pine, loblolly pine, Virginia pine, and shortleaf pine are some of the important trees to plant or favor for commercial production.

This soil has good potential for use as habitat for openland wildlife and woodland wildlife.

This soil has fair potential for most urban uses. The high content of clay, slope, moderately slow permeability, and moderate shrink-swell potential are limitations to these uses. These limitations can be offset by good design. Low strength is a limitation to the use of this soil as sites for local roads and streets. This limitation, too, can be offset by good design. The clayey subsoil has moderately slow permeability, which is a severe limitation to the use of this soil as septic tank absorption fields. This limitation can be offset by expanding the filter field.

This map unit is in capability subclass IIIe and woodland suitability group 3c.

LoD—Lowell silt loam, 12 to 20 percent slopes. This is a deep, well drained, moderately steep soil. It is on foot slopes. Areas are about 40 acres in size. They are about 2,500 feet long and 600 feet wide.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil to a depth of 14 inches is dark brown silty clay loam. From 14 to 48 inches it is yellowish brown silty clay and clay. The substratum extends to a depth of 68 inches. It is mottled clay.

This soil is high in natural fertility and low in content of organic matter. Reaction is strongly acid to neutral above the substratum and medium acid to neutral in the substratum. Permeability is moderately slow, and the available water capacity is high. Tilth is good. The shrink-swell potential is moderate. The root zone is deep.

Included in mapping are small areas of eroded soils that have a surface layer of silty clay loam. Also included are a few areas of soils that are less than 40 inches deep to bedrock, and some Trimble soils.

Most of the acreage of this soil is used as pasture or is idle. This soil has fair potential for use as pasture and hayland. It is suited to most of the grasses and legumes commonly grown in the survey area.

This soil has poor potential for use as cultivated cropland. The narrowness of areas and the slope are limitations to the use of farm equipment. Erosion is a very severe hazard if cultivated crops are grown. Minimum tillage, no-tillage, the use of crop residue, and the use of grasses and legumes and other cover crops in the cropping system can help reduce runoff and control erosion.

This soil has fair potential for use as woodland. Yellow-poplar, eastern white pine, loblolly pine, Virginia pine, and shortleaf pine are some of the important trees to plant for commercial production. The high content of clay and the steepness of slope limit the use of equipment needed in woodland management or harvesting.

This soil has fair potential for use as habitat for openland wildlife and good potential for use as habitat for woodland wildlife.

This soil has poor potential for most urban uses. The high content of clay, the steepness of slope, and the shrink-swell potential are limitations to these uses. These limitations can be offset by good design. Low strength is a limitation to the use of this soil as sites for local roads and streets. This limitation, too, can be offset by good design. The clayey subsoil has moderately slow permeability, which is a severe limitation to the use of this soil as septic tank absorption fields. This limitation can be offset by increasing the size of the filter field.

This map unit is in capability subclass IVe and woodland suitability group 3c.

Me—Melvin silt loam. This is a deep, poorly drained, nearly level soil. It is on flood plains. Areas are irregularly shaped. They range from 4 to 20 acres in size. The slope ranges from 0 to 2 percent.

Typically, the surface layer is grayish brown silt loam about 7 inches thick. The subsoil and the substratum to a depth of 60 inches are gray silt loam that is mottled in shades of brown.

This soil is high in natural fertility and low in content of organic matter. Reaction is slightly acid to mildly alkaline throughout the profile. Permeability is moderate, and the available water capacity is high. Tilth is good. A seasonal water table is at a depth of 1 foot or less. The shrink-swell potential is low. Most areas of this soil are subject to flooding late in winter and in spring. Some areas along the Cumberland River are protected from flooding by Wolf Creek Dam. The root zone is deep and is easily penetrated by the roots.

Included in mapping are a few small areas of Newark and Lawrence soils. These soils are on low stream terraces. Also included are a few small areas of soils that have a clayey subsoil and a fine-textured surface layer.

Most of the acreage of this soil is used as pasture or is idle. This soil has good potential for hay and pasture. It is best suited to plants that are tolerant of wetness and occasional flooding.

This soil has fair potential for use as cultivated cropland. Wetness and the hazard of flooding are limitations to this use. High yields can be obtained if the soil is well managed. The use of surface and subsurface drainage systems can reduce wetness. Incorporating crop residue in the soil can help to maintain tilth.

This soil has good potential for use as woodland. Wetness limits the growth of seedlings and the use of equipment generally needed in woodland management or harvesting. This limitation can be overcome by using special equipment or by harvesting when the soil is dry. Pin oak, American sycamore, sweetgum, and loblolly pine can grow well on this soil.

This soil has fair potential for use as habitat for openland or woodland wildlife and good potential for use as habitat for wetland wildlife.

The potential for urban uses is poor because of flooding and wetness. Flooding is the most significant limitation.

This map unit is in capability subclass IIIw and woodland suitability group 1w.

Ne—Newark silt loam. This is a deep, somewhat poorly drained, nearly level soil. It is on flood plains and in upland depressions. Most areas range in size from 1 to 30 acres. The slope ranges 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 14 inches is brown silt loam that is mottled in shades of gray and brown. From 14 to 27 inches it is light brownish gray silt loam that is mottled in shades of brown. The substratum to a depth of 60 inches is mottled light brownish gray, grayish brown, and dark grayish brown silt loam.

This soil is high in natural fertility and low in content of organic matter. Reaction ranges from medium acid to mildly alkaline. Permeability is moderate, and the available water capacity is high. Tilth is good. A seasonal high water table is at a depth of 6 to 18 inches. The shrink-swell potential is low. Most areas of this soil are subject to flooding in most years. Some areas along the Cumberland River are protected from flooding by Wolf Creek Dam. The root zone is deep and is easily penetrated by the roots.

Included in mapping are a few areas of Lindside and Melvin soils.

Most of the acreage of this soil is used as pasture or is idle. This soil has good potential for hay or pasture. It is best suited to plants that are tolerant of wetness and occasional flooding.

This soil has good potential for use as cultivated cropland. Wetness and the hazard of flooding are limitations to this use. Flooding, however, seldom occurs during the growing season. High yields can be obtained if the soil is well managed. The use of surface and subsurface drainage systems can reduce wetness. Incorporating crop residue in the soil can help to maintain tilth.

This soil has good potential for use as woodland. Wetness is a limitation to the use of equipment generally needed in woodland management or harvesting. This limitation can be overcome by using special equipment or by harvesting when the soil is dry. Eastern cottonwood, sweetgum, eastern white pine, yellow-poplar, and American sycamore can grow well on this soil.

This soil has fair potential for use as habitat for openland and wetland wildlife and good potential for use as habitat for woodland wildlife.

This soil has poor potential for most urban uses because of flooding and wetness. Flooding is the most significant limitation.

This map unit is in capability subclass IIw and woodland suitability group 1w.

No—Nolin silt loam. This is a deep, well drained, nearly level soil. It is on flood plains along small streams and the Cumberland River. Areas vary in length and width. The areas range from 20 to 120 acres in size. The slope ranges from 0 to 2 percent.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil to a depth of 24 inches is brown silt loam. From 24 to 60 inches it is dark yellowish brown silt loam.

This soil is high in natural fertility and low in content of organic matter. Reaction is medium acid to mildly alkaline throughout. Permeability is moderate, and the available water capacity is high. Tilth is good within a wide range in moisture content. A seasonal water table is at a depth of 3 to 6 feet. The shrink-swell potential is low. Most areas of this soil are subject to flooding in winter and early in spring. Some areas along the Cumberland River are protected from flooding by Wolf Creek Dam. The root zone is deep and is easily penetrated by the roots.

Included in mapping are a few small areas of Nolin Variant, Lindside, and Newark soils.

Most of the acreage of this soil is used as cropland or pasture. This soil has good potential for use as cultivated cropland. High yields can be obtained if the soil is well managed. Incorporating crop residue in the soil is an easy way to maintain tilth. Erosion is a slight hazard if cultivated crops are grown. Flooding seldom occurs during the growing season. This soil also has good potential for hay or pasture. It is well suited to most of the grasses and legumes commonly grown in the survey area, but it is best suited to those that are tolerant of flooding for brief periods.

This soil has good potential for use as woodland. It has no significant limitation to this use. Only a few acres is used as woodland. This soil is well suited to yellow-poplar, eastern white pine, eastern cottonwood, white ash, and sweetgum.

This soil has good potential for use as habitat for openland and woodland wildlife.

This soil has poor potential for most urban uses. Flooding is the most significant limitation to these uses.

This map unit is in capability class I and woodland suitability group 1o.

Nv—Nolin Variant fine sandy loam. This is a deep, well drained, nearly level soil. It is on flood plains along the major streams, on river bottoms, and at the headwaters of minor tributaries. Most areas are about 10 acres in size; some are as large as 90 acres. The larger areas are along the Cumberland River. The slope ranges from 0 to 2 percent.

Typically, the surface layer is brown fine sandy loam about 8 inches thick. The subsoil to a depth of 18 inches is brown fine sandy loam. From 18 to 38 inches it is dark grayish brown fine sandy loam. The substratum to a depth of 64 inches is a brown fine sandy loam.

This soil is medium in natural fertility and low in content of organic matter. Reaction ranges from medium acid to neutral. Permeability is moderately rapid, and the available water capacity is moderate. Tilth is good. A seasonal water table is at a depth of 3 to 6 feet. The shrink-swell potential is low. Most areas are flooded for brief periods from late winter to early spring. Some areas along the Cumberland River are protected from flooding by Wolf Creek Dam. The root zone is deep and is easily penetrated by the roots.

Included in mapping are a few small areas of Nolin, Lindside, and Newark soils. The included areas are less than 3 acres in size.

Most of the acreage of this soil is used for pasture or cultivated crops. This soil has fair potential for cultivated crops. It tends to be droughty. High yields can be obtained if the soil is well managed. Incorporating crop residue in the soil can help to maintain tilth. Erosion is a slight hazard if cultivated crops are grown. Flooding seldom occurs during the growing season. This soil has good potential for hay or pasture. It is best suited to plants that are tolerant of flooding for brief periods.

This soil has a good potential for use as woodland. The content of sand limits the use of heavy equipment and affects the rate of seedling mortality. This soil is used as woodland in only a few areas. It is well suited to yellow-poplar, eastern cottonwood, shortleaf pine, and American sycamore.

This soil has good potential for use as habitat for openland and woodland wildlife.

This soil has poor potential for most urban uses. Flooding is the most significant limitation to these uses.

This map unit is in capability subclass IIs and woodland suitability group 2s.

Se—Sensabaugh gravelly silt loam. This is a deep, well drained, nearly level soil. It is on flood plains along small, narrow streams, commonly near the headwaters. Most areas are less than 100 feet in width, and they range from 8 to 20 acres in size. The slope ranges from 0 to 2 percent.

Typically, the surface layer is brown gravelly silt loam about 8 inches thick. The subsoil and the substratum to a depth of 60 inches are brown gravelly silt loam.

This soil is medium in natural fertility and low in content of organic matter. Reaction is medium acid to neutral. Permeability is moderately rapid, and the available water capacity is moderate. The gravel in the plow layer hinders cultivation. A seasonal water table is at a depth of 4 to 6 feet. The shrink-swell potential is low. Most areas of this soil are subject to flooding in winter and early in spring. Some areas along the Cumberland River are protected from flooding by Wolf Creek Dam. The root zone is deep.

Included in mapping are a few small areas of similar soils that have a surface layer of loam, silt loam, and fine sandy loam. Also included are small areas of Skidmore and Nolin soils.

Most of the acreage of this soil is used as pasture (fig. 9) or is idle. This soil has good potential for hay or pasture. It is best suited to plants that are tolerant of flooding for very brief periods.

This soil has fair potential for cultivated crops. It tends to be droughty. High yields can be obtained if the soil is well managed. Incorporating crop residue in the soil is an easy way to maintain tilth. Erosion is a slight hazard if cultivated crops are grown. Flooding seldom occurs during the growing season.

This soil has good potential for use as woodland. It has no significant limitation to this use. Black walnut, loblolly pine, yellow-poplar, and eastern white pine are the important trees to plant or favor for commercial production.

This soil has good potential for use as habitat for openland and woodland wildlife.

This soil has poor potential for most urban uses. Flooding is the most significant limitation to these uses.

This map unit is in capability subclass IIs and woodland suitability group 2o.

Sk—Skidmore gravelly loam. This is a deep, well drained, nearly level soil. It is on flood plains. Areas are long and narrow, and they range from 2 to 50 acres in size. The slope ranges from 0 to 2 percent.

Typically, the surface layer is brown gravelly loam about 7 inches thick. The subsoil is pale brown gravelly loam, and it extends to a depth of 24 inches. The substratum is pale brown very gravelly loam, and it extends to a depth of 48 inches. Shaly limestone underlies the substratum.

This soil is medium in natural fertility and low in content of organic matter. Reaction ranges from medium acid to neutral. Permeability is moderately rapid, and the available water capacity is moderate. The gravel in the surface layer hinders cultivation. A seasonal water table is at a depth of 3 to 4 feet. The shrink-swell potential is low. Most areas of this soil are subject to brief periods of flooding, especially in winter and early in spring, in most years. Some areas along the Cumberland River are protected from flooding by Wolf Creek Dam. The root zone is deep.

Included in mapping are small areas of soils that have a surface layer of loam, silt loam, and fine sandy loam. Also included are small areas of Sensabaugh, Nolin, and Lindside soils.

Most of the acreage of this soil is used as pasture or is idle. This soil has fair potential for hay and pasture. It is best suited to plants that are tolerant of flooding.

This soil has fair potential for use as cultivated cropland. The gravel in the plow layer and the hazard of flooding are limitations to this use. Flooding, however, seldom occurs during the growing season. Moderate yields can be obtained if the soil is well managed. Incorporating crop residue in the soil can help to maintain tilth. If cultivated crops are grown, erosion is a slight hazard.

This soil has good potential for use as woodland. There is no significant limitation to this use. Yellow-poplar, black walnut, white ash, American sycamore, and eastern white pine are the important trees to plant for commercial production.

This soil has good potential for use as habitat for openland wildlife and fair potential for use as habitat for woodland wildlife.

This soil has poor potential for most urban uses. Flooding is the most significant limitation to these uses.

This map unit is in capability subclass IIs and woodland suitability group 1o.

TaC—Tarklin cherty silt loam, 6 to 12 percent slopes. This is a deep, moderately well drained, sloping soil. It is on terraces, foot slopes, and uplands. Most areas are short and moderately wide and average about 5 acres in size.

Typically, the surface layer is grayish brown cherty silt loam about 8 inches thick. The subsoil to a depth of 24 inches consists of yellowish brown cherty silt loam and cherty silty clay loam. From 24 to 60 inches it is a fragipan of silty clay loam that is mottled in shades of brown and gray.

This soil is medium in natural fertility and low in content of organic matter. Reaction is strongly acid to very strongly acid in unlimed areas. Permeability is slow, and the available water capacity is moderate. The chert fragments in the plow layer hinder cultivation. A seasonal

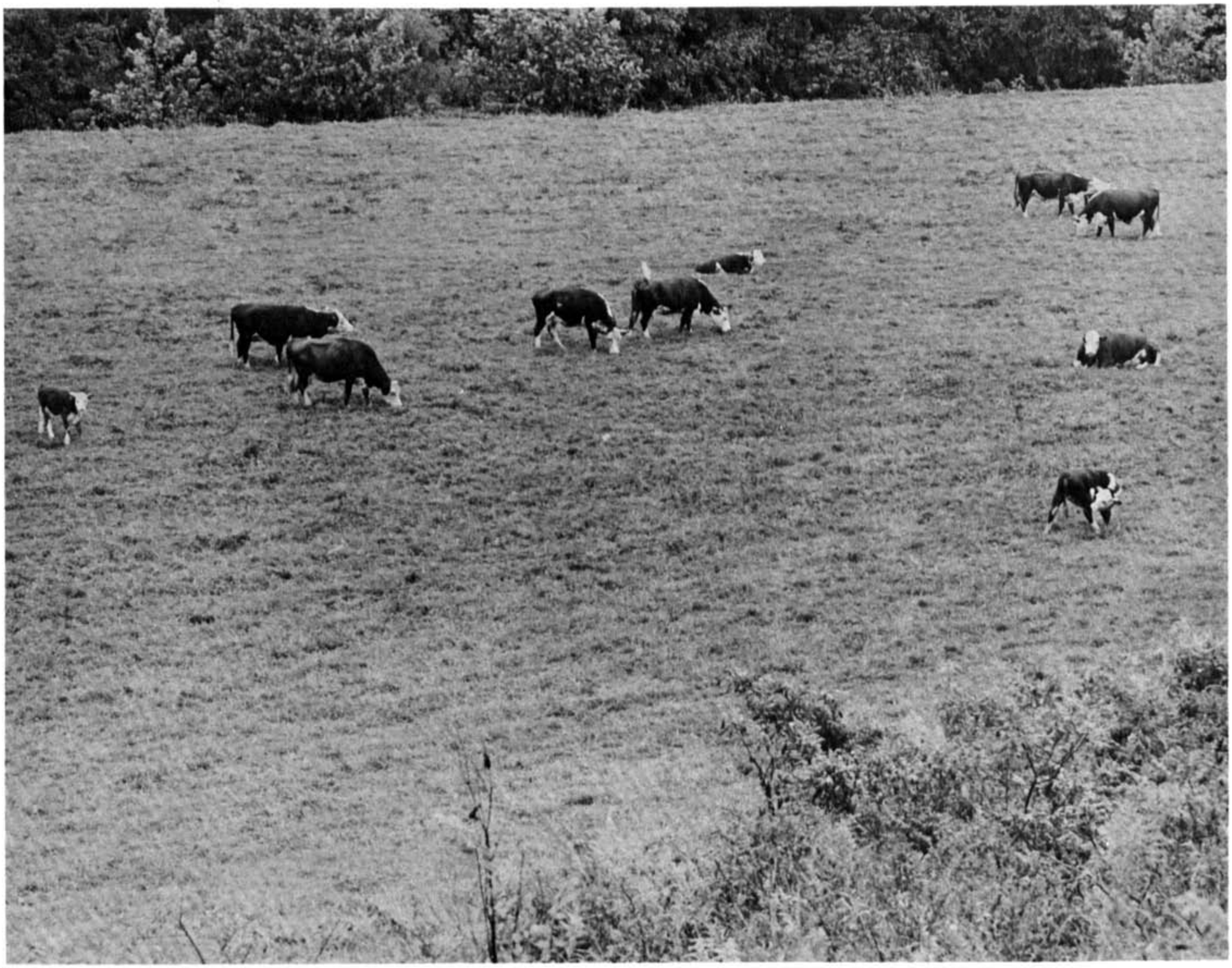


Figure 9.—These cattle are grazing in an area of Sensabaugh gravelly silt loam in a narrow valley.

water table is at a depth of 18 to 24 inches. The shrink-swell potential is low. The fragipan restricts root growth.

Included in mapping are small areas of similar soils that are eroded and similar soils that have slope of less than 6 percent. Also included are small areas of Trimble and Bedford soils.

Most of the acreage of this soil is used as pasture or is idle. This soil has good potential for hay and pasture.

This soil has fair potential for use as cultivated cropland. It is limited for this use by the smallness of most areas and the chert fragments in the surface layer. Incorporating crop residue in the soil can help to maintain the supply of organic matter. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, no-tillage, the use of crop residue, and the use of grasses and legumes and other cover crops in the cropping system can help to reduce runoff and control erosion.

This soil has fair potential for use as woodland. There is no significant limitation to this use. Eastern white pine, loblolly pine, shortleaf pine, white ash, and yellow-poplar are the trees to plant or favor for commercial production.

This soil has good potential for use as habitat for openland and woodland wildlife.

This soil has fair potential for most urban uses. Wetness, slow permeability, slope, and the chert fragments are the main limitations to these uses. Some of these limitations can be offset by good design.

This map unit is in capability subclass IIIe and woodland suitability group 3o.

TrB—Trimble cherty silt loam, 2 to 6 percent slopes. This is a deep, well drained, gently sloping soil. It is on narrow ridgetops and foot slopes. Most areas are short and narrow or oval in shape. They average 8 acres in size.

Typically, the surface layer is grayish brown cherty silt loam about 6 inches thick. The subsoil to a depth of 46 inches is strong brown cherty silty clay loam. From 46 to 62 inches it is mottled yellowish brown, brown, and pale brown cherty silty clay loam.

This soil is medium in natural fertility and low in content of organic matter. Reaction is strongly acid or very strongly acid in unlimed areas. Permeability is moderate, and the available water capacity is high. The coarse fragments in the plow layer impede tillage. The shrink-swell potential is low. The root zone is deep.

Included in mapping are small areas of soils that are less than 40 inches deep to bedrock. Also included are a few small areas of Bewleyville, Garmon, and Tarklin soils.

Most of the acreage of this soil is used for pasture or cultivated crops. This soil has good potential for use as cultivated cropland. However, it is limited for cultivation in some areas, which are small and are adjacent to areas of steep soils. The use of crop residue and the use of grasses and legumes and other cover crops in the cropping system help to maintain the content of organic matter. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, no-tillage, and the use of grasses and legumes and other cover crops in the cropping system can help to reduce runoff and control erosion. This soil also has good potential for hay and pasture. It is suited to most of the grasses and legumes commonly grown in the survey area.

This soil has good potential for use as woodland. There is no significant limitation to this use. Eastern white pine, black walnut, Virginia pine, and shortleaf pine are some of the important trees to plant for commercial production.

This soil has good potential for use as habitat for openland and woodland wildlife.

This soil has good potential for most urban uses. It has few limitations to these uses. Low strength is a limitation to the use of this soil as sites for local roads and streets. This limitation can be offset by good design.

This map unit is in capability subclass IIe and woodland suitability group 2o.

TrC—Trimble cherty silt loam, 6 to 12 percent slopes. This is a deep, well drained, sloping soil. It is on ridgetops and foot slopes. Most areas are long, moderately wide, and irregular in shape. They range from 8 to 60 acres in size.

Typically, the surface layer is grayish brown cherty silt loam about 6 inches thick. The subsoil to a depth of 46 inches is strong brown cherty silty clay loam. From 46 to 62 inches it is mottled yellowish brown, brown, and pale brown cherty silty clay loam.

This soil is medium in natural fertility and low in content of organic matter. Reaction is strongly acid or very strongly acid in unlimed areas. Permeability is moderate, and the available water capacity is high. The shrink-swell potential is low. The root zone is deep.

Included in mapping are small areas of similar soils that are less than 40 inches deep to bedrock. Also included are a few spots of eroded soils and small areas of Bewleyville and Tarklin soils.

Most of the acreage of this soil is used as pasture or is idle. This soil has good potential for hay and pasture. It is suited to most of the grasses and legumes commonly grown in the survey area.

This soil has fair potential for use as cultivated cropland. The smallness of some areas and the steepness of adjacent soils are limitations to this use. The coarse fragments in the plow layer impede tillage. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, no-tillage, the use of crop residue, and the use of grasses and legumes and other cover crops in the cropping system can help reduce runoff and control erosion.

This soil has good potential for use as woodland. There is no significant limitation to this use. Eastern white pine, black walnut, Virginia pine, and shortleaf pine are some of the important trees to plant for commercial production.

This soil has good potential for use as habitat for openland and woodland wildlife.

This soil has fair potential for most urban uses. Slope and small stones are the most significant limitations to these uses. Low strength is a limitation to the use of this soil as sites for local roads and streets. The limitations can be overcome by good design.

This map unit is in capability subclass IIIe and woodland suitability group 2o.

TrD—Trimble cherty silt loam, 12 to 20 percent slopes. This is a deep, well drained, moderately steep soil. It is on narrow ridgetops and side slopes. Most areas are short and irregular in shape. They range from 5 to 10 acres in size.

Typically, the surface layer is grayish brown cherty silt loam about 6 inches thick. The subsoil to a depth of 46 inches is strong brown cherty silty clay loam. From 46 to 62 inches it is mottled yellowish brown, brown, and pale brown cherty silty clay loam.

This soil is medium in natural fertility and low in content of organic matter. Reaction is strongly acid or very strongly acid in unlimed areas. Permeability is moderate, and the available water capacity is high. The coarse fragments in the plow layer impede tillage. The shrink-swell potential is low. The root zone is deep.

Included in mapping are small areas of soils that are eroded and soils that are less than 40 inches deep to bedrock. Also included are small areas of Garmon and Waynesboro soils.

Most of the acreage of this soil is used as pasture (fig. 10) or is idle. This soil has fair potential for hay and pasture.

This soil has poor potential for use as cultivated cropland. The steepness of slope and the cherty fragments in the surface layer are limitations to this use. Erosion is a very severe hazard if cultivated crops are grown. Minimum tillage, no-tillage, and the use of grasses and legumes and other cover crops in the cropping system can help reduce runoff and control erosion.

This soil has good potential for use as woodland. The steepness of slope and the chert fragments in the surface layer are limitations to this use. Eastern white pine, black walnut, shortleaf pine, loblolly pine, and black walnut are some of the important trees to plant or favor for commercial production.

This soil has good potential for use as habitat for openland and woodland wildlife.

This soil has poor potential for most urban uses. The steepness of slope and the content of coarse fragments are limitations to these uses.

This map unit is in capability subclass IVe and woodland suitability group 2r.

TrD3—Trimble cherty silt loam, 12 to 20 percent slopes, severely eroded. This is a deep, well drained, moderately steep soil. It is on moderately wide side slopes. Most areas are irregular in shape and 2 to 8 acres in size. Shallow gullies are common. The plow layer consists mostly of the subsoil.

Typically, the surface layer is grayish brown cherty silt loam about 3 inches thick. The subsoil to a depth of 46 inches is strong brown cherty silty clay loam. From 46 to 62 inches it is mottled yellowish brown, brown, and pale brown cherty silty clay loam.

This soil is medium in natural fertility and low in content of organic matter. Reaction is strongly acid or very strongly acid in unlimed areas. Permeability is moderate, and the available water capacity is high. The shrink-swell potential is low. The root zone is deep.

Included in mapping are small areas of similar soils that are not eroded and soils that are less than 40 inches deep to bedrock. Also included are small areas of Garmon and Waynesboro soils.

Most of the acreage of this soil is used as pasture or is idle. This soil has poor potential for most cultivated crops. It is limited for use as cropland by the steepness of slope and the cherty fragments in the plow layer.

Figure 10.—This pasture is on Trimble cherty silt loam, 12 to 20 percent slopes.

Erosion is a very severe hazard if cultivated crops are grown. Because of the hazard of erosion, this soil should have a permanent vegetative cover. This soil has fair potential for pasture or hay. It is suited to most of the grasses and legumes commonly grown in the survey area.

This soil has good potential for use as woodland. The steepness of slope is a limitation to the use of equipment generally needed in woodland management or harvesting. Eastern white pine, Virginia pine, black walnut, and shortleaf pine are some of the important trees to plant for commercial production.

This soil has fair potential for use as habitat for openland wildlife and good potential for use as habitat for woodland wildlife.

This soil has poor potential for most urban uses. The steepness of slope and the content of chert fragments are limitations to these uses.

This map unit is in capability subclass VIe and woodland suitability group 2r.

TrE—Trimble cherty silt loam, 20 to 30 percent slopes. This is a deep, well drained, steep soil. It is on side slopes. Areas are long and narrow and are commonly adjacent to streams. Most areas average 60 acres in size.

Typically, the surface layer is grayish brown cherty silt loam about 6 inches thick. The subsoil to a depth of 46 inches is strong brown cherty silty clay loam. From 46 to 62 inches it is mottled yellowish brown, brown, and pale brown cherty silty clay loam.

This soil is medium in natural fertility and low in content of organic matter. Reaction is strongly acid or very strongly acid in unlimed areas. Permeability is moderate, and the available water capacity is high. The shrink-swell potential is low. The root zone is deep. The plow layer is cherty.

Included in mapping are small areas of soils that are eroded and soils that are less than 40 inches deep to bedrock. Also included are a few small areas of Garmon soils.

Most of the acreage of this soil is used as woodland or unimproved pasture.

This soil has poor potential for use as hayland, pasture, or cropland because of the steepness of slope and a very severe hazard of erosion.

This soil has good potential for use as woodland. The steepness of slope is the most significant limitation to this use. Eastern white pine, black walnut, loblolly pine, and shortleaf pine are some of the important trees to plant or favor for commercial production.

This soil has fair potential for use as habitat for openland wildlife and good potential for use as habitat for woodland wildlife.

This soil has poor potential for most urban uses. The steepness of slope is the most significant limitation to these uses.

This map unit is in capability subclass VIe and woodland suitability group 2r.

WaC—Waynesboro loam, 6 to 12 percent slopes. This is a deep, well drained, sloping soil. It is on ridges and karst landscape. Areas range from 12 to 200 acres in size. Sinkholes and depressions, characteristic of karst landscape, are common.

Typically, the surface layer is brown loam about 5 inches thick. The subsoil to a depth of 11 inches is yellowish red clay loam. From 11 to 24 inches it is red clay loam. And from 24 to 80 inches it is dark red clay.

This soil is medium in natural fertility and low in content of organic matter. Reaction is strongly acid or very strongly acid in unlimed areas. Permeability is moderate, and the available water capacity is high. Tilth is good. The shrink-swell potential is moderate. The root zone is deep and is easily penetrated by the roots.

Included in mapping are small areas of similar soils that have sandy loam, silt loam, and gravel in the surface layer and the subsoil and that are eroded in spots. Also included are a few small areas of Crider, Trimble, and Bewleyville soils.

In most areas this soil is used as pasture or is idle land. It has good potential for use as pasture or hayland.

This soil has fair potential for cultivated crops (fig. 11). Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, no-tillage, the use of crop residue, and the use of cover crops in the cropping system can help to reduce runoff and control erosion.

This soil has fair potential for use as woodland. There is no significant limitation to this use. Most areas have been logged, and the present timber stands are of inferior quality. The stands can be improved by planting or favoring yellow-poplar, black walnut, loblolly pine, and shortleaf pine.

This soil has good potential for use as habitat for openland and woodland wildlife.

This soil has fair potential for most urban uses. The slope and the high content of clay are significant limitations to these uses. These limitations can be offset by good design.

This map unit is in capability subclass IIIe and woodland suitability group 3o.

WaD—Waynesboro loam, 12 to 20 percent slopes. This is a deep, well drained, moderately steep soil. It is on side slopes. Most areas are on karst landscape. They range from 25 to 200 acres in size.

Typically, the surface layer is brown loam about 5 inches thick. The subsoil to a depth of 11 inches is yellowish red clay loam. From 11 to 24 inches it is red clay loam. And from 24 to 80 inches it is dark red clay.

This soil is medium in natural fertility and low in content of organic matter. Reaction is strongly acid or very strongly acid in unlimed areas. Permeability is moderate, and the available water capacity is high. Tilth is good. The shrink-swell potential is moderate. The root zone is deep and is easily penetrated by the roots.

Included in mapping are small areas of similar soils that have sandy loam, silt loam, and gravel in the surface layer or the subsoil and that are eroded in a few

Figure 11.—This crop of canna is being grown for bulbs on Waynesboro loam, 6 to 12 percent slopes.

spots. Also included are a few small areas of Trimble soils.

Most of the acreage of this soil is used as pasture or is idle. This soil has poor potential for row crops and small grains. Erosion is a very severe hazard if cultivated crops are grown. Minimum tillage, no-tillage, the use of crop residue, and the use of cover crops in the cropping system can help to reduce runoff and control erosion. This soil has fair potential for use as pasture and hayland.

This soil has fair potential for use as woodland. It has no significant limitation to this use. Most areas have been logged, and the present timber stands are of inferior quality. However, the stands can be improved by planting or favoring yellow-poplar, black walnut, loblolly pine, and shortleaf pine.

This soil has good potential for use as habitat for openland and woodland wildlife.

This soil has poor potential for most urban uses because of the steepness of slope. For some uses this limitation can be offset by good design.

This map unit is in capability subclass IVe and woodland suitability group 3o.

WaE—Waynesboro loam, 20 to 30 percent slopes. This is a deep, well drained, steep soil. It is on side slopes. In most areas the topography is rough. Most areas are moderately wide and irregular in shape. They typically range from 50 to 500 acres in size. In some areas a few outcrops of limestone are near the base of the slope break.

Typically, the surface layer is brown loam about 5 inches thick. The subsoil to a depth of 11 inches is yellowish red clay loam. From 11 to 24 inches it is red clay loam. And from 24 to 80 inches it is dark red clay.

This soil is medium in natural fertility and low in content of organic matter. Reaction is strongly acid or very strongly acid in unlimed areas. Permeability is moderate, and the available water capacity is high. The shrink-swell potential is moderate. The root zone is deep and is easily penetrated by the roots.

Included in mapping are small areas of similar soils that have a gravelly surface layer or subsoil and that are eroded in a few spots. Also included are small spots of Trimble and Garmon soils.

Most of the acreage of this soil is used as woodland, and the potential for this use is fair. The steepness of slope and the hazard of erosion are the most significant limitations to this use. Yellow-poplar, black walnut, loblolly pine, and shortleaf pine are the trees to plant or favor for commercial production.

This soil has poor potential for use as hayland, pasture, or cropland because of the steepness of slope and a very severe hazard of erosion.

This soil has fair potential for use as habitat for openland wildlife and good potential for use as habitat for woodland wildlife.

This soil has poor potential for most urban uses. The steepness of slope is the most significant limitation to these uses.

This map unit is in capability subclass VIe and woodland suitability group 3r.

WnC3—Waynesboro clay loam, 6 to 12 percent slopes, severely eroded. This is a deep, well drained, sloping soil. It is on ridges and side slopes. Most areas are irregular in shape and have shallow gullies. Most areas average 6 acres. The plow layer consists mainly of the subsoil.

Typically, the surface layer is yellowish red clay loam about 5 inches thick. The subsoil to a depth of 24 inches is red clay loam. From 24 to 80 inches it is red clay.

This soil is medium in natural fertility and low in content of organic matter. Reaction is strongly acid or very strongly acid in unlimed areas. Permeability is moderate, and the available water capacity is high. The shrink-swell potential is moderate. The root zone is deep and is easily penetrated by the roots.

Included in mapping are small areas of similar soils that are not eroded. Also included are small areas of similar soils that have a gravelly surface layer or subsoil. Also included are soils that have sandy clay loam in the lower part of the subsoil.

Most of the acreage of this soil is idle or is used as unimproved pasture. This soil has fair potential for use as pasture or hayland.

This soil has poor potential for cultivated crops. If cultivated crops are grown, erosion is a severe hazard. No-tillage, minimum tillage, and the use of grasses and legumes in the cropping system can help reduce runoff and control erosion. Because of the hazard of erosion, this soil should have a permanent vegetative cover.

This soil has fair potential for use as woodland. An erosion hazard and equipment limitation are significant limitations to be considered in harvesting or managing trees on this soil. This soil is used as woodland in only a few areas; however, it is best suited to this use. Virginia pine, loblolly pine, and shortleaf pine are trees to plant or favor for commercial production.

This soil has good potential for use as habitat for openland and woodland wildlife.

This soil has fair potential for most urban uses. Slope and the high content of clay are the most significant limitations to these uses. For some uses these limitations can be offset by good design.

This map unit is in capability subclass IVe and woodland suitability group 4c.

WnD3—Waynesboro clay loam, 12 to 30 percent slopes, severely eroded. This is a deep, well drained, moderately steep soil. Most areas are moderately long and very irregular in shape and have many shallow gullies. The plow layer consists mainly of the subsoil.

Typically, the surface layer is yellowish red clay loam about 5 inches thick. The subsoil to a depth of 24 inches is red clay loam. From 24 to 80 inches it is red clay.

This soil is medium in natural fertility and low in content of organic matter. Reaction is strongly acid or very strongly acid in unlimed areas. Permeability is moderate, and the available water capacity is high. The shrink-swell potential is moderate. The root zone is deep and is easily penetrated by the roots.

Included in mapping are a few areas of similar soils that have a gravelly or uneroded surface layer and a gravelly subsoil. Also included are areas of similar soils that have sandy clay loam in the lower part of the subsoil.

Most of the acreage of this soil is used as pasture or is idle. This soil has poor potential for use as pasture or hayland.

This soil has poor potential for cultivated crops. If cultivated crops are grown, erosion is a very severe hazard. Because of the hazard of erosion, this soil should have a permanent vegetative cover.

This soil has fair potential for use as woodland. An erosion hazard and equipment limitation are significant limitations to be considered in harvesting or managing trees on this soil. This soil is used as woodland in only a few areas; however, it is best suited to this use. Loblolly pine and shortleaf pine are trees to plant or favor for commercial production.

This soil has fair potential for use as habitat for openland wildlife and good potential for use as habitat for woodland wildlife.

This soil has poor potential for most urban uses. The steepness of slope and the high content of clay are the most significant limitations to these uses.

This map unit is in capability subclass VIe and woodland suitability group 4c.

use and management of the soils

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

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

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

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

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

crops and pasture

Kenneth R. Johnson, district conservationist, Soil Conservation Service, assisted in writing this section.

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

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

More than 105,000 acres in the survey area was used for crops and pasture in 1976 (*7*). Of this, 49,029 acres was used for permanent pasture; 14,857 acres was used for row crops, mainly corn; 2,750 acres was used for close-growing crops, mainly wheat and oats; 26,516 acres was used for hay and pasture in rotation; and 3,542 acres was used for hayland. The rest was idle cropland.

The soils in Monroe County have good potential for increased production of food. About 24,000 acres of potentially good cropland is currently used as woodland, and about 28,000 acres is used as pasture. Food production could also be increased considerably by applying the latest crop production technology to all the soils currently used as cropland.

Soil erosion is the major concern on about four-fifths of the cropland and pasture in the county. If slope is more than 2 percent, erosion is a hazard.

Erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated in the plow layer. Loss of the surface layer is especially damaging to soils that have a clayey subsoil, which is difficult to till. Frederick, Lowell, and Waynesboro soils are examples. Loss of the surface layer is damaging also to soils that have a layer that restricts root growth in or below the subsoil. Bedford, Lawrence, and Tarklin soils, for example, have a fragipan. Erosion also reduces productivity on soils that tend to be droughty, for example, Garmon and Caneyville soils. Second, soil erosion on farmland results in the sedimentation of streams. The sediment fills stream channels and reduces the quality of water for municipal use, for recreation, and for fish and wildlife.

A cropping system that keeps a vegetative cover on the soil for extended periods can hold soil erosion losses to amounts that will not reduce the productive capacity of the soils. On livestock farms, the legume and grass forage crops in the cropping system reduce erosion on sloping land, provide nitrogen, and improve the tilth of the soil for the following crop.

Terraces and diversions reduce the length of slope and thus reduce runoff and erosion. They are practical on deep, well drained soils that have regular slopes. The Crider and Bewleyville soils are suitable for terraces in most areas. The other soils are less suitable for terraces and diversions because of irregular slopes, a potential for excessive wetness in the terrace channels, a clayey subsoil, which would be exposed in terrace channels, or bedrock at a depth of less than 40 inches. Wetness in the terrace channels can be reduced by installing a closed tile drain system.

In most areas of the sloping Frederick, Garmon, Trimble, and Waynesboro soils, slopes are so short and irregular that contour tillage or terracing is not practical. On these soils, using a cropping system that provides substantial vegetative cover or minimizing tillage is required to control erosion. These practices can be adapted to most of the soils in the survey area. No-tillage for corn, which is common on an increasing acreage, is effective in reducing erosion on sloping land and can be adapted to most of the soils in the survey area.

Contour tillage and contour stripcropping are erosion control practices used in the survey area. They are best adapted to soils that have smooth, uniform slopes; for example, Bewleyville and Crider soils.

Soil drainage is the major management need on about 4 percent of the acreage used for crops and pasture in the survey area. The Melvin soils are poorly drained, and the production of crops common to the survey area is generally not possible. Unless artificially drained, the somewhat poorly drained Newark and Lawrence soils are so wet that crops are damaged during most years.

The design of surface and subsurface drainage systems varies with the kind of soil. A combination of surface drainage and tile drainage is needed in most areas of the poorly drained Melvin soils used for intensive row cropping. Drains have to be more closely spaced in slowly permeable soils than in more permeable soils.

Most of the soils on uplands are medium to high in natural fertility. All are naturally acid. The soils on flood plains, such as Huntington, Skidmore, Nolin Variant, and Egam soils, are higher in natural fertility than most of the soils on uplands, and they range from slightly acid to mildly alkaline.

Many of the soils on uplands are very strongly acid in their natural state. Applications of ground limestone are required to raise the pH to a level sufficient for the good growth of alfalfa and other crops that grow only on nearly neutral soils. The content of available phosphorus and potash is naturally low in most of these soils. The amount of lime and fertilizer added to a soil should be based on the results of soil tests, on the need of the crops, 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.

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

Most of the soils used for crops have a surface layer of silt loam that is light in color and low in content of organic matter. Generally, the structure of these soils is weak, and intense rainfall causes the formation of a crust on the surface. The crust is hard when dry and nearly impervious to water. As a result, runoff increases. Regular additions of crop residue, manure, and other organic material can help improve soil structure and reduce crust formation.

Fall plowing is generally not practical on the soils that are subject to crusting. Because a crust forms in winter and spring, many of these soils are nearly as dense and hard at planting time after fall plowing as they were before they were plowed. Also, about four-fifths of the cropland consists of the soils that are sloping and are subject to erosion if they are plowed in fall.

Corn, tobacco, and soybeans are the crops most commonly grown in the survey area. The soils and climate are also suited to many field crops that are not commonly grown. For example, grain sorghum, sunflowers, potatoes, and similar crops can be grown if economic conditions are favorable.

Wheat and oats are the common close-growing crops. Rye, barley, buckwheat, and flax could be grown; and orchardgrass, fescue, timothy, and bluegrass could be grown for seed.

The specialty crops grown commercially in the survey area are vegetables, small fruits, canna bulbs, and nursery plants. A small acreage is used for melons, strawberries, sweet corn, tomatoes, peppers, and other vegetables and small fruits.

Deep soils that have good natural drainage and that warm up early in spring are especially well suited to many vegetables and small fruits. The Bewleyville and Crider soils, which make up about 11,800 acres of the survey area, are examples. They have slope of less than 6 percent. Crops can generally be planted and harvested earlier on these soils than on most other soils in the survey area.

Most of the well drained soils in the survey area are suited to orchards and nursery plants. Soils in low-lying areas, where frost is frequent and air drainage is poor, generally are poorly suited to early vegetables, small fruits, and orchard crops.

In 1967, less than 5,000 acres was urban or built-up land (*7*). The soils on a large acreage in the county have good to fair potential for urban uses. In general, the soils that are well suited to crops are also well suited to urban development. The information about specific soils in this soil survey can be used in planning future land use patterns. The potential of a soil for use as farmland should be weighed against its potential for nonfarm uses.

yields per acre

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

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

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

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

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

land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for 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.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation. Monroe County has no soils in capability class V.

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, assisted in writing this section.

Monroe County is in the western mesophytic forest region of Kentucky. Of the several forest types in this region the oak-hickory is the most extensive, making up 58 percent of the county's 92,800 acres of commercial forest land. Practically all of the forest land is privately owned in small holdings (*3*).

In approximately 37 percent of the forest land the average annual growth is 50 to 85 cubic feet per acre. In another 29 percent it is less than 50 cubic feet per acre.

At most sites the growth rate is below the potential; however, it can be improved with careful management.

The five commercial sawmills in Monroe County produce mostly rough lumber, dimension stock, crossties, fuelwood, and chips. Mills in the adjoining Allen, Barren, Cumberland, and Metcalfe counties use wood grown in Monroe County.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, t, d, c, s, f, and r.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade where there are openings in the tree canopy. The invading plants compete with native plants or planted seedlings. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* indicates that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed to control undesirable plants.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. In this survey area it was calculated at age 30 years for eastern cottonwood and at 50 years for all other species. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

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

recreation

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

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

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

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

wildlife habitat

The wildlife population of Monroe County is composed of an estimated 37 species of mammals, 52 species of reptiles and amphibians, and 111 species of native birds. Many of the more than 200 species of non-native migratory birds that are in Kentucky each year can be found in this survey area.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

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

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

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

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

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

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

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry.

Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse, seeds, and cones. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

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

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

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, mourning dove, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, gray squirrel and fox squirrel, gray fox, raccoon, white-tailed deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, green heron, shore birds, kingfisher, 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 in the engineering tables are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

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

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

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

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

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

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

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

building site development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

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

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

sanitary facilities

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

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

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

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

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

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

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

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

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

construction materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of these materials. 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 properties and classifications 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.

The ratings in table 12 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 14.

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

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

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

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

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

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

water management

Table 13 gives information on the soil properties and site features that affect water management. The kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees.

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

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

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow.

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

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

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

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

engineering properties

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

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

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

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

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

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

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

physical and chemical properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

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

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

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

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

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

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

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

soil and water features

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

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

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

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

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

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

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

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

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

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. Only saturated zones within a depth of about 6 feet are indicated. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

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 severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

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

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

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*8*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 17, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

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

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

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine, mixed, mesic Typic Hapludalfs.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

soil series and their morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*6*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*8*). 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."

Bedford series

The Bedford series consists of deep, moderately well drained, very slowly permeable soils. The soil material in the upper 20 to 40 inches of the solum formed in loess, and the soil material below that depth formed in residuum of limestone. These soils are on broad and narrow ridges. The slope ranges from 2 to 12 percent.

Bedford soils are on the same landscape as Crider, Lawrence, Bewleyville, and Trimble soils. Crider and Bewleyville soils, unlike Bedford soils, are deep and well drained and do not have a fragipan. Lawrence soils, unlike Bedford soils, are somewhat poorly drained and have mottles that have chroma of 2 or less in the upper part of the solum. Trimble soils are generally lower on the landscape than Bedford soils. They do not have a fragipan, and they are more than 15 percent chert fragments throughout the solum.

Typical pedon of Bedford silt loam, 2 to 6 percent slopes, in a cultivated field, one-half mile north of the intersection of Ky. Hwy. 163 and Ky. Hwy. 100 in Tompkinsville and 50 feet east of Ky. Hwy. 163:

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

B1—8 to 12 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; few fine roots; strongly acid; clear smooth boundary.

B21t—12 to 26 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; firm; few fine roots; few clay films on some peds; few small black concretions; very strongly acid; clear wavy boundary.

Bx—26 to 38 inches; yellowish brown (10YR 5/4) silt loam, common fine distinct light brownish gray (2.5Y 6/2) and few fine distinct pale brown (10YR 6/3) and brown (10YR 5/3) mottles; weak very coarse prismatic structure parting to moderate medium angular and subangular blocky; firm, compact, brittle; common clay films on peds; few dark brown concretions; very strongly acid; clear wavy boundary.

IIB22t—38 to 61 inches; yellowish red (5YR 5/6) silty clay loam; common fine and medium distinct strong brown (7.5YR 5/6), pale brown (10YR 6/3), and red (2.5YR 5/6) mottles; moderate medium angular blocky structure; firm; common clay films on some peds; few small chert fragments and few dark brown concretions; very strongly acid.

The solum is 50 to 80 inches thick. Bedrock is at a depth of more than 60 inches. Reaction in the solum is very strongly acid to extremely acid in unlimed areas. The solum is free of coarse fragments in the upper part, but it is 0 to 20 percent, by volume, chert fragments and pebbles in the lower part.

The Ap horizon is 5 to 9 inches thick. It has hue of 10YR, value of 4 or 5, and chroma of 2 through 4.

The B1 horizon is 3 to 6 inches thick. It has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 through 6.

The B2t horizon is 8 to 18 inches thick. It has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 6. Texture is silt loam or silty clay loam. In some pedons, the B2t horizon has mottles of light brownish gray (10YR 6/2) in the lower part.

The Bx horizon is 10 to 24 inches thick. It has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 through 6. Texture is silt loam or silty clay loam. This horizon has few to common mottles in shades of brown and gray throughout.

The IIB22t horizon is 24 to 48 inches thick. It has hue of 10YR through 5YR, value of 4 or 5, and chroma of 6. It is mottled in shades of brown, red, and gray. It has texture of silty clay loam or silty clay.

Some pedons have a IIC horizon that is similar in color and texture to the IIB22t horizon.

Bewleyville series

The Bewleyville series consists of deep, well drained soils. These soils formed in the residuum of sandstone, shale, and limestone and in the overlying silt mantle. They are on ridges and side slopes. The slope ranges from 2 to 12 percent.

Bewleyville soils are on the same landscape as Bedford, Crider, Garmon, Trimble, and Waynesboro soils. Bedford soils, unlike Bewleyville soils, have a fragipan. Crider soils are less red in the upper part of the B horizon than the Bewleyville soils. Unlike Bewleyville soils, Garmon and Trimble soils are more than 15 percent chert fragments throughout the solum, and Waynesboro soils have a clayey control section.

Typical pedon of Bewleyville silt loam, 2 to 6 percent slopes, 4.0 miles northeast of the intersection of Ky. Hwy. 163 and Ky. Hwy. 100 in Tompkinsville, 3.5 miles northeast on Ky. Hwy. 1049, 50 feet east of the highway, in pasture:

Ap—0 to 8 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; very friable; common fine roots; worm holes and casts; very strongly acid; abrupt smooth boundary.

B21t—8 to 28 inches; yellowish red (5YR 5/6) silt loam; weak medium subangular blocky structure; friable; few fine roots; thick continuous yellowish red (5YR 4/6) clay films on ped faces; very strongly acid; gradual wavy boundary.

IIB22t—28 to 40 inches; yellowish red (5YR 4/6) silty clay loam; some dark red streaks and coatings on ped faces; moderate medium subangular blocky structure; friable; few fine roots; few yellowish brown (10YR 5/6) sandstone streaks, ghosts, and fragments; common clay films; strongly acid; clear wavy boundary.

IIB23t—40 to 65 inches; dark red (2.5YR 3/6) silty clay loam; moderate fine subangular blocky structure; firm; common clay films; few yellowish brown (10YR 5/6) sandstone streaks, ghosts, and fragments; strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. Reaction in the solum is strongly acid or very strongly acid in unlimed areas. Coarse fragments—mostly chert fragments, pebbles, and sandstone fragments—make up 0 to 5 percent of the solum to a depth of 30 inches and 0 to 25 percent below that depth.

The A horizon is 6 to 10 inches thick. It has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4.

Some pedons have a B1 horizon that is up to 10 inches thick. This horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 through 6. Texture is silt loam or silty clay loam.

The B2t horizon has hue of 7.5YR through 2.5YR, value of 4 or 5, and chroma of 4 through 6. In most pedons it has streaks of red and brown. Texture is silt loam or silty clay loam.

The IIB2t horizon has hue of 5YR through 2.5YR, value of 3 through 5, and chroma of 4 through 8. Texture is silty clay loam, clay loam, and clay. In some pedons this horizon is mottled in shades of brown and gray in the lower part.

Caneyville series

The Caneyville series consists of moderately deep, well drained soils that have moderately slow permeability. These soils formed in material that weathered from limestone. They are on uplands. Rock outcrop is common in areas of these soils. The slope ranges from 6 to 10 percent.

Caneyville soils are on the same landscape as Crider, Bewleyville, and Waynesboro soils. Crider and Bewleyville soils, unlike Caneyville soils, have a fine-silty control section and have bedrock at a depth of more than 60 inches. Waynesboro soils, unlike Caneyville soils, have a clayey control section and have bedrock at a depth of more than 60 inches.

Typical pedon of Caneyville silt loam in an area of Caneyville silt loam-Rock outcrop complex, 6 to 30 percent slopes, 10 miles northeast of the intersection of Ky. Hwy. 163, 1 mile south of the intersection of Ky. Hwy. 63 and paved county road, one-eighth mile west of the county road, in pasture:

Ap—0 to 5 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; neutral; gradual wavy boundary.

B1—5 to 10 inches; dark brown (7.5YR 4/4) silt loam; weak fine subangular blocky structure; friable; few fine roots; few black concretions; neutral; gradual wavy boundary.

B2t—10 to 39 inches; yellowish red (5YR 4/6) clay; moderate medium subangular blocky structure; firm; few fine roots; thick continuous clay films; slightly acid.

R—39 inches; limestone.

The thickness of the solum and the depth to bedrock are 20 to 40 inches. In unlimed areas the solum is very strongly acid to medium acid in the upper part and medium acid to slightly acid in the lower part. Limestone and chert fragments make up 0 to 10 percent of the solum.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 through 4. In some pedons, there is an A1 or A2 horizon, which has hue of 10YR or 7.5YR. The A1 horizon has value of 3 through 5 and chroma of 2 or 3. The A2 horizon has value of 6 or 5 and chroma of 3 or 4.

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

The B2t horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 through 8. In some pedons this horizon is mottled in shades of red, brown, or yellow throughout. The texture is silty clay loam, silty clay, or clay. In some pedons the B2t horizon in the lower part has hue of 10YR through 2.5YR, value of 4 or 5, and chroma of 4 through 6, or it is mottled in shades of red, brown, yellow, olive, or gray.

Crider series

The Crider series consists of deep, well drained soils that have moderate permeability. These soils formed in loess and the underlying residuum of limestone. They are on broad ridges and side slopes. The slope ranges from 2 to 12 percent.

Crider soils are on the same landscape as Bedford, Bewleyville, and Trimble soils. Bedford soils, unlike Crider soils, are moderately well drained and have a fragipan. Bewleyville soils are redder in the upper part of the B horizon than Crider soils. Trimble soils have chert fragments throughout the solum, and they have a strong brown subsoil.

Typical pedon of Crider silt loam, 2 to 6 percent slopes, 2.5 miles southwest of intersection of Ky. Hwy. 100 and Ky. Hwy. 163 in Tompkinsville, 100 feet south of Ky. Hwy. 1366, in a cultivated field:

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

B21t—8 to 24 inches; brown (7.5YR 4/4) silty clay loam; weak fine and medium subangular blocky structure; friable; common fine roots; few clay films; strongly acid; gradual smooth boundary.

B22t—24 to 36 inches; reddish brown (5YR 4/4) silty clay loam, moderate medium subangular blocky structure; firm; few fine roots; common clay films; few small pebbles and chert fragments; few black concretions; pale brown (10YR 6/3) silt coatings; black stains on peds; strongly acid; gradual smooth boundary.

IIB23t—36 to 50 inches; yellowish red (5YR 4/6) silty clay loam; common fine distinct pale brown (10YR 6/3) and yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; firm; common clay films; black stains and pale brown (10YR 6/3) silt coatings on some peds; many black concretions; few small chert fragments; strongly acid; gradual smooth boundary.

IIB24t—50 to 65 inches; yellowish red (5YR 4/6) silty clay loam; few fine and medium distinct pale brown (10YR 6/3) and red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; common clay films; few small black concretions; few small chert fragments; very strongly acid.

The solum is more than 60 inches thick. In unlimed areas the solum is slightly acid to strongly acid in the upper part and medium acid to very strongly acid in the lower part. Coarse fragments make up 0 to 15 percent, by volume, of the solum in the lower part.

The Ap horizon is 6 to 12 inches thick. It has hue of 10YR or 7.5YR, value of 4, and chroma of 3 or 4.

In some pedons there is a B1 horizon, which is up to 10 inches thick. It has hue of 7.5YR or 10YR, value of 4, and chroma of 4. Texture is silt loam.

The B21t horizon is 10 to 18 inches thick. It has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 6. Texture is silt loam or silty clay loam.

The B22t horizon is 10 to 18 inches thick. It has hue of 7.5YR through 5YR, value of 4, and chroma of 4 through 8. It has texture of silt loam or silty clay loam.

The IIB2t horizon is 16 to 48 inches thick. It has hue of 5YR through 10R, value of 3 through 5, and chroma of 4 through 6. Texture is silty clay loam, silty clay, or clay. In some pedons this horizon is mottled in shades of brown and yellow and, in the lower part, in shades of gray.

Egam series

The Egam series consists of deep, moderately well drained soils. These soils formed in alluvium that derived from soils of limestone origin. They are on flood plains. The slope is 0 to 2 percent.

In this survey area the Egam soils are a taxadjunct to the Egam series. They have a mollic epipedon that is thinner than that defined for the series. The subsoil in the upper part has a moist color of brown (10YR 4/3) that is too high in value for a mollic epipedon. These differences do not affect the use and management of the soils.

Egam soils are on the same landscape as Huntington, Lindside, Nolin, and Nolin Variant soils. Huntington, Nolin, and Nolin Variant soils, unlike Egam soils, are well drained and do not have a fine-textured control section. Lindside soils are moderately well drained and have a fine-silty control section.

Typical pedon of Egam silty clay loam, 2 1/2 miles southeast of the intersection of Ky. Hwy. 100 and Ky. Hwy. 163 in Tompkinsville, 6 miles east of Ky. Hwy. 214, 165 feet south of the highway, in a tobacco field along Herd Branch:

Ap—0 to 8 inches; dark brown (10YR 3/3) silty clay loam, moderate medium subangular blocky structure; friable; common fine roots; slightly acid; clear smooth boundary.

B21—8 to 20 inches; dark brown (10YR 3/3) silty clay, brown (10YR 4/3) crushed; strong medium angular blocky structure; firm; common fine roots; thin patchy clay films; slightly acid; gradual smooth boundary.

B22—20 to 36 inches; dark grayish brown (10YR 4/2) silty clay, brown (10YR 4/3) crushed; few fine distinct grayish brown (10YR 5/2) mottles; strong medium blocky structure; very firm; few fine roots between peds; thin patchy clay films; medium acid; gradual smooth boundary.

B23—36 to 52 inches; dark brown (10YR 3/3) silty clay, brown (10YR 4/3) crushed; common fine and medium faint grayish brown (10YR 5/2) and yellowish brown (10YR 5/4) mottles; strong medium angular blocky structure; very firm; few fine roots; few thin patchy clay films; slightly acid; gradual smooth boundary.

B3—52 to 64 inches; dark grayish brown (10YR 4/2) silty clay; brown (10YR 4/3) crushed; common medium and fine faint grayish brown (10YR 5/2) and yellowish brown (10YR 5/4) mottles; strong medium subangular blocky structure; very firm; few small pebbles; few black stains on peds; common clay films; neutral.

The solum ranges from 40 to more than 60 inches in thickness. Bedrock is at a depth of more than 60 inches. Reaction is medium acid to neutral throughout. Some pedons may have a few pebbles throughout the solum.

The A horizon is 6 to 10 inches thick. It has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 or 3.

The B2 horizon is 26 to 40 inches thick. It has hue of 10YR or 7.5YR, value of 3 to 4, and chroma of 2 to 4. In some pedons it has few mottles in shades of gray. Texture is silty clay loam, silty clay, or clay.

The B3 horizon is 10 to 25 inches thick. It is similar in color and texture to the B2 horizon. In some pedons this horizon is mottled in shades of brown and gray.

Frederick series

The Frederick series consists of deep, well drained soils that have moderate permeability. These soils formed in residuum of cherty limestone and shale. They are on ridges and side slopes. Sinkholes and depressions are common in some areas of these soils. The slope ranges from 2 to 20 percent.

Frederick soils are on the same landscape as Bedford, Crider, Bewleyville, and Trimble soils. Bedford soils, unlike Frederick soils, are moderately well drained and have a fragipan. Crider, Bewleyville, and Trimble soils, unlike Frederick soils, do not have a clayey control section, and they are not as red in the upper part of the solum as Frederick soils.

Typical pedon of Frederick cherty silt loam, 6 to 12 percent slopes, 9.4 miles northwest of the intersection of Ky. Hwy. 163 and Ky. Hwy. 100, 0.1 mile north of Ky. Hwy. 839, in a hayfield:

Ap—0 to 6 inches; brown (10YR 4/3) cherty silt loam; weak fine granular structure; friable; common fine roots; 20 percent chert fragments; neutral; clear smooth boundary.

B1—6 to 14 inches; strong brown (7.5YR 5/6) cherty silty clay loam; moderate fine subangular blocky structure; firm; few clay films; common fine roots; 18 percent chert fragments; strongly acid; gradual smooth boundary.

B21t—14 to 22 inches; yellowish red (5YR 5/6) silty clay loam; common medium distinct strong brown (7.5YR 5/6) and light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; firm; common clay films; few fine roots; 4 percent chert fragments; strongly acid; gradual smooth boundary.

B22t—22 to 40 inches; red (2.5YR 4/6) clay; common medium distinct yellowish brown (10YR 5/6), light yellowish brown (10YR 6/4), and yellowish red (5YR 5/6) mottles; strong medium subangular blocky structure; very firm; few fine roots in upper part; common clay films; 2 percent chert fragments; very strongly acid; gradual wavy boundary.

B3t—40 to 62 inches; mottled red (2.5YR 4/6), yellowish brown (10YR 7/2), light gray (10YR 7/2), and dark red (10YR 3/6) clay; moderate medium blocky structure; very firm; common clay films; 1 percent chert and soft shale fragments; very strongly acid; gradual wavy boundary.

C—62 to 70 inches; mottled red (2.5YR 4/6), strong brown (7.5YR 5/6), light gray (10YR 7/2), yellowish red (5YR 5/6), and dark red (10YR 3/6) clay; massive; very firm; 2 percent chert and soft gray shale fragments; very strongly acid.

The solum is more than 60 inches thick. Bedrock is at a depth of more than 72 inches. The Ap and B1 horizons are medium acid to strongly acid in unlimed areas. The B2t horizon is strongly acid to very strongly acid. The soil material below a depth of 60 inches is very strongly acid to medium acid. Coarse fragments 1 to 5 inches in diameter make up 15 to 25 percent, by volume, of the A and B1 horizons. The content of coarse fragments, 1 to 5 inches in diameter, in the lower part of the Bt horizon and in the C horizon ranges from 0 to 15 percent. By weighted average, coarse fragments make up less than 6 percent of the B and C horizons.

The A horizon is 3 to 9 inches thick. It has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 through 4. Texture is cherty silt loam except in severely eroded areas, where it is cherty silty clay loam.

The B1 horizon is up to 9 inches thick. It has hue of 7.5YR through 2.5YR, value of 4 through 6, and chroma of 6 through 8. Texture is cherty silty clay loam or cherty silt loam.

The B2t horizon is 14 to 40 inches thick. It has hue of 5YR through 2.5YR, value of 4 through 5, and chroma of 6 through 8. In some pedons it is mottled in shades of brown and yellow. Texture is silty clay, clay, and silty clay loam.

The B3t horizon is 18 to 36 inches thick. It has hue of 5YR through 2.5YR, value of 4 or 5, and chroma of 6 through 8. In some pedons it is mottled in shades of brown, red, yellow, and gray. Texture is silty clay or clay.

The C horizon is similar in color and texture to the B3t horizon.

Garmon series

The Garmon series consists of moderately deep, well drained soils that have moderately rapid permeability. These soils formed in residuum of shaly limestone, calcareous shale, and siltstone. They are mainly on hillsides and side slopes. The slope ranges from 6 to 60 percent but is dominantly greater than 20 percent.

Garmon soils are on the same landscape as Bedford, Lowell, Bewleyville, and Trimble soils. Unlike Garmon soils, Bedford soils have a fragipan and are moderately well drained, and Lowell soils are more than 40 inches deep to bedrock. Lowell soils contain more clay than the Garmon soils. Bewleyville soils, unlike Garmon soils, are more than 60 inches deep to bedrock, have an argillic horizon, and do not have shale fragments throughout the solum. Trimble soils are higher on the landscape and deeper to bedrock than the Garmon soils; they are more than 15 percent chert throughout the solum, and they have an argillic horizon.

Typical pedon of Garmon shaly silt loam, 12 to 20 percent slopes, 9 miles north of the intersection of Ky. Hwy. 100 and Ky. Hwy. 163 in Tompkinsville, 2 miles northwest of Sulphur Lick, 100 feet east of Ky. Hwy. 839, in pasture:

Ap—0 to 7 inches; brown (10YR 4/3) shaly silt loam; weak fine granular structure; very friable; common fine roots; 20 percent shale fragments; medium acid; clear smooth boundary.

B21—7 to 17 inches; yellowish brown (10YR 5/4) shaly silt loam; weak fine subangular blocky structure; friable; few fine roots; 25 percent shale fragments; medium acid; gradual wavy boundary.

B22—17 to 26 inches; yellowish brown (10YR 5/4) shaly silt loam; weak fine subangular blocky structure; friable; 40 percent shale fragments; slightly acid; gradual wavy boundary.

R—26 inches; dark gray (5Y 4/1) shaly limestone.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. Reaction ranges from medium acid to neutral throughout the solum. Siltstone, shale, and limestone fragments that are less than 1 inch to as much as 10 inches across make up 5 to 45 percent, by volume, of the entire profile and 15 to 35 percent, by weighted average, of the control section.

The A horizon is 4 to 8 inches thick. The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The A1 and A2 horizons have hue of 10YR. The A1 horizon has value of 3 or 4 and chroma of 2 or 3. The A2 horizon has value of 5 or 6 and chroma of 3 or 4.

The B2 horizon is 13 to 28 inches thick. It has hue of 7.5YR or 10YR, value of 5, and chroma of 4 through 8. It is shaly silt loam, shaly loam, shaly silty clay loam, or their flaggy analogs.

Some pedons have a B3 or a C horizon that is 5 to 15 inches thick and similar in color and texture to the B2 horizon.

Huntington series

The Huntington series consists of deep, well drained soils. These soils formed in alluvium that derived chiefly from soils of limestone origin. They are on flood plains along small drainageways and major streams and in sinkholes or depressions on karst landscape. The slope is 0 to 2 percent.

In this survey area the Huntington soils are a taxadjunct to the Huntington series because they have a thicker mollic epipedon than is typical for the series. This difference does not affect the use and management of the soils.

Huntington soils are on the same landscape as Lindside, Newark, Crider, and Bedford soils. Lindside soils, unlike Huntington soils, are moderately well drained, do not have a mollic epipedon, and have mottles that have chroma of 2 within a depth of 24 inches. Newark soils, unlike Huntington soils, are somewhat poorly drained and do not have a mollic epipedon. They are grayer in the upper part of the solum than the Huntington soils. Crider soils have a redder subsoil than Huntington soils, and they have an argillic horizon. Bedford soils, unlike Huntington soils, do not have a mollic epipedon and have a fragipan.

Typical pedon of Huntington silt loam, 2 miles north of the intersection of Ky. Hwy. 100 and Ky. Hwy. 163 in Tompkinsville, 25 feet east of Ky. Hwy. 163, in a cultivated depression:

Ap—0 to 10 inches; dark brown (7.5YR 3/2) silt loam; weak fine granular structure; very friable; common fine roots; mildly alkaline; gradual smooth boundary.

B1—10 to 36 inches; dark brown (7.5YR 3/2) silt loam; moderate fine granular structure; friable; common fine roots; neutral; gradual smooth boundary.

B21—36 to 50 inches; brown (7.5YR 4/4) silt loam; few fine distinct light yellowish brown (10YR 6/4) mottles; weak fine and medium granular structure; friable; few fine roots; neutral; gradual smooth boundary.

B22—50 to 61 inches; brown (7.5YR 4/4) silt loam; weak fine and medium granular structure; friable; few small black concretions and few small pebbles; slightly acid.

The solum is more than 40 inches thick. Bedrock is at a depth of more than 60 inches. Reaction ranges from medium acid to mildly alkaline throughout. Some pedons have mottles below a depth of 3 feet.

The A horizon is 8 to 14 inches thick. It has hue of 10YR or 7.5YR, value of 3, and chroma of 2 or 3.

The B1 horizon is 16 to 30 inches thick. It has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 through 4. Texture is silt loam or silty clay loam. Some pedons may have an A1 or a B3 horizon that is similar in color and texture to the B1 horizon.

The B21 and B22 horizons are 12 to 36 inches thick. They have hue of 7.5YR or 10YR, value of 4, and chroma of 3 or 4. Texture is silt loam or silty clay loam. Some pedons have a C horizon that is similar in color and texture to the B2 horizon.

Lawrence series

The Lawrence series consists of deep, somewhat poorly drained, slowly permeable soils that formed in old alluvium or in residuum of limestone, shale, siltstone, and sandstone. These soils are on stream terraces and on slightly concave slopes in the uplands. The slopes are dominantly 1 percent, but they range to 2 percent.

Lawrence soils are on the same landscape as Bedford, Crider, Newark, and Melvin soils. Bedford and Crider soils are better drained than Lawrence soils. Unlike Lawrence soils, Crider soils do not have a fragipan. Newark and Melvin soils are on flood plains.

Typical pedon of Lawrence silt loam, 3 miles south of the intersection of Ky. Hwy. 163 and Ky. Hwy. 100 in Tompkinsville, 6 miles west on paved county road, 1,650 feet southeast of river bank at Otia, in pasture:

Ap—0 to 6 inches; grayish brown (2.5Y 5/2) silt loam; weak fine granular structure; very friable; common fine roots; strongly acid; clear smooth boundary.

B21t—6 to 14 inches; yellowish brown (10YR 5/6) silt loam; common fine faint light brownish gray (2.5Y 6/2) and brown (10YR 5/3) mottles; weak fine and medium subangular blocky structure; friable; common fine roots; few small soft brown masses; strongly acid; gradual smooth boundary.

B22t—14 to 25 inches; yellowish brown (10YR 5/6) silty clay loam; many medium distinct light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; continuous clay films on peds; few small black concretions; strongly acid; clear smooth boundary.

Bx1—25 to 42 inches; mottled yellowish brown (10YR 5/6), light brownish gray (2.5Y 6/2), light yellowish brown (2.5Y 6/4), and strong brown (7.5YR 5/6) silty clay loam; weak very coarse prismatic structure parting to moderate medium angular blocky; firm, compact, brittle; few fine roots; common clay films; few very small black concretions; strongly acid; gradual wavy boundary.

Bx2—42 to 62 inches; mottled light brownish gray (2.5Y 6/2), yellowish brown (10YR 5/6), light yellowish brown (2.5Y 6/4), and strong brown (7.5YR 5/6) silty clay loam; weak very coarse prismatic structure parting to moderate medium angular blocky; very firm, compact, brittle; common clay films; common small soft brown masses and few black concretions; strongly acid.

The solum is 40 to 80 inches thick. Bedrock is at a depth of more than 60 inches. The fragipan is strongly acid or very strongly acid throughout in unlimed areas. The substratum ranges from very strongly acid through neutral.

The A horizon is 5 to 10 inches thick. The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 through 4. In some pedons there is an A2 horizon, which is similar in color and texture to the Ap horizon.

The B2t horizon is 15 to 20 inches thick. It has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 through 6. Texture is silt loam or silty clay loam. There are few to many mottles that have chroma of 2 or less.

The Bx horizon is 10 to 50 inches thick. It has hue of 7.5YR through 2.5Y, value of 5 through 7, and chroma of 0 through 8. In many pedons it is equally mottled in shades of gray or brown. Texture is silt loam or silty clay loam.

In the C horizon in some pedons the matrix and mottles have hue of 2.5Y through 5YR, value of 4 through 6, and chroma of 0 through 6. Texture is silt loam through clay.

Lindside series

The Lindside series consists of deep, moderately well drained soils. These soils formed in alluvium that derived chiefly from limestone. They are on flood plains and in upland depressions. The slope is 0 to 2 percent.

Lindside soils are on the same landscape as Bedford, Newark, and Nolin soils. Bedford soils, unlike Lindside soils, have a fragipan. Newark soils, unlike Lindside soils, are somewhat poorly drained and have dominant chroma of 2 or less within a depth of 24 inches. Nolin soils, unlike Lindside soils, are well drained and do not have mottles that have chroma of 2 within a depth of 24 inches.

Typical pedon of Lindside silt loam, 1.5 miles southwest of the intersection of Ky. Hwy. 100 and Ky. Hwy. 163, 1.5 miles south of Ky. Hwy. 1366, 25 feet east of Ky. Hwy. 63, in a cultivated field:

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

B21—10 to 21 inches; brown (10YR 5/3) silt loam; weak fine subangular blocky structure; friable; common fine roots; slightly acid; gradual wavy boundary.

B22—21 to 34 inches; brown (10YR 5/3) silt loam; common fine faint light gray (10YR 7/2 or 2.5Y 7/2), light brownish gray (2.5Y 6/2), and pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; friable; few fine roots; slightly acid; clear smooth boundary.

C—34 to 64 inches; light brownish gray (10YR 6/2) silt loam; common fine and medium distinct dark brown (10YR 3/3), light yellowish brown (10YR 6/4), light gray (2.5Y 7/2), and grayish brown (2.5Y 5/2) mottles; massive; firm; few small pebbles; slightly acid.

The solum is 30 to more than 60 inches thick. Bedrock is at a depth of more than 60 inches. The solum is strongly acid to slightly acid in the upper part and medium acid to neutral in the lower part. In most pedons there are no coarse fragments, but in some pedons, coarse fragments make up as much as 5 percent of the solum. Low-chroma mottles are at a depth of 19 to 24 inches.

The A horizon is 6 to 12 inches thick. The Ap horizon has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 2 or 3.

The B2 horizon is 16 to 34 inches thick. It has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 through 6. Texture is silt loam or silty clay loam.

The C horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 1 through 4. The textures are loam, silty clay loam, or silt loam.

Lowell series

The Lowell series consists of deep, well drained soils that have moderately slow permeability. These soils formed in residuum of interbedded limestone, shale, and siltstone. They are on ridgetops, foot slopes, and benches. The slope is 2 to 20 percent.

Lowell soils are on the same landscape as Garmon and Trimble soils. Garmon soils, unlike Lowell soils, are moderately deep and have a fine-loamy control section. They are higher on the landscape than Lowell soils. Trimble soils, unlike Lowell soils, are more than 15 percent chert fragments throughout the solum.

Typical pedon of Lowell silt loam, 12 to 20 percent slopes, 9.5 miles east of the intersection of Ky. Hwy. 100 and Ky. Hwy. 163 in Tompkinsville, 440 feet south of Ky. Hwy. 272 at Center Point, and 50 feet east of gravel road, in pasture on hillside:

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; moderate fine granular structure; friable; common fine roots; slightly acid; clear smooth boundary.

B1—7 to 14 inches; dark brown (7.5YR 4/4) silty clay loam; weak fine subangular blocky structure; firm; common fine roots; few fine clay films; few brown and black concretions; medium acid; gradual smooth boundary.

B2t—14 to 28 inches; yellowish brown (10YR 5/6) silty clay; strong fine and medium subangular blocky structure; firm; few fine roots; common clay films; few black concretions; strongly acid; gradual smooth boundary.

B3t—28 to 48 inches; yellowish brown (10YR 5/6) clay; common fine distinct pale brown (10YR 6/3), strong brown (7.5YR 5/6), light yellowish brown (10YR 6/4), and olive gray (5Y 5/2) mottles; moderate fine blocky structure; very firm; few fine roots; common clay films; few black concretions; strongly acid; gradual irregular boundary.

C—48 to 68 inches; yellowish brown (10YR 5/6) clay; many medium distinct dark yellowish brown (10YR 4/4), pale brown (10YR 6/3), and strong brown

(7.5YR 5/6) mottles; massive; very firm; common black concretions; strongly acid.

The solum is 30 to 50 inches thick. Limestone or interbedded limestone, shale, and siltstone bedrock are at a depth of 40 to 80 inches. Reaction is strongly acid to slightly acid in all layers except the one directly above the bedrock; in this layer, reaction is medium acid to neutral. Coarse fragments make up 0 to 5 percent of the solum in the upper part and 0 to 15 percent in the lower part.

The A horizon is 6 to 10 inches thick. The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 6. Texture is silt loam or silty clay loam.

The B1 horizon is up to 8 inches thick. It has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 6. Texture is silty clay loam or silty clay.

The B2 horizon is 8 to 16 inches thick. It has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 6. Texture is silty clay or clay. In some pedons the B2 horizon in the lower part has few to common mottles in shades of brown, gray, and yellow.

The B3t horizon is 14 to 26 inches thick. It has hue of 10YR through 5Y, value of 5, and chroma of 4 through 6, and it is mottled in shades of brown, gray, yellow, and olive. Texture is silty clay or clay.

The C horizon is 12 to 36 inches thick. It is similar in color and texture to the B3t horizon.

Melvin series

The Melvin series consists of deep, moderately permeable, poorly drained soils. These soils formed in alluvium that derived chiefly from limestone. They are on flood plains. The slope is 0 to 2 percent.

Melvin soils are on the same landscape as Lindside, Newark, and Nolin soils. Lindside, Newark, and Nolin soils are better drained than Melvin soils, and they are not dominantly gray in the upper part of the solum.

Typical pedon of Melvin silt loam, 3 miles north of the intersection of Ky. Hwy. 100 and Ky. Hwy. 163, one-half mile east of Ky. Hwy. 163, 50 feet north of paved county road:

Ap—0 to 7 inches; grayish brown (10YR 5/2) silt loam; common fine faint yellowish brown (10YR 5/6) and light brownish gray (2.5Y 6/2) mottles; weak fine granular structure; friable; slightly acid; gradual smooth boundary.

Bg—7 to 26 inches; gray (10YR 5/1) silt loam; common fine faint pale brown (10YR 6/3), brown (10YR 5/3), and yellowish brown (10YR 5/6) mottles; weak fine granular and subangular blocky structure; firm; few fine roots; few small soft brown masses; few pebbles; neutral; gradual smooth boundary.

Cg—26 to 60 inches; gray (10YR 5/1) silt loam; common fine faint brown (10YR 5/3) and yellowish brown (10YR 5/4) mottles; massive; few fine roots; few small soft brown masses; neutral.

The solum is 20 to 40 inches thick. Bedrock is at a depth of more than 60 inches. Reaction is slightly acid to mildly alkaline throughout the profile. Coarse fragments, mainly chert fragments and pebbles, generally make up less than 5 percent of the entire profile. A seasonal water table is at a depth of 1 foot or less.

The A horizon is 6 to 10 inches thick. It has hue of 10YR through 5Y, value of 4 through 7, and chroma of 1 through 3.

The Bg horizon is 10 to 25 inches thick. It has hue of 10YR through 5Y, value of 6 or 7, and chroma of 2 or less or value of 5 and chroma of 1 or less. Mottles are in shades of brown and red. Texture is silt loam or silty clay loam.

The Cg horizon is similar in color and texture to the Bg horizon. In some pedons there are strata of loamy, clayey, and sandy material below a depth of 40 inches.

Newark series

The Newark series consists of deep, somewhat poorly drained soils that have moderate permeability. These soils formed in alluvium that derived chiefly from soils of limestone origin. They are on flood plains and in upland depressions. The slope is 0 to 2 percent.

Newark soils are on the same landscape as Lindside, Melvin, and Nolin soils. Lindside and Nolin soils are better drained than Newark soils. Melvin soils, unlike Newark soils, are dominantly gray throughout the solum.

Typical pedon of Newark silt loam, 1.5 miles southwest of the intersection of Ky. Hwy. 100 and Ky. Hwy. 163 in Tompkinsville, 1.4 miles south of Ky. Hwy. 1366, 50 feet east of Ky. Hwy. 63, in cultivated field near East Mill Creek:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; common fine roots; mildly alkaline; clear smooth boundary.

B21—8 to 14 inches; brown (10YR 5/3) silt loam; few fine distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/8) mottles; weak fine granular structure; friable; common fine roots; mildly alkaline; gradual smooth boundary.

B22g—14 to 27 inches; light brownish gray (2.5Y 6/2) silt loam; common fine faint and distinct yellowish brown (10YR 5/8) and brown (10YR 5/3) mottles; weak fine granular structure; friable; few fine roots; neutral; clear smooth boundary.

Cg—27 to 60 inches; mottled light brownish gray (2.5Y 6/2), grayish brown (10YR 5/2), and dark grayish brown (10YR 4/2) silt loam; massive; friable; few sand grains; small brown concretions; neutral.

The solum is 22 to 44 inches thick. Bedrock is at a depth of more than 60 inches. Reaction ranges from medium acid to mildly alkaline. Coarse fragments, mostly pebbles, make up 0 to 5 percent, by volume, of the profile to a depth of 30 inches and 0 to 15 percent below that depth.

The A horizon is 6 to 10 inches thick. The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3.

The B21 horizon is 4 to 10 inches thick. It has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. In some pedons this horizon is mottled in shades of brown and gray. Texture is silt loam or silty clay loam.

The B22g horizon is 10 to 25 inches thick. It has hue of 10YR through 2.5Y, value of 4 through 7, and chroma of 1 or 2. It contains mottles in shades of brown. Texture is silt loam or silty clay loam.

The Cg horizon is similar in color and texture to the B22g horizon.

Nolin series

The Nolin series consists of deep, well drained, moderately permeable soils. These soils formed in alluvium that derived from limestone, sandstone, shale, and loess. They are in depressions on flood plains. The slope is 0 to 2 percent.

Nolin soils are on the same landscape as Nolin Variant, Lindside, and Newark soils. Nolin Variant soils, unlike Nolin soils, have a coarse-loamy control section and a fine sandy loam surface layer. Lindside soils, unlike Nolin soils, are moderately well drained and have mottles of chroma of 2 within a depth of 24 inches. Newark soils are somewhat poorly drained, and they are grayer in the solum than Nolin soils.

Typical pedon of Nolin silt loam, 6 miles east of the intersection of Ky. Hwy. 163 and Ky. Hwy. 100 in Tompkinsville, 1.5 miles south of Ky. Hwy. 100, 100 yards northeast of McMillans Ferry on Ky. Hwy. 214:

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

B21—8 to 24 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; very friable; few fine roots; slightly acid; gradual smooth boundary.

B22—24 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; very friable; slightly acid.

The solum is more than 40 inches thick. Bedrock is at a depth of more than 60 inches. Reaction is medium acid to mildly alkaline in the solum. Coarse fragments, mainly gravel, make up 0 to 5 percent of the solum. In some pedons, gravel makes up more than 15 percent, by volume, of the substratum.

The Ap horizon is 6 to 14 inches thick. It has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Texture is loam or silt loam.

In some pedons there is a B1 horizon, which is similar in color and texture to the Ap horizon.

The B2 horizon is 12 to 48 inches thick. It has hue of 10YR, value of 4, and chroma of 3 or 4. It has texture of silt loam or silty clay loam. Some pedons have chroma of 2 or less below a depth of 30 inches.

The C horizon is similar in color and texture to the B2 horizon.

Nolin Variant

The Nolin Variant consists of deep, well drained soils that have moderately rapid permeability. These soils formed in recent alluvium that washed from soils that formed in residuum of sandstone, shale, and limestone. They are on flood plains. The slope is 0 to 2 percent.

Nolin Variant soils are on the same landscape as Lindside, Newark, and Nolin soils. Lindside soils, unlike Nolin Variant soils, are moderately well drained and have mottles of chroma of 2 within a depth of 24 inches. Newark soils are somewhat poorly drained and are grayer in the upper part of the solum than Nolin Variant soils. Nolin soils, unlike Nolin Variant soils, have a fine-silty control section.

Typical pedon of Nolin Variant fine sandy loam, 3 miles southeast of the intersection of Ky. Hwy. 163 and Ky. Hwy. 100 in Tompkinsville, 6 miles east of Ky. Hwy. 163, on paved county road, east bank of Cumberland River at Otia, 50 feet south of Ky. Hwy. 214:

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

B21—8 to 18 inches; brown (10YR 4/3) fine sandy loam; weak fine subangular blocky structure; friable; few fine roots; few small pebbles; slightly acid; abrupt smooth boundary.

B22—18 to 38 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine subangular blocky structure; friable; slightly acid; abrupt smooth boundary.

C—38 to 64 inches; brown (10YR 4/3) fine sandy loam; massive; friable; slightly acid.

The solum is 24 to 48 inches thick. Bedrock is at a depth of more than 60 inches. Reaction is medium acid to neutral throughout. The content of coarse fragments ranges from 0 to 15 percent in the control section.

The A horizon is 6 to 12 inches thick. It has hue of 10YR, value of 4, and chroma of 2 or 3. It has texture of fine sandy loam, sandy loam, and silt loam.

The B2 horizon is 18 to 35 inches thick. It has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 2 through 4. Texture is sandy loam or fine sandy loam.

In some pedons there is a B3 horizon. The B3 horizon and the C horizon are similar in color and texture to the B2 horizon.

Sensabaugh series

The Sensabaugh series consists of deep, well drained, nearly level soils that have moderately rapid permeability. These soils formed in recent alluvium that derived from limestone, sandstone, and shale. They are on flood plains along the major and minor streams throughout the county. The slope is 0 to 2 percent.

Sensabaugh soils are on the same landscape as Lindside, Nolin, and Skidmore soils. Lindside soils, unlike Sensabaugh soils, have mottles of chroma of 2 within a depth of 24 inches. Nolin soils, unlike Sensabaugh soils, have a fine-silty control section and are less than 15 percent coarse fragments in the control section. Skidmore soils, unlike Sensabaugh soils, have a loamy-skeletal control section.

Typical pedon of Sensabaugh gravelly silt loam, 1.5 miles southwest of the intersection of Ky. Hwy. 100 and Ky. Hwy. 163 in Tompkinsville, 2.2 miles south of Ky. Hwy. 1366, 50 feet north of Gully Creek Bridge:

Ap—0 to 8 inches; brown (10YR 4/3) gravelly silt loam; weak fine granular structure; very friable; common fine roots; 18 percent gravel; slightly acid; gradual smooth boundary.

B21—8 to 28 inches; brown (10YR 4/3) gravelly silt loam; weak fine subangular blocky structure; common fine roots; 20 percent gravel; slightly acid; gradual smooth boundary.

B22—28 to 60 inches; brown (10YR 4/3) gravelly silt loam; weak fine granular structure; few fine roots in upper part; 40 percent quartz gravel and cobblestones; neutral.

The solum is 24 or more inches thick. Bedrock is at a depth of more than 60 inches. Reaction is medium acid to neutral. The content of coarse fragments, mostly rounded pebbles, is 10 to 25 percent, by volume, in the A horizon and 15 to 40 percent below. In the control section the content of coarse fragments, by weighted average, is 15 to 35 percent.

The Ap horizon is 6 to 12 inches thick. It has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The B2 horizon is 40 or more inches thick. It has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 4. In some pedons there are low-chroma mottles below a depth of 30 inches. Texture is gravelly silt loam and gravelly loam.

Skidmore series

The Skidmore series consists of deep, well drained, moderately rapidly permeable, gravelly soils. These soils formed in alluvium that derived from soils underlain by cherty limestone, shale, and sandstone. They are on flood plains. In most places the slope is 1 percent, but along the smaller tributaries it ranges from 0 to 2 percent.

Skidmore soils are on the same landscape as Nolin Variant, Lindside, and Nolin soils. Nolin Variant soils, unlike Skidmore soils, are less than 15 percent coarse fragments to a depth of 40 inches. Lindside and Nolin soils, unlike Skidmore soils, have a silt loam or silty clay loam B horizon.

Typical pedon of Skidmore gravelly loam, 3.2 miles south of the intersection of Ky. Hwy. 100 and Ky. Hwy. 163 in Tompkinsville, 1 mile southwest of the intersection of Ky. Hwy. 1446 and paved county road at Harlan Crossroad, 20 feet south of gravel road, along Gully Creek:

Ap—0 to 7 inches; brown (10YR 4/3) gravelly loam; weak fine granular structure; very friable; common fine roots; 25 percent gravel; neutral; gradual smooth boundary.

B—7 to 24 inches; pale brown (10YR 6/3) gravelly loam; weak fine granular structure; friable; many fine roots; 35 percent gravel; slightly acid; gradual smooth boundary.

C—24 to 48 inches; pale brown (10YR 6/3) very gravelly loam; massive; friable; few fine roots in the upper part; 60 percent pebbles and limestone and shale fragments; slightly acid; gradual wavy boundary.

R—48 inches; gray (5Y 5/1) shaly limestone.

The solum is 20 to 40 inches thick. Bedrock is at a depth of more than 40 inches. Reaction ranges from medium acid to neutral. Gravel and waterworn chert make up 10 to 25 percent, by volume, of the A horizon, 25 to 45 percent of the B horizon, and 45 to 75 percent of the C horizon. By weighted average, these coarse fragments make up 35 to 50 percent of the control section.

The A horizon is 6 to 10 inches thick. It has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The B horizon is 15 to 20 inches thick. It has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. Texture is gravelly loam or gravelly fine sandy loam.

The C horizon is similar in color and texture to the B horizon.

Tarklin series

The Tarklin series consists of deep, moderately well drained soils that have slow permeability. These soils formed in alluvium or colluvium that derived from residuum of cherty limestone. They are on terraces, foot slopes, and uplands. The slope is 6 to 12 percent.

Tarklin soils are on the same landscape as Nolin Variant and Trimble soils. Nolin Variant and Trimble soils, unlike Tarklin soils, do not have a fragipan and are well drained.

Typical pedon of Tarklin cherty silt loam, 6 to 12 percent slopes, 3 miles south of the intersection of Ky. Hwy. 100 and Ky. Hwy 163 in Tompkinsville, 0.2 mile southeast of Ky. Hwy. 63, in pasture:

Ap—0 to 8 inches; grayish brown (10YR 5/2) cherty silt loam; weak fine granular structure; very friable; common fine roots and pores; 20 percent cherty fragments; medium acid; clear smooth boundary.

B1—8 to 14 inches; yellowish brown (10YR 5/4) cherty silt loam; weak fine and medium subangular blocky structure; friable; common fine roots and pores; 28 percent cherty fragments; medium acid; clear smooth boundary.

B2t—14 to 24 inches; yellowish brown (10YR 5/6) cherty silty clay loam; moderate fine and medium subangular blocky structure; common fine roots; 30 percent cherty fragments; few clay films; ped faces coated with pale brown (10YR 6/3) silt loam; medium acid; clear wavy boundary.

Bx1—24 to 38 inches; mottled light yellowish brown (10YR 5/4) and light brownish gray (10YR 6/2) cherty silty clay loam; weak very coarse prismatic structure parting to weak medium angular blocky; firm, compact, brittle; some peds coated with gray (10YR 5/1) silt loam; common clay films; 35 percent chert fragments; strongly acid; gradual wavy boundary.

Bx2—38 to 60 inches; mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/4), and light gray (2.5Y 7/2) cherty silty clay loam; weak very coarse prismatic structure parting to weak medium angular blocky; very firm, compact, brittle; common clay films; 28 percent chert fragments and gravel; many dark brown concretions; strongly acid.

The solum is 40 to 60 inches thick. Bedrock is at a depth of more than 60 inches. Reaction is strongly acid to very strongly acid in unlimed areas. Coarse fragments make up 15 to 35 percent, by weighted average, of the control section. Most of these fragments are chert; some are quartzite and siltstone.

The A horizon is 6 to 12 inches thick. It has hue of 10YR, value of 4 through 6, and chroma of 2 or 3.

The B1 horizon is up to 8 inches thick. It has hue of 10YR, value of 5, and chroma of 4 or 6.

The B2 horizon is 7 to 15 inches thick. It has hue of 10YR, value of 5 or 6, and chroma of 4 or 6. Texture is cherty silt loam or cherty silty clay loam.

The Bx horizon is 20 to 40 inches thick. It is mottled in hue of 10YR, 7.5YR, or 2.5Y, value of 5 to 7, and chroma of 2 to 6; it is equally mottled in shades of gray and brown. Texture is cherty loam or cherty silty clay loam.

Trimble series

The Trimble series consists of deep, well drained soils that have moderate permeability. These soils formed in residuum of cherty limestone. They are on ridgetops, side slopes, foot slopes, and stream terraces. The slope ranges from 2 to 30 percent.

Trimble soils are on the same landscape as Frederick, Garmon, Bewleyville, and Waynesboro soils. Frederick and Waynesboro soils, unlike Trimble soils, have a clayey control section. Garmon soils, unlike Trimble soils, are moderately deep and have shale fragments throughout the profile. Bewleyville soils, unlike Trimble soils, are not more than 15 percent cherty fragments throughout the control section.

Typical pedon of Trimble cherty silt loam, 12 to 20 percent slopes, 6 miles southwest of intersection of Ky. Hwy. 100 and Ky. Hwy. 163 in Tompkinsville, 1 mile west of the intersection of Ky. Hwy. 63 and Ky. Hwy. 87, 0.7 mile south of Ky. Hwy. 87 at Gamaliel, in a pasture:

Ap—0 to 6 inches; grayish brown (10YR 5/2) cherty silt loam; weak fine granular structure; friable; common fine roots; 22 percent chert fragments; slightly acid; gradual smooth boundary.

B1—6 to 14 inches; strong brown (7.5YR 5/6) cherty silty clay loam; weak fine and medium subangular blocky structure; firm; common fine roots; 20 percent cherty fragments; strongly acid; gradual wavy boundary.

B21t—14 to 46 inches; strong brown (7.5YR 5/6) cherty silty clay loam; moderate fine and medium subangular blocky structure; firm; few fine roots; thin clay films; 30 percent cherty fragments; few fine black concretions; strongly acid; gradual wavy boundary.

B22t—46 to 62 inches; mottled strong brown (7.5YR 5/6), dark brown (7.5YR 3/2), and pale brown (10YR 6/3) cherty silty clay loam; moderate medium subangular blocky structure; firm; few clay films; 35 percent chert fragments; few dark brown and black concretions; strongly acid.

The thickness of the solum and the depth to bedrock are 60 inches or more. Reaction is strongly acid or very strongly acid in unlimed areas. Coarse fragments, mostly chert fragments, make up 15 to 35 percent, by volume, of the control section.

The A horizon is 3 to 9 inches thick. It has hue of 10YR, value of 4 or 5, chroma of 2 or 3.

The B1 horizon is 5 to 14 inches thick. It has hue of 10YR or 7.5YR, value of 5, and chroma of 4 through 8. Texture is cherty silt loam or cherty silty clay loam.

The B21t horizon is 20 to 40 inches thick. It has hue of 10YR or 7.5YR, value of 5, and chroma of 4 through 8. Texture is cherty silt loam or cherty silty clay loam. In some pedons this horizon has common fine faint mottles in shades of brown.

The B22t horizon is mottled in hue of 10YR through 5YR, value of 5 or 6, and chroma of 1 through 6. Texture is cherty silt loam or cherty silty clay loam.

Some pedons have a C horizon, which is similar in color and texture to the B22t horizon.

Waynesboro series

The Waynesboro series consists of deep, well drained soils that have moderate permeability. These soils formed in residuum of sandstone, limestone, and shale. They are on ridges and side slopes and on karst landscape. The slope ranges from 6 to 30 percent.

Waynesboro soils are on the same landscape as Bedford, Crider, Bewleyville, and Trimble soils. Bedford soils, unlike Waynesboro soils, have a fragipan. Crider and Bewleyville soils, unlike Waynesboro soils, are well drained and do not have a clayey control section. Trimble soils, unlike Waynesboro soils, have a fine-loamy control section and are more than 15 percent chert fragments in the control section.

Typical pedon of Waynesboro loam, 6 to 12 percent slopes, 3 miles south of the intersection of Ky. Hwy. 163 and Ky. Hwy 100 in Tompkinsville, 50 feet east of Ky. Hwy. 1466, in pasture:

Ap—0 to 5 inches; brown (10YR 4/3) loam; weak fine granular structure; common fine roots; few small pebbles; neutral; clear smooth boundary.

B1—5 to 11 inches; yellowish red (5YR 4/6) clay loam; weak fine subangular blocky structure; friable; common fine roots; slightly acid; clear smooth boundary.

B21t—11 to 24 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; firm; common fine roots; few small pebbles; common clay films; strongly acid; gradual wavy boundary.

B22t—24 to 38 inches; dark red (10R 3/6) clay; few fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; common clay films; few small pebbles; very strongly acid; gradual wavy boundary.

B23t—38 to 80 inches; dark red (10YR 3/6) clay; few medium distinct light red (2.5YR 6/6) and reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; friable; common clay films; few small pebbles; very strongly acid.

The thickness of the solum and the depth to bedrock are greater than 60 inches. Reaction is strongly acid or very strongly acid in unlimed areas. Coarse fragments, mostly cobblestones, quartzite gravel, and chert fragments make up 0 to 15 percent, by volume, of the profile.

The A horizon is 4 to 10 inches thick. It has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 3 or 4.

The B1 horizon is 4 to 10 inches thick. It has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 through 8. Texture is clay loam, sandy clay loam, and loam.

The B2t horizon is more than 40 inches thick. It has hue of 5YR through 10YR, value of 3 or 4, and chroma of 4 through 8. In some pedons it has few mottles in shades of brown or yellow. Texture is clay loam, sandy clay, or clay.

formation of the soils

Soil is formed by the interaction of five factors: parent material, climate, plant and animal life, relief, and time. The relative importance of each factor differs from one area to another. Climate and plant and animal life are not likely to vary much over an area the size of one or two counties, but many local differences in soils may have been caused by differences in relief and parent material. Because the interrelationships among these five factors are complex, the effects of any one factor are difficult to determine.

parent material

Parent material is the unconsolidated mass of organic or mineral material in which a soil forms. The soils in this survey area formed in residuum, loess, alluvium, and colluvium.

Most of the soils formed in the residuum of limestone, calcareous shale, siltstone, and brecciated sandstone of the Mississippian, Devonian, and Ordovician geologic periods. Frederick and Trimble soils for example, formed in the residuum of limestone. Garmon and Lowell soils formed in the residuum of interbedded limestone, calcareous shale, and siltstone.

A few soils formed in the residuum of limestone or brecciated sandstone and in an overlying mantle of loess. Crider, Bedford, and Bewleyville soils are examples.

Scattered throughout the survey area are soils that formed in alluvium or a mixture of alluvium and colluvium. Huntington, Nolin, Lindside, and Newark soils are examples.

climate

The soils in this survey formed in a temperate, humid climate that probably was similar to that of the present time. The climate is relatively uniform throughout the survey area. Abundant rainfall and warm temperatures have permitted almost continuous weathering of these soils.

Water moving downward through the soils leaches soluble substances and transports clay. Some of the soluble substances are relocated in the lower part of the soil, and some are completely removed. Temperature affects the rate at which the chemical and physical processes of weathering occur. Many of the soils in this survey area are deep and have zones of accumulation of translocated clay. Frederick and Waynesboro soils are examples. Most of the upland soils in the survey area are acid because the soluble bases have been leached out.

Rainfall and temperature also influence the type of living organisms in the soil and their activity. These organisms, in turn, influence the development of the soil profile.

plant and animal life

The decayed remains of plants and animals form an integral part of the soil as organic matter. The organic matter content affects the friability and tilth of a soil. Most of the soils in the survey area formed under a cover of mixed hardwood forest, which the early settlers cleared for farming. These soils are low in content of organic matter and have a light colored surface layer. Bewleyville, Crider, Frederick, Garmon, and Trimble soils are examples.

Insects, earthworms, rodents, protozoans, bacteria, fungi, and similar organisms have less influence than plants on soil formation. The larger of the these organisms make channels in the soil material, mainly in the surface layer. Microorganisms help to decompose organic matter.

In the little time since the settlement of the survey area, man has altered the soils, mainly in the surface layer and in the upper part of the subsoil. By plowing he has mixed the surface layer and the subsoil, and by grading and leveling he has exposed much of the surface layer to erosion in some areas.

relief

Relief influences the formation of soils through its effects on drainage and erosion. In this survey area, relief varies from nearly level to steep, and this variation accounts for many of the differences among the soils—for example, differences in drainage, rate of erosion, amount of leaching, and depth to bedrock.

On nearly level soils in slight depressions or in low-lying areas, runoff is slow, and little or no soil has eroded. Melvin, Lawrence, and Newark soils are examples. These poorly drained or somewhat poorly drained soils are deep to bedrock.

On steep soils that developed on hillsides, most of the rainfall runs off, carrying soil material with it. Little water infiltrates the soil and moves downward to leach and translocate clay minerals. Garmon soils are an example. They are moderately deep to bedrock and have essentially no accumulation of clay in the subsoil. The less steep Waynesboro soils, which developed on ridges and side slopes, are deep and have zones of clay accumulation.

time

Time is one of the most important factors of soil formation. The time required for a soil to form depends on the other factors. For example, less time is required for a soil to form in a warm, moist climate than in a cool, dry climate.

The age of a soil is determined by the degree of profile development rather than by the number of years it has been weathering. Huntington, Nolin, and Newark soils are considered younger than Bewleyville, Crider, Frederick, and Waynesboro soils. They are considered younger because they have very faint horizons and because they are on flood plains where alluvium still accumulates.

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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 64-inch profile or to a limiting layer is expressed as—

	Inches
Very low	Less than 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.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

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

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

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

Coarse fragments. Mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter.

Coarse textured soil. Sand or loamy sand.

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

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

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.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

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.

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

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

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow.

Some are steep. All are free of the mottling related to wetness.

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

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

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

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

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

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

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

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

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

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

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.

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

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

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.

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

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.

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

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

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.
B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.
C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.
R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

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

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

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

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.

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

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

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

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

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

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

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

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

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Percolation. The downward movement of water through the soil.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, differences in slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

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

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.

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.

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.

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.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

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

Substratum. The part of the soil below the solum.

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."

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

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, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

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

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-76 at Scottsville, Kentucky]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	46.3	27.8	37.1	72	-6	14	4.76	2.42	6.67	9	3.9
February---	50.7	30.2	40.5	74	0	38	4.44	2.33	6.16	8	3.5
March------	59.1	37.4	48.3	82	15	142	5.59	3.17	7.57	10	3.0
April------	70.9	47.4	59.2	87	27	284	4.48	2.87	5.93	8	.1
May--------	78.1	55.2	66.7	91	33	518	4.75	3.11	6.24	8	.0
June-------	85.0	62.9	74.0	96	47	720	4.84	1.93	7.19	7	.0
July-------	87.9	66.3	77.2	97	52	843	4.39	2.46	5.96	8	.0
August-----	87.6	65.2	76.4	98	52	818	3.28	1.59	4.65	6	.0
September--	82.1	59.0	70.6	96	39	618	3.33	1.70	4.66	5	.0
October----	71.9	47.7	59.8	89	27	317	2.68	1.21	3.86	5	.0
November---	58.2	37.3	47.8	80	13	67	4.27	2.34	5.84	7	1.1
December---	48.9	30.9	39.9	71	3	32	4.62	2.27	6.54	8	2.3
Yearly:											
Average--	68.9	47.3	58.1	---	---	---	---	---	---	---	---
Extreme--	---	---	---	99	-8	---	---	---	---	---	---
Total----	---	---	---	---	---	4,411	51.43	44.20	57.46	89	13.9

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

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1951-76 at Scottsville, Kentucky]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 2	April 14	May 6
2 years in 10 later than--	March 28	April 10	April 29
5 years in 10 later than--	March 18	April 1	April 16
First freezing temperature in fall:			
1 year in 10 earlier than--	October 28	October 22	October 11
2 years in 10 earlier than--	November 2	October 27	October 16
5 years in 10 earlier than--	November 12	November 5	October 25

TABLE 3.--GROWING SEASON

[Recorded in the period 1951-76 at Scottsville, Kentucky]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	218	196	167
8 years in 10	225	203	175
5 years in 10	238	217	191
2 years in 10	250	230	207
1 year in 10	257	237	215

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

Map symbol	Soil name	Acres	Percent
BeB	Bedford silt loam, 2 to 6 percent slopes	6,010	2.8
BeC	Bedford silt loam, 6 to 12 percent slopes	2,470	1.2
BvB	Bewleyville silt loam, 2 to 6 percent slopes	6,800	3.2
BvC	Bewleyville silt loam, 6 to 12 percent slopes	8,580	4.0
CaD	Caneyville silt loam-Rock outcrop complex, 6 to 30 percent slopes	1,090	0.5
CrB	Crider silt loam, 2 to 6 percent slopes	5,070	2.4
CrC	Crider silt loam, 6 to 12 percent slopes	4,740	2.2
Eg	Egam silty clay loam	2,410	1.1
FrB	Frederick cherty silt loam, 2 to 6 percent slopes	640	0.3
FrC	Frederick cherty silt loam, 6 to 12 percent slopes	3,010	1.4
FrD	Frederick cherty silt loam, 12 to 20 percent slopes	2,740	1.3
FtD3	Frederick cherty silty clay loam, 12 to 20 percent slopes, severely eroded	420	0.2
GaC	Garmon shaly silt loam, 6 to 12 percent slopes	3,270	1.5
GaD	Garmon shaly silt loam, 12 to 20 percent slopes	7,740	3.6
GRF	Garmon association, steep	43,350	20.3
Hu	Huntington silt loam	640	0.3
La	Lawrence silt loam	1,510	0.7
Ln	Lindside silt loam	1,940	0.9
LoB	Lowell silt loam, 2 to 6 percent slopes	260	0.1
LoC	Lowell silt loam, 6 to 12 percent slopes	970	0.5
LoD	Lowell silt loam, 12 to 20 percent slopes	580	0.3
Me	Melvin silt loam	490	0.2
Ne	Newark silt loam	3,080	1.4
No	Nolin silt loam	4,660	2.2
Nv	Nolin Variant, fine sandy loam	690	0.3
Se	Sensabaugh gravelly silt loam	2,800	1.3
Sk	Skidmore gravelly loam	590	0.3
TaC	Tarklin cherty silt loam, 6 to 12 percent slopes	580	0.3
TrB	Trimble cherty silt loam, 2 to 6 percent slopes	3,630	1.7
TrC	Trimble cherty silt loam, 6 to 12 percent slopes	20,580	9.6
TrD	Trimble cherty silt loam, 12 to 20 percent slopes	13,700	6.4
TrD3	Trimble cherty silt loam, 12 to 20 percent slopes, severely eroded	800	0.4
TrE	Trimble cherty silt loam, 20 to 30 percent slopes	9,540	4.5
WaC	Waynesboro loam, 6 to 12 percent slopes	19,210	9.0
WaD	Waynesboro loam, 12 to 20 percent slopes	17,860	8.3
WaE	Waynesboro loam, 20 to 30 percent slopes	5,450	2.6
WnC3	Waynesboro clay loam, 6 to 12 percent slopes, severely eroded	1,750	0.8
WnD3	Waynesboro clay loam, 12 to 30 percent slopes, severely eroded	4,050	1.9
	Total	213,700	100.0

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

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn	Wheat	Soybeans	Tobacco	Grass-legume hay	Pasture
	Bu	Bu	Bu	Lb	Ton	AUM*
BeB------ Bedford	105	45	40	2,800	4.0	9.0
BeC------ Bedford	90	35	30	2,500	4.0	9.0
BvB------ Bewleyville	110	40	40	2,800	4.5	9.5
BvC------ Bewleyville	90	35	30	2,600	4.5	9.0
CaD**------ Caneyville	---	---	---	---	---	5.0
CrB------ Crider	120	45	45	3,200	5.0	10.5
CrC------ Crider	95	45	35	2,900	4.5	9.5
Eg------ Egam	135	---	40	---	4.0	7.5
FrB------ Frederick	110	45	30	2,800	4.0	8.5
FrC------ Frederick	95	40	30	2,600	4.0	8.0
FrD, FtD3------ Frederick	80	35	---	---	3.5	7.5
GaC------ Garmon	75	20	---	1,550	3.0	5.0
GaD------ Garmon	---	---	---	---	2.5	5.0
GRF**------ Garmon	---	---	---	---	---	---
Hu------ Huntington	135	45	45	3,200	5.0	8.5
La------ Lawrence	85	---	35	1,700	3.5	7.5
Ln------ Lindside	130	45	45	2,900	4.0	8.5
LoB------ Lowell	110	40	35	2,900	4.0	8.0
LoC------ Lowell	100	35	30	2,600	3.5	8.0
LoD------ Lowell	85	30	---	2,300	3.0	7.0
Me------ Melvin	110	---	35	---	3.5	7.5

See footnotes at end of table.

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

Soil name and map symbol	Corn	Wheat	Soybeans	Tobacco	Grass-legume hay	Pasture
	Bu	Bu	Bu	Lb	Ton	AUM*
Ne----------------------- Newark	125	40	40	2,500	4.5	8.5
No----------------------- Nolin	135	45	45	3,300	5.5	8.5
Nv----------------------- Nolin Variant	90	---	30	---	3.5	7.0
Se----------------------- Sensabaugh	85	45	30	---	4.0	7.0
Sk----------------------- Skidmore	70	30	30	---	3.0	5.5
TaC---------------------- Tarklin	85	35	25	1,900	2.5	5.0
TrB---------------------- Trimble	95	40	35	2,800	3.0	6.0
TrC---------------------- Trimble	90	40	30	2,400	3.0	6.0
TrD---------------------- Trimble	70	35	25	2,200	2.5	5.0
TrD3--------------------- Trimble	---	---	---	---	2.0	4.0
TrE---------------------- Trimble	---	---	---	---	---	---
WaC---------------------- Waynesboro	110	40	35	2,700	4.0	7.5
WaD---------------------- Waynesboro	90	30	---	1,850	3.5	6.5
WaE---------------------- Waynesboro	---	---	---	---	---	5.5
WnC3--------------------- Waynesboro	80	30	20	1,600	3.0	5.5
WnD3--------------------- Waynesboro	---	---	---	---	---	4.5

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

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	7,240	---	---	---
II	30,980	22,410	5,490	3,080
III	62,140	60,140	2,000	---
IV	39,900	39,900	---	---
V	---	---	---	---
VI	29,090	28,000	---	1,090
VII	43,350	43,350	---	---
VIII	---	---	---	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
BeB, BeC----------- Bedford	3o	Slight	Slight	Slight	Slight	White oak----------- Northern red oak---- Yellow-poplar------- Virginia pine------- Sugar maple---------	70 75 90 75 75	Eastern white pine, shortleaf pine, loblolly pine, yellow-poplar, white ash.
BvB, BvC----------- Bewleyville	3o	Slight	Slight	Slight	Slight	Yellow-poplar------- White oak----------- Virginia pine------- Loblolly pine-------	95 73 70 80	Yellow-poplar, black walnut, loblolly pine, eastern redcedar.
CaD*--------------- Caneyville	3c	Moderate	Moderate	Moderate	Slight	Scarlet oak--------- Eastern redcedar---- Yellow-poplar-------	69 45 90	Eastern redcedar, Virginia pine, eastern white pine, shortleaf pine, loblolly pine.
CrB, CrC----------- Crider	1o	Slight	Slight	Slight	Moderate	Northern red oak---- Yellow-poplar------- Virginia pine------- Shortleaf pine------	88 97 78 80	Eastern white pine, yellow-poplar, black walnut, American sycamore, loblolly pine, white ash.
Eg----------------- Egam	2o	Slight	Slight	Slight	Severe	Yellow-poplar------- Loblolly pine------- Southern red oak---- Water oak-----------	100 90 90 90	Yellow-poplar, black walnut, loblolly pine.
FrB, FrC----------- Frederick	2c	Slight	Moderate	Slight	Moderate	Northern red oak---- Yellow-poplar------- Loblolly pine-------	85 90 90	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine.
FrD, FtD3---------- Frederick	2c	Moderate	Moderate	Slight	Moderate	Northern red oak---- Yellow-poplar------- Loblolly pine-------	85 90 90	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine.
GaC---------------- Garmon	4o	Slight	Slight	Slight	Slight	Northern red oak---- Virginia pine------- Eastern redcedar----	61 65 38	Shortleaf pine, Virginia pine, eastern redcedar, loblolly pine, eastern white pine.
GaD---------------- Garmon	4r	Moderate	Moderate	Slight	Slight	Northern red oak---- Virginia pine------- Eastern redcedar----	61 65 38	Shortleaf pine, Virginia pine, eastern redcedar, loblolly pine, eastern white pine.
GRF*--------------- Garmon	4r	Severe	Severe	Slight	Slight	Northern red oak---- Virginia pine------- Eastern redcedar----	61 65 38	Shortleaf pine, Virginia pine, eastern redcedar, loblolly pine, eastern white pine.
Hu----------------- Huntington	1o	Slight	Slight	Slight	Severe	Yellow-poplar------- Northern red oak----	95 85	Yellow-poplar, black walnut, eastern white pine, American sycamore, white ash.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
La: Lawrence	2w	Slight	Moderate	Slight	Severe	Northern red oak	73	Yellow-poplar, green ash, loblolly pine, American sycamore.
						Yellow-poplar	90	
						Sweetgum	90	
						Shortleaf pine	70	
Ln: Lindside	1w	Slight	Moderate	Slight	Severe	Northern red oak	85	Eastern white pine, yellow-poplar.
						Yellow-poplar	95	
						White oak	80	
LoB, LoC: Lowell	3c	Slight	Moderate	Slight	Moderate	Northern red oak	70	Yellow-poplar, eastern white pine, shortleaf pine, Virginia pine, loblolly pine.
						Yellow-poplar	90	
						Shortleaf pine	80	
						Virginia pine	80	
LoD: Lowell	3c	Moderate	Moderate	Slight	Moderate	Northern red oak	70	Yellow-poplar, eastern white pine, shortleaf pine, Virginia pine, loblolly pine.
						Yellow-poplar	90	
						Shortleaf pine	75	
						Virginia pine	75	
Me: Melvin	1w	Slight	Severe	Severe	Severe	Pin oak	100	Pin oak, American sycamore, sweetgum, loblolly pine.
						Sweetgum	90	
						Eastern cottonwood	95	
						Southern red oak	91	
Ne: Newark	1w	Slight	Moderate	Slight	Severe	Pin oak	99	Eastern cottonwood, sweetgum, loblolly pine, American sycamore, eastern white pine, yellow-poplar.
						Eastern cottonwood	94	
						Northern red oak	85	
						Yellow-poplar	95	
						Sweetgum	85	
No: Nolin	1o	Slight	Slight	Slight	Severe	Sweetgum	99	Sweetgum, yellow-poplar, eastern white pine, eastern cottonwood, white ash, cherrybark oak.
Nv: Nolin Variant	2s	Slight	Moderate	Moderate	Moderate	Yellow-poplar	94	Yellow-poplar, shortleaf pine, eastern cottonwood, American sycamore.
						Northern red oak	80	
Se: Sensabaugh	2o	Slight	Slight	Slight	Moderate	Yellow-poplar	100	Yellow-poplar, black walnut, loblolly pine, eastern white pine.
						White oak	80	
						Shortleaf pine	80	
						Virginia pine	75	
Sk: Skidmore	1o	Slight	Slight	Slight	Moderate	Northern red oak	85	Yellow-poplar, black walnut, white ash, eastern white pine, American sycamore.
						Yellow-poplar	108	
TaC: Tarklin	3o	Slight	Slight	Slight	Moderate	Northern red oak	74	Eastern white pine, loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, white ash.
						Yellow-poplar	80	
						Shortleaf pine	70	
						Virginia pine	70	
						Loblolly pine	80	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
TrB, TrC Trimble	2o	Slight	Slight	Slight	Moderate	Northern red oak Yellow-poplar Shortleaf pine Virginia pine Eastern redcedar	80 90 75 75 50	Eastern white pine, black walnut, Virginia pine, loblolly pine, shortleaf pine.
TrD, TrD3, TrE Trimble	2r	Slight	Moderate	Slight	Moderate	Northern red oak Yellow-poplar Shortleaf pine Virginia pine Eastern redcedar	80 90 75 75 50	Eastern white pine, black walnut, Virginia pine, loblolly pine, shortleaf pine.
WaC, WaD Waynesboro	3o	Slight	Slight	Slight	Moderate	Yellow-poplar White oak Loblolly pine Shortleaf pine Virginia pine	90 75 80 70 74	Yellow-poplar, black walnut, loblolly pine, Virginia pine, shortleaf pine.
WaE Waynesboro	3r	Moderate	Moderate	Slight	Moderate	Yellow-poplar White oak Loblolly pine Shortleaf pine Virginia pine	90 75 80 70 74	Yellow-poplar, black walnut, loblolly pine, Virginia pine, shortleaf pine.
WnC3, WnD3 Waynesboro	4c	Moderate	Moderate	Moderate	Slight	Loblolly pine Shortleaf pine Virginia pine	70 60 65	Loblolly pine, Virginia pine, shortleaf pine.

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

TABLE 8.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BeB------------------- Bedford	Severe: percs slowly.	Slight----------	Severe: percs slowly.	Slight------------	Slight.
BeC------------------- Bedford	Severe: percs slowly.	Moderate: slope.	Severe: slope, percs slowly.	Slight------------	Moderate: slope.
BvB------------------- Bewleyville	Slight----------	Slight----------	Moderate: slope.	Slight------------	Slight.
BvC------------------- Bewleyville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight------------	Moderate: slope.
CaD*------------------ Caneyville	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
CrB------------------- Crider	Slight----------	Slight----------	Moderate: slope.	Slight------------	Slight.
CrC------------------- Crider	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight------------	Moderate: slope.
Eg-------------------- Egam	Severe: floods.	Moderate: too clayey.	Moderate: floods, too clayey.	Moderate: too clayey.	Moderate: floods.
FrB------------------- Frederick	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
FrC------------------- Frederick	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, small stones.
FrD, FtD3------------- Frederick	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope.
GaC------------------- Garmon	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, depth to rock.
GaD------------------- Garmon	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope.
GRF*------------------ Garmon	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Hu-------------------- Huntington	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight------------	Moderate: floods.
La-------------------- Lawrence	Severe: wetness.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Ln-------------------- Lindside	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight------------	Moderate: floods.
LoB------------------- Lowell	Moderate: percs slowly.	Slight----------	Moderate: percs slowly, slope.	Slight------------	Slight.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LoC: Lowell	Moderate: percs slowly, slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
LoD: Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Me: Melvin	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ne: Newark	Severe: floods, wetness.	Moderate: wetness, floods.	Severe: wetness.	Moderate: wetness.	Moderate: floods, wetness.
No: Nolin	Severe: floods.	Moderate: floods.	Severe: floods.	Slight	Moderate: floods.
Nv: Nolin Variant	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight	Moderate: floods.
Se: Sensabaugh	Severe: floods.	Moderate: floods.	Moderate: floods, small stones.	Slight	Moderate: floods.
Sk: Skidmore	Severe: floods.	Moderate: floods, small stones.	Severe: small stones.	Moderate: small stones.	Moderate: floods, small stones.
TaC: Tarklin	Moderate: slope, small stones, wetness.	Moderate: slope, small stones, wetness.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, small stones, wetness.
TrB: Trimble	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
TrC: Trimble	Moderate: small stones, slope.	Moderate: small stones, slope.	Severe: slope, small stones.	Moderate: small stones.	Moderate: small stones, slope.
TrD, TrD3: Trimble	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: small stones, slope.	Severe: slope.
TrE: Trimble	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
WaC: Waynesboro	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
WaD: Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
WaE: Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WnC3: Waynesboro	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, too clayey.
WnD3: Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

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

TABLE 9.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor"]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
BeB: Bedford	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BeC: Bedford	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BvB: Bewleyville	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BvC: Bewleyville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CaD*: Caneyville	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CrB: Crider	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CrC: Crider	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Eg: Egam	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
FrB: Frederick	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FrC: Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FrD, FtD3: Frederick	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GaC: Garmon	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GaD: Garmon	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GRF*: Garmon	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Hu: Huntington	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
La: Lawrence	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Ln: Lindside	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
LoB: Lowell	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LoC: Lowell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LoD: Lowell	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Me: Melvin	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Ne----------------- Newark	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
No----------------- Nolin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Nv----------------- Nolin Variant	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Se----------------- Sensabaugh	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Sk----------------- Skidmore	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
TaC---------------- Tarklin	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TrB---------------- Trimble	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TrC---------------- Trimble	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TrD, TrD3---------- Trimble	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
TrE---------------- Trimble	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	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.
WaE---------------- Waynesboro	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WnC3--------------- Waynesboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WnD3--------------- Waynesboro	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

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

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BeB---------------- Bedford	Moderate: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness, low strength.	Moderate: slope, shrink-swell, wetness.	Severe: low strength.	Slight.
BeC---------------- Bedford	Moderate: slope, wetness.	Moderate: slope, shrink-swell, wetness.	Severe: wetness, low strength.	Severe: slope.	Severe: low strength.	Moderate: slope.
BvB---------------- Bewleyville	Slight----------	Slight----------	Moderate: shrink-swell.	Moderate: slope.	Moderate: low strength.	Slight.
BvC---------------- Bewleyville	Moderate: slope.	Moderate: slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength.	Moderate: slope.
CaD*--------------- Caneyville	Severe: slope, depth to rock, too clayey.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
CrB---------------- Crider	Slight----------	Slight----------	Moderate: shrink-swell.	Moderate: slope.	Moderate: low strength.	Slight.
CrC---------------- Crider	Moderate: slope.	Moderate: slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.
Eg----------------- Egam	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods, low strength.	Moderate: floods.
FrB---------------- Frederick	Severe: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Moderate: small stones.
FrC---------------- Frederick	Severe: too clayey.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope, small stones.
FrD, FtD3---------- Frederick	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
GaC---------------- Garmon	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Moderate: slope, depth to rock.
GaD, GRF*---------- Garmon	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
Hu----------------- Huntington	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.
La----------------- Lawrence	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: low strength, wetness.	Moderate: wetness.
Ln----------------- Lindside	Severe: floods, wetness.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Severe: floods.	Moderate: floods.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
LoB: Lowell	Severe: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
LoC: Lowell	Severe: too clayey.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
LoD: Lowell	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Me: Melvin	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness, low strength.	Severe: floods, wetness.
Ne: Newark	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods.
No: Nolin	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Nv: Nolin Variant	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Se: Sensabaugh	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.
Sk: Skidmore	Severe: floods, cutbanks cave.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods, small stones.
TaC: Tarklin	Severe: wetness, slope.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: slope, wetness, low strength.	Moderate: slope, small stones, wetness.
TrB: Trimble	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Moderate: small stones.
TrC: Trimble	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: small stones, slope.
TrD, TrD3, TrE: Trimble	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WaC: Waynesboro	Moderate: slope, too clayey.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength, shrink-swell.	Moderate: slope.
WaD, WaE: Waynesboro	Severe: too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WnC3: Waynesboro	Moderate: slope, too clayey.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength, shrink-swell.	Moderate: slope, too clayey.
WnD3: Waynesboro	Severe: too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

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

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BeB: Bedford	Severe: percs slowly, wetness.	Severe: wetness.	Moderate: too clayey, wetness.	Moderate: wetness.	Fair: too clayey, wetness.
BeC: Bedford	Severe: percs slowly, wetness.	Severe: slope, wetness.	Moderate: too clayey, wetness.	Moderate: slope, wetness.	Fair: slope, too clayey, wetness.
BvB: Bewleyville	Slight	Moderate: slope, seepage.	Slight	Slight	Good.
BvC: Bewleyville	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.	Fair: slope.
CaD*: Caneyville	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: slope.	Poor: slope, too clayey.
CrB: Crider	Slight	Moderate: seepage.	Slight	Slight	Good.
CrC: Crider	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.	Fair: slope.
Eg: Egam	Severe: floods, percs slowly, wetness.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Fair: too clayey.
FrB: Frederick	Moderate: percs slowly.	Moderate: slope, seepage.	Severe: too clayey.	Slight	Fair: too clayey.
FrC: Frederick	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.
FrD, FtD3: Frederick	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope.
GaC: Garmon	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage.	Fair: slope, thin layer.
GaD: Garmon	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, seepage.	Severe: slope, seepage.	Poor: slope.
GRF*: Garmon	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage.	Poor: slope.
Hu: Huntington	Severe: floods.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Good.
La: Lawrence	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Good.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ln: Lindside	Severe: floods, wetness, percs slowly.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Good.
LoB: Lowell	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, too clayey.	Slight	Poor: too clayey.
LoC: Lowell	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: slope.	Poor: too clayey.
LoD: Lowell	Severe: slope, percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Severe: slope.	Poor: slope, too clayey.
Me: Melvin	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
Ne: Newark	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
No: Nolin	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Good.
Nv: Nolin Variant	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness, seepage.	Severe: floods, seepage.	Good.
Se: Sensabaugh	Severe: floods.	Severe: floods, seepage.	Severe: floods, seepage, wetness.	Severe: floods, seepage.	Fair: small stones.
Sk: Skidmore	Severe: floods, wetness, depth to rock.	Severe: floods, seepage, wetness.	Severe: floods, seepage, wetness.	Severe: floods, seepage, wetness.	Poor: small stones.
TaC: Tarklin	Severe: percs slowly, wetness.	Severe: slope, wetness.	Moderate: wetness.	Moderate: slope, wetness.	Fair: small stones.
TrB: Trimble	Slight	Moderate: slope, seepage.	Severe: depth to rock.	Slight	Fair: small stones, too clayey.
TrC: Trimble	Moderate: slope.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Fair: small stones, too clayey, slope.
TrD, TrD3: Trimble	Severe: slope.	Severe: slope.	Severe: depth to rock.	Severe: slope.	Poor: slope.
TrE: Trimble	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope.
WaC: Waynesboro	Moderate: slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WaD------------------ Waynesboro	Severe: slope.	Severe: slope.	Moderate: too clayey, slope.	Severe: slope.	Poor: slope.
WaE------------------ Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
WnC3----------------- Waynesboro	Moderate: slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey, slope.
WnD3----------------- Waynesboro	Severe: slope.	Severe: slope.	Moderate: too clayey, slope.	Severe: slope.	Poor: slope.

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

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor"]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BeB: Bedford	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
BeC: Bedford	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
BvB: Bewleyville	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
BvC: Bewleyville	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
CaD*: Caneyville	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, thin layer.
CrB: Crider	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
CrC: Crider	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
Eg: Egam	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
FrB, FrC: Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
FrD, FtD3: Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
GaC: Garmon	Poor: thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones, thin layer.
GaD: Garmon	Poor: thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones, thin layer.
GRF*: Garmon	Poor: slope, thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones, thin layer.
Hu: Huntington	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
La: Lawrence	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Ln: Lindside	Fair: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
LoB: Lowell	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
LoC: Lowell	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
LoD: Lowell	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Me: Melvin	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Ne: Newark	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
No: Nolin	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Nv: Nolin Variant	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Good.
Se: Sensabaugh	Good	Unsuited: excess fines.	Unsuited: excess fines.	Fair: small stones.
Sk: Skidmore	Fair: area reclaim, low strength, large stones.	Poor: excess fines.	Fair: excess fines.	Poor: small stones.
TaC: Tarklin	Fair: low strength, wetness.	Poor: excess fines.	Poor: excess fines.	Poor: small stones.
TrB, TrC: Trimble	Fair: low strength.	Poor: excess fines.	Poor: excess fines.	Poor: small stones.
TrD, TrD3: Trimble	Fair: low strength, slope.	Poor: excess fines.	Poor: excess fines.	Poor: slope, small stones.
TrE: Trimble	Poor: slope.	Poor: excess fines.	Poor: excess fines.	Poor: slope, small stones.
WaC: Waynesboro	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer, too clayey.
WaD: Waynesboro	Fair: slope, low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
WaE: Waynesboro	Severe: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
WnC3: Waynesboro	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer, too clayey.
WnD3: Waynesboro	Fair: slope, low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.

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

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary]

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
BeB Bedford	Favorable	Wetness	Percs slowly	Erodes easily, wetness, rooting depth.	Erodes easily, wetness, rooting depth.
BeC Bedford	Favorable	Wetness	Percs slowly	Erodes easily, wetness. rooting depth.	Slope, wetness, erodes easily.
BvB Bewleyville	Seepage	Hard to pack	Not needed	Erodes easily	Erodes easily.
BvC Bewleyville	Seepage	Hard to pack	Not needed	Slope, erodes easily.	Slope, erodes easily.
CaD* Caneyville	Seepage	Hard to pack, thin layer.	Not needed	Depth to rock, slope, erodes easily.	Slope, erodes easily, depth to rock.
CrB, CrC Crider	Seepage	Hard to pack	Not needed	Slope	Slope.
Eg Egam	Seepage	Hard to pack	Floods, percs slowly.	Not needed	Slight.
FrB, FrC, FrD, FtD3 Frederick	Seepage	Hard to pack	Not needed	Slope, erodes easily.	Slope, erodes easily.
GaC, GaD, GRF* Garmon	Seepage, depth to rock.	Thin layer	Not needed	Slope, depth to rock.	Slope, depth to rock.
Hu Huntington	Seepage	Piping	Not needed	Not needed	Not needed.
La Lawrence	Favorable	Piping, wetness.	Percs slowly	Not needed	Percs slowly, wetness, rooting depth.
Ln Lindside	Seepage	Piping	Floods	Not needed	Wetness.
LoB Lowell	Seepage, depth to rock.	Hard to pack	Not needed	Favorable	Erodes easily.
LoC Lowell	Seepage, depth to rock.	Hard to pack	Not needed	Favorable	Slope, erodes easily.
LoD Lowell	Seepage, depth to rock.	Hard to pack	Not needed	Slope	Slope, erodes easily.
Me Melvin	Seepage	Wetness	Floods	Not needed	Wetness, erodes easily.
Ne Newark	Seepage	Wetness	Floods	Not needed	Wetness, erodes easily.
No Nolin	Seepage	Piping	Not needed	Not needed	Not needed.
Nv Nolin Variant	Seepage	Piping	Not needed	Not needed	Favorable.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
Se------- Sensabaugh	Seepage-------	Favorable-------	Not needed-------	Not needed-------	Favorable.
Sk------- Skidmore	Seepage-------	Seepage-------	Not needed-------	Favorable-------	Favorable.
TaC------- Tarklin	Favorable-------	Wetness, piping.	Percs slowly, slope.	Percs slowly, wetness, rooting depth.	Percs slowly, slope, rooting depth.
TrB, TrC, TrD, TrD3, TrE------- Trimble	Seepage-------	Seepage, piping.	Not needed-------	Slope-------	Slope.
WaC, WaD, WaE, WnC3, WnD3------- Waynesboro	Seepage-------	Hard to pack-------	Not needed-------	Slope-------	Slope.

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

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
BeB, BeC-----------Bedford	0-12	Silt loam-------	CL, ML	A-6, A-4	0	100	100	95-100	85-95	30-40	5-15
	12-26	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	95-100	95-100	85-95	25-45	15-25
	26-38	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	95-100	95-100	85-95	25-45	15-25
	38-61	Silty clay, silty clay loam.	CL, CH	A-7	0-5	90-100	75-95	70-95	65-90	45-55	20-30
BvB----------------Bewleyville	0-8	Silt loam-------	ML, CL-ML	A-4	0	100	95-100	95-100	85-100	20-30	2-7
	8-40	Silty clay loam, silt loam.	CL	A-6, A-7	0	95-100	95-100	90-100	85-100	30-45	11-22
	40-65	Clay, clay loam, silty clay loam.	CL, ML, MH	A-6, A-7	0-5	75-100	75-100	70-95	60-95	35-65	12-32
BvC----------------Bewleyville	0-8	Silt loam-------	ML, CL-ML	A-4	0	100	95-100	95-100	85-100	20-30	2-7
	8-40	Silty clay loam, silt loam.	CL	A-6, A-7	0	95-100	95-100	90-100	85-100	30-45	11-22
	40-65	Clay, clay loam, silty clay loam.	CL, ML, MH	A-6, A-7	0-5	75-100	75-100	70-95	60-95	35-65	12-32
CaD*---------------Caneyville	0-10	Silt loam-------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	10-39	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	39	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CrB, CrC-----------Crider	0-8	Silt loam-------	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	85-100	25-35	4-12
	8-36	Silt loam, silty clay loam.	CL, ML, CL-ML	A-7, A-6, A-4	0	100	95-100	90-100	85-100	25-42	4-20
	36-65	Silty clay, clay, silty clay loam.	CL, CH	A-7, A-6	0-5	85-100	75-100	70-100	60-100	35-65	15-40
Eg-----------------Egam	0-20	Silty clay loam	CL, ML, CL-ML	A-6, A-7, A-4	0	95-100	95-100	85-100	75-95	21-45	4-20
	20-64	Silty clay, silty clay loam, clay.	CL, MH, CH	A-7, A-6	0	95-100	95-100	90-100	85-95	38-60	15-30
FrB, FrC, FrD------Frederick	0-6	Cherty silt loam	ML, GM, GC, CL	A-2, A-4, A-6	0-10	45-80	35-70	30-60	30-55	<35	NP-15
	6-22	Clay loam, silty clay loam, cherty silty clay loam.	CL, GC	A-6, A-7	0-5	60-100	50-100	45-95	40-90	30-45	10-25
	22-70	Clay, silty clay, cherty clay.	CH, GC	A-7	0-5	60-100	50-100	45-100	40-100	50-85	25-55
FtD3---------------Frederick	0-3	Cherty silty clay loam.	ML, GM, GC, CL	A-2, A-4, A-6	0-10	45-80	35-70	30-60	30-55	<35	NP-15
	3-70	Clay, silty clay, cherty clay.	CH, GC	A-7	0-5	60-100	50-100	45-100	40-100	50-85	25-55

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
GaC, GaD, GRF*----- Garmon	0-7	Shaly silt loam	ML, CL, SM	A-4, A-6	0-10	55-80	50-75	45-75	40-70	25-35	5-15
	7-26	Shaly silt loam, shaly loam, shaly silty clay loam.	GM, GC	A-2, A-4, A-6	0-15	50-80	40-75	40-75	30-70	20-40	5-20
	26	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Hu----------------- Huntington	0-10	Silt loam-------	ML, CL	A-4, A-6	0	95-100	95-100	85-100	60-95	25-35	5-15
	10-61	Silt loam, loam, silty clay loam.	ML, CL	A-4, A-6	0	95-100	95-100	85-100	60-95	25-35	5-15
La----------------- Lawrence	0-6	Silt loam-------	ML, CL, CL-ML	A-4	0	100	95-100	90-100	80-100	25-35	2-10
	6-25	Silty clay loam, silt loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	80-100	25-42	5-20
	25-62	Silty clay loam, silt loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	80-100	25-42	5-20
Ln----------------- Lindside	0-64	Silt loam-------	ML, CL, CL-ML	A-4, A-6	0	100	95-100	80-100	55-90	25-40	2-15
LoB, LoC, LoD------ Lowell	0-7	Silt loam-------	ML, CL, CL-ML	A-4	0	100	95-100	90-100	85-100	22-32	4-10
	7-28	Silty clay, clay, silty clay loam.	CL, CH, MH	A-7, A-6	0	100	95-100	90-100	85-100	35-65	15-32
	28-68	Clay, silty clay	CH, MH, CL	A-7	0-20	95-100	90-100	85-100	75-100	45-75	20-40
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
	7-60	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
Ne----------------- Newark	0-8	Silt loam-------	ML, CL, CL-ML	A-4	0	95-100	90-100	80-100	55-95	<32	NP-10
	8-27	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	70-95	22-42	4-20
	27-60	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	4-20
No----------------- Nolin	0-8	Silt loam-------	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	8-60	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	100	95-100	85-100	75-100	25-40	5-18
Nv----------------- Nolin Variant	0-8	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4	0	95-100	85-100	65-95	35-75	<25	NP-5
	8-64	Fine sandy loam, sandy loam.	SM, ML, CL-ML, SM-SC	A-4	0	95-100	85-100	65-80	35-50	<25	NP-5

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Se-----------------Sensabaugh	0-8	Gravelly silt loam.	CL-ML, CL, ML, SM	A-4	0-18	75-90	65-75	55-65	40-55	16-29	3-9
	8-28	Gravelly silt loam, gravelly loam.	CL-ML, CL, SM-SC, SC	A-4, A-6	2-18	70-95	55-90	45-75	35-65	20-35	5-14
	28-60	Gravelly silt loam, gravelly loam.	SM-SC, SC, GM-GC, GC	A-4, A-6	5-25	70-90	55-75	45-65	35-55	22-36	6-15
Sk-----------------Skidmore	0-24	Gravelly loam---	GM, SM, GM-GC, ML	A-4, A-2	0-10	60-90	50-85	40-75	25-60	<30	NP-7
	24-48	Gravelly fine sandy loam, gravelly loam, very gravelly loam.	GM, GP-GM	A-2, A-1	5-30	35-60	20-50	15-40	10-35	<30	NP-5
	48	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
TaC----------------Tarklin	0-8	Cherty silt loam	ML, CL, GM	A-4	0-10	60-80	55-75	45-75	40-70	25-35	2-10
	8-24	Cherty silt loam, cherty silty clay loam.	ML, CL, GM, GC	A-4, A-6	0-10	60-80	55-75	45-75	40-70	25-40	5-20
	24-60	Cherty silt loam, cherty silty clay loam.	ML, CL, GM, GC	A-4, A-6	0-10	60-80	55-75	45-75	40-70	25-40	5-20
TrB, TrC, TrD------Trimble	0-6	Cherty silt loam	ML, CL, GM	A-4	0-10	65-85	55-80	45-75	40-70	25-35	3-10
	6-46	Cherty silty clay loam, cherty silt loam.	CL, GM-GC, GC, CL-ML	A-4, A-6	0-10	65-85	55-80	45-80	40-75	25-40	5-20
	46-62	Cherty silt loam, cherty silty clay loam.	GM, GC, ML, CL	A-4, A-6	0-10	65-85	55-80	45-75	35-75	20-40	2-20
TrD3---------------Trimble	0-3	Cherty silt loam	ML, CL, GM	A-4	0-10	65-85	55-80	45-75	40-70	25-35	3-10
	3-46	Cherty silty clay loam, cherty silt loam.	CL, GM-GC, GC, CL-ML	A-4, A-6	0-10	65-85	55-80	45-80	40-75	25-40	5-20
	46-62	Cherty silt loam, cherty silty clay loam.	GM, GC, ML, CL	A-4, A-6	0-10	65-85	55-80	45-75	35-75	20-40	2-20
TrE----------------Trimble	0-6	Cherty silt loam	ML, CL, GM	A-4	0-10	65-85	55-80	45-75	40-70	25-35	3-10
	6-46	Cherty silty clay loam, cherty silt loam.	CL, GM-GC, GC, CL-ML	A-4, A-6	0-10	65-85	55-80	45-80	40-75	25-40	5-20
	46-62	Cherty silt loam, cherty silty clay loam.	GM, GC, ML, CL	A-4, A-6	0-10	65-85	55-80	45-75	35-75	20-40	2-20

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
WaC, WaD, WaE------ Waynesboro	0-5	Loam------------	ML, CL-ML, CL, SM	A-4	0-5	85-100	80-100	70-95	43-70	16-29	2-9
	5-24	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
	24-80	Clay loam, sandy clay, clay.	MH, CL, ML, CH	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	38-68	9-32
WnC3, WnD3--------- Waynesboro	0-5	Clay loam--------	ML, CL-ML, CL, SM	A-4	0-5	85-100	80-100	70-95	43-70	16-29	2-9
	5-24	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
	24-80	Clay loam, sandy clay, clay.	MH, CL, ML, CH	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	38-68	9-32

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

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

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

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
BeB, BeC--------- Bedford	0-12	0.6-2.0	0.22-0.23	3.6-6.5	Low------------	0.43	4
	12-26	0.6-2.0	0.18-0.20	3.6-5.0	Moderate-------	0.43	
	26-38	<0.06	0.06-0.08	3.6-5.0	Moderate-------	0.43	
	38-61	<0.06	0.06-0.08	3.6-5.0	Moderate-------	0.32	
BvB-------------- Bewleyville	0-8	0.6-2.0	0.20-0.22	4.5-5.5	Low------------	0.43	5
	8-40	0.6-2.0	0.18-0.20	4.5-5.5	Low------------	0.37	
	40-65	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-------	0.37	
BvC-------------- Bewleyville	0-8	0.6-2.0	0.20-0.22	4.5-5.5	Low------------	0.43	5
	8-40	0.6-2.0	0.18-0.20	4.5-5.5	Low------------	0.37	
	40-65	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-------	0.37	
CaD*------------- Caneyville	0-10	0.6-2.0	0.15-0.22	4.5-6.0	Low------------	0.43	3
	10-39	0.2-0.6	0.12-0.18	5.6-6.5	Moderate-------	0.28	
	39	---	---	---	--------------	---	
CrB, CrC--------- Crider	0-8	0.6-2.0	0.19-0.23	5.1-6.5	Low------------	0.32	4
	8-36	0.6-2.0	0.18-0.23	5.1-6.5	Low------------	0.28	
	36-65	0.6-2.0	0.12-0.18	4.5-6.0	Moderate-------	0.28	
Eg--------------- Egam	0-20	0.2-0.6	0.18-0.22	5.6-7.3	Moderate-------	0.28	4
	20-64	0.2-0.6	0.14-0.20	5.6-7.3	Moderate-------	0.32	
FrB, FrC, FrD---- Frederick	0-6	2.0-6.0	0.12-0.20	5.1-6.5	Low------------	0.28	4
	6-22	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-------	0.28	
	22-70	0.6-2.0	0.09-0.18	4.5-6.0	Moderate-------	0.28	
FtD3------------- Frederick	0-3	2.0-6.0	0.12-0.20	5.1-6.5	Low------------	0.28	3
	3-70	0.6-2.0	0.09-0.18	4.5-6.0	Moderate-------	0.28	
GaC, GaD, GRF*--- Garmon	0-7	2.0-6.0	0.05-0.16	5.6-7.3	Low------------	0.28	3
	7-26	2.0-6.0	0.05-0.16	5.6-7.3	Low------------	0.28	
	26	---	---	---	--------------	---	
Hu--------------- Huntington	0-10	0.6-2.0	0.18-0.23	5.6-7.8	Low------------	0.37	5
	10-61	0.6-2.0	0.10-0.16	5.6-7.8	Low------------	0.43	
La--------------- Lawrence	0-6	0.6-2.0	0.19-0.23	4.5-5.5	Low------------	0.43	3
	6-25	0.6-2.0	0.18-0.22	4.5-5.5	Low------------	0.37	
	25-62	0.06-0.2	0.08-0.12	4.5-5.5	Low------------	0.43	
Ln--------------- Lindside	0-64	0.6-2.0	0.20-0.23	5.1-7.3	Low------------	0.43	5
LoB, LoC, LoD---- Lowell	0-7	0.6-2.0	0.18-0.23	4.5-6.5	Low------------	0.37	3
	7-28	0.2-2.0	0.13-0.19	4.5-6.5	Moderate-------	0.28	
	28-68	0.2-0.6	0.12-0.17	5.1-7.3	Moderate-------	0.28	
Me--------------- Melvin	0-7	0.6-2.0	0.18-0.23	6.1-7.8	Low------------	0.43	5
	7-60	0.6-2.0	0.18-0.23	6.1-7.8	Low------------	0.43	
Ne--------------- Newark	0-8	0.6-2.0	0.15-0.23	5.6-7.8	Low------------	0.43	5
	8-27	0.6-2.0	0.18-0.23	5.6-7.8	Low------------	0.43	
	27-60	0.6-2.0	0.15-0.22	5.6-7.8	Low------------	0.43	
No--------------- Nolin	0-8	0.6-2.0	0.18-0.23	5.6-7.8	Low------------	0.43	5
	8-60	0.6-2.0	0.18-0.23	5.6-7.8	Low------------	0.43	
Nv--------------- Nolin Variant	0-8	2.0-6.0	0.12-0.16	5.6-7.3	Low------------	0.32	5
	8-64	2.0-6.0	0.12-0.16	5.6-7.3	Low------------	0.32	

See footnote at end of table.

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

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
Se----------------- Sensabaugh	0-8	2.0-6.0	0.10-0.16	5.6-7.3	Low------------	0.20	5
	8-28	2.0-6.0	0.10-0.16	5.6-7.3	Low------------	0.20	
	28-60	2.0-6.0	0.10-0.15	5.6-7.3	Low------------	0.20	
Sk----------------- Skidmore	0-24	2.0-6.0	0.07-0.13	5.6-7.3	Low------------	0.17	5
	24-48	2.0-6.0	0.04-0.10	5.6-7.3	Low------------	0.17	
	48	---	---	---	---------------	---	
TaC---------------- Tarklin	0-8	0.6-6.0	0.13-0.18	4.5-5.5	Low------------	0.32	3
	8-24	0.6-6.0	0.13-0.18	4.5-5.5	Low------------	0.32	
	24-60	0.06-0.2	0.06-0.10	4.5-5.5	Low------------	0.32	
TrB, TrC, TrD---- Trimble	0-6	0.6-2.0	0.14-0.19	4.5-5.5	Low------------	0.28	3
	6-46	0.6-2.0	0.14-0.19	4.5-5.5	Low------------	0.28	
	46-62	0.6-2.0	0.14-0.19	4.5-5.5	Low------------	0.24	
TrD3--------------- Trimble	0-3	0.6-2.0	0.14-0.19	4.5-5.5	Low------------	0.28	3
	3-46	0.6-2.0	0.14-0.19	4.5-5.5	Low------------	0.28	
	46-62	0.6-2.0	0.14-0.19	4.5-5.5	Low------------	0.24	
TrE---------------- Trimble	0-6	0.6-2.0	0.14-0.19	4.5-5.5	Low------------	0.28	3
	6-46	0.6-2.0	0.14-0.19	4.5-5.5	Low------------	0.28	
	46-62	0.6-2.0	0.14-0.19	4.5-5.5	Low------------	0.24	
WaC, WaD, WaE, WnC3, WnD3------ Waynesboro	0-5	0.6-2.0	0.16-0.20	4.5-5.5	Low------------	0.24	5
	5-24	0.6-2.0	0.12-0.16	4.5-5.5	Low------------	0.28	
	24-80	0.6-2.0	0.10-0.15	4.5-5.5	Moderate--------	0.28	

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

TABLE 16.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	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			
BeB, BeC---------- Bedford	C	None---------	---	---	2.0-4.0	Perched	Dec-Apr	>60	---	High------	High.
BvB, BvC---------- Bewleyville	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
CaD*-------------- Caneyville	C	None---------	---	---	>6.0	---	---	20-40	Hard	High------	Moderate.
CrB, CrC---------- Crider	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Eg---------------- Egam	C	Occasional	Very brief	Dec-May	3.0-4.0	Apparent	Dec-Mar	>60	---	High------	Low.
FrB, FrC, FrD, FtD3------------- Frederick	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High.
GaC, GaD, GRF*---- Garmon	C	None---------	---	---	>6.0	---	---	20-40	Hard	Low-------	Moderate.
Hu---------------- Huntington	B	Occasional	Brief------	Dec-May	3.0-6.0	Apparent	Dec-Apr	>60	---	Low-------	Moderate.
La---------------- Lawrence	C	None---------	---	---	1.0-2.0	Perched	Dec-May	>60	---	High------	High.
Ln---------------- Lindside	C	Occasional	Brief------	Dec-May	1.5-3.0	Apparent	Dec-Apr	>60	---	Moderate	Low.
LoB, LoC, LoD----- Lowell	C	None---------	---	---	>6.0	---	---	>40	Hard	High------	Moderate.
Me---------------- Melvin	D	Occasional	Brief------	Dec-May	0.0-1.0	Apparent	Dec-May	>60	---	High------	Low.
Ne---------------- Newark	C	Occasional	Brief------	Dec-May	0.5-1.5	Apparent	Dec-May	>60	---	High------	Low.
No---------------- Nolin	B	Occasional	Brief------	Dec-May	3.0-6.0	Apparent	Jan-Mar	>60	---	Low-------	Moderate.
Nv---------------- Nolin Variant	A	Occasional	Brief------	Dec-May	3.0-6.0	Apparent	Jan-Mar	>60	---	Low-------	Moderate.
Se---------------- Sensabaugh	B	Occasional	Very brief	Dec-May	4.0-6.0	Apparent	Jan-Mar	>60	---	Low-------	Low.
Sk---------------- Skidmore	B	Occasional	Very brief	Dec-May	3.0-4.0	Apparent	Dec-Mar	>40	Hard	Low-------	Moderate.
TaC--------------- Tarklin	C	None---------	---	---	1.5-2.0	Perched	Dec-Apr	>60	---	Moderate	High.
TrB, TrC, TrD, TrD3, TrE-------- Trimble	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High.
WaC, WaD, WaE, WnC3, WnD3------- Waynesboro	B	None---------	---	---	>6.0	---	---	>60	---	High------	High.

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

TABLE 17.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Bedford	Fine-silty, mixed, mesic Typic Fragiudults
Bewleyville	Fine-silty, siliceous, thermic Typic Paleudults
Caneyville	Fine, mixed, mesic Typic Hapludalfs
Crider	Fine-silty, mixed, mesic Typic Paleudalfs
*Egam	Fine, mixed, thermic Cumulic Hapludolls
Frederick	Clayey, kaolinitic, mesic Typic Paleudults
Garmon	Fine-loamy, mixed, mesic Dystric Eutrochrepts
*Huntington	Fine-silty, mixed, mesic Fluventic Hapludolls
Lawrence	Fine-silty, mixed, mesic Aquic Fragiudalfs
Lindside	Fine-silty, mixed, mesic Fluvaquentic Eutrochrepts
Lowell	Fine, mixed, mesic Typic Hapludalfs
Melvin	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Newark	Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents
Nolin	Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Nolin Variant	Coarse-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
Sensabaugh	Fine-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
Skidmore	Loamy-skeletal, mixed, mesic Dystric Fluventic Eutrochrepts
Tarklin	Fine-loamy, siliceous, mesic Typic Fragiudults
Trimble	Fine-loamy, siliceous, mesic Typic Paleudults
Waynesboro	Clayey, kaolinitic, thermic Typic Paleudults

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