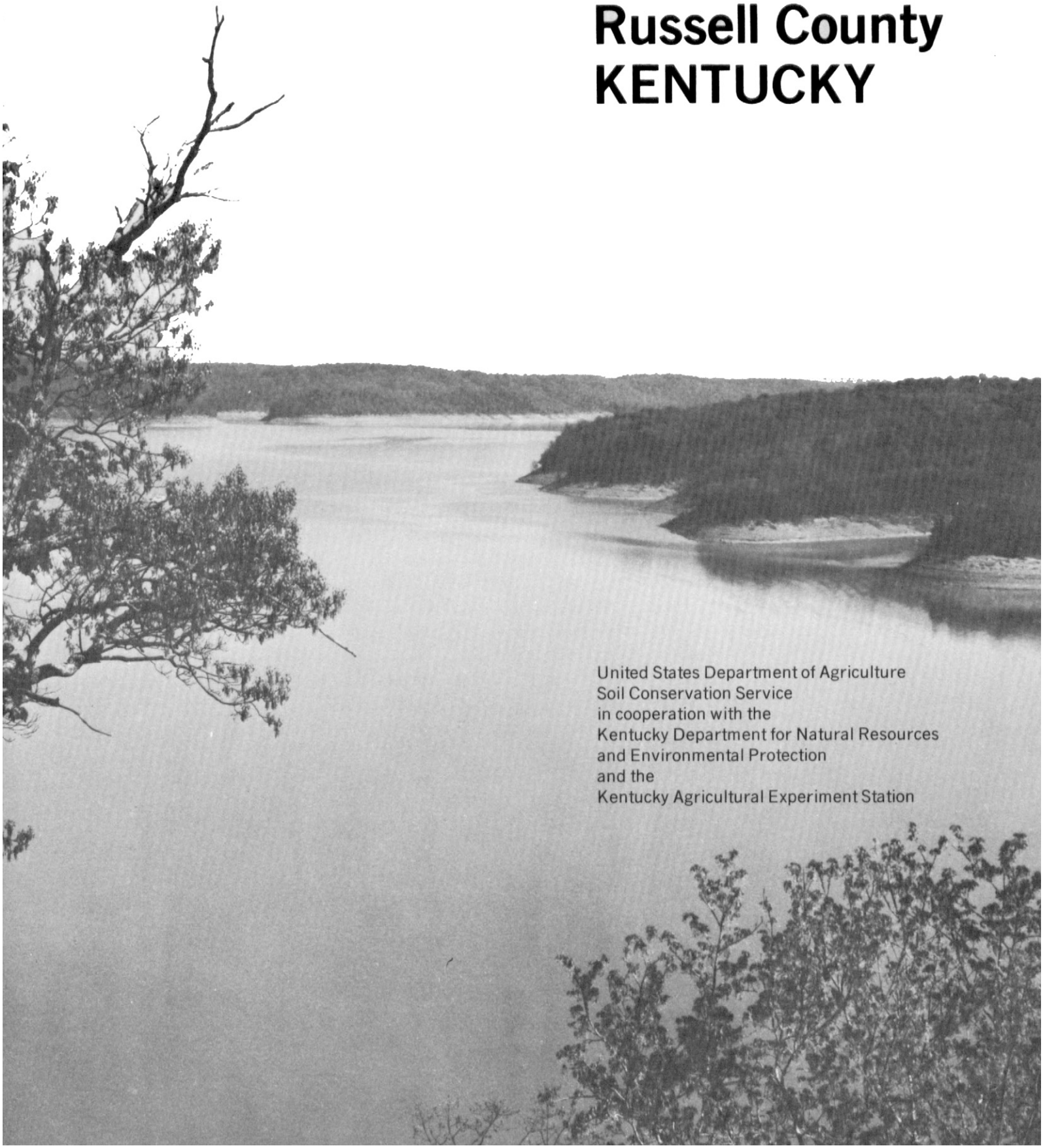
Soil survey of

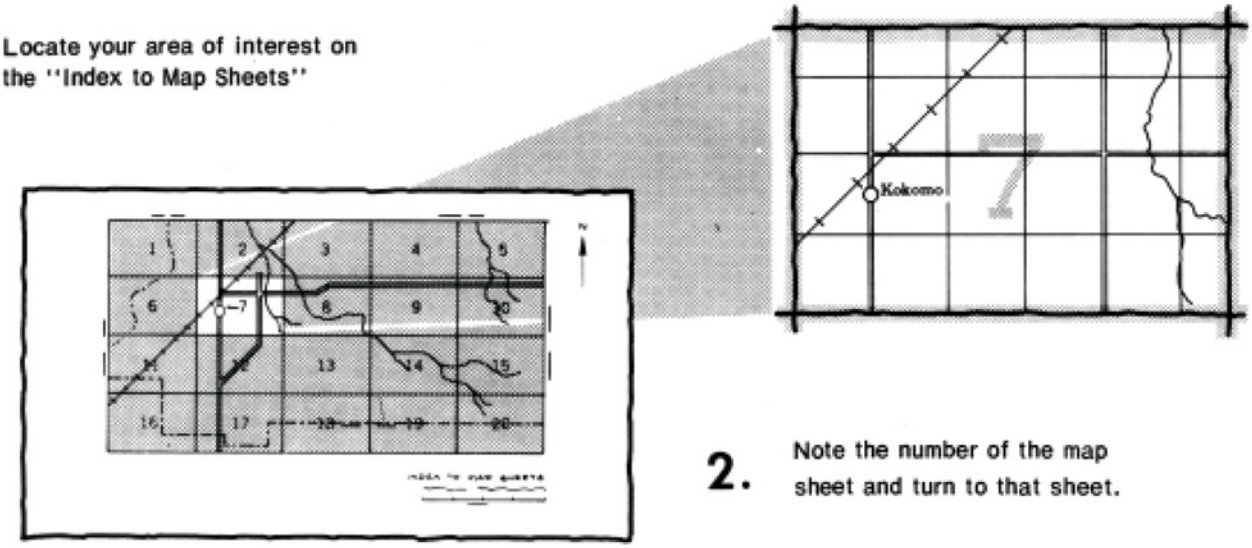
Russell County KENTUCKY



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

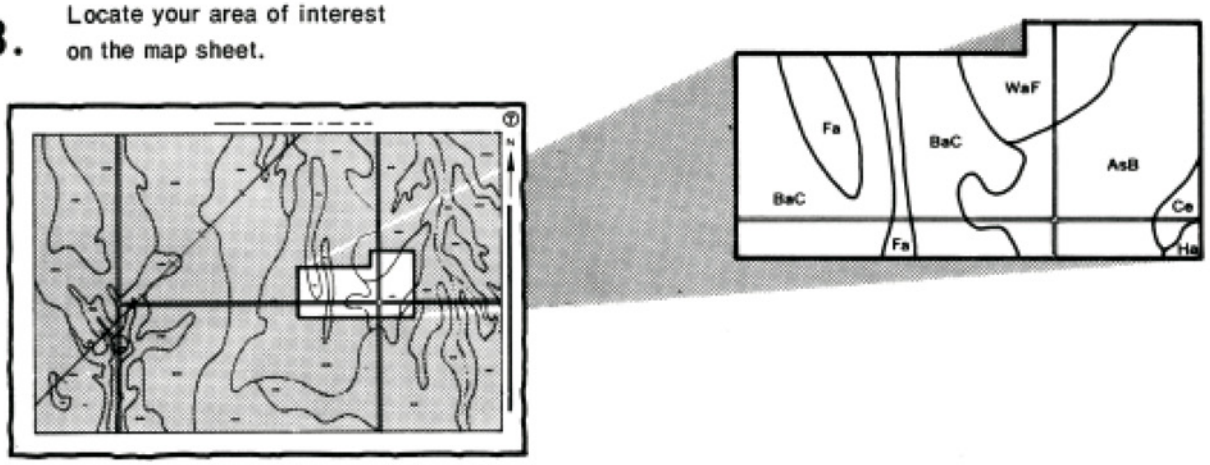
HOW TO USE

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

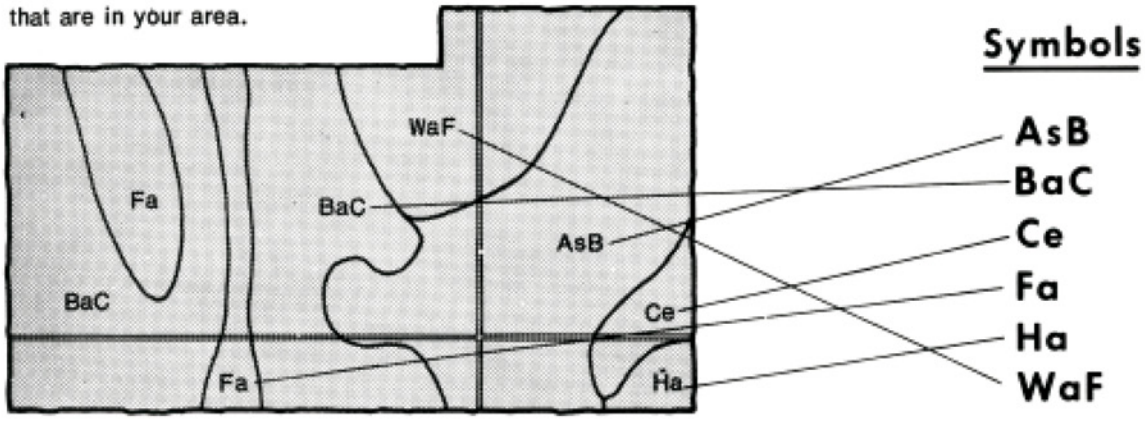


2. Note the number of the map sheet and turn to that sheet.

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

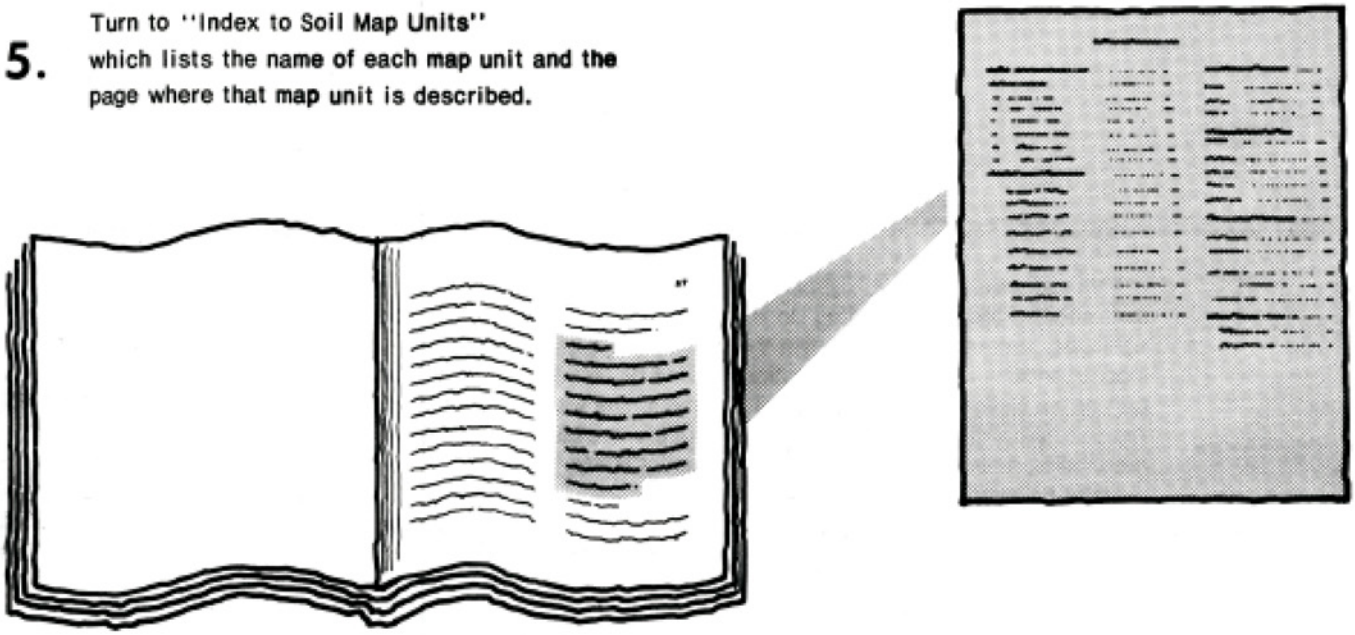


4. List the map unit symbols that are in your area.

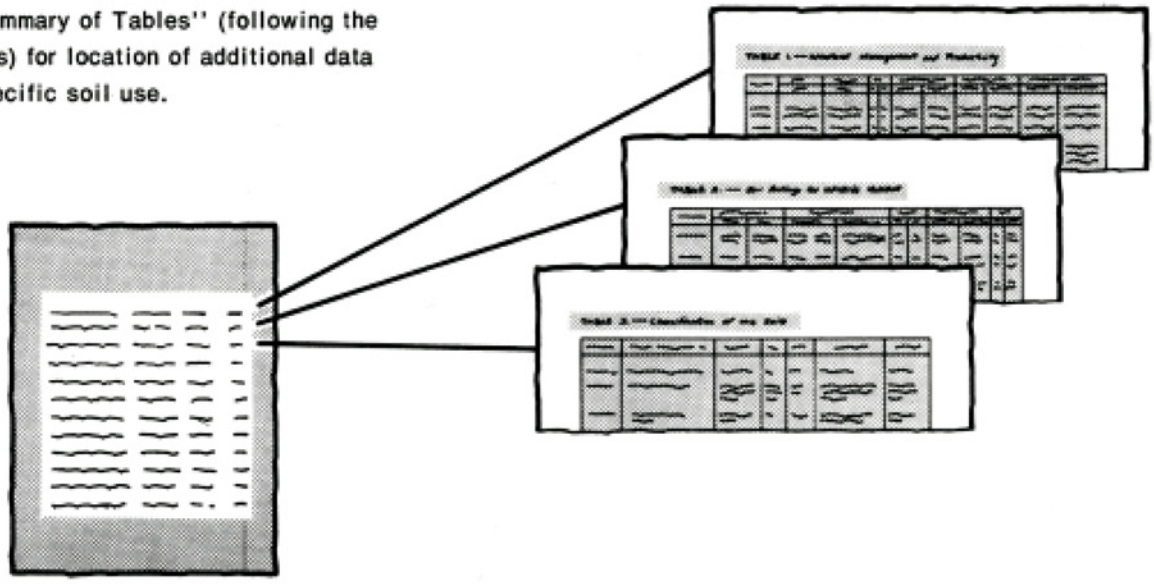


THIS SOIL SURVEY

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 1974-78. Soil names and descriptions were approved in 1978. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1979. 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 Russell 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: Lake Cumberland bordered by woodland on Garmon-Caneyville association, very steep.

contents

soil series

Issued February 1982

index to soil map units

summary of tables

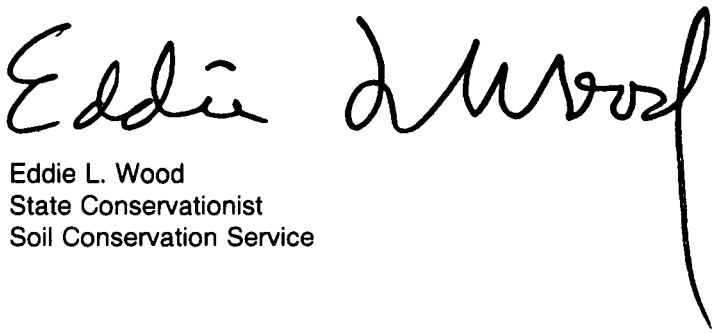
foreword

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

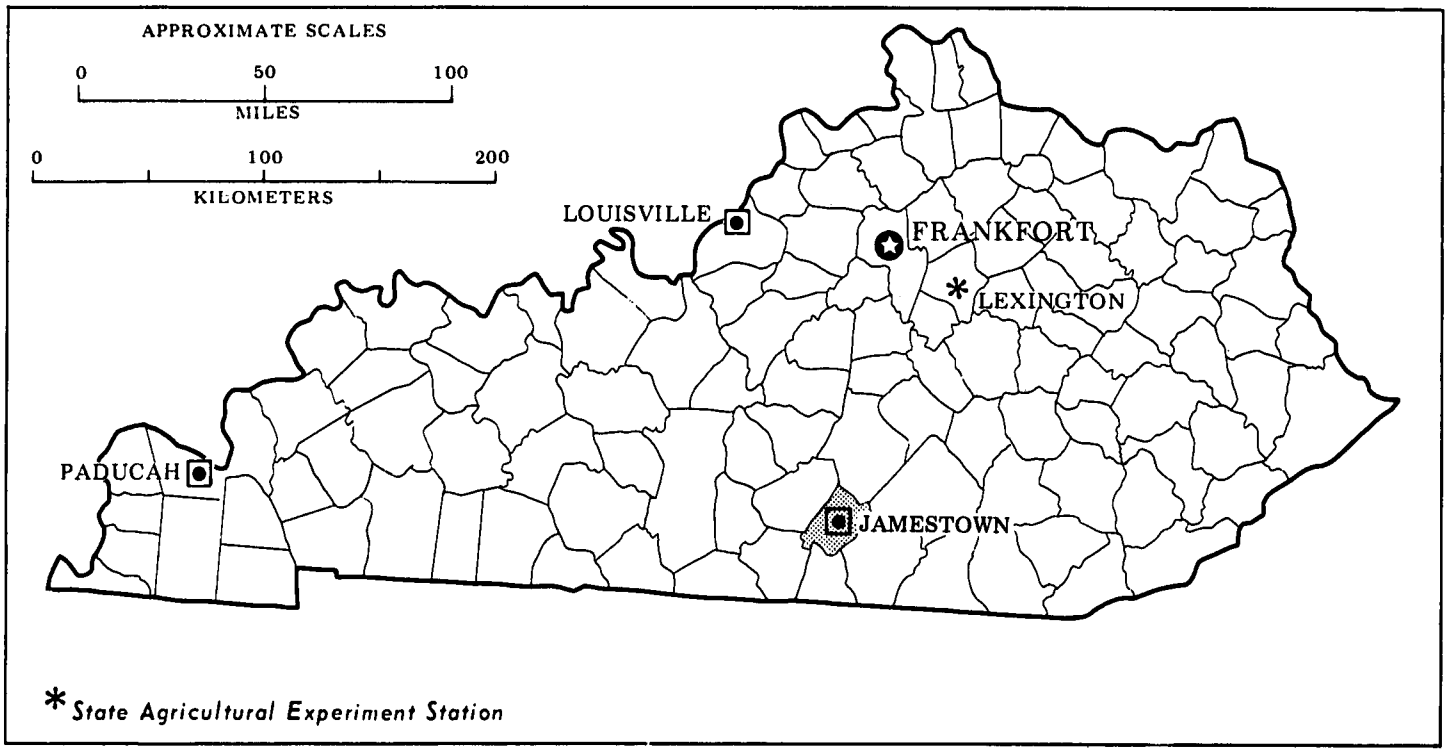
This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use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

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

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



Eddie L. Wood
State Conservationist
Soil Conservation Service



Location of Russell County in Kentucky.

soil survey of
Russell County, Kentucky

By James P. Fehr, Soil Conservation Service

Soils surveyed by James P. Fehr
Soil Conservation Service and
Gerald A. Richardson and Robert C. Somers, Jr.
Kentucky Department for Natural Resources and Environmental Protection

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

Russell County is in the south-central part of Kentucky. It has a land area of 152,510 acres, or 238 square miles, and a population of 10,500. Jamestown, the county seat, has a population of 1,000. Cumberland Lake, which extends across the southern part of the county, has a water area of 27,968 acres.

The county is in the Pennyroyal Land Resource Area (*4*). The north-central part of the county is mainly rolling uplands with short, hilly slopes along the streams. The soils are mostly deep and well drained. A nearly level to undulating area lies in the northwest corner of the county. The soils are moderately well to somewhat poorly drained and have fragipans. The south-central part of the county is undulating to hilly and is mostly karst topography. The soils are mostly well drained and have red clay subsoils. A small area along the lower Cumberland River is mostly nearly level to sloping. The soils are well drained to poorly drained. The rest of the county is rolling to very steep and highly dissected by small streams. The soils are moderately deep over bedrock and are well drained.

general nature of the county

This section briefly describes the climate, history and development, relief and drainage, and farming of Russell County.

climate

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

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

Table 1 gives data on temperature and precipitation as recorded at Somerset in adjacent Pulaski County 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 37° F, and the average daily minimum temperature is 27°. The lowest

temperature on record, which occurred at Somerset on January 24, 1963, is minus 28°. In summer the average temperature is 73°, and the average daily maximum temperature is 85°. The highest recorded temperature, which occurred at Somerset on July 28, 1952, is 103°.

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° F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 50 inches. Of this, 26 inches, or 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 23 inches. The heaviest 1-day rainfall during the period of record was 6.21 inches at Somerset on August 9, 1970. Thunderstorms occur on about 50 days each year, and most occur in summer.

Average seasonal snowfall is 10 inches. The greatest snow depth at any one time during the period of record was 13 inches. On an average of 5 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and 40 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 12 miles per hour, in March.

history and development

Russell County was formed in 1825 from territory taken from Adair, Wayne, and Cumberland Counties. It was named for Colonel William Russell, a native of Fayette County.

Jamestown, the county seat, was incorporated in 1827. It was first known as Jacksonville, for General Andrew Jackson. In 1836, it was renamed Jamestown after James Woolridge, who donated 100 acres of land where the town was established.

The largest town in the county is Russell Springs, population 1,690. It was built around "Big Boiling Springs," a health resort that was visited by many people throughout the year. The spring water was thought to have medicinal qualities. Russell Springs was named after the county and the springs.

Creelsboro was laid out on the banks of the Cumberland River by Elijah and Eliza Creel in 1809. It served as a shipping point in the early settlement of the area.

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

Transportation facilities include the Cumberland Parkway, a limited access highway that crosses the county from east to west, and U.S. Highway 127, which runs north and south. A network of state and county highways give access to nearly all parts of the county. The Russell County Airport between Jamestown and Russell Springs has a paved runway and facilities for light aircraft.

Small recreation parks are located at both Jamestown and Russell Springs. Lake Cumberland extends across the county and provides many recreational facilities. These facilities include Lake Cumberland State Park, three U.S. Army Corps of Engineers parks that provide cabins or camping facilities, or both, and numerous boat launching ramps.

relief and drainage

Russell County ranges from nearly level to very steep in relief. Elevation ranges from about 550 to about 1,100 feet above sea level. The lowest point is where the Cumberland River crosses into Cumberland County west of Creelsboro. The highest point is about a mile east of Russell Springs.

Most of the surface drainage flows into the Cumberland River mainly through Caney Fork, Crocus, Greasy, Lily, Alligator, and Wolf Creeks. Most of the area north of Kentucky Highway 80 flows northward into the Green River through Hudson, Lutrell, and Goose Creeks.

farming

Farming in Russell County is diversified. There are about 1,200 farms in the county, and the average size is about 85 acres (*18*). Tobacco, corn, pasture, and hay are the main crops. Tobacco is the main cash crop. In recent years, vegetable crops for processing and fresh consumption have become important. Most of the forage and grain crops are fed locally to livestock.

Dairy cattle, beef cattle, and hogs are the principal livestock.

Production of timber also provides a source of farm income in Russell County. About 63,600 acres is in woodland, most of which is privately owned.

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, rangeland and 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.

soil descriptions

1. Elk-Nolin-Melvin

Deep, nearly level to sloping, well drained and poorly drained soils that have a loamy subsoil; formed in alluvium

This map unit consists of long, narrow flood plains, broad, rolling stream terraces, and wet depressions (fig. 1). It is dissected by many small streams. Slopes range from about 0 to 12 percent.

This unit covers about 2 percent of the county. It is about 30 percent Elk soils, 25 percent Nolin soils, 25 percent Melvin soils, and 20 percent soils of minor extent.

Elk soils are on high stream terraces. They have a brown, silt loam surface layer and a strong brown, silty clay loam subsoil.

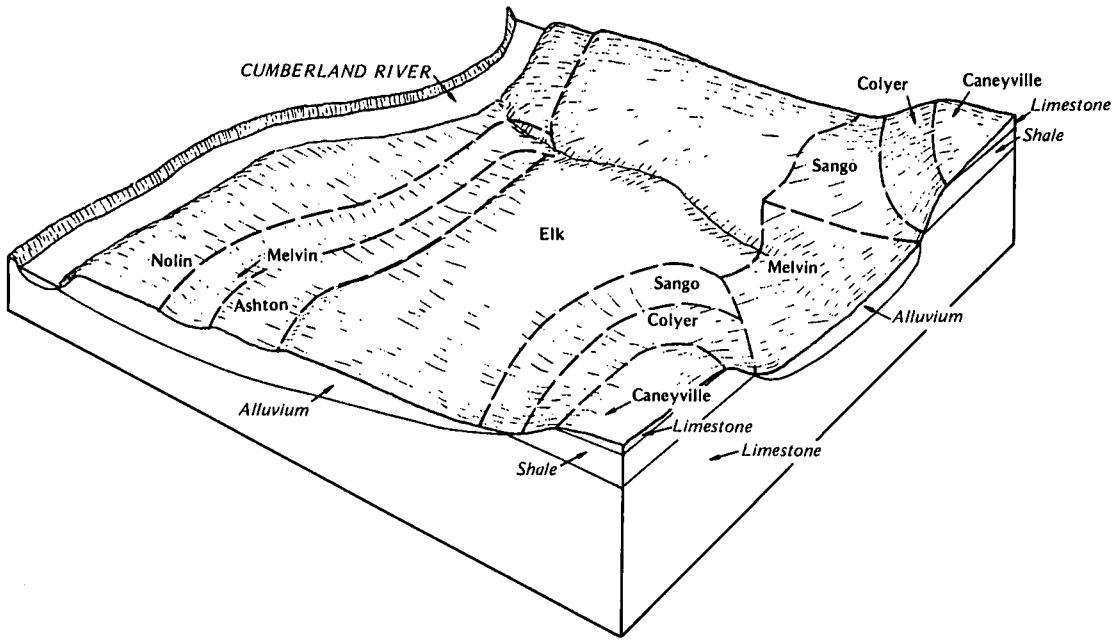


Figure 1.—Relationship of soils to topography and underlying material in the Elk-Nolin-Melvin General Soil Map Unit.

Nolin soils are on flood plains. They have a dark grayish brown, silt loam surface layer and a dark yellowish brown, silt loam subsoil.

Melvin soils are on flood plains. They have a dark gray, silt loam surface layer and a gray, silt loam subsoil.

The minor soils in this unit are the well drained Ashton soils, the moderately well drained Sango soils, the somewhat poorly drained Taft soils on stream terraces, and the well drained Woolper and Faywood soils on toe slopes. Colyer and Caneyville soils are on nearby uplands.

Most of the acreage in this unit is used for cultivated crops, hay, and pasture. The uncleared areas are mostly in wet depressions and on streambanks.

The soils in this unit are generally well suited to farming. Erosion is a hazard on the Elk soils when they are cultivated, but it can be overcome by the use of erosion control practices. Drainage is necessary on the Melvin soils. Although most areas of the Melvin soils are suited to hay and pasture, these soils are better suited to plants that tolerate wetness. Flooding on this unit is controlled by Wolf Creek Dam.

The soils are well suited to trees. They are generally well suited to most urban and recreational uses. Flooding is not a problem of soils on the flood plain because they are protected by Wolf Creek Dam. Wetness is a severe hazard for urban uses on Melvin soils.

2. Garmon-Caneyville

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

This map unit is on hillsides and ridges. The hillsides generally have short slopes and are highly dissected by small drainageways and streams (fig. 2). The ridges are long and narrow and are generally uniform in elevation. Slopes range from about 6 to 75 percent.

This unit makes up about 31 percent of the county. It is about 55 percent Garmon soils, 25 percent Caneyville soils, and 20 percent soils of minor extent.

Garmon soils are on the slopes below the Caneyville soils and on ridges at the lower elevations. They have a brown, channery silt loam surface layer and a yellowish brown, channery silt loam subsoil.

Caneyville soils are on the upper hillsides and ridgetops. They have a brown, silt loam surface layer and a yellowish red, silty clay subsoil.

The minor soils in this unit are the well drained Nolin soils and the poorly drained Melvin soils on the flood plains; the well drained Trimble soils on the toe slopes;

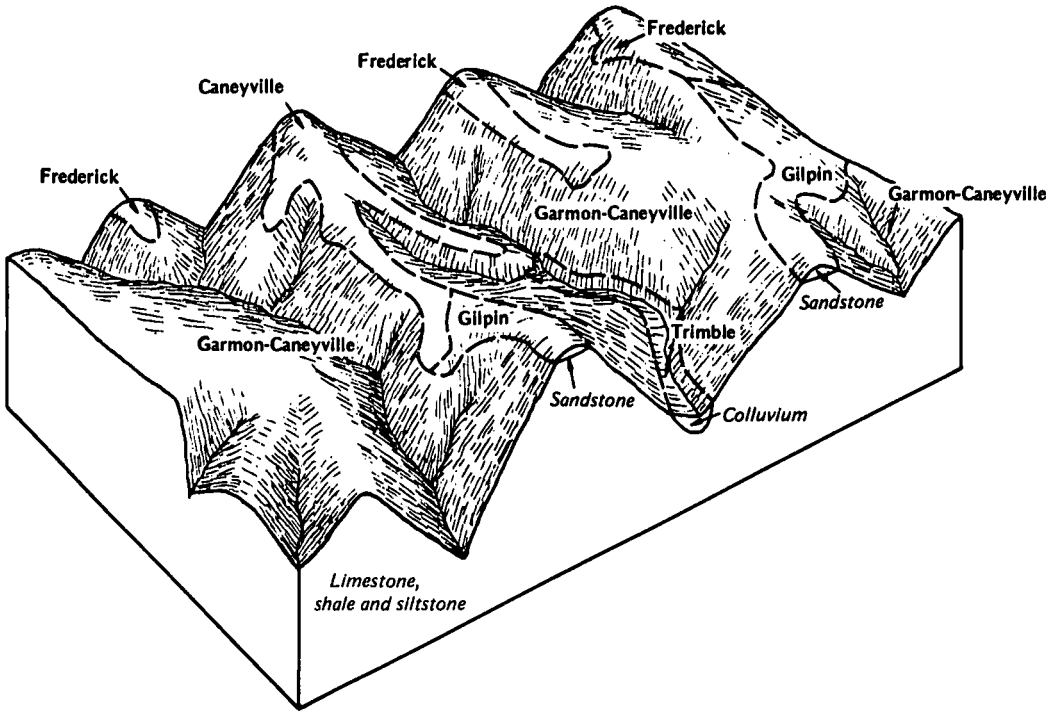


Figure 2.—Relationship of soils to topography and underlying material in the Garmon-Caneyville General Soil Map Unit.

and the well drained Gilpin and Frederick soils on the upper side slopes and ridges.

Most of the acreage in this unit is in mixed hardwoods. The cleared areas are generally on ridges and are used for hay and pasture.

The soils in this unit are not generally suited to farming because of the steep slopes and moderate depth over bedrock. Except on some ridges and upper side slopes, this unit is poorly suited to pasture and hay.

The soils are moderately well suited to trees. They are generally poorly suited to most urban and recreational uses because of their steep slopes and moderate depth over bedrock.

3. Frederick-Mountview-Gilpin

Deep and moderately deep, gently sloping to moderately steep, well drained soils that have loamy or clayey subsoils; formed in material weathered from limestone, sandstone, or shale or from limestone with a silt mantle

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

This unit covers about 27 percent of the county. It is about 50 percent Frederick soils, 20 percent Mountview soils, 15 percent Gilpin soils, and 15 percent soils of minor extent.

Frederick soils are on ridges and upper side slopes. They are brown silt loam in the surface layer and red silty clay in the subsoil.

Mountview soils are on the broader ridges. They are brown silt loam in the surface layer and upper part of the subsoil and red silty clay in the lower part of the subsoil.

Gilpin soils are on the lower side slopes. They are brown silt loam in the surface layer and yellowish brown channery silt loam in the subsoil.

The minor soils in this unit are the well drained Nolin soils and the poorly drained Melvin soils on the flood plains; the moderately well drained Sango soils on the broader ridges; and the well drained Garmon and Caneyville soils on the steep hillsides.

Most of the acreage in this unit is used for hay and pasture. Cultivated crops are grown on the ridges and more gentle slopes. The uncleared areas are mostly on the steep hillsides.

The soils in this unit are generally suited to farming. The gently sloping soils on ridges are well suited to cultivated crops. Erosion is the main hazard, and erosion control practices are needed. The soils are well suited to hay and pasture.

The soils are well suited to trees. They are generally moderately well suited to most urban and recreational uses. The major limitations are shrink-swell potential on the Frederick soils and moderate depth over bedrock on the Gilpin soils. Slope is a moderate to severe limitation.

4. Lonewood-Gilpin

Deep and moderately deep, gently sloping to moderately steep, well drained soils that have a loamy subsoil; formed in material weathered from sandstone, siltstone, or shale.

This map unit is on ridges and side slopes. The ridges are broad and smooth, but are dotted with occasional wet depressions (fig. 4). The side slopes are short and highly dissected by small drainageways. Slopes range from about 2 to 20 percent.

This unit covers about 33 percent of the county. It is about 35 percent Lonewood soils, 30 percent Gilpin soils, and 35 percent soils of minor extent.

Lonewood soils are mostly on broad ridges. They have a brown, loam surface layer and a yellowish brown, loam subsoil.

Gilpin soils are on side slopes. They have a brown, silt loam surface layer and a yellowish brown, channery silt loam subsoil.

The minor soils are the well drained Nolin and Skidmore soils and the poorly drained Melvin soils on the flood plains; the well drained Mountview soils and moderately well drained Sango soils on ridges; the somewhat poorly drained Taft soils in depressions; the well drained Frederick soils on side slopes; and the well drained Garmon and Caneyville soils on steep hillsides.

Most of the acreage in this unit is used for cultivated crops, hay, and pasture. The uncleared areas are mostly on steep hillsides.

The soils in this unit are generally well suited to farming. Erosion is the main hazard, and erosion control practices are needed. The Gilpin soils are generally moderately deep over bedrock and are best suited to hay and pasture. Lonewood soils are less sloping and are better suited to cultivated crops.

The soils are generally well suited to trees. They are generally well suited to moderately well suited to most urban and recreational uses. The major limitations are moderate depth over bedrock on the Gilpin soils and slope on the hilly soils.

5. Sango-Taft

Deep, nearly level and gently sloping, moderately well drained and somewhat poorly drained soils that have a loamy subsoil; formed in material weathered from sandstone and siltstone or in alluvium

This map unit is on broad, smooth ridges and wet depressions (fig. 5). Most of the area is drained by small drainageways. Slopes range from about 0 to 4 percent.

This map unit covers about 7 percent of the county. It is about 60 percent Sango soils, 15 percent Taft soils, and 25 percent soils of minor extent.

Sango soils are on broad ridges. They have a brown, silt loam surface layer; a yellowish brown, silt loam

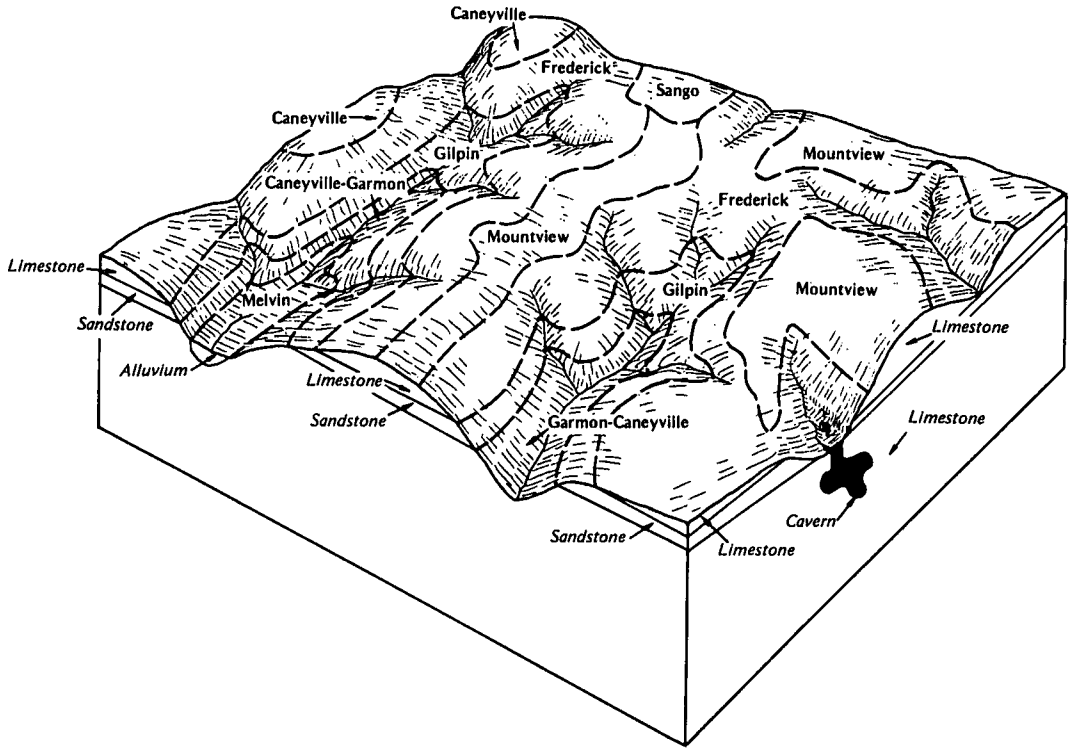


Figure 3.—Relationship of soils to topography and underlying material in the Frederick-Mountview-Gilpin General Soil Map Unit.

subsoil with gray mottles; and a fragipan at a depth of about 2 feet.

Taft soils are in slight upland depressions. They have a grayish brown, silt loam surface layer; a yellowish brown, silt loam subsoil with gray mottles; and a fragipan at a depth of about 2 1/2 feet.

The minor soils in this unit are the poorly drained Melvin soils along small drainageways; the well drained Lonewood soils on the higher ridges; and the Gilpin soils on the rolling side slopes.

Most of the acreage in this unit is used for cultivated crops, hay, and pasture. The uncleared areas are mostly in the wet depressions.

The soils in this unit generally are moderately well suited to farming. Most areas are underlain by a fragipan, and wetness is the main limitation. Most of the soils in this unit are well suited to hay and pasture.

The soils are generally well suited to trees. They are moderately well suited to poorly suited to most urban and recreational uses. Wetness is the major limitation.

broad land use considerations

About 18 percent of the county is used for cultivated crops. This cropland is scattered throughout the county but is concentrated largely in general soil map units 1, 4, and 5, which are the units best suited to crops. Wetness is the major limitation for crops on the Melvin soils in map unit 1 and on the major soils in map unit 5. Map unit 4 is on uplands where the hazard of erosion is the main limitation for crops. Lonewood soils are the main soils used for cultivated crops in unit 4.

About 20 percent of the county is in pasture. All soils except those in general soil map unit 2 are generally well suited to pasture. In map unit 2 only the ridgetops are suited to pasture plants.

About 42 percent of the county is woodland. Generally the soils in map units 1, 3, 4, and 5 are well suited to hardwoods. The soils in map unit 2 generally are only moderately well suited to hardwoods because of their moderate depth over bedrock.

About 12,150 acres in the county is urban or built-up land, mainly in the Jamestown and Russell Springs areas and along the major highways. Wetness is the major limitation to this use in map units 1 and 5. Shrink-swell potential is the main limitation in map unit 3, and moderate depth over bedrock and steep slopes are the main limitations in unit 2. In general, the soils in map unit 4 are suited to urban uses.

Water-based recreation and camping bring many visitors to Russell County. Attractions include Cumberland River and Cumberland Lake, and the surrounding hardwood forest in map units 1 and 2. The suitability for recreation varies, depending on the intensity of use. Map unit 5 generally is moderately well to poorly suited to intensive uses because of wetness, and unit 2 is poorly suited because of steep slopes. Map units 1, 3, and 4 generally are suited to intensive recreation uses such as playgrounds and camp areas. All of these units, however, are suitable for extensive uses such as hiking or nature study areas.

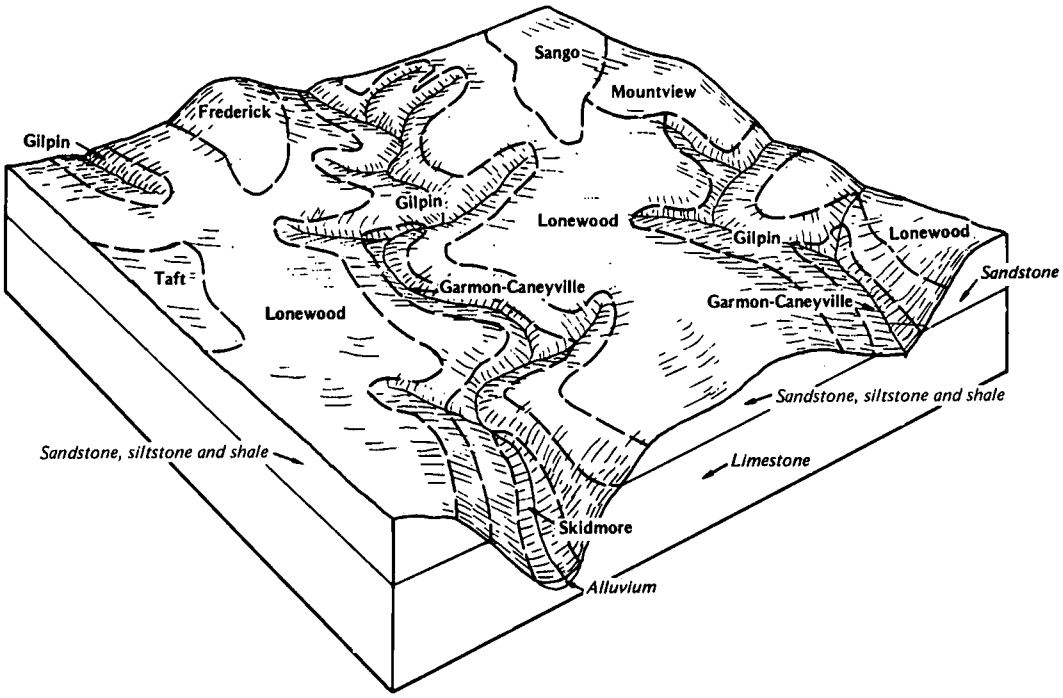


Figure 4.—Relationship of soils to topography and underlying material in the Lonewood-Gilpin General Soil Map Unit.

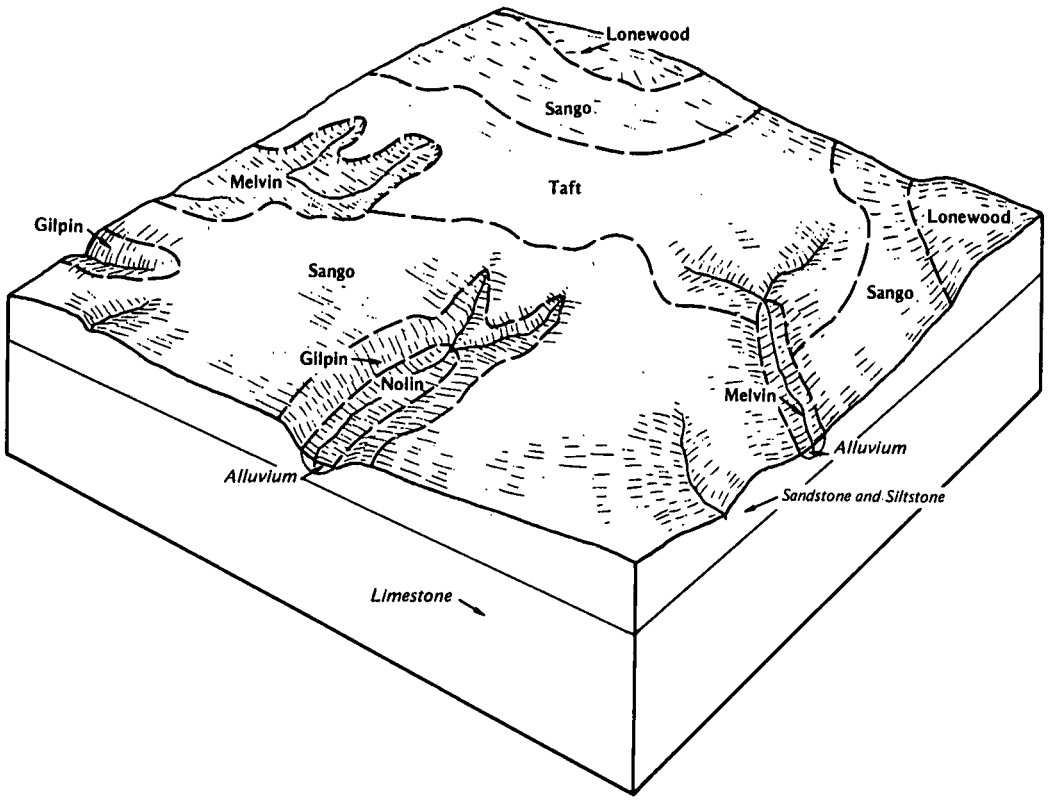


Figure 5.—Relationship of soils to topography and underlying material in the Sango-Taft General Soil Map Unit.

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, Frederick silt loam, 2 to 6 percent slopes, is one of several phases in the Frederick series.

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

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

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

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

Ab—Ashton silt loam. This deep, well drained, nearly level soil is on low stream terraces. Individual areas are about 3 to 90 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsoil, which extends to a depth of about 42 inches, is brown, friable silt loam. The underlying material is dark yellowish brown silt loam to a depth of 60 inches.

This soil has moderate permeability and high available water capacity. The root zone is deep, and the organic matter content is moderate. This soil is easily tilled. Reaction is medium acid to neutral. Runoff is slow. Depth to bedrock is more than 60 inches. This soil is subject to rare flooding, but it is protected below Wolf Creek Dam on the Cumberland River.

Included with this soil in mapping are a few small areas of Sango, Elk, and Nolin soils. In some places these soils have a dark brown subsoil. These inclusions make up about 6 to 10 percent of the unit.

Most of the acreage of this Ashton soil is used for cultivated crops, hay, and pasture; a few areas are in woodland.

This soil is well suited to corn, soybeans, small grains, and tobacco. The erosion hazard is slight. Because of the rare flooding during winter and early spring, tillage operations may be delayed in unprotected areas. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond well to fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when

wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Plant competition is severe, but there are no other significant limitations for woodland use and management.

Except where it is protected, this soil is severely limited by flooding for nearly all urban uses. The protected areas have slight limitations for most urban uses.

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

CaC—Caneyville silt loam, very rocky, 6 to 12 percent slopes. This moderately deep, well drained, sloping soil is on side slopes and ridgetops. Limestone outcrops cover about 5 to 10 percent of the surface. Individual areas are about 3 to 50 acres.

Typically, the surface layer is brown, friable silt loam about 6 inches thick. The subsoil, which extends to a depth of about 32 inches, is yellowish brown, friable silt loam in the upper part. The next layer is yellowish red, firm silty clay, and the lower part is dark yellowish brown, firm silty clay. Below this is gray limestone.

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

Included with this soil in mapping are small areas of Frederick, Garmon, and Gilpin soils. Some of these soils near the head of Bethel Creek are underlain by calcareous shales. In Rockhouse Bottom and near the head of Luttrell Creek these soils are underlain by black shale. Also included are small areas where the soil is deeper than 40 inches over bedrock. These inclusions make up about 10 to 15 percent of the unit.

Most of the acreage of this Caneyville soil is used for hay and pasture; a few areas are in cultivated crops and woodland.

This soil is not suited to cultivated crops because of depth to bedrock and rock outcrops.

This soil is moderately well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth. Seedbed preparation, weed control, and harvesting hay is difficult because of rock outcrops.

This soil is moderately well suited to trees. Equipment limitation, plant competition, and erosion hazard are moderate. There are no other significant limitations for woodland use or management.

This soil has severe limitations for nearly all urban uses because of the depth to bedrock and moderately slow permeability.

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

CGE—Caneyville-Garmon association, steep. This map unit consists of moderately deep, well drained soils that occur in a regular and repeating pattern. The soils are in areas large enough to be mapped separately, but because of present and predicted land use, they were mapped together as one unit. The landscape is a series of steep side slopes and narrow, winding ridgetops. The Caneyville soils formed in material weathered from hard limestone that caps the ridgetops and extends over the upper side slopes. The Garmon soils formed in material weathered from shaly limestone, calcareous shales, and siltstone on steep side slopes below the Caneyville soils. Limestone outcrop covers about 10 to 15 percent of the surface. Mapped areas are about 3 to 500 acres. Most areas mapped contain both soils, but a few contain only one. Slopes range from 20 to 30 percent.

About 45 percent of the unit is Caneyville soils. Typically, the surface layer is brown, friable silt loam about 6 inches thick. The subsoil, which extends to a depth of about 32 inches, is yellowish brown, friable silt loam in the upper part. The next layer is yellowish red, firm silty clay, and the lower part is dark yellowish brown, firm silty clay. Below this is gray limestone.

Caneyville soils have moderately slow permeability and moderate available water capacity. The root zone is moderately deep, and the organic matter content is low. Reaction is very strongly acid to neutral in the upper part of the subsoil and medium acid to mildly alkaline in the lower part. Runoff is rapid. Depth to bedrock is 20 to 40 inches, and the shrink-swell potential is moderate.

About 40 percent of the unit is Garmon soils. Typically, the surface layer is brown, very friable channery silt loam about 2 inches thick. The subsoil is yellowish brown, friable channery silt loam and extends to a depth of about 26 inches. Below this is siltstone.

Garmon soils have moderately rapid permeability and low available water capacity. The root zone is moderately deep, and the organic matter content is low. Reaction is very strongly acid to neutral. Runoff is rapid. Depth to bedrock is 20 to 40 inches.

Included in mapping are small areas of Gilpin soils and rock outcrop. Also included are small areas of Trimble and Frederick soils. Some soils near the head of Bethel Creek are underlain by calcareous shales.

Most of the acreage of these soils is used for woodland. Small areas are used for cultivated crops or grass.

Because of steepness of slopes, this unit is not suited to cultivated crops.

This unit is poorly suited to hay and pasture because of steepness of slopes and depth to bedrock.

This association is moderately well suited to trees. On the Caneyville soils the erosion hazard and equipment limitations are severe. Plant competition is severe on north-facing slopes and moderate on south-facing slopes. The equipment limitation is moderate on the Garmon soils. There are no other significant limitations for woodland use or management.

Steepness of slopes and depth to bedrock are severe limitations for most urban uses.

This unit is in capability subclass VIIs. The Caneyville soils are in woodland groups 2x (north) and 3x (south). The Garmon soils are in woodland group 4x.

CoE—Colyer shaly silt loam, 20 to 50 percent slopes. This shallow, somewhat excessively drained, steep soil is on convex side slopes. Individual areas are about 3 to 90 acres.

Typically, the surface layer is dark grayish brown, friable shaly silt loam about 4 inches thick. The subsoil, which extends to a depth of about 11 inches, is brown, firm shaly silty clay loam. The underlying material is brown very shaly silty clay to a depth of about 18 inches. Below this is hard, black shale.

This soil has slow permeability and very low available water capacity. The root zone is shallow, and the organic matter content is low. Reaction is very strongly acid to extremely acid unless limed. Runoff is very rapid. Depth to bedrock is 8 to 20 inches.

Included with this soil in mapping are small areas that are moderately deep over bedrock. These inclusions make up about 5 to 8 percent of the unit.

Most of the acreage of this Colyer soil is used for hay, pasture, and woodland.

This soil is not suited to cultivated crops because of the shallow depth to bedrock and steepness of slopes.

This soil is poorly suited to hay or pasture because of steepness of slope and depth to bedrock.

This soil is poorly suited to trees. On the north-facing slopes, the erosion hazard, equipment limitation, and seedling mortality rate are moderate. On the south-facing slopes, the erosion hazard and equipment limitation are moderate and the seedling mortality rate is severe. There are no other significant limitations for woodland use or management.

This soil is severely limited for nearly all urban uses by the depth to bedrock and steepness of slope.

This soil is in capability subclass VIIs. It is in woodland groups 4d (north) and 5d (south).

EkB—Elk silt loam, 2 to 6 percent slopes. This deep, well drained soil is on gently sloping convex stream terraces. Individual areas are about 3 to 20 acres.

Typically, the surface layer is brown, friable silt loam about 9 inches thick. The subsoil, which extends to a depth of about 45 inches, is brown, friable silt loam in the upper 3 inches and strong brown, firm silty clay loam in the remainder. The underlying material is strong brown silty clay loam to a depth of more than 60 inches.

This soil has moderate permeability and high available water capacity. The root zone is deep, and the organic matter content is moderate. This soil is easily tilled. Reaction is very strongly acid to slightly acid. Runoff is medium. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Ashton and Sango soils. In some places the subsoil is redder and more alkaline. These inclusions make up about 4 to 6 percent of the unit.

Most of the acreage of this Elk soil is used for cultivated crops, hay, and pasture; a few areas are in woodland.

This soil is well suited to corn, soybeans, small grain, and tobacco. The erosion hazard is moderate when this soil is cultivated, and a combination of cropping systems and erosion control practices are needed to slow runoff and control erosion. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Plant competition is severe, but there are no other significant limitations for woodland use or management.

This soil is severely limited for local roads and streets by low strength. It is well suited to most other urban uses.

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

EkC—Elk silt loam, 6 to 12 percent slopes. This deep, well drained soil is on sloping convex stream terraces. Individual areas are about 3 to 125 acres.

Typically, the surface layer is brown, friable silt loam about 9 inches thick. The subsoil, which extends to a depth of about 45 inches, is brown, friable silt loam in the upper part and strong brown, firm silty clay loam in the lower part. The underlying material is strong brown silty clay loam to a depth of more than 60 inches.

This soil has moderate permeability and high available water capacity. The root zone is deep, and the organic matter content is moderate. This soil is easily tilled. Reaction is very strongly acid to slightly acid. Runoff is medium. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Sango soils. Also included are short slopes ranging to about 18 percent. In some places the subsoil is redder

and more alkaline. These inclusions make up about 10 to 15 percent of the unit.

Most of the acreage of this Elk soil is used for cultivated crops, hay, and pasture; a few areas are in woodland.

This soil is suited to corn, soybeans, small grain, and tobacco. The erosion hazard is severe when this soil is cultivated, and a combination of cropping systems and erosion control practices are needed to slow runoff and control erosion. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Plant competition is severe, but there are no other significant limitations for woodland use or management.

This soil is moderately limited for most urban uses by steepness of slope. It is severely limited for local roads and streets by low strength.

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

FwE—Faywood silt loam, 12 to 30 percent slopes. This moderately deep, well drained soil is on moderately steep to steep upland side slopes. Individual areas are about 5 to 230 acres.

Typically, the surface layer is brown, friable silt loam about 5 inches thick. The subsoil, which extends to a depth of about 39 inches, is yellowish brown, firm silty clay loam in the upper part and yellowish brown, firm silty clay in the lower part. Below this is limestone interbedded with calcareous shale.

This soil has moderately slow to slow permeability and moderate available water capacity. The root zone is moderately deep, and the organic matter content is low. The soil is somewhat difficult to till because of high clay content. Reaction is strongly acid to neutral. Runoff is medium to rapid. Depth to bedrock is 20 to 40 inches. Shrink-swell potential is moderate.

Included with this soil in mapping are small areas of soils that are deeper than 40 inches over bedrock and soils that are less than 20 inches deep over bedrock. These inclusions make up about 8 to 12 percent of the unit.

Most of the acreage of this Faywood soil is used for hay and pasture; a few areas are in woodland.

Because of the steepness of slopes, this soil is not suited to cultivated crops.

This soil is moderately well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is moderately suited to trees. Erosion hazard and plant competition are moderate, and the equipment limitation is severe. There are no other significant limitations for woodland use or management.

This soil is severely limited for most urban uses by moderately slow to slow permeability, depth to bedrock, and steepness of slopes.

This soil is in capability subclass VIe and woodland group 3c.

FeB—Frederick silt loam, 2 to 6 percent slopes. This deep, well drained soil is on gently sloping convex ridgetops and side slopes. Individual areas are about 3 to 35 acres.

Typically, the surface layer is brown, very friable silt loam about 10 inches thick. The subsoil extends to a depth of more than 70 inches. The upper part is yellowish red, friable silty clay loam. The next layer is red, firm silty clay. The next layer is red, firm clay, and the lower part is mottled, strong brown and red, firm clay.

This soil has moderate permeability and high available water capacity. The root zone is deep, and the organic matter content is moderate. This soil is easily tilled. Reaction is very strongly acid or strongly acid. Runoff is medium. Depth to bedrock is more than 60 inches. Shrink-swell potential is moderate.

Included with this soil in mapping are a few small areas of Mountview and Gilpin soils. Also included are small areas of soils that are redder and sandier in the lower part of the subsoil. Some soils are underlain by soft clay shale. These inclusions make up about 8 to 12 percent of the unit.

Most of the acreage of this Frederick soil is used for cultivated crops, hay, and pasture; a few areas are in woodland.

This soil is well suited to corn, soybeans, small grain, and tobacco. The erosion hazard is moderate when this soil is cultivated, and a combination of cropping systems and erosion control practices are needed to slow runoff and control erosion. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. The equipment limitation is moderate, and plant competition is severe. There are no other significant limitations for woodland use or management.

This soil is limited for nearly all urban uses by the moderate shrink-swell potential and low strength. It is moderately limited for septic tank filter fields by moderate permeability.

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

FeC—Frederick silt loam, 6 to 12 percent slopes. This deep, well drained soil is on sloping upland side slopes and convex ridgetops. Individual areas are about 5 to 500 acres.

Typically, the surface layer is brown, very friable silt loam about 10 inches thick. The subsoil extends to a depth of more than 70 inches. The upper part is yellowish red, friable silty clay loam. The next layer is red, firm silty clay. The next layer is red, firm clay, and the lower part is mottled, strong brown and red, firm clay.

This soil has moderate permeability and high available water capacity. The root zone is deep, and the organic matter content is moderate. This soil is easily tilled. Reaction is very strongly acid or strongly acid. Runoff is medium. Depth to bedrock is more than 60 inches. Shrink-swell potential is moderate.

Included with this soil in mapping are small areas of Mountview and Gilpin soils. Also included are small areas of soils that are redder and sandier in the lower part of the subsoil. Some areas are underlain by soft clay shales. These inclusions make up about 5 to 8 percent of the unit.

Most of the acreage of this Frederick soil is used for cultivated crops, hay, and pasture; a few areas are in woodland.

This soil is suited to corn, soybeans, small grain, and tobacco. The erosion hazard is severe when this soil is cultivated, and a combination of cropping systems and erosion control practices are needed to slow runoff and control erosion. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. The equipment limitation is moderate, and plant competition is severe. There are no other significant limitations for woodland use or management.

This soil is limited for nearly all urban uses by moderate shrink-swell potential and steepness of slope. It is moderately limited for septic tank filter fields because of moderate permeability.

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

FeD—Frederick silt loam, 12 to 20 percent slopes. This deep, well drained soil is on moderately steep side slopes. Individual areas are about 3 to 160 acres.

Typically, the surface layer is brown, very friable silt loam about 10 inches thick. The subsoil extends to a depth of more than 70 inches. The upper part of the subsoil is yellowish red, friable silty clay loam. The next layer is red, firm silty clay. The next layer is red, firm clay, and the lower part is mottled, strong brown and red, firm clay.

This soil has moderate permeability and high available water capacity. The root zone is deep, and the organic matter content is moderate. This soil is easily tilled. Reaction is very strongly acid or strongly acid. Runoff is medium to rapid. Depth to bedrock is more than 60 inches. Shrink-swell potential is moderate.

Included with these soils in mapping are small areas of Gilpin and Caneyville soils. Some soils are redder and sandier in the lower part of the subsoil. Also included are soils that are underlain by soft clay shales and Frederick soils that have slopes of more than 20 percent or that are eroded. A few areas are cherty. These inclusions make up about 10 to 12 percent of the unit.

Most of the acreage of this Frederick soil is used for hay and pasture; a few areas are in cultivated crops and woodland.

This soil is poorly suited to most cultivated crops because of the slope. The erosion hazard is very severe when this soil is cultivated, and a combination of cropping systems and erosion control practices are needed to slow runoff and control erosion. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond moderately well to lime and fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county (fig. 6). Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. The erosion hazard, equipment limitation, and plant competition are severe. There are no other significant limitations for woodland use or management.

This soil is severely limited for nearly all urban uses by steepness of slope.

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

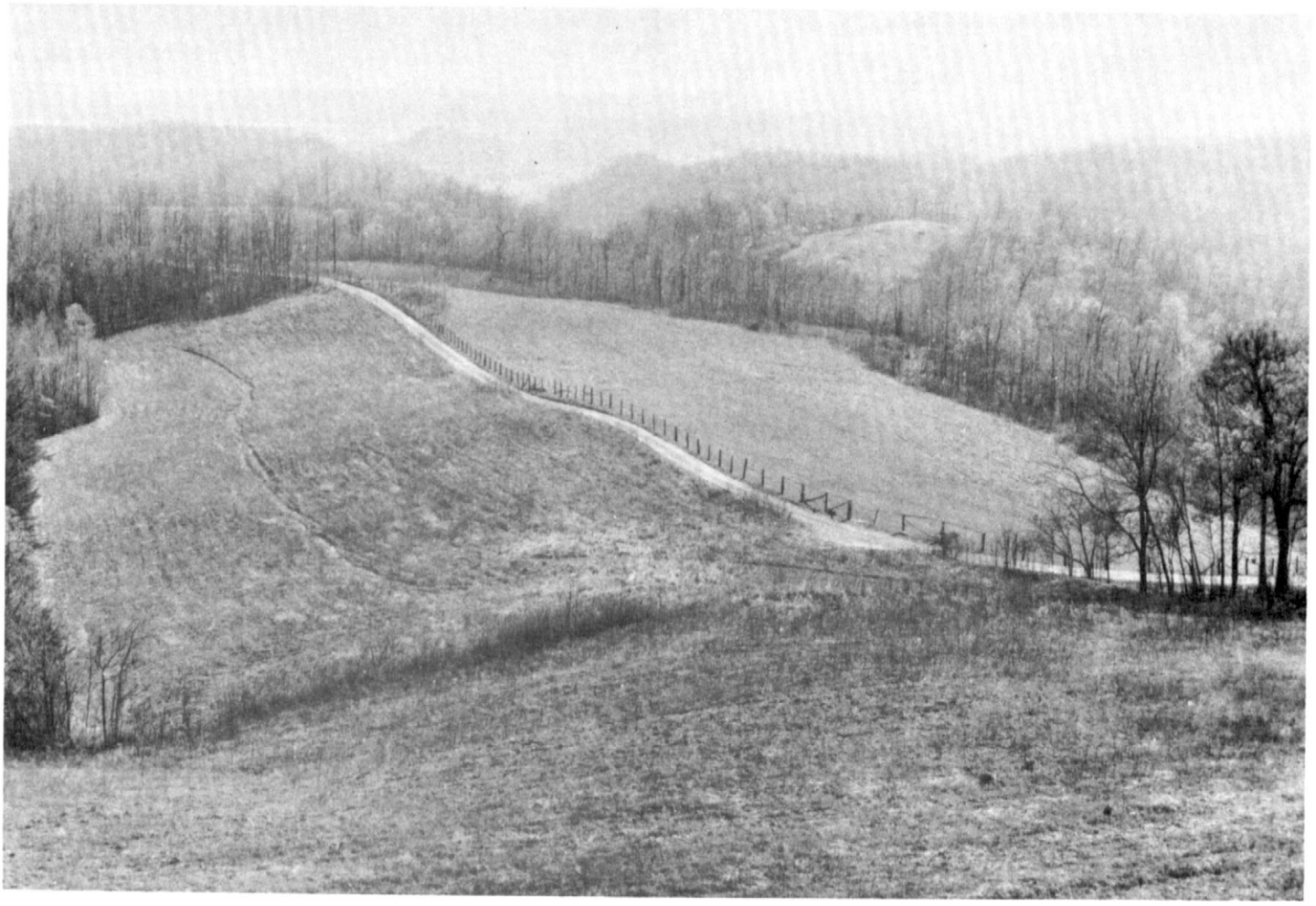


Figure 6.—Pasture on Frederick silt loam, 12 to 20 percent slopes. Woodland in background is on Garmon-Caneyville association, very steep.

FrC3—Frederick silty clay loam, 6 to 12 percent slopes, severely eroded. This deep, well drained soil is on sloping upland side slopes. Individual areas are about 3 to 30 acres. In most places this soil has lost most of the original surface layer through erosion.

Typically, the surface layer is strong brown, friable silty clay loam about 5 inches thick. The subsoil extends to a depth of about 70 inches. The upper part of the subsoil is yellowish red, firm silty clay. The lower part is yellowish red, firm silty clay with mottles of red and brown.

This soil has moderate permeability and high available water capacity. The root zone is deep, and the organic matter content is low. The soil is somewhat difficult to till because of the clay content. Reaction is very strongly acid or strongly acid. Runoff is medium to rapid. Depth to bedrock is more than 60 inches. Shrink-swell potential is moderate.

Included with this soil in mapping are small areas of Mountview and Gilpin soils. Also included are small areas of soils that are redder and sandier in the lower part of the subsoil. Some small areas underlain by soft clay shales. A few areas are cherty. Also included are a few areas with slopes greater than 12 percent. These inclusions make up about 6 to 10 percent of the unit.

Most of the acreage of this Frederick soil is used for hay and pasture; some areas are in cultivated crops and woodland.

This soil is poorly suited to most cultivated crops because of slope and past erosion. The erosion hazard is very severe when this soil is cultivated, and a combination of cropping systems and erosion control practices are needed to slow runoff and control erosion. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and

legumes in the cropping system. Crops on this soil respond moderately well to lime and fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Equipment limitation is moderate, and plant competition is severe. There are no other significant limitations for woodland use or management.

This soil is limited for most urban uses by steepness of slope, clayey textures, and shrink-swell potential. It has moderate limitations for septic tank filter fields because of moderate permeability.

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

GCF—Garmon-Caneyville association, very steep. This map unit consists of moderately deep, well drained soils that occur in a regular and repeating pattern. Individual areas of these soils are large enough to be mapped separately, but because of present and predicted land use they were mapped together as one unit. The landscape is a series of highly dissected, very steep hillsides and bluffs. The Garmon soils formed in material weathered from shaly limestone, calcareous shales, and siltstone on steep side slopes below the Caneyville soils. The Caneyville soils formed in material weathered from hard limestone on the upper side slopes and on the points of narrow ridgetops. Limestone outcrop covers about 10 to 15 percent of the surface. Mapped areas of this unit are about 5 to 1,000 acres. Individual areas of each soil are about 5 to 100 acres. Most areas mapped contain both soils, but a few contain only one. Slopes range from 20 to 75 percent.

About 65 percent of the unit is Garmon soils. Typically, the surface layer is brown, very friable channery silt loam about 2 inches thick. The subsoil is yellowish brown, friable channery silt loam and extends to a depth of about 26 inches. Below this is siltstone.

This Garmon soil has moderately rapid permeability and low available water capacity. The root zone is moderately deep, and the organic matter content is low. Reaction is very strongly acid to neutral. Runoff is rapid. Depth to bedrock is 20 to 40 inches.

About 20 percent of the unit is Caneyville soils. Typically, the surface layer is brown, friable silt loam about 6 inches thick. The subsoil, which extends to a depth of about 32 inches, is yellowish brown, friable silt loam in the upper part. The next layer is yellowish red, firm silty clay, and the lower part is dark yellowish brown, firm silty clay. Below this is gray limestone.

This Caneyville soil has moderately slow permeability and moderate available water capacity. The root zone is moderately deep, and the organic matter content is low. Reaction is very strongly acid to neutral in the upper part of the solum and medium acid to mildly alkaline in the lower part. Runoff is rapid. Depth to bedrock is 20 to 40 inches. Shrink-swell potential is moderate.

Included with these soils in mapping are small areas of Colyer soils, Gilpin soils, Trimble soils, and Rock outcrop.

Most of the acreage of these soils is used for woodland. Some small areas are used for pasture.

Because of the very steep slopes, this association is not suited to cultivated crops, hay, or pasture.

On the Garmon soils, the erosion hazard is moderate and equipment limitation is severe. On the north-facing slopes of Caneyville soils, the erosion hazard, equipment limitation, and plant competition are severe. On the south-facing slopes, the erosion hazard and equipment limitation are severe, and the seedling mortality rate and plant competition are moderate. There are no other significant limitations for woodland use or management.

This association is severely limited for most urban uses by steepness of slopes and depth to bedrock.

This unit is in capability subclass VIIs. The Garmon soil is in woodland group 4x. The Caneyville soil is in woodland groups 2x (north) and 3x (south).

GpB—Gilpin silt loam, 2 to 6 percent slopes. This moderately deep, well drained soil is on gently sloping convex ridgetops and side slopes. Individual areas are about 3 to 40 acres.

Typically, the surface layer is brown, friable silt loam about 9 inches thick. The subsoil extends to a depth of about 25 inches. The upper part of the subsoil is brown, friable channery silt loam. The lower part is yellowish brown, friable channery silt loam. The underlying material is yellowish brown very channery silty clay loam to a depth of about 30 inches. Below this is soft sandstone bedrock.

This soil has moderate permeability and moderate available water capacity. The root zone is moderately deep, and the organic matter content is low. This soil is easily tilled. The reaction is strongly acid to extremely acid. Runoff is medium. Depth to bedrock is 20 to 40 inches.

Included with this soil in mapping are a few small areas of Lonewood soils and small areas of soils that are more than 40 inches deep over bedrock. Some areas in the southern part of the county are cherty. These inclusions make up about 10 to 15 percent of the unit.

Most of the acreage of this Gilpin soil is used for cultivated crops, hay, and pasture; a few areas are in woodland.

This soil is well suited to corn, soybeans, small grain, and tobacco. The erosion hazard is moderate when this soil is cultivated, and a combination of cropping systems and erosion control practices are needed to slow runoff and control erosion. Tilth can be maintained and

improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Plant competition is moderate, but there are no other significant limitations for woodland use or management.

This soil is severely limited for septic tank filter fields and moderately limited for most other urban uses by the depth to bedrock.

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

GpC—Gilpin silt loam, 6 to 12 percent slopes. This moderately deep, well drained soil is on sloping convex ridgetops and side slopes. Individual areas are about 5 to 300 acres.

Typically, the surface layer is brown, friable silt loam about 9 inches thick. The subsoil extends to a depth of about 25 inches. The upper part of the subsoil is brown, friable channery silt loam. The lower part is yellowish brown, friable channery silt loam. The underlying material is yellowish brown very channery silty clay loam to a depth of about 30 inches. Below this is soft sandstone bedrock.

This soil has moderate permeability and moderate available water capacity. The root zone is moderately deep, and the organic matter content is low. This soil is easily tilled. Reaction is strongly acid to extremely acid. Runoff is medium. Depth to bedrock is 20 to 40 inches.

Included with this soil in mapping are small areas of Lonewood, Mountview, and Frederick soils. Also included are small areas of soils that are more than 40 inches deep over bedrock and some areas in the southern part of the county that are cherty. These inclusions make up about 10 to 15 percent of the unit.

Most of the acreage of this Gilpin soil is used for cultivated crops, hay, and pasture; some areas are in woodland.

This soil is suited to corn, soybeans, small grain, and tobacco. The erosion hazard is severe when this soil is cultivated, and a combination of cropping systems and erosion control practices are needed to slow runoff and control erosion. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Plant competition is moderate, but there are no other significant limitations for woodland use or management.

This soil is severely limited for septic tank filter fields and moderately limited for most other urban uses by the depth to bedrock and slope.

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

GpD—Gilpin silt loam, 12 to 20 percent slopes. This moderately deep, well drained soil is on moderately steep convex ridgetops and side slopes. Individual areas are about 5 to 300 acres.

Typically, the surface layer is brown, friable silt loam about 9 inches thick. The subsoil extends to a depth of about 25 inches. The upper part of the subsoil is brown, friable channery silt loam. The lower part is yellowish brown, friable channery silt loam. The underlying material is yellowish brown very channery silty clay loam to a depth of about 30 inches. Below this is soft sandstone bedrock.

This soil has moderate permeability and moderate available water capacity. The root zone is moderately deep, and the organic matter content is low. This soil is easily tilled. Reaction is strongly acid to extremely acid. Runoff is rapid. Depth to bedrock is 20 to 40 inches.

Included with these soils in mapping are a few areas of Garmon, Caneyville, and Frederick soils. Also included are a few areas of soils that are more than 40 inches deep over bedrock, and some cherty soils in the southern part of the county. These inclusions make up about 15 to 20 percent of the unit.

Most of the acreage of this Gilpin soil is used for woodland, hay, and pasture; some areas are in cultivated crops.

This soil is poorly suited to most cultivated crops because of slope. The erosion hazard is very severe when this soil is cultivated, and a combination of cropping systems and erosion control practices are needed to slow runoff and control erosion. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond moderately well to lime and fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. On north-facing slopes, the erosion hazard and equipment limitations are

moderate, and plant competition is severe. On south-facing slopes, the erosion hazard, equipment limitation, seedling mortality rate, and plant competition are moderate. There are no other significant limitations for woodland use or management.

This soil is severely limited for nearly all urban uses by the depth to bedrock and steepness of slope.

This soil is in capability subclass IVe and woodland group 2r (north) and 3r (south).

LoB—Lonewood loam, 2 to 6 percent slopes. This deep, well drained soil is on gently sloping convex ridgetops. Individual areas are about 3 to 500 acres.

Typically, the surface layer is brown, very friable loam about 7 inches thick. The subsoil extends to a depth of about 45 inches. The upper part of the subsoil is yellowish brown, very friable loam. The next layer is yellowish brown, friable loam, and the lower part is yellowish brown, firm loam. The underlying material is soft red, yellow, and gray sandstone to a depth of about 84 inches.

This soil has moderate permeability and high available water capacity. The root zone is deep, and the organic matter content is moderate. This soil is easy to till. Reaction is strongly acid to very strongly acid. Runoff is medium. Depth to bedrock is 3 1/2 to 6 feet or more.

Included with this soil in mapping are small areas of Mountview and Gilpin soils. These inclusions make up about 6 to 10 percent of the unit.

Most of the acreage of this Lonewood soil is used for cultivated crops, hay, and pasture; a few areas are in woodland.

This soil is suited to corn, soybeans, small grain, and tobacco. The erosion hazard is moderate when this soil is cultivated, and a combination of cropping systems and erosion control practices are needed to slow runoff and control erosion. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Plant competition is moderate, but there are no other significant limitations for woodland use or management.

This soil is well suited to most urban uses. It is moderately limited for septic tank filter fields by moderate permeability. It is severely limited for local roads and streets by low strength.

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

LoC—Lonewood loam, 6 to 12 percent slopes. This deep, well drained soil is on sloping side slopes and convex ridgetops. Individual areas are about 3 to 100 acres.

Typically, the surface layer is brown, very friable loam about 7 inches thick. The subsoil extends to a depth of about 45 inches. The upper part of the subsoil is yellowish brown, very friable loam. The next layer is yellowish brown, friable loam, and the lower part is yellowish brown, firm loam. The underlying material is soft red, yellow, and gray sandstone to a depth of about 84 inches.

This soil has moderate permeability and high available water capacity. The root zone is deep, and the organic matter content is moderate. This soil is easy to till. Reaction is strongly acid to very strongly acid. Runoff is medium. Depth to bedrock is 3 1/2 to 6 feet or more.

Included with this soil in mapping are small areas of Mountview and Gilpin soils. These inclusions make up about 6 to 10 percent of the unit.

Most of the acreage of this Lonewood soil is used for cultivated crops, hay, and pasture; a few areas are in woodland.

This soil is suited to corn, soybeans, small grain, and tobacco. The erosion hazard is severe when this soil is cultivated, and a combination of cropping systems and erosion control practices are needed to slow runoff and control erosion. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Plant competition is moderate, but there are no other significant limitations for woodland use or management.

This soil is moderately limited for nearly all urban uses by steepness of slope. It is severely limited for local roads and streets by low strength.

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

Me—Melvin silt loam. This deep, poorly drained, nearly level soil is on flood plains. Individual areas are about 3 to 150 acres.

Typically, the surface layer is dark gray, friable silt loam about 8 inches thick. The subsoil, which extends to about 27 inches, is gray, friable silt loam with pale brown mottles. The underlying material is gray silt loam to a depth of more than 60 inches.

This soil has a moderate permeability and high available water capacity. The root zone is deep, and the

organic matter content is moderate. This soil is easily tilled. Reaction is slightly acid to neutral. Runoff is slow to ponded. The seasonal high water table is within a foot of the surface. Depth to bedrock is more than 60 inches. This soil is subject to occasional flooding, but it is protected below Wolf Creek Dam on the Cumberland River.

Included with this soil in mapping are small areas with very dark gray surfaces and soils that are sandier. Also included are small areas of somewhat poorly drained soils. These inclusions make up about 15 to 20 percent of the unit.

Most of the acreage of this Melvin soil is used for pasture and woodland; a few areas are in cultivated crops and hay.

This soil is suited only to cultivated crops that can tolerate wetness and occasional flooding. The erosion hazard is slight. Winter crops are poorly suited to this soil because of the seasonal high water table and flooding during winter and spring. Tillage operations are often delayed by wetness. Tile drains and open ditches may improve internal drainage, and in some places diversions help control runoff and overwash from adjacent soils. Where these drainage practices can be installed, they lengthen the effective growing season, reduce the delay in tillage operations, and widen the range of suitable plants. Tilth can be improved and the supply of organic matter maintained by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. When drained, crops respond well to lime and fertilizer.

This soil is suited to hay and pasture plants that tolerate wetness and withstand flooding for brief periods. If drained, it is well suited to a wide range of pasture plants. Overgrazing and grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Equipment limitation, plant competition, and seedling mortality are severe. There are no other significant limitations for woodland use or management.

This soil is severely limited for nearly all urban uses by flooding and wetness.

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

MoB—Mountview silt loam, 2 to 6 percent slopes. This deep, well drained gently sloping soil is on convex ridgetops. Individual areas are about 3 to 400 acres.

Typically, the surface layer is brown, friable silt loam about 9 inches thick. The subsoil, which extends to a depth of more than 65 inches, is strong brown, friable silty clay loam in the upper part and red, firm silty clay in the lower part.

This soil has moderate permeability and high available water capacity. The root zone is deep, and the organic matter content is moderate. This soil is easily tilled. Reaction is strongly to very strongly acid. Runoff is medium. Depth to bedrock is more than 60 inches. Shrink-swell potential is moderate.

Included with this soil in mapping are small areas of Sango, Frederick, Gilpin, and Lonewood soils. Some small areas are moderately deep over bedrock. These inclusions make up about 6 to 10 percent of the unit.

Most of the acreage of this Mountview soil is used for cultivated crops, hay, and pasture; a few areas are in woodland.

This soil is well suited to corn, soybeans, small grain, and tobacco (fig. 7). The erosion hazard is moderate when this soil is cultivated, and a combination of cropping systems and erosion control practices are needed to slow runoff and control erosion. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing and grazing when the soil is too wet will cause soil compaction and excessive runoff Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Plant competition is severe, but there are no other significant limitations for woodland use or management.

This soil is moderately limited for urban uses by steepness of slope, moderate shrink-swell potential, and moderate permeability. It is severely limited for local roads and streets by low strength.

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

MoC—Mountview silt loam, 6 to 12 percent slopes. This deep, well drained sloping soil is on convex ridgetops and side slopes. Individual areas are about 3 to 90 acres.

Typically, the surface layer is brown, friable silt loam about 9 inches thick. The subsoil, which extends to a depth of more than 65 inches, is strong brown, friable silty clay loam in the upper part and red, firm silty clay in the lower part.

This soil has moderate permeability and high available water capacity. The root zone is deep, and the organic matter content is moderate. This soil is easily tilled. Reaction is strongly to very strongly acid. Runoff is medium. Depth to bedrock is more than 60 inches. Shrink-swell potential is moderate.

Included with this soil in mapping are small areas of Sango, Lonewood, Gilpin, and Frederick soils. Some areas are moderately deep over bedrock. These inclusions make up about 6 to 10 percent of the unit.

Figure 7.—Contour strips of burley tobacco on Mountview silt loam, 2 to 6 percent slopes.

Most of the acreage of this Mountview soil is used for cultivated crops, hay, and pasture; a few areas are in woodland.

This soil is suited to corn, soybeans, small grain, and tobacco. The erosion hazard is severe when this soil is cultivated, and a combination of cropping systems and erosion control practices are needed to slow runoff and control erosion. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Plant competition is severe, but there are no other significant limitations for woodland use or management.

This soil is moderately limited for most urban uses by steepness of slope, moderate shrink-swell potential, and moderate permeability. It is severely limited for local roads and streets by low strength.

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

No—Nolin silt loam. This deep, well drained, nearly level soil is on flood plains. Individual areas are about 3 to 250 acres.

Typically, the surface is dark grayish brown, friable silt loam about 8 inches thick. The subsoil, which extends to a depth of about 42 inches, is dark yellowish brown silt loam. The underlying material is dark yellowish brown silt loam to a depth of more than 60 inches.

This soil has a moderate permeability and high available water capacity. The root zone is deep, and the organic matter content is moderate. This soil is easily tilled. Reaction is medium acid to moderately alkaline. Runoff is slow. The seasonal high water table is 3 to 6 feet below the surface. Depth to bedrock is more than 60 inches. This soil is subject to occasional flooding, but it is protected below Wolf Creek Dam on the Cumberland River.

Included with this soil in mapping are small areas of Ashton and Melvin soils. Some areas have a dark brown

surface and some are sandier. Some steep banks along the Cumberland River are included with this soil. These inclusions make up about 5 to 8 percent of the unit.

Most of the acreage of this Nolin soil is used for cultivated crops and hay; a few areas are in pasture and woodland.

This soil is well suited to corn, soybeans, and small grains. The erosion hazard is slight. Except where protected, occasional flooding during winter and early spring may delay tillage operations. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to hay and pasture plants that can tolerate flooding for brief periods. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Plant competition is severe, but there are no other significant limitations for woodland use or management.

Except where protected, this soil is severely limited for nearly all urban uses by flooding.

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

Nv—Nolin Variant fine sandy loam. This deep, well drained, nearly level soil is on flood plains. Individual areas are about 3 to 50 acres.

Typically, the surface layer is dark grayish brown, friable fine sandy loam about 8 inches thick. The subsoil, which extends to a depth of about 42 inches, is brown, friable fine sandy loam. The underlying material is fine sandy loam more than 60 inches deep.

This soil has moderately rapid permeability and high available water capacity. The root zone is deep, and the organic matter content is low. This soil is easily tilled. Reaction is medium acid to neutral. Runoff is slow. The seasonal high water table is 4 to 6 feet below the surface. Depth to bedrock is more than 60 inches. This soil is subject to occasional flooding, except where it is protected below Wolf Creek Dam on the Cumberland River.

Included with this soil in mapping are small areas of Skidmore soils and soils with silt loam textures. Some steep banks along the Cumberland River are included with this soil. Some areas are less than 60 inches to bedrock. These inclusions make up about 5 to 10 percent of the unit.

Most of the acreage of this Nolin soil is used for cultivated crops and hay; a few areas are in pasture and woodland.

This soil is well suited to corn, soybeans, and small grains. The erosion hazard is slight. Except where protected, occasional flooding during winter and spring months may delay tillage operations. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to hay and pasture plants that tolerate flooding for brief periods. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Plant competition is severe, but there are no other significant limitations for woodland use or management.

Except where protected, this soil is severely limited for nearly all urban uses by flooding. Seepage is a severe limitation for sewage lagoons and sanitary landfills.

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

SaB—Sango silt loam, 1 to 4 percent slopes. This deep, moderately well drained soil is on nearly level ridgetops and terraces. Individual areas are about 4 to 200 acres.

Typically, the surface layer is grayish brown, very friable silt loam about 4 inches thick. The subsurface layer is light yellowish brown, very friable silt loam that extends to a depth of about 8 inches. The subsoil extends to a depth of more than 94 inches. The upper part of the subsoil is brownish yellow, very friable silt loam. The next layer is a yellowish brown, very firm, silt loam fragipan. The lower part is reddish yellow, firm silty clay loam.

This soil has moderate permeability in the horizons above the fragipan and slow in the fragipan. The available water capacity is moderate. The root zone is moderately deep, and the organic matter content is moderate. The soil is easily tilled. Reaction is strongly acid to very strongly acid. Runoff is slow. The seasonal high water table is 2 to 3 feet below the surface. Depth to bedrock is more than 60 inches.

Included with these soils in mapping are small areas of Mountview, Lonewood, and Taft soils. These inclusions make up about 4 to 8 percent of the unit.

Most of the acreage of this Sango soil is used for cultivated crops, hay, and pasture; a few areas are in woodland.

This soil is well suited to corn, soybeans, small grains, and tobacco. Erosion hazard is slight. Tillage operations may be delayed in spring by wetness. In some places, diversions help control runoff and overwash from adjacent hills. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including

grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to most hay and pasture plants that are commonly grown in the county. Alfalfa is short lived on this soil because of wetness. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Plant competition is moderate, but there are no other limitations for woodland use or management.

This soil is severely limited by wetness for septic tank filter fields and for building houses with basements. It is moderately limited for most other urban uses.

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

Sk—Skidmore gravelly loam. This deep, well drained, nearly level soil is on flood plains. Individual areas are about 3 to 300 acres.

Typically, the surface layer is brown, friable gravelly loam about 10 inches thick. The subsoil, which extends to a depth of about 28 inches, is brown, friable gravelly sandy loam. The underlying material is brown very gravelly loam to 60 inches.

This soil has moderately rapid permeability and moderate available water capacity. The root zone is deep, and the organic matter content is low. This soil is somewhat difficult to till because of the high gravel content. Reaction is medium acid to mildly alkaline. Runoff is slow. The seasonal high water table is 3 to 4 feet below the surface. Depth to bedrock is more than 40 inches. This soil is subject to occasional flooding.

Included with this soil in mapping are small areas of Nolin and Melvin soils. Some soils contain less gravel and a few areas are less well drained. These inclusions make up about 5 to 8 percent of the unit.

Most of the acreage of this Skidmore soil is used for cultivated crops, hay, and pasture; a few areas are in woodland.

This soil is well suited to corn, small grains, and tobacco. The erosion hazard is slight. Occasional flooding during winter and early spring months may delay tillage operations. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to pasture plants that can tolerate flooding for brief periods. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Plant competition is severe, but there are no other limitations for woodland use and management.

This soil is severely limited for nearly all urban uses by flooding.

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

Ta—Taft silt loam. This deep, somewhat poorly drained, nearly level soil is on stream terraces and broad, concave upland flats. Individual areas are about 3 to 90 acres.

Typically, the surface layer is grayish brown, friable silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown, friable silt loam with gray mottles. The next layer is brown, firm silt loam with gray mottles. The lower part is a light brownish gray, firm silt loam fragipan with brown mottles.

This soil has slow permeability and moderate available water capacity. The root zone is moderately deep, and the organic matter content is moderate. This soil is easily tilled. Reaction is strongly acid to very strongly acid. Runoff is slow. The seasonal high water table is 1 to 2 feet below the surface. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Melvin and Sango soils. Also included are small areas of poorly drained soils. These inclusions make up about 5 to 8 percent of the unit.

Most of the acreage of this Taft soil is used for woodland and pasture; a few areas are in cultivated crops and hay.

This soil is suited to cultivated crops that can tolerate wetness. Winter crops are poorly suited to this soil because of the seasonal high water table during winter and spring. The erosion hazard is slight. Tillage operations are often delayed by excessive wetness. Tile drainage is ineffective because of the fragipan, but surface drainage may reduce wetness. In some places, diversions help control runoff and overwash from adjacent soils. Where these drainage practices can be installed, they lengthen the effective growing season, reduce the delay in tillage operations, and widen the range of suitable plants. Tilth can be improved and the supply of organic matter maintained by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond moderately well to lime and fertilizer.

This soil is well suited to hay and pasture plants that tolerate wetness. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Equipment limitation and plant competition are moderate, but there are no

other significant limitations for woodland use or management.

This soil is severely limited by wetness for nearly all urban uses.

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

TrC—Trimble channery silt loam, 6 to 12 percent slopes. This deep, well drained soil is on sloping alluvial fans and toe slopes. Individual areas are about 3 to 30 acres.

Typically, the surface layer is dark grayish brown, friable channery silt loam about 3 inches thick. The subsurface layer, to a depth of 5 inches, is pale brown, friable channery silt loam. The subsoil extends to a depth of about 45 inches. The upper part of the subsoil is brown, firm channery silt loam. The lower part is yellowish brown, firm channery silty clay loam. The underlying material is yellowish brown very channery silty clay loam to a depth of 60 inches.

This soil has moderate permeability and high available water capacity. The root zone is deep, and the organic matter content is low. The soil is difficult to till because of the high content of coarse fragments. Reaction is strongly acid to extremely acid. Runoff is medium. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Skidmore and Woolper soils. Some areas contain more coarse fragments. Also included are small areas where the slope is less than 6 percent and small areas of soils that are moderately deep over soft acid shale. These inclusions make up about 5 to 8 percent of the unit.

Most of the acreage of this Trimble soil is used for cultivated crops, hay, and pasture; some areas are in woodland.

This soil is suited to corn, soybeans, small grain, and tobacco. The erosion hazard is severe when this soil is cultivated, and a combination of cropping systems and erosion control practices are needed to slow runoff and control erosion. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Plant competition is severe, but there are no other significant limitations for woodland use or management.

This soil is moderately limited for nearly all urban uses by steepness of slope and the amount of coarse fragments.

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

TrD—Trimble channery silt loam, 12 to 20 percent slopes. This deep, well drained soil is on moderately steep toe slopes and alluvial fans. Individual areas are about 3 to 60 acres.

Typically, the surface layer is dark grayish brown, friable channery silt loam about 3 inches thick. The subsurface layer, to a depth of 5 inches, is pale brown, friable channery silt loam. The subsoil extends to a depth of about 45 inches. The upper part of the subsoil is brown, firm channery silt loam. The lower part is yellowish brown, firm channery silty clay loam. The underlying material is yellowish brown very channery silty clay loam to a depth of 60 inches.

This soil has moderate permeability and high available water capacity. The root zone is deep, and the organic matter content is low. This soil is difficult to till because of the high content of coarse fragments. Reaction is strongly acid to extremely acid. Runoff is medium. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Garmon soils and soils that are moderately deep over soft acid shale. Some small areas contain more coarse fragments. These inclusions make up about 6 to 10 percent of the unit.

Most of the acreage of this Trimble soil is used for hay and pasture; a few areas are in cultivated crops and woodland.

This soil is poorly suited to most cultivated crops because of the steepness of slope.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Equipment limitation is moderate and plant competition is severe, but there are no other significant limitations for woodland use and management.

This soil is severely limited for nearly all urban uses by steepness of slope and the amount of coarse fragments.

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

Ud—Udorthents, undulating. Udorthents are mostly deep and well drained. They occur on stream terraces, immediately below Wolf Creek Dam. The original soil material was removed during construction of the dam. Slopes range from 2 to 10 percent.

The soil in this unit is variable but generally consists of stratified layers of fine sandy loam, loamy fine sands, and fine sands. The underlying material is weakly consolidated sandstone. There are a few small areas where the soil is shallow over limestone, and there are a

few small areas where the soil is clayey. One area of about 10 acres is a dump for soil materials removed from the core of the dam during a repair project. Most of the acreage is planted to pine.

This unit is too variable to be placed in a capability subclass or woodland group.

WoC—Woolper silty clay loam, 6 to 12 percent slopes. This deep, well drained soil is on sloping foot slopes and alluvial fans. Individual areas are about 3 to 90 acres.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil extends to a depth of about 49 inches. The upper part of the subsoil is very dark grayish brown, friable silty clay loam. The lower part is brown, firm silty clay. The underlying material is dark yellowish brown silty clay to a depth of 60 inches.

This soil has slow to moderately slow permeability and high available water capacity. The root zone is deep, and the organic matter content is moderate. The soil is easily tilled. Reaction is slightly acid to mildly alkaline. Runoff is medium. Depth to bedrock is more than 60 inches. Shrink-swell potential is moderate.

Included with this soil in mapping are a few small areas of Trimble soils. Some areas have slopes of less than 6 percent and some areas are moderately well drained. In a few small areas the dark surface is thinner. These inclusions make up about 5 to 10 percent of the unit.

Most of the acreage of this Woolper soil is used for cultivated crops, hay, and pasture; a few areas are in woodland.

This soil is suited to corn, soybeans, small grain, and tobacco. The erosion hazard is severe when this soil is cultivated, and a combination of cropping systems and erosion control practices are needed to slow runoff and control erosion. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and including grasses and legumes in the cropping system. Crops on this soil respond well to fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain plant cover and soil tilth.

This soil is well suited to trees. Equipment limitation is moderate and plant competition is severe, but there are no other significant limitations for woodland use or management.

This soil is moderately limited for nearly all urban uses by steepness of slope and moderate shrink-swell potential. It is severely limited for septic tank filter fields by slow permeability and for local roads and streets by low strength.

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

prime farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in providing the Nation's short- and long-range needs for food and fiber. Because the amount of this high quality farmland is limited, it should be used with wisdom and foresight.

Prime farmland is the land best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when it is treated and managed using acceptable farming methods. With minimal inputs of energy and economic resources, prime farmland produces the highest yields, and farming it results in less damage to the environment than farming other types of land.

Prime farmland may now be cropland, pasture, woodland, or other land, but not urban and built-up land or water areas. It must either be used for producing food or fiber or be available for these uses.

Prime farmland usually receives an adequate and dependable supply of moisture. It also has favorable temperatures, an adequate growing season, and suitable acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods and is not flooded during the growing season. The slope gradient is usually less than 6 percent. For more detailed information on the criteria for prime farmland consult the local staff of the Soil Conservation Service.

About 23 percent of Russell County, or 35,000 acres, meets the requirements for prime farmland. It is scattered throughout the county, but most is in the northern part and in the Cumberland River Valley. It is mainly in map units 1, 4, and 5 on the general soil map. Approximately 15,000 acres of this prime farmland is used for crops, mainly tobacco, corn, and soybeans.

A recent trend in some parts of the county has been the conversion of some prime farmland to industrial and urban uses. Such loss of prime farmland to nonfarm uses results in more farming on marginal lands that generally are more erodible, droughty, and difficult to cultivate, and are usually less productive.

The detailed soil map units that make up the prime farmland in Russell County are listed in this section. This list, however, is not a recommendation for a particular land use.

Some soils that have limitations—such as a high water table or flooding—may qualify as prime farmland if the limitations are overcome by corrective measures. The limitations of these soils are indicated in parentheses in

the following list. Onsite evaluation is necessary, however, to see if the corrective measures are effective.

The map units in this list are prime farmland except where the indicated limitations are not overcome or where the unit is in urban or built-up land. Urban and built-up land is defined as any contiguous area 10 acres or more in size that is used for residences, industrial sites, commercial sites, construction sites, institutional sites, railroad yards, small parks, cemeteries, airports, golf courses, spillways, shooting ranges, or other similar uses.

Ab—Ashton silt loam
EkB—Elk silt loam, 2 to 6 percent slopes
FeB—Frederick silt loam, 2 to 6 percent slopes
GpB—Gilpin silt loam, 2 to 6 percent slopes
LoB—Lonewood loam, 2 to 6 percent slopes
Me—Melvin silt loam (where artificially drained and protected from flooding)
MoB—Mountview silt loam, 2 to 6 percent slopes
No—Nolin silt loam (where protected from flooding)
Nv—Nolin Variant fine sandy loam (where protected from flooding)
SaB—Sango silt loam, 1 to 4 percent slopes
Ta—Taft silt loam (where artificially drained)

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 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 (*11*).

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

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

crops and pasture

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

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

More than 57,500 acres in Russell County was used for crops and pasture in 1967, according to the Conservation Needs Inventory (*8*). Of this total, 30,000 acres was used for permanent pasture; 10,000 acres for row crops, mainly corn, soybeans, and burley tobacco; 7,000 acres for rotation hay and pasture; 600 acres for close-growing crops; and the rest was idle cropland.

The acreage in crops and pasture has gradually been decreasing as more and more land is used for urban development. In 1967 there was about 12,000 acres of urban and built-up land in the county, and this figure has been growing at the rate of about 200 acres per year.

The soils in Russell County have good potential for increased production of food. About 14,000 acres of potentially good cropland is currently used as woodland, and about 19,000 acres is pasture. In addition to the reserve productive capacity represented by this land, food production could also be increased considerably by extending the latest crop production technology to all cropland in the county.

Soil *erosion* is the major concern on most of the cropland and pasture in Russell County. Where the slope is more than 2 percent, erosion is a hazard. Elk, Frederick, Gilpin, Lonewood, and Mountview soils, for example, have slopes of 2 to 12 percent.

Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and the subsoil is incorporated into the plow layer. This is especially damaging to soils that have a clayey subsoil, such as Frederick and Woolper soils, and soils that have a layer in or below the subsoil that limits the depth of the root zone. Such limiting layers could be a fragipan, as in the Sango soils, or bedrock, as in the Gilpin soils. Second, soil erosion on farmland results in streams polluted by sediment and poor quality of water for municipal use, recreation, and fish and wildlife.

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

Erosion can be reduced, however, by certain practices. In general, erosion control practices provide a protective

plant cover, reduce water runoff, and increase infiltration. A cropping system that keeps plant cover on the soil for extended periods can hold erosion losses to amounts that will not reduce the productive capacity. On livestock farms, which require pasture and hay, the legume and grass forage crops in the cropping system will reduce erosion on sloping land and also provide nitrogen and improve tilth for subsequent crops.

Minimizing tillage and leaving crop residues on the surface help increase infiltration and reduce the hazards of runoff and erosion. These practices can be adapted to most soils in the county, but they are more difficult to use successfully on the eroded soils with a clayey surface layer, such as the severely eroded Frederick soils. 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 soils in the county. It is more difficult to practice successfully, however, on the soils that have a clayey surface layer.

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

Contouring and contour stripcropping are best adapted to soils that have smooth, uniform slopes. Slopes are so short and irregular that contour tillage or terracing is not practical in most areas of the sloping Frederick soils. On these soils, a cropping system that provides substantial plant cover is required to control erosion unless minimum tillage is practiced.

Information on the design of erosion control practices for each kind of soil is contained in the Technical Guide available in local offices of the Soil Conservation Service.

Soil *drainage* is the major management need on about 5 percent of the acreage used for crops and pasture in the county. The poorly drained Melvin soils and the somewhat poorly drained Taft soils, without artificial drainage, are too wet for many crops. The design of drainage systems varies, however, with the kind of soil. A combination of surface drainage and tile drainage is needed in most areas of the poorly drained Melvin soils. Drains have to be more closely spaced in slowly permeable soils than in more permeable soils. Open ditch drainage is commonly more effective in the Taft soils, which have a fragipan.

Natural *fertility* is medium in most upland soils in the county, and they are naturally acid. The soils on flood plains, such as Ashton, Melvin, Nolin, and Skidmore soils, range from medium acid to mildly alkaline and are richer in plant nutrients than most upland soils. Many of the upland soils are very strongly acid in their natural state. If they have never been limed, applications of ground limestone are required to lower the acidity sufficiently for good growth of alfalfa and other crops that grow only on nearly neutral soils. Available phosphorus and potash are naturally low in most of upland soils. Additions of lime and fertilizer on any soil should be based on the results of soil tests, on the need of the crop, and on the desired 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 in the germination of seeds and in the infiltration of water into the soil. Soils with good tilth are granular and porous. Most of the soils used for crops in the county have a surface layer of silt loam that is light in color and moderate in content of *organic matter*.

Field crops suited to the soils and climate of the survey area include many that are not now commonly grown. Corn and soybeans and burley tobacco are the common row crops. Grain sorghum, sunflowers, potatoes, and similar crops can be grown.

Special crops grown commercially in the county are vegetables, small fruits, and tree fruits. A small acreage throughout the survey area is used for strawberries, sweet corn, tomatoes, peppers, and other vegetables and small fruits. In addition, large areas can be adapted to other special crops such as blueberries, grapes, and many vegetables. Apples and peaches are the most important tree fruits grown in the county.

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

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 (*14*). Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

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

Class I soils have few limitations that restrict their use.

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

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

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

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

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

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

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

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

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

The acreage of soils in each capability class and subclass is shown in table 6. The capability classification of each map unit is given in the section "Detailed soil map units."

woodland management and productivity

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

Forty-two percent of the land in Russell County is forested. An oak-hickory mixture is the most extensive forest type, covering approximately 58 percent of the 63,600 acres of commercial forest land in the county.

Most of the forest land is essentially unmanaged and is in small holdings that average about 24 acres each. Tree growth averages 33 cubic feet per acre per year; which is well below the 50 plus cubic feet potential of most forest land (*6, 7, 9, 10*).

Thirty percent of the landowners own forest land as part of a farm or larger tract. As a result, many stands are owned for short intervals, usually about 10 years, and are not well stocked with trees of high quality.

Tree growth, stocking, and quality can be improved with good management. This would involve removal of low quality trees in stands of all sizes as well as regeneration of sawtimber stands after harvest.

The wood-using industry in Russell County consists primarily of two commercial sawmills and two pallet mills. Products include rough lumber, dimension stock, crossties, tobacco sticks, charcoal wood, and pallets. Several mills in adjoining counties also purchase logs and standing trees.

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* (*5*). This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. Site index was determined at age 30 years for eastern cottonwood, 35 years for American sycamore, and 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

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

The wildlife in Russell County consists of an estimated 41 species of mammals, 46 species of reptiles and amphibians, and 108 species of breeding birds. More than 200 other kinds of birds visit Kentucky each year, and many of these can be found in the county during certain seasons.

The kinds of wildlife most important to man at present are game for sport hunting or commercial trapping. In Russell County these are cottontail, gray squirrel, fox squirrel, white-tailed deer, raccoon, red fox, mink, muskrat, bobwhite quail, mourning dove, and various kinds of ducks and geese.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants (*3*).

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

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

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

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

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

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

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

Coniferous plants furnish browse, 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, cedar, and hemlock.

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

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

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

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

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, shore birds, muskrat, mink, and beaver.

engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. 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, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

sanitary facilities

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

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and 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, and soil reaction affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

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

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

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

construction materials

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

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

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

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

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

of suitable material, but the material is less than 3 feet thick.

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

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

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

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

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

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

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

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

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

water management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

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

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

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

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders or organic matter. 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. Availability of drainage outlets is not considered in the ratings.

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

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

soil properties

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

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 19.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas (*16*). Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

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

engineering index properties

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

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

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 14.

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

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

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

physical and chemical properties

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

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 (*12*) 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.

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 or by runoff from adjacent slopes. 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 no more than once 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. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone. Only saturated zones within a depth of about 6 feet are indicated.

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.

physical and chemical analyses of selected soils

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

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods (*15*).

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

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

Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all materials less than 2 mm (3A1).
Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of materials less than 2 mm (3A1).
Organic carbon—dichromate, ferric sulfate titration(6A1a).
Extractable cations—ammonium acetate pH 7.0, uncorrected; calcium (6N2), magnesium (602), sodium (6P2), potassium (6Q2).
Extractable acidity—barium chloride-triethanolamine I (6H1a).
Cation-exchange capacity—ammonium acetate, pH 7.0 (5A1a).
Cation-exchange capacity—sum of cations (5A3a).
Base saturation—ammonium acetate, pH 7.0 (5C1).
Base saturation—sum of cations, TEA, pH 8.2 (5C3).
Reaction (pH)—1:1 water dilution (8C1a).
Reaction (pH)—potassium chloride (8C1c).
Available phosphorus—(procedure 656 of the Kentucky Agricultural Experiment Station).
Field sampling—site selection (1A1).
Field sampling—soil sampling (1A2).
Laboratory preparation—standard (airdry) material (1B1).
Particles—(specified size) 2 mm (2A2).
Particles—<2 mm (2A1).
Particles—greater than 2 mm by field or laboratory weighing (3B1a).
Extractable bases—(5B1a).
Exchangeable Acidity—(H+ Al) method of Yuan procedure 67-3.52, Part 2, methods of analysis, ASA, 1965.
Calcium Carbonate Equivalent—procedure (236b) USDA Handbook 60, USDA Salinity Laboratory 1954 (6N7).

engineering index test data

Table 19 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil series and their morphology." The soil samples were tested by the Division of Research, Bureau of Highways, Kentucky Department of Transportation.

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

The tests and methods are: AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM); California bearing ratio—T 193 (AASHTO), D 1883 (ASTM).

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*17*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 20, 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 Alfisol.

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 Udalf (*Ud*, meaning udic moisture regime, plus *alf*, from Alfisol).

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 *udalf*, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic 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 (*13*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*17*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Ashton series

The Ashton series consists of deep, well drained, moderately permeable soils on low stream terraces, mostly along the Cumberland River. They formed in mixed alluvium and are subject to rare flooding. Slopes range from 0 to 2 percent.

Ashton soils are associated with Elk, Melvin, and Nolin soils. Melvin and Nolin soils are on flood plains and do not have an argillic horizon. Melvin soils are poorly drained. Elk soils are on higher terraces and do not have a dark surface.

Typical pedon of Ashton silt loam, 1/4 mile south of the intersection of Millers Creek and Kentucky Highway 379 and 225 yards east of Millers Creek, 10 1/2 miles southwest of Jamestown:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; friable; few fine roots; slightly acid; clear smooth boundary.
B1—7 to 16 inches; brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable; few fine roots; slightly acid; gradual smooth boundary.
B2t—16 to 42 inches; brown (7.5YR 4/4) silt loam; weak fine subangular blocky structure; friable; few fine roots; few fine pores; few thin discontinuous clay films; slightly acid; clear smooth boundary.
C—42 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; massive; friable; slightly acid.

Solum thickness ranges from 40 to 60 inches. Depth to bedrock is more than 60 inches and is commonly many feet. Reaction ranges from medium acid to neutral.

The Ap horizon is less than 10 inches thick. It has hue of 10YR, value of 3, and chroma of 2 or 3.

The B1 horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 2 through 4.

The B2t horizon has hue of 7.5YR, value of 4 or 5, and chroma of 3 through 6. It is silt loam or silty clay loam.

Color and texture of the C horizon are like those of the B2t horizon except that the hue of 10YR is included, and textures include loam and fine sandy loam. Some pedons have few or common mottles in shades of gray below a depth of 36 inches.

Caneyville series

The Caneyville series consists of moderately deep, well drained soils that have moderately slow permeability. They formed in clayey residuum from limestone on convex ridgetops and side slopes, mostly in the southern half of the county. Slopes range from 6 to 50 percent but are dominantly 12 to 30 percent.

Caneyville soils are associated with Frederick, Garmon, and Gilpin soils. Frederick soils are deep over bedrock. Garmon soils do not have an argillic horizon. Gilpin soils have a fine-loamy control section.

Typical pedon of Caneyville silt loam, very rocky, 6 to 12 percent slopes, 1/4 mile southeast on Kentucky Highway 196 from Jabez; 3/4 mile east on gravel road; 100 yards east of gravel road; 10 miles east of Jamestown:

Ap—0 to 6 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; 7 to 9 percent chert fragments; moderately alkaline; abrupt smooth boundary.
B1—6 to 8 inches; yellowish brown (10YR 5/4) silt loam; weak subangular blocky structure; friable; common fine roots; few fine pores; 4 to 6 percent chert fragments; medium acid; clear smooth boundary.
B21t—8 to 17 inches; yellowish red (5YR 5/6) silty clay; moderate medium and fine angular blocky structure; firm; common fine roots; few fine pores; thin continuous clay films; few chert fragments; medium acid; clear smooth boundary.
B22t—17 to 32 inches; dark yellowish brown (10YR 4/4) silty clay; moderate medium angular blocky structure; firm; common fine roots; common fine pores; continuous clay films; few black concretions; slightly acid; abrupt smooth boundary.
R—32 inches; hard gray limestone.

Solum thickness and depth to bedrock ranges from 20 to 40 inches. Reaction ranges from very strongly acid to neutral in the upper part of the solum, except where limed, and medium acid to mildly alkaline in the lower part. Fragments of limestone, chert, or sandstone range from 0 to 10 percent.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 through 4. Some pedons have an A1 horizon with hue of 10YR or 7YR, value of 3 through 5, and chroma of 2 or 3.

The B1 horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 through 6. Texture is silt loam or silty clay loam.

The B21t horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 to 6. Texture is silty clay loam, silty clay, or clay.

The B22t horizon has hue of 2.5YR to 10YR, value of 4 or 5, and chroma of 4 through 6. Texture is silty clay or clay. Some pedons have mottles in shades of red, brown, or gray in the lower part.

Some pedons have a C horizon that is similar to the B22t in color and texture.

Colyer series

The Colyer series consists of shallow, well drained, slowly permeable soils on convex side slopes in the extreme northern and southwestern ends of the county. They formed in residuum from black, highly fissile acidic shales. Slopes range from 20 to 50 percent.

Colyer soils are associated with Garmon, Trimble, and Faywood soils. Garmon and Faywood soils are moderately deep over bedrock. Garmon and Trimble soils have fine-loamy control sections. Trimble soils are deep over bedrock.

Typical pedon of Colyer shaly silt loam, 20 to 50 percent slopes, south from Kentucky Highway 76 on gravel road 2 1/2 miles west of Dunnville to barn at end of road near Luttrell Creek; 150 yards northeast of barn; 12 1/2 miles north of Jamestown:

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) shaly silt loam; weak fine granular structure; friable; many

fine roots; 15 percent black shale fragments; slightly acid; clear smooth boundary.
B2—4 to 11 inches; brown (7.5YR 4/4) shaly silty clay loam; weak fine subangular blocky structure; firm; few fine roots; 40 percent black shale fragments; very strongly acid; abrupt smooth boundary.
C—11 to 18 inches; brown (7.5YR 4/4) very shaly silty clay; massive and relic shale structure; firm; 70 percent black shale fragments; extremely acid; clear smooth boundary.
R—18 inches; hard black shale.

Thickness of solum and depth to bedrock is 8 to 20 inches. Reaction is very strongly to extremely acid, unless limed. Content of shale fragments ranges from 15 to 35 percent in the Ap horizon, from 35 to 55 percent in the B2 horizon, and from 35 to 90 percent in the C horizon.

The Ap horizon has hue of 10YR, value of 4, and chroma of 2 or 3.

The B2 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 6. Texture of the fine earth is silty clay loam or silty clay.

The C horizon, where present, has colors like those of the B2 horizon, and some pedons have mottles in shades of gray or olive. Texture of the fine earth is silty clay or clay.

Elk series

The Elk series consists of deep, well drained soils that have moderate permeability. They formed in alluvium from soils that formed in residium from limestone, siltstone, shale, and sandstone. Elk soils are on stream terraces throughout the county. Slopes range from 2 to 12 percent, but are dominantly 6 to 12 percent.

Elk soils are associated with Ashton, Nolin, Taft, and Sango soils. Ashton soils have a dark brown A horizon. Nolin soils have no argillic horizon. Taft and Sango soils are more poorly drained and have a fragipan.

Typical pedon of Elk silt loam in an area of Elk silt loam, 2 to 6 percent slopes, 200 feet south of Kentucky Highway 379 and 1,100 feet west of Sycamore Creek; 11 miles southwest of Jamestown:

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common roots; medium acid; abrupt smooth boundary.
B1—9 to 12 inches; brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; few roots; strongly acid; clear smooth boundary.
B21t—12 to 26 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; few roots; thin patchy clay films; few fine soft black concretions; strongly acid; gradual smooth boundary.
B22t—26 to 45 inches; strong brown (7.5YR 5/6) silty clay loam; with common medium distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; firm; few roots; thin patchy clay films; few small black concretions; strongly acid; gradual smooth boundary.
C—45 to 60 inches; strong brown (7.5YR 5/6) silty clay loam; with common medium distinct pale brown (10YR 6/3) mottles; massive; firm; strongly acid.

Thickness of the solum is 40 to 60 inches. Depth to bedrock ranges from 5 to more than 10 feet. Reaction ranges from slightly acid through very strongly acid except where limed.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 through 4.

The B horizon 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. Some pedons have gray mottles in the lower part.

The color of the C horizon is like that of the B.

Faywood series

The Faywood series consists of moderately deep, well drained soils with moderately slow to slow permeability on side slopes near the Cumberland River. They formed in material weathered from interbedded limestone and shale. Slopes range from 12 to 30 percent.

Faywood soils are associated with Garmon and Woolper soils. Garmon soils have a fine-loamy control section. Woolper soils are deep over bedrock and have a dark A horizon.

Typical pedon of Faywood silt loam, 12 to 30 percent slopes, 1/2 mile south of Wolf Creek Dam; 2 miles northwest on Kentucky Highway 1730; 100 yards north of road and 100 yards south of Rock Lick Creek; 9 1/2 miles southwest of Jamestown:

Ap—0 to 5 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; medium acid; abrupt smooth boundary.
B21t—5 to 16 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; firm; few fine roots; thin continuous clay films; strongly acid; clear smooth boundary.
B22t—16 to 39 inches; yellowish brown (10YR 5/6) silty clay; moderate fine subangular blocky structure; firm; few fine roots; thin continuous clay films; few fine black concretions; few olive mottles in lower part; strongly acid; abrupt smooth boundary.
R—39 inches; limestone interbedded with calcareous shale.

Solum thickness and depth to bedrock ranges from 20 to 40 inches. Content of flagstones and channery fragments of limestone ranges from 0 to 15 percent in the solum and up to 25 percent in the C horizon. Reaction ranges from strongly acid to neutral throughout the profile.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3.

The B21t horizon has hue of 10YR, value of 4 or 5, and chroma of 5 or 6. Texture is silty clay loam or silty clay.

The B22t horizon has hue of 10YR, value of 4 or 5, and chroma of 5 or 6. Texture is silty clay or clay. A few olive mottles are in the lower part of this horizon.

Frederick series

The Frederick series consists of deep, well drained, moderately permeable soils on convex ridgetops and side slopes, mostly in the southern half of the county. They formed in clayey residuum from limestone with a small component of sandstone and shale. Slopes range from 2 to 20 percent, but are dominantly 6 to 12 percent.

Frederick soils are associated with Caneyville, Garmon, Gilpin, and Mountview soils. Caneyville, Garmon, and Gilpin soils are moderately deep over bedrock. Mountview soils contain less clay in the upper solum than do the Frederick soils.

Typical pedon of Frederick silt loam, 6 to 12 percent slopes, 4 miles south of the intersection of Kentucky Highways 619 and 1680, 500 yards west of Kentucky Highway 1680 on gravel road and 1 mile northwest of Cumberland Lake; 3 miles southeast of Jamestown:

Ap—0 to 10 inches; brown (7.5YR 4/4) silt loam; weak fine and very fine granular structure; very friable; common fine roots; strongly acid; abrupt smooth boundary.

B1—10 to 16 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky parting to moderate very fine angular blocky structure; friable; few fine roots; few thin patchy clay films; few small black bodies; strongly acid; clear smooth boundary.

B21t—16 to 27 inches; red (2.5YR 4/6) silty clay; common fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky parting to moderate fine angular blocky structure; firm; thin continuous clay films; few small chert fragments; strongly acid; gradual smooth boundary.

B22t—27 to 41 inches; red (2.5YR 4/6) clay; few medium distinct pinkish gray (5YR 6/2) mottles; moderate medium angular blocky parting to moderate very fine angular blocky structure; firm; thin continuous clay films; strongly acid; clear smooth boundary.

B23t—41 to 53 inches; red (2.5YR 4/6) clay; many medium distinct strong brown (7.5YR 5/6) and pinkish gray (5YR 6/2) mottles; moderate medium angular blocky parting to weak very fine angular blocky structure; firm; thin continuous clay films; five percent chert fragments; very strongly acid; gradual smooth boundary.

B24t—53 to 70 inches; mottled strong brown (7.5YR 5/6) and red (2.5YR 4/6) clay; moderate medium angular blocky structure; firm; slightly brittle; continuous strong brown and pinkish gray clay films on large peds; many thin red clay films on small peds; 15 percent chert fragments; very strongly acid.

Thickness of solum ranges from 60 to 80 inches. Depth to bedrock is more than 60 inches. Reaction is strongly or very strongly acid throughout the profile, unless limed. Content of coarse fragments—mostly chert—ranges from 0 to 20 percent throughout the profile.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 through 6. Texture is silt loam or silty clay loam.

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

The B2t horizon has hue of 2.5YR through 7.5YR, value of 4 or 5, and chroma of 6 through 8. Texture is silty clay loam through clay.

Garmon series

The Garmon series consists of moderately deep, well drained soils with moderately rapid permeability. They are on highly dissected hillsides throughout the county. They formed in residuum from shaly limestones, calcareous shales, and siltstones. Slopes range from 20 to 75 percent.

Garmon soils are associated with Caneyville, Frederick, Gilpin, and Trimble soils. All of these soils have an argillic horizon. Frederick and Trimble soils are deep over bedrock.

Typical pedon of Garmon channery silt loam in an area of Garmon-Caneyville association, very steep, 1 1/2 miles northwest of Jabez crossroads on gravel road; 75 feet south of road and 1,500 feet south of Cumberland Lake; 13 miles southeast of Jamestown:

O1—1/4 to 0 inches; partially decomposed leaf litter.

A1—0 to 2 inches; brown (10YR 5/3) channery silt loam; weak fine granular structure; very friable; many fine roots; 15 percent thin flat sandstone fragments; very strongly acid; abrupt smooth boundary.

B21—2 to 12 inches; light yellowish brown (10YR 6/4) channery silt loam; weak fine and medium subangular blocky structure; friable; common, fine roots; 15 percent thin flat sandstone fragments; strongly acid; clear smooth boundary.

B22—12 to 26 inches; yellowish brown (10YR 5/4) channery silt loam; weak medium subangular blocky structure; friable; few fine roots; 20 percent thin flat sandstone fragments; medium acid; abrupt smooth boundary.

R—26 inches; siltstone.

Thickness of solum and depth to bedrock ranges from 20 to 40 inches. Reaction ranges from very strongly acid to neutral. Content of coarse fragments of shale, siltstone, and limestone ranges from 10 to 45 percent throughout the profile, and the weighted average in the control section is 10 to 35 percent.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. Texture of the fine earth is loam or silt loam.

The B2 horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 4 through 6. Texture of the fine earth is loam, silt loam, or silty clay loam.

Gilpin series

The Gilpin series consists of moderately deep, well drained, moderately permeable soils on convex ridgetops and side slopes throughout the county. They formed in residuum from interbedded acid siltstone, shale, and sandstone. Slopes range from 2 to 20 percent, but are dominantly 6 to 12 percent.

Gilpin soils are associated with Frederick, Garmon, Sango, and Lonewood soils. Frederick, Sango, and Lonewood soils are deep over bedrock. Frederick soils have more clay throughout the solum. Sango soils have a fragipan. Garmon soils do not have an argillic horizon.

Typical pedon of Gilpin silt loam, 6 to 12 percent slopes, 1 mile north on Kentucky Highway 1545 from junction with Kentucky Highway 80; 400 yards east of road; 7 miles north of Jamestown:

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; about 5 percent sandstone fragments; common fine roots; neutral; abrupt smooth boundary.

B21t—9 to 20 inches; brown (7.5YR 5/4) channery silt loam; weak fine subangular blocky structure; friable; few patchy clay films on peds; about 15 percent sandstone fragments; few fine roots; few fine pores; strongly acid; clear smooth boundary.

B22t—20 to 25 inches; yellowish brown (10YR 5/6) channery silt loam; weak fine subangular blocky structure; friable; few patchy clay films on peds; about 30 percent sandstone fragments; few fine roots; strongly acid; clear smooth boundary.

C—25 to 30 inches; yellowish brown (10YR 5/6) very channery silty clay loam; massive; about 80 percent sandstone fragments; strongly acid; abrupt smooth boundary.

R—30 inches; soft sandstone bedrock.

Thickness of solum ranges from 20 to 36 inches. Depth to bedrock ranges from 20 to 40 inches. Content of sandstone and siltstone fragments ranges from 5 to 40 percent in the solum and from 30 to 90 percent in the C horizon. Reaction ranges from strongly to extremely acid, unless limed.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Texture of the fine earth is silt loam or loam.

The B21t horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 through 6. Texture of the fine earth is silt loam or silty clay loam.

The B22t horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 through 8. Texture of the fine earth is silt loam or silty clay loam.

The C horizon has color and texture like that of the B22t.

Lonewood series

The Lonewood series consists of deep, well drained, moderately permeable soils on smooth convex ridgetops and side slopes mostly in the northern half of the county. They formed in silty material from loess and from fine grained sandstone and siltstone. Slopes range from 2 to 12 percent, but are dominantly 2 to 6 percent.

Lonewood soils are associated with the Gilpin, Taft, Mountview, and Sango soils. Gilpin soils are moderately deep over bedrock. Mountview soils contain more clay in the lower solum. Taft and Sango soils are more poorly drained and have a fragipan.

Typical pedon of Lonewood loam, 2 to 6 percent slopes, 2 miles north of Webbs Crossroads, turn northwest to end of gravel road, 250 yards northeast of house trailer at end of road; 13 miles north of Jamestown:

Ap—0 to 7 inches; brown (10YR 5/3) loam; weak fine granular structure; very friable; common fine roots; strongly acid; abrupt smooth boundary.

B1—7 to 14 inches; yellowish brown (10YR 5/4) loam; weak fine and medium subangular blocky; very friable; common fine roots; few fine tubular pores; few channels, cracks and pores filled with materials like the Ap horizon; strongly acid; clear smooth boundary.

B21t—14 to 26 inches; yellowish brown (10YR 5/6) loam; moderate medium subangular blocky structure; friable; few fine roots; few fine tubular pores; few thin distinct clay films; very strongly acid; clear wavy boundary.

B22t—26 to 45 inches; yellowish brown (10YR 5/4); loam; common medium distinct very pale brown (10YR 7/3) mottles; moderate medium subangular blocky structure; firm; slightly brittle; 10 percent by volume very firm and brittle with strong brown mottles; few fine roots and tubular pores; thin discontinuous clay films on peds, continuous in some pores; very strongly acid; abrupt wavy boundary.

Cr1—45 to 64 inches; red (2.5YR 4/6) soft sandstone; yellowish brown clay films between 10-20 mm thick layers of the soft sandstone that crushes to a sandy

clay loam; very strongly acid; clear smooth boundary.
Cr2—64 to 84 inches; red, yellow, and gray soft sandstone; crushes to a sandy clay loam.

Thickness of solum ranges from 40 to 65 inches. Depth to soft bedrock is 3 1/2 to more than 6 feet. Reaction is strongly or very strongly acid except where limed. Content of sandstone and chert fragments ranges from 0 to 10 percent in the solum and from 0 to 70 percent in the C horizon.

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

The B1 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 6. Texture is silt loam or loam.

The B2t horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 8. Some pedons have hue of 5YR in the lower part. They have few to common mottles in shades of brown and yellow in the lower part. Texture is silt loam, loam, or silty clay loam.

The Cr horizon has hue of 7.5YR through 2.5YR, value of 4 or 5, and chroma of 4 through 6. Texture of the fine earth is silt loam, silty clay loam, or sandy clay loam.

In Russell County, Lonewood soils have a Cr horizon, hue of 10YR in the lower part of the B2t horizon, and hard bedrock below a depth of 72 inches. They are considered taxadjuncts to the Lonewood series. Use and management of the soils are the same.

Melvin series

The Melvin series consists of deep, poorly drained, moderately permeable soils on flood plains throughout the county. They formed in alluvium and are subject to occasional flooding. The water table is within a foot of the surface in late winter and early spring. Slopes range from 0 to 2 percent.

Melvin soils are associated with Ashton, Elk, and Nolin soils. All of these are well drained. Ashton and Elk soils have an argillic horizon.

Typical pedon of Melvin silt loam, 70 yards south of Mt. Olive Creek and 200 yards west of Kentucky Highway 1729; 8 miles northwest of Jamestown:

Ap—0 to 8 inches; dark gray (10YR 4/1) silt loam; weak fine granular structure; friable; common dark reddish brown (5YR 3/4) organic stains in old root channels; common fine roots; few small soft brown concretions; slightly acid; abrupt smooth boundary.
B2g—8 to 27 inches; mottled gray (10YR 5/1) and dark gray (10YR 4/1) silt loam; few fine faint pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; common fine roots; few fine pores; few small soft brown concretions; slightly acid; gradual boundary.
Cg—27 to 60 inches; mottled gray (10YR 5/1) and dark gray (10YR 4/1) silt loam; massive; friable; slightly acid.

Thickness of the solum ranges from 20 to 40 inches. Depth to bedrock is more than 60 inches. Reaction ranges from slightly acid to neutral throughout the profile.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 through 3.

The B2g horizon has hue of 10YR, 2.5Y, or N; value of 4 through 6; and chroma of 2 or less. Mottles are few to many in shades of brown and gray. Texture is silt loam or silty clay loam.

The Cg horizon has color and texture like the B2g.

Mountview series

The Mountview series consists of deep, well drained, moderately permeable soils on smooth convex ridgetops and side slopes, mostly in the southern half of the county. They formed in a loess mantle 2 to 3 feet thick and in clayey residuum from cherty limestone. Slopes range from 2 to 12 percent, but are dominantly 6 to 12 percent.

Mountview soils are associated with Frederick, Garmon, Gilpin, and Lonewood soils. Frederick soils have more clay and are redder in the upper solum. Garmon and Gilpin soils are moderately deep over bedrock, and Garmon soils do not have an argillic horizon. Lonewood soils have less clay in the lower solum than do the Mountview soils.

Typical pedon of Mountview silt loam, 2 to 6 percent slopes, 1/4 mile southeast of Jabez on Kentucky Highway 196; 1/2 mile northeast on gravel road and 100 yards south of road; 10 1/4 miles east of Jamestown:

Ap—0 to 9 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.
B21t—9 to 28 inches; strong brown (7.5YR 5/6) silty clay loam; weak fine subangular blocky structure; friable; few fine roots; patchy clay films; strongly acid; gradual smooth boundary.
IIB22t—28 to 36 inches; red (2.5YR 4/6) silty clay; moderate fine angular blocky structure; firm; continuous clay films; about 10 percent light brown (7.5YR 6/4) chert fragments; strongly acid; gradual smooth boundary.
IIB23t—36 to 65 inches; red (2.5YR 4/6) silty clay; moderate fine and medium angular blocky structure; very firm; continuous clay films; about 5 percent quartz grains; about 5 percent small chert fragments; strongly acid.

Thickness of the solum and depth to bedrock is more than 60 inches. The upper part of the solum, which is formed in a silty mantle, ranges from 22 to 36 inches.

The lower solum is developed in clayey residium from cherty limestone. Content of chert and sandstone fragments ranges from 0 to 5 percent in the upper solum and from 5 to 30 percent in the lower solum. Reaction is strongly or very strongly acid except where limed.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4.

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

The IIB2t horizon has hue of 5YR or 2.5YR, value of 3 through 5, and chroma of 6. Some pedons contain few or common mottles in shades of brown and gray in the lower part. Texture is silty clay loam or silty clay.

In Russell County, the Mountview soils are in the mesic temperature zone and have more sand in the 2- to 10-mm size than is defined for the series. They are considered taxadjuncts to the Mountview series. Use and management of the soils are the same.

Nolin series

The Nolin series consists of deep, well drained, moderately permeable soils on flood plains throughout the county. They formed in alluvium and are subject to occasional flooding. Slopes range from 0 to 2 percent.

Nolin soils are associated with Ashton, Elk, and Melvin soils. Ashton soils are on low terraces and have an argillic horizon and a darker A horizon. Elk soils are on stream terraces and have an argillic horizon. Melvin soils are poorly drained.

Typical pedon of Nolin silt loam, 200 feet south of Kentucky Highway 379 and 100 feet west of Miller's Creek, 10 miles southwest of Jamestown:

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

B2—8 to 42 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; friable; few roots; slightly acid; gradual smooth boundary.

C—42 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; massive; friable; few small soft black concretions; few fine pebbles; neutral.

Thickness of the solum is more than 40 inches. Depth to bedrock is more than 60 inches. Reaction ranges from medium acid to moderately alkaline.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The B2 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. Some pedons contain few or common gray mottles below a depth of 24 inches. Texture is silt loam or silty clay loam.

The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 through 4. Texture is silt loam or silty clay loam.

Nolin Variant

The Nolin Variant consists of deep, well drained soils that are moderately rapidly permeable. They are on flood plains throughout the county. They formed in alluvium washed from soils that formed in residium from sandstone and shale and are subject to occasional flooding. Slopes range from 0 to 2 percent.

These soils are associated with Ashton, Melvin, Nolin, and Skidmore soils. Ashton, Melvin, and Nolin soils contain less sand. Ashton soils have an argillic horizon and Melvin soils are poorly drained. Skidmore soils contain more coarse fragments.

Typical pedon of Nolin Variant fine sandy loam, 1/4 mile south of the intersection of Millers Creek and Kentucky Highway 379, 440 yards east of Millers Creek, 10 1/4 miles southwest of Jamestown:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

B2—8 to 42 inches; brown (10YR 4/3) fine sandy loam; weak coarse subangular blocky structure; friable; few fine roots; few organic stains in pores; few worm casts; medium acid; gradual boundary.

C—42 to 60 inches; brown (10YR 4/3) fine sandy loam; massive; friable; few fine roots; medium acid.

Thickness of the solum is more than 40 inches. Depth to bedrock is more than 60 inches. Reaction ranges from medium acid to neutral. Content of coarse fragments ranges from 0 to 15 percent.

The Ap horizon has a hue of 10YR, value of 4, and chroma of 2 or 3. Texture is fine sandy loam or loam.

The B2 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. Texture is fine sandy loam or loam.

The C horizon has color and texture similar to that of the B2 horizon.

Sango series

The Sango series consists of deep, moderately well drained soils that have a slowly permeable fragipan. They are on smooth ridgetops and stream terraces throughout the county. They formed in loamy residuum from acid siltstone, fine grained sandstone, or in old alluvium. They have a water table at a depth of 2 to 3 feet in late winter and early spring. Slopes range from 1 to 4 percent.

Sango soils are associated with Elk, Gilpin, Taft, and Lonewood soils. Elk, Gilpin, and Lonewood soils are well drained and do not have a fragipan. Gilpin soils are moderately deep over bedrock. Taft soils are somewhat poorly drained.

Typical pedon of Sango silt loam, 1 to 4 percent slopes, 1/2 mile north on US Highway 127 from Webbs

Crossroads; 1/2 mile northwest on blacktop road; 1 mile west on gravel road to barn at end of road; 100 yards west of road; 11 miles north of Jamestown:

Ap—0 to 4 inches; grayish brown (10YR 5/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine granular structure; very friable; many fine roots; common fine pores, some coated with the yellowish brown iron accumulations; extremely acid; abrupt smooth boundary.

A2—4 to 8 inches; light yellowish brown (10YR 6/4) silt loam; few fine faint mottles of yellowish brown (10YR 5/6); weak medium subangular blocky structure; very friable; common fine roots; common very fine and fine continuous tubular pores; few yellowish brown (10YR 5/6) coatings of iron accumulations in the pores; extremely acid; clear smooth boundary.

B2—8 to 26 inches; brownish yellow (10YR 6/6) silt loam; few fine faint mottles of yellowish brown (10YR 5/6); weak medium subangular blocky structure; very friable; few fine roots; common fine continuous tubular pores; thin discontinuous silt coats of light yellowish brown (10YR 6/4); extremely acid; clear wavy boundary.

Bx—26 to 62 inches; yellowish brown (10YR 5/6) silt loam; few fine distinct light brownish gray (10YR 6/2) mottles; moderate very coarse prismatic parting to weak and moderate fine to coarse subangular and angular blocky structure; very firm and brittle; 5-15 mm of light gray silty clay loam between the prisms; few fine and very fine discontinuous tubular pores; thin continuous clay films on some blocky peds, some are dark grayish brown (10YR 4/2); few discontinuous thin manganese coatings on blocky peds; extremely acid; clear wavy boundary.

B2t—62 to 94 inches; reddish yellow (7.5YR 6/6) silty clay loam; few fine and medium distinct mottles of light gray (10YR 7/2) and yellowish red (5YR 5/8); moderate very coarse prismatic parting to moderate fine and medium subangular blocky and angular blocky structure; firm; 5-15 mm thick light gray (10YR 6/1) silty clay loam between prisms; firm; few fine discontinuous tubular pores; few thick continuous clay films on some blocks; thin manganese coatings on a few blocks; extremely acid.

Thickness of solum ranges from 40 to more than 60 inches. Depth to bedrock is more than 60 inches. Depth to the fragipan ranges from 20 to 34 inches. Content of coarse fragments of sandstone ranges from 0 to 5 percent in the solum and up to 25 percent in the C horizon. Reaction is strongly acid or very strongly acid, unless limed.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The A2 horizon has hue of 10YR, value of 4 or 6, and chroma of 2 through 4.

The B2 horizon has hue of 10YR, value of 5 or 6, and chroma of 4 through 6.

The Bx horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 through 6. Mottles are in shades of brown, if the matrix is gray, or in shades of gray, if the matrix is brown. They are sometimes equally in shades of gray and brown. Texture is silt loam or silty clay loam.

The B2t horizon has hue of 10YR through 5YR, value of 5 or 6, and chroma of 4 through 6. Mottles are in shades of gray, yellow, brown, or red. Texture is silt loam or silty clay loam.

In Russell County, the Sango soils are in the mesic temperature zone, range to a minimum of 20 inches in depth to the fragipan, have no lithologic discontinuity, and are formed chiefly in siltstone and sandstone in the lower part of the profile. They are considered taxadjuncts to the Sango series. Use and management of the soils are the same.

Skidmore series

The Skidmore series consists of deep, well drained soils that have moderately rapid permeability. They are on flood plains throughout the county. They formed in alluvium washed from soils formed in acid sandstone and siltstone and are subject to occasional flooding. Slopes range from 0 to 2 percent.

Skidmore soils are associated with Melvin, Nolin, and Trimble soils. Melvin and Nolin soils do not have the coarse fragments associated with the Skidmore soils. Melvin soils are poorly drained. Trimble soils are formed in colluvial material on foot slopes and have an argillic horizon.

Typical pedon of Skidmore gravelly loam, 30 yards south of Kentucky Highway 76 and 30 yards west of Little Goose Creek; 8 miles north of Jamestown:

Ap—0 to 10 inches; brown (10YR 4/3) gravelly loam; weak fine granular structure; friable; many fine roots; 25 percent gravel; medium acid; abrupt smooth boundary.

B2—10 to 28 inches; brown (10YR 4/3) gravelly sandy loam; weak fine subangular blocky structure; friable; few fine roots; 40 percent gravel; neutral; gradual boundary.

C—28 to 60 inches; brown (10YR 4/3) very gravelly loam; massive; friable; 75 percent gravel; neutral.

Thickness of the solum ranges from 20 to 40 inches. Depth to bedrock is more than 40 inches. The content of coarse fragments of sandstone and siltstone ranges from 10 to 40 percent in the A horizon and upper half of the B horizon and from 35 to 90 percent in the lower half of the B horizon and in the C horizon. The weighted average content of coarse fragments in the control section ranges from 35 to 50 percent. Reaction ranges from medium acid to mildly alkaline.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6. Some pedons have few or common gray mottles in the lower part. Texture of the fine earth is loam or sandy loam.

The color and texture of the C horizon are like those of the B horizon.

Taft series

The Taft series consists of deep, somewhat poorly drained, slowly permeable soils on stream terraces and concave upland areas throughout the county. They formed in old mixed alluvium or in residuum from siltstone or sandstone. They have a water table at a depth of 1 to 2 feet in late winter and early spring. Slopes range from 0 to 2 percent.

Taft soils are associated with Melvin, Sango, and Lonewood soils. Melvin and Lonewood soils do not have a fragipan and Melvin soils are on flood plains. Sango soils are better drained than Taft soils.

Typical pedon of Taft silt loam, 1 mile east of Sango on blacktop road; 130 yards southwest of road; 9 miles northwest of Jamestown:

Ap—0 to 7 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; friable; common strong brown (7.5YR 5/6) organic stains on peds and in pores; common fine roots; medium acid; abrupt smooth boundary.

B21t—7 to 17 inches; yellowish brown (10YR 5/4) silt loam; many fine distinct mottles of light brownish gray (10YR 6/2); moderate fine angular blocky structure; friable; few fine roots; many fine pores; clay films in pores; few small soft brown concretions; very strongly acid; clear smooth boundary.

B22t—17 to 31 inches; brown (10YR 5/3) silt loam; many fine distinct mottles of light brownish gray (10YR 6/2); moderate fine angular blocky structure; firm; few fine roots; few fine pores; thin discontinuous clay films; few clean sand grains; few small soft brown concretions; strongly acid; clear smooth boundary.

Bx—31 to 60 inches; light brownish gray (10YR 6/2) silt loam; common fine distinct mottles of brown (10YR 5/3) and yellowish brown (10YR 5/6); very coarse prismatic structure parting to moderate fine angular blocky; firm compact and brittle; few small pores; thin discontinuous clay films; few clean sand grains between prisms; few soft brown concretions; very strongly acid.

Thickness of the solum ranges from 50 to more than 60 inches. Depth to bedrock is more than 60 inches. Depth to the fragipan ranges from 20 to 36 inches. Reaction is strongly or very strongly acid, unless limed.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The B2t horizon has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 3 or 4 with few to many mottles of 2 or lower chroma. Texture is silt loam or silty clay loam.

The Bx horizon has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 1 through 6 in both matrix and mottle colors. Texture is silt loam or silty clay loam.

Trimble series

The Trimble series consists of deep, well drained, moderately permeable soils on convex toe slopes throughout the county. They formed in colluvial material washed from siltstone and sandstone soils. Slopes range from 6 to 20 percent, but are dominantly 12 to 20 percent.

Trimble soils are associated with Garmon and Skidmore soils. Skidmore soils are on flood plains. Garmon soils are moderately deep over bedrock. Neither of these soils has an argillic horizon.

Typical pedon of Trimble channery silt loam, 12 to 20 percent slopes, 2 1/2 miles west of Dunnville on Kentucky Highway 76; south on gravel road to barn at end of road; 550 yards southeast of barn; 13 miles north of Jamestown:

A1—0 to 3 inches; dark grayish brown (10YR 4/2) channery silt loam; weak fine granular structure; friable; many roots; 15 to 20 percent sandstone and chert fragments; medium acid; abrupt smooth boundary.

A2—3 to 5 inches; pale brown (10YR 6/3) channery silt loam; weak fine subangular blocky structure; friable; many roots; 15 to 20 percent sandstone and chert fragments; medium acid; clear smooth boundary.

B21t—5 to 15 inches; brown (7.5Y 5/4) channery silt loam; moderate fine and medium subangular blocky structure; firm; few roots; 30 to 35 percent sandstone and chert fragments; very strongly acid; clear smooth boundary.

B22t—15 to 45 inches; yellowish brown (10YR 5/4) channery silty clay loam with many fine faint pale brown (10YR 6/3) and few fine distinct gray (10YR 6/1) mottles; moderate fine and medium subangular blocky structure; firm; 40 to 50 percent sandstone and chert fragments; few roots; very strongly acid; gradual smooth boundary.

C—45 to 60 inches; yellowish brown (10YR 5/4) very channery silty clay loam; massive 50 to 55 percent sandstone and chert fragments; very strongly acid.

Thickness of solum is more than 40 inches and depth to bedrock is more than 60 inches. Content of chert, sandstone, and siltstone coarse fragments range from 15 to 35 percent in the Ap horizon and upper part of the B horizon and from 15 to 55 percent in the lower B and

C horizons. Reaction ranges from strongly to extremely acid except where limed.

The Ap and A2 horizons have hue of 10YR, value of 4 or 6, and chroma of 2 or 3.

The B2t horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 through 6. Some pedons contain mottles in shades of brown and yellow in the lower part. Texture of the fine earth is silt loam or silty clay loam.

The C horizon, where present, has hue of 10YR, value of 5, and chroma of 4 through 6.

In Russell County, the Trimble soils have a thinner solum and contain more coarse fragments in the lower part than defined for the series. They are considered taxadjuncts to the Trimble series. Use and management of the soils are the same.

Woolper series

The Woolper series consists of deep, well drained soils that have moderately slow permeability. They formed in colluvium washed from soils of limestone origin. They are on convex foot slopes and alluvial fans with slopes of 6 to 12 percent in the southwestern corner of the county.

Woolper soils are associated with Elk, Faywood, Taft, Melvin, Nolin, and Sango soils. Elk, Taft, Melvin, Nolin, and Sango soils have a fine-silty control section. The Faywood soils are more shallow over bedrock. None of the associated soils have a mollic epipedon.

Typical pedon of Woolper silty clay loam, 6 to 12 percent slopes, 75 yards north of Crocus Creek at a point 1/2 mile east of Adair County line; 8 1/2 miles west of Jamestown.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silty clay loam; weak fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

B21t—8 to 21 inches; very dark grayish brown (10YR 3/2) silty clay loam; weak medium coarse subangular blocky parting to moderate fine subangular blocky structure; friable; few fine roots; few fine pores; thin continuous clay films; few scattered shale fragments; neutral; gradual smooth boundary.

B22t—21 to 30 inches; brown (10YR 4/3) silty clay; weak medium and coarse prismatic parting to moderate medium and fine subangular blocky structure; firm; few fine roots; few fine pores; continuous clay films; few soft brown concretions; few shale fragments; neutral; gradual smooth boundary.

B3t—30 to 49 inches; brown (10YR 4/3) silty clay; weak medium and coarse subangular blocky structure; firm; few fine roots; few fine pores; few patchy clay films; few brown concretions; few shale fragments; neutral; gradual smooth boundary.

C—49 to 60 inches; dark yellowish brown (10YR 4/4) silty clay; massive structure; few small brown concretions; neutral.

Thickness of solum ranges from 40 to 60 inches. Depth to bedrock is more than 60 inches. Reaction is slightly acid to mildly alkaline throughout the profile. The mollic epipedon ranges from 10 to 24 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 2 or 3. Texture is silt loam or silty clay loam.

The B21t horizon has hue of 10YR, value of 2 or 3, and chroma of 2 or 3. Texture is silty clay loam, silty clay, or clay.

The B22t and B3t horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. Texture is silty clay or clay.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 4 through 6. Texture is silty clay or clay.

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glossary

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

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	less than 2.4
Low	2.4 to 3.27
Moderate	3.2 to 5.2
High	more than 5.2

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

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

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

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

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

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

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

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

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

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.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

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

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

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

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

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

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

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

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

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

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

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

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

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

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

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

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

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

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.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

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

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

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

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.

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.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

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

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

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Narrow-base terrace. A terrace no more than 4 to 8 feet wide at the base. A narrow-base terrace is similar to a broad-base terrace, except for the width of the ridge and channel.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of 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.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified

size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. 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 loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

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.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

tables

TABLE 1--TEMPERATURE AND PRECIPITATION

[Based on data recorded in the period 1951-76 at Somerset, 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	In	In	In	In		In
January----	45.5	25.3	35.4	70	-12	13	4.50	2.34	6.26	9	4.1
February---	49.3	27.3	38.3	72	-6	26	4.29	2.12	6.05	8	2.3
March------	57.5	34.2	45.9	80	12	102	5.23	2.83	7.18	10	.8
April------	68.9	43.7	56.3	86	23	208	4.39	2.65	5.94	9	.0
May--------	76.8	51.7	64.3	90	30	443	4.39	2.59	5.99	9	.0
June-------	83.4	59.5	71.5	94	43	645	4.56	2.88	6.07	8	.0
July-------	86.4	63.2	74.8	95	47	769	4.78	2.48	6.66	9	.0
August-----	85.8	61.8	73.9	95	47	741	3.64	2.04	4.95	6	.0
September--	80.6	55.7	68.1	94	36	543	3.73	1.83	5.28	6	.0
October----	70.5	43.6	57.1	87	22	238	2.45	1.07	3.60	5	.0
November---	56.9	34.0	45.5	79	11	30	3.59	2.08	4.82	7	.8
December---	48.0	28.0	38.0	71	-1	25	4.37	1.91	6.36	8	1.5
Yearly:											
Average--	67.5	44.0	55.8	---	---	---	---	---	---	---	---
Extreme--	---	---	---	97	-15	---	---	---	---	---	---
Total----	---	---	---	---	---	3,783	49.92	43.85	55.83	94	9.5

[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

[Based on data recorded in the period 1951-76 at Somerset, 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 14	April 30	May 11
2 years in 10 later than--	April 8	April 23	May 5
5 years in 10 later than--	March 28	April 11	April 22
First freezing temperature in fall:			
1 year in 10 earlier than--	October 24	October 11	October 4
2 years in 10 earlier than--	October 28	October 16	October 8
5 years in 10 earlier than--	November 5	October 24	October 17

TABLE 3.--GROWING SEASON LENGTH

[Based on data recorded in the period 1951-76 at Somerset, 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	203	174	154
8 years in 10	209	181	162
5 years in 10	221	196	177
2 years in 10	233	210	192
1 year in 10	239	217	200

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Ab	Ashton silt loam	440	0.3
CaC	Caneyville silt loam, very rocky, 6 to 12 percent slopes	540	0.4
CGE	Caneyville-Garmon association, steep	14,150	9.3
CoE	Colyer shaly silt loam, 20 to 50 percent slopes	240	0.2
EkB	Elk silt loam, 2 to 6 percent slopes	320	0.2
EkC	Elk silt loam, 6 to 12 percent slopes	710	0.5
FwE	Faywood silt loam, 12 to 30 percent slopes	1,320	0.9
FeB	Frederick silt loam, 2 to 6 percent slopes	720	0.5
FeC	Frederick silt loam, 6 to 12 percent slopes	12,750	8.4
FeD	Frederick silt loam, 12 to 20 percent slopes	7,680	5.0
FrC3	Frederick silty clay loam, 6 to 12 percent slopes, severely eroded	750	0.5
GCF	Garmon-Caneyville association, very steep	35,610	23.3
GpB	Gilpin silt loam, 2 to 6 percent slopes	620	0.4
GpC	Gilpin silt loam, 6 to 12 percent slopes	17,280	11.2
GpD	Gilpin silt loam, 12 to 20 percent slopes	8,910	5.8
LoB	Lonewood loam, 2 to 6 percent slopes	15,720	10.3
LoC	Lonewood loam, 6 to 12 percent slopes	4,270	2.8
Me	Melvin silt loam	2,370	1.6
MoB	Mountview silt loam, 2 to 6 percent slopes	4,560	3.0
MoC	Mountview silt loam, 6 to 12 percent slopes	8,080	5.2
No	Nolin silt loam	1,630	1.1
Nv	Nolin Variant fine sandy loam	930	0.6
SaB	Sango silt loam, 1 to 4 percent slopes	7,970	5.2
Sk	Skidmore gravelly loam	1,510	1.0
Ta	Taft silt loam	1,640	1.1
TrC	Trimble channery silt loam, 6 to 12 percent slopes	240	0.2
TrD	Trimble channery silt loam, 12 to 20 percent slopes	470	0.3
Ud	Udorthents, undulating	260	0.2
WoC	Woolper silty clay loam, 6 to 12 percent slopes	670	0.4
	Small water areas (less than 40 acres)	150	0.1
	Total land area	152,510	100.0
	Large water areas	27,968	--
	Total area	180,478	--

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*
Ab---------- Ashton	140	50	45	3,200	5.0	9.5
CaC**---------- Caneyville	---	---	---	---	3.5	6.5
CGE**:						
Caneyville----------	---	---	---	---	---	5.0
Garmon----------	---	---	---	---	---	3.0
CoE---------- Colyer	---	---	---	---	---	2.5
EkB---------- Elk	125	45	45	3,200	4.5	9.0
EkC---------- Elk	110	40	35	2,900	4.0	8.0
FwE---------- Faywood	---	---	---	---	---	4.0
FeB---------- Frederick	125	45	---	2,400	4.0	8.0
FeC---------- Frederick	120	40	---	2,250	3.5	7.0
FeD---------- Frederick	110	35	---	---	3.5	7.0
FrC3---------- Frederick	90	30	---	---	3.0	6.5
GCF**:						
Garmon----------	---	---	---	---	---	---
Caneyville.						
GpB---------- Gilpin	90	40	---	2,200	3.0	6.5
GpC---------- Gilpin	85	35	---	2,100	3.0	6.5
GpD---------- Gilpin	80	30	---	---	2.5	6.0
LoB---------- Lonewood	110	50	35	2,300	3.5	7.0
LoC---------- Lonewood	90	45	30	2,200	3.0	6.0
Me---------- Melvin	80	---	35	---	3.5	7.0
MoB---------- Mountview	110	50	40	2,400	3.5	7.0
MoC---------- Mountview	90	50	35	2,250	3.0	6.0

See footnote 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*
No---------- Nolin	135	45	45	3,300	4.5	8.5
Nv---------- Nolin Variant	110	---	30	---	4.0	8.0
SaB---------- Sango	75	40	35	2,000	3.5	7.0
Sk---------- Skidmore	70	30	30	---	2.5	6.0
Ta---------- Taft	60	30	35	---	---	4.0
TrC---------- Trimble	90	40	30	2,400	3.0	6.0
TrD---------- Trimble	70	35	25	2,200	2.5	5.0
Ud**. Udorthents						
WoC---------- Woolper	110	40	35	2,600	3.5	7.0

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	3,000	---	---	---	---
II	31,420	21,940	7,970	1,510	---
III	48,010	44,000	4,010	---	---
IV	17,810	17,810	---	---	---
V	---	---	---	---	---
VI	1,860	1,320	---	540	---
VII	50,000	---	---	50,000	---
VIII	---	---	---	---	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
Ab Ashton	1o	Slight	Slight	Slight	Severe	Northern red oak Pin oak Yellow-poplar Sweetgum Shumard oak	85 103 95 77 94	Eastern white pine, yellow-poplar, black walnut, sweetgum, cherrybark oak.
CaC Caneyville	3c	Moderate	Moderate	Slight	Moderate	Northern red oak Yellow-poplar Eastern redcedar	69 80 45	Eastern redcedar, Virginia pine, eastern white pine, loblolly pine.
CGE*:								
Caneyville (north aspect)	2x	Severe	Severe	Slight	Severe	Yellow-poplar Black oak	90 69	Yellow-poplar, black walnut, Virginia pine.
Garmon	4x	Slight	Moderate	Slight	Slight	Northern red oak Virginia pine Eastern redcedar	67 65 38	Shortleaf pine, Virginia pine, eastern redcedar, loblolly pine, eastern white pine.
Caneyville (south aspect)	3x	Severe	Severe	Moderate	Moderate	Scarlet oak Eastern redcedar	51 34	Eastern redcedar, Virginia pine, eastern white pine, shortleaf pine, loblolly pine.
CoE Colyer (north aspect)	4d	Moderate	Moderate	Moderate	Slight	Scarlet oak Virginia pine	64 58	Virginia pine, shortleaf pine, eastern white pine.
Colyer (south aspect)	5d	Moderate	Moderate	Severe	Slight	Scarlet oak Virginia pine	54 52	Virginia pine, shortleaf pine, eastern white pine.
EkB, EkC Elk	2o	Slight	Slight	Slight	Severe	Northern red oak Yellow-poplar Shortleaf pine Eastern white pine	80 90 80 90	Eastern white pine, yellow-poplar, black walnut, loblolly pine.
FwE Faywood	3c	Moderate	Severe	Slight	Moderate	Northern red oak Eastern white pine Virginia pine	70 70 70	Shortleaf pine, loblolly pine, eastern white pine, black locust, eastern redcedar.
FeB, FeC Frederick	2c	Slight	Moderate	Slight	Severe	Northern red oak Yellow-poplar Black locust White oak Black walnut	76 86 --- --- ---	Eastern white pine, yellow-poplar.
FeD Frederick	2c	Moderate	Severe	Slight	Severe	Northern red oak Yellow-poplar Black locust White oak Black walnut	76 86 --- --- ---	Eastern white pine, yellow-poplar.
FrC3 Frederick	2c	Slight	Moderate	Slight	Severe	Northern red oak Yellow-poplar Black locust White oak Black walnut	76 86 --- --- ---	Eastern white pine, yellow-poplar.

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	
GCF*:								
Garmon	4x	Moderate	Severe	Slight	Slight	Northern red oak Virginia pine Eastern redcedar	67 65 38	Shortleaf pine, Virginia pine, eastern redcedar, loblolly pine, eastern white pine.
Caneyville (north aspect)	2x	Severe	Severe	Slight	Severe	Yellow-poplar Black oak	90 69	Yellow-poplar, black walnut, Virginia pine.
Caneyville (south aspect)	3x	Severe	Severe	Moderate	Moderate	Scarlet oak Eastern redcedar	51 34	Eastern redcedar, Virginia pine, eastern white pine, shortleaf pine, loblolly pine.
GpB, GpC Gilpin	3o	Slight	Slight	Slight	Moderate	Northern red oak Yellow-poplar	73 82	Virginia pine, eastern white pine, yellow-poplar.
GpD Gilpin (north aspect)	2r	Moderate	Moderate	Slight	Severe	Northern red oak Yellow-poplar	80 95	Virginia pine, eastern white pine, black cherry, yellow-poplar.
Gilpin (south aspect)	3r	Moderate	Moderate	Moderate	Moderate	Northern red oak Yellow-poplar	73 82	Virginia pine, eastern white pine, black cherry, yellow-poplar.
LoB, LoC Lonewood	3o	Slight	Slight	Slight	Moderate	White oak Shortleaf pine Virginia pine Loblolly pine Eastern white pine	70 70 70 80 80	Loblolly pine, shortleaf pine, Virginia pine, eastern white pine.
Me Melvin	1w	Slight	Severe	Severe	Severe	Pin oak Sweetgum	98 92	Pin oak, American sycamore, sweetgum, loblolly pine.
MoB, MoC Mountview	2o	Slight	Slight	Slight	Severe	Yellow-poplar White oak Virginia pine	92 82 69	Shortleaf pine, loblolly pine, Virginia pine, yellow-poplar.
No Nolin	1o	Slight	Slight	Slight	Severe	Sweetgum Yellow-poplar	92 107	Sweetgum, yellow-poplar, eastern white pine, eastern cottonwood, white ash, cherrybark oak.
Nv Nolin Variant	2o	Slight	Slight	Slight	Severe	Yellow-poplar Northern red oak	94 80	Yellow-poplar, shortleaf pine, eastern cottonwood, American sycamore.
SaB Sango	3o	Slight	Slight	Slight	Moderate	Yellow-poplar White oak Loblolly pine Shortleaf pine	85 70 80 65	Loblolly pine, shortleaf pine, eastern white pine.
Sk Skidmore	1o	Slight	Slight	Slight	Severe	Northern red oak Yellow-poplar	85 108	Yellow-poplar, black walnut, white ash, eastern white pine, American sycamore.

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	
Ta---------- Taft	3w	Slight	Moderate	Slight	Moderate	Yellow-poplar------- White oak---------- Loblolly pine------- Sweetgum---------- Shortleaf pine------	90 60 85 80 60	Loblolly pine, American sycamore, sweetgum.
TrC---------- Trimble	2o	Slight	Slight	Slight	Severe	Northern red oak---- Yellow-poplar------- Shortleaf pine------ Virginia pine------- Eastern redcedar----	80 90 75 75 50	Eastern white pine, black walnut, black locust, Virginia pine, loblolly pine, shortleaf pine, eastern redcedar.
TrD---------- Trimble	2r	Slight	Moderate	Slight	Severe	Northern red oak---- Yellow-poplar------- Shortleaf pine------ Virginia pine------- Eastern redcedar----	80 90 75 75 50	Eastern white pine, black walnut, black locust, Virginia pine, loblolly pine, shortleaf pine, eastern redcedar.
WoC---------- Woolper	2c	Slight	Moderate	Slight	Severe	Northern red oak---- Yellow-poplar------- Shortleaf pine------	80 90 80	Black walnut, yellow-poplar, eastern white 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." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ab Ashton	Severe: floods.	Slight	Slight	Slight	Slight.
CaC Caneyville	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
CGE*: Caneyville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Garmon	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
CoE Colyer	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: droughty, slope, thin layer.
EkB Elk	Slight	Slight	Moderate: slope.	Slight	Slight.
EkC Elk	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
FwE Faywood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
FeB Frederick	Slight	Slight	Moderate: slope.	Slight	Slight.
FeC Frederick	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
FeD Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
FrC3 Frederick	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.	Moderate: slope, too clayey.
GCF*: Garmon	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Caneyville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
GpB Gilpin	Slight	Slight	Moderate: small stones, slope.	Slight	Moderate: thin layer.
GpC Gilpin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, thin layer.
GpD Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
LoB Lonewood	Slight	Slight	Moderate: 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--- Lonewood	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Me--- Melvin	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
MoB--- Mountview	Slight---	Slight---	Moderate: slope.	Severe: erodes easily.	Slight.
MoC--- Mountview	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
No--- Nolin	Severe: floods.	Slight---	Moderate: floods.	Slight--- erodes easily.	Moderate: floods.
Nv--- Nolin Variant	Severe: floods.	Slight---	Moderate: floods.	Slight---	Moderate: floods.
SaB--- Sango	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight---	Slight.
Sk--- Skidmore	Severe: floods.	Moderate: small stones.	Severe: small stones.	Slight---	Severe: small stones.
Ta--- Taft	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
TrC--- Trimble	Moderate: small stones, slope.	Moderate: small stones, slope.	Severe: slope, small stones.	Slight---	Moderate: small stones, slope.
TrD--- Trimble	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Ud*. Udorthents					
WoC--- Woolper	Moderate: percs slowly, slope.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Ab---------- Ashton	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
CaC---------- Caneyville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CGE*:										
Caneyville--------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Garmon----------	Very poor.	Fair	Good	Good	Fair	Very poor.	Very poor.	Fair	Good	Very poor.
CoE---------- Colyer	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
EkB---------- Elk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EkC---------- Elk	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FwE---------- Faywood	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FeB---------- Frederick	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FeC---------- Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FeD---------- Frederick	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FrC3---------- Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GCF*:										
Garmon----------	Very poor.	Poor	Good	Good	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Caneyville--------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
GpB---------- Gilpin	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
GpC---------- Gilpin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
GpD---------- Gilpin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
LoB---------- Lonewood	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LoC---------- Lonewood	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	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--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
MoB---- Mountview	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
MoC---- Mountview	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
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.
SaB---- Sango	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Sk---- Skidmore	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
Ta---- Taft	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
TrC---- Trimble	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TrD---- Trimble	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ud*. Udorthents										
WoC---- Woolper	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ab Ashton	Slight	Severe: floods.	Severe: floods.	Severe: floods.	Severe: low strength.	Slight.
CaC Caneyville	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, thin layer.
CGE*:						
Caneyville	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Garmon	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
CoE Colyer	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope,	Severe: droughty, slope, thin layer.
EkB Elk	Slight	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
EkC Elk	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
FwE Faywood	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
FeB Frederick	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
FeC Frederick	Moderate: too clayey, slope.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
FeD Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
FrC3 Frederick	Moderate: too clayey, slope.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: slope. too clayey.
GCF*:						
Garmon	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
Caneyville	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
GpB Gilpin	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Moderate: low strength.	Moderate: thin layer.
GpC Gilpin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope, thin layer.

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
GpD---------- Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LoB---------- Lonewood	Slight---------	Slight---------	Slight---------	Moderate: slope.	Severe: low strength.	Slight.
LoC---------- Lonewood	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
Me---------- Melvin	Severe: wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: low strength, wetness, floods.	Severe: wetness.
MoB---------- Mountview	Moderate: too clayey.	Slight---------	Moderate: shrink-swell.	Moderate: slope.	Severe: low strength.	Slight.
MoC---------- Mountview	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
No---------- Nolin	Moderate: wetness, floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: low strength, floods.	Moderate: floods.
Nv---------- Nolin Variant	Moderate: floods, wetness.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.
SaB---------- Sango	Moderate: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength.	Slight.
Sk---------- Skidmore	Moderate: depth to rock, wetness, floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: small stones.
Ta---------- Taft	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
TrC---------- Trimble	Severe: low strength.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: small stones, slope.
TrD---------- Trimble	Severe: slope, low strength.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ud*. Udorthents						
WoC---------- Woolper	Moderate: too clayey, slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: 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. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ab Ashton	Moderate: floods.	Severe: floods.	Moderate: floods.	Moderate: floods.	Fair: too clayey.
CaC Caneyville	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
CGE*: Caneyville	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Garmon	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage, slope.	Severe: slope, seepage, depth to rock.	Poor: slope, thin layer, area reclaim.
CoE Colyer	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey, slope.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, slope.
EkB Elk	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
EkC Elk	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, too clayey.
FwE Faywood	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: slope, depth to rock, too clayey.	Severe: slope, depth to rock.	Poor: area reclaim, too clayey, hard to pack.
FeB Frederick	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, thin layer.
FeC Frederick	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, thin layer.
FeD Frederick	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope, too clayey.
FrC3 Frederick	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, thin layer.
GCF*: Garmon	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage, slope.	Severe: slope, seepage, depth to rock.	Poor: slope, thin layer, area reclaim.
Caneyville	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
GpB---------- Gilpin	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
GpC---------- Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Fair: thin layer, area reclaim.
GpD---------- Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, thin layer, area reclaim.
LoB---------- Lonewood	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: area reclaim, too clayey.
LoC---------- Lonewood	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Fair: area reclaim, too clayey, slope.
Me---------- Melvin	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
MoB---------- Mountview	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight----------	Poor: too clayey, hard to pack.
MoC---------- Mountview	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
No---------- Nolin	Severe: floods.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Fair: wetness.
Nv---------- Nolin Variant	Severe: floods.	Severe: floods, seepage.	Severe: floods, seepage, wetness.	Severe: floods, seepage.	Good.
SaB---------- Sango	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: wetness.
Sk---------- Skidmore	Severe: floods, wetness.	Severe: floods, seepage, wetness.	Severe: floods, seepage, depth to rock.	Severe: floods, seepage, wetness.	Poor: small stones, seepage.
Ta---------- Taft	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
TrC---------- Trimble	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Poor: small stones, too clayey, slope.
TrD---------- Trimble	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Ud*. Udorthents					

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
WoC---------- Woolper	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ab Ashton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
CaC Caneyville	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
CGE*: Caneyville	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Garmon	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
CoE Colyer	Poor: area reclaim, slope, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
EkB Elk	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
EkC Elk	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
FwE Faywood	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, thin layer.
FeB Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
FeC Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
FeD Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, thin layer.
FrC3 Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
GCF*: Garmon	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Caneyville	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
GpB Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, small stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
GpC--Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, thin layer, small stones.
GpD--Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
LoB--Lonewood	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
LoC--Lonewood	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
Me--Melvin	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MoB, MoC--Mountview	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
No--Nolin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Nv--Nolin Variant	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
SaB--Sango	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
Sk--Skidmore	Fair: area reclaim.	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
Ta--Taft	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
TrC--Trimble	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
TrD--Trimble	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Ud*. Udorthents				
WoC--Woolper	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
Ab Ashton	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
CaC Caneyville	Moderate: slope, depth to rock.	Severe: hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
CGE*: Caneyville	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Garmon	Severe: seepage, slope.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
CoE Colyer	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, droughty.
EkB Elk	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Favorable.
EkC Elk	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Slope.
FwE Faywood	Severe: slope.	Severe: thin layer, hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
FeB Frederick	Moderate: seepage.	Moderate: hard to pack.	Deep to water	Favorable	Favorable.
FeC Frederick	Moderate: seepage.	Moderate: hard to pack.	Deep to water	Slope	Slope.
FeD Frederick	Moderate: seepage.	Moderate: hard to pack.	Deep to water	Slope	Slope.
FrC3 Frederick	Moderate: seepage.	Moderate: hard to pack.	Deep to water	Slope	Slope.
GCF*: Garmon	Severe: seepage, slope.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
Caneyville	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
GpB Gilpin	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
GpC, GpD Gilpin	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes and levees	Drainage	Terraces and diversions	Grassed waterways
LoB---------- Lonewood	Moderate: seepage, depth to rock,	Moderate: piping.	Deep to water----	Erodes easily----	Erodes easily.
LoC---------- Lonewood	Moderate: seepage, depth to rock.	Moderate: piping.	Deep to water----	Slope, erodes easily.	Slope, erodes easily.
Me---------- Melvin	Moderate: seepage.	Severe: piping, wetness.	Floods----------	Erodes easily, wetness.	Wetness, erodes easily.
MoB---------- Mountview	Moderate: seepage.	Moderate: hard to pack.	Deep to water----	Erodes easily----	Erodes easily.
MoC---------- Mountview	Moderate: seepage.	Moderate: hard to pack.	Deep to water----	Slope, erodes easily.	Slope, erodes easily.
No---------- Nolin	Moderate: seepage.	Severe: piping.	Deep to water----	Erodes easily----	Erodes easily.
Nv---------- Nolin Variant	Severe: seepage.	Severe: piping.	Deep to water----	Favorable--------	Favorable.
SaB---------- Sango	Moderate: seepage.	Severe: piping.	Percs slowly-----	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth, percs slowly.
Sk---------- Skidmore	Severe: seepage.	Severe: seepage.	Deep to water----	Large stones-----	Droughty, large stones.
Ta---------- Taft	Moderate: seepage.	Severe: piping.	Percs slowly-----	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
TrC, TrD---------- Trimble	Moderate: seepage.	Severe: piping.	Deep to water----	Slope----------	Slope.
Ud*. Udorthents					
WoC---------- Woolper	Slight----------	Severe: hard to pack.	Deep to water----	Erodes easily, percs slowly, slope.	Slope, erodes easily, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ab	0-7	Silt loam	ML, CL, CL-ML	A-4	0	95-100	90-100	75-100	60-95	<35	NP-10
Ashton	7-42	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	80-100	25-42	5-20
	42-60	Silt loam, loam, fine sandy loam.	ML, CL, SM, SC	A-4, A-6	0-5	90-100	85-100	65-95	40-90	<40	NP-20
CaC	0-8	Silt loam	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
Caneyville	8-17	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	17-32	Clay, silty clay	CH	A-7	0-3	90-100	85-100	75-100	65-100	50-75	30-45
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CGE*:											
Caneyville	0-8	Silt loam	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	8-17	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	17-32	Clay, silty clay	CH	A-7	0-3	90-100	85-100	75-100	65-100	50-75	30-45
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Garmon	0-2	Channery silt loam.	CL, GC, GM-GC, CL-ML	A-4, A-6	0-10	55-80	50-75	45-75	40-70	25-35	5-15
	2-12	Loam, channery silt loam, shaly silty clay loam.	GM-GC, CL,ML, CL, SM-SC	A-4, A-6	0-15	60-92	60-92	45-80	35-70	20-40	5-20
	12-26	Channery silt loam, channery silty clay loam, shaly loam.	GM-GC, CL-ML, CL, SM-SC	A-4, A-6	0-20	60-85	50-85	45-80	35-70	20-40	5-20
	26	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CoE	0-4	Shaly silt loam	CL-ML, ML, GC, GM-GC	A-4, A-6	0-5	55-80	50-75	45-75	35-70	25-40	5-15
Colyer	4-11	Shaly clay, very shaly silty clay, very shaly silty clay loam.	GC, GM	A-2, A-6, A-7	0-10	25-60	20-50	20-50	15-45	35-55	11-30
	11-18	Shaly clay, very shaly silty clay, very shaly silty clay loam.	GC, GM	A-2, A-6, A-7	0-15	25-60	20-50	20-50	15-45	35-55	11-30
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
EkB, EkC	0-9	Silt loam	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	70-95	25-35	3-10
Elk	9-45	Silty clay loam, silt loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	75-100	25-40	5-15
	45-60	Silty clay loam, silt loam.	ML, CL, CL-ML,	A-4, A-6	0	95-100	90-100	85-100	55-95	25-40	5-15
FwE	0-5	Silt loam	ML, CL, CL-ML	A-4	0-15	100	95-100	90-100	85-100	25-35	4-10
Faywood	5-39	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-15	90-100	90-100	85-100	75-100	42-70	20-45
	39	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
FeB, FeC, FeD---- Frederick	0-10	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-5	80-100	75-100	65-95	75-90	<35	NP-15
	10-16	Silty clay loam, cherty silty clay loam.	CL, CH, MH, ML	A-6, A-7	0-5	70-100	60-100	60-100	50-95	30-55	10-30
	16-70	Silty clay loam, silty clay, cherty clay, clay.	CH, CL, MH, ML	A-7	0-5	80-100	70-100	60-100	55-100	45-75	20-40
FrC3---------- Frederick	0-5	Silty clay loam	ML, CL, CL-ML	A-4, A-6, A-7	0-5	80-100	75-100	70-95	50-95	30-45	10-25
	5-70	Silty clay loam, silty clay, cherty clay, clay.	CH, CL, MH	A-7	0-5	80-100	75-100	65-100	55-100	45-75	20-40
GCF*:											
Garmon----------	0-2	Channery silt loam.	CL, GC, GM-GC, CL-ML	A-4, A-6	0-10	55-80	50-75	45-75	40-70	25-35	5-15
	2-12	Loam, channery silt loam, shaly silty clay loam.	GM-GC, CL-ML, CL, SM-SC	A-4, A-6	0-15	60-92	60-92	45-80	36-70	20-40	5-20
	12-26	Shaly silt loam, channery silty clay loam, shaly loam.	GM-GC, CL-ML, CL, SM-SC	A-4, A-6	0-20	60-85	50-85	45-80	36-70	20-40	5-20
	26	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Caneyville------	0-8	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	8-17	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	17-32	Clay, silty clay	CH	A-7	0-3	90-100	85-100	75-100	65-100	50-75	30-45
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GpB, GpC, GpD---- Gilpin	0-9	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	9-25	Channery silt loam, shaly silt loam, silty clay loam.	GC-GM, SC, CL, CL-ML, GM	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	25-30	Channery silt loam, very channery silt loam, very shaly silty clay loam.	GM, GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LoB, LoC---------- Lonewood	0-7	Loam----------	ML, CL-ML	A-4	0	100	95-100	85-100	75-90	20-26	2-7
	7-45	Silt loam, silty clay loam, loam.	ML	A-4, A-6	0	100	95-100	85-95	65-90	25-39	2-18
	45-84	Weathered bedrock									
Me---------- Melvin	0-8	Silt loam--------	CL, CL-ML, ML	A-4	0	95-100	90-100	80-100	80-95	25-35	4-10
	8-27	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
	27-60	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	85-100	80-100	70-100	60-95	25-40	5-20

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
MoB, MoC--------- Mountview	0-9	Silt loam---------	ML, CL-ML	A-4	0	100	95-100	95-100	85-95	20-30	2-7
	9-28	Silt loam, silty clay loam.	CL	A-6, A-7	0	95-100	95-100	90-100	85-95	30-43	10-20
	28-65	Silty clay, cherty clay, cherty silty clay loam.	CL, ML, MH, CH	A-6, A-7	0-20	75-100	65-100	60-95	50-95	35-65	11-32
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, A-7	0	100	95-100	85-100	75-100	25-46	5-23
Nv--------------- Nolin Variant	0-8	Fine sandy loam	ML, CL-ML, SM, SC-SM	A-4	0	100	85-100	70-85	40-55	<20	NP-5
	8-42	Fine sandy loam, loam, sandy loam.	ML, CL-ML, SM	A-4	0	100	85-100	70-90	40-75	<20	NP-5
	42-60	Fine sandy loam, loam, sandy clay loam.	ML, CL-ML, SM	A-4	0	100	85-100	70-90	40-75	<20	NP-5
SaB-------------- Sango	0-8	Silt loam---------	CL-ML, ML	A-4	0	100	95-100	90-100	75-98	18-30	1-9
	8-26	Silt loam---------	ML	A-4, A-6	0	100	95-100	95-100	75-95	18-38	1-16
	26-62	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	90-100	85-100	80-100	75-95	23-42	4-20
	62-94	Silty clay loam, silt loam.	GC-GM, CL, SM, SC	A-6, A-7 A-4.	0-25	60-100	45-100	45-90	36-85	25-48	5-25
Sk--------------- Skidmore	0-28	Gravelly loam----	GM, SM, GM-GC, ML	A-4, A-2	0-10	60-90	40-85	40-75	25-60	<30	NP-7
	28-60	Gravelly fine sandy loam, very channery sandy loam, very gravelly loam.	GM, GP-GM, GC-GM	A-2, A-1	5-30	35-60	20-50	15-40	10-35	<30	NP-5
Ta--------------- Taft	0-31	Silt loam---------	CL-ML, ML	A-4	0	100	95-100	90-100	75-95	18-30	2-7
	31-60	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6, A-7	0	95-100	90-100	85-100	80-95	23-42	5-20
TrC, TrD--------- Trimble	0-5	Channery silt loam	ML, CL, GM, SC	A-4	0-10	65-85	55-80	45-75	40-70	25-35	3-10
	5-45	Channery silty clay loam, channery silt loam.	CL, GM-GC, GC, CL-ML	A-4, A-6	0-10	65-85	50-80	45-80	40-75	25-40	5-20
	45-60	Channery silt loam, silty clay loam, channery loam.	GM, GC, ML, CL	A-4, A-6 A-2	0-10	45-85	30-80	25-75	20-75	20-40	2-20
Ud*. Udorthents											
WoC-------------- Woolper	0-8	Silty clay loam	CL	A-6, A-7	0-10	95-100	90-100	85-100	75-100	34-42	15-22
	8-21	Silty clay, silty clay loam, clay.	CL, CH	A-7, A-6	0-10	95-100	90-100	85-100	75-100	35-65	15-40
	21-60	Clay, silty clay	CH, CL	A-7	0-10	95-100	90-100	85-100	75-100	45-75	20-45

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
Ab	0-7	0.6-2.0	0.16-0.23	5.6-7.3	Low	0.28	4
Ashton	7-42	0.6-2.0	0.18-0.23	5.6-7.3	Low	0.43	
	42-60	0.6-2.0	0.14-0.20	5.6-7.3	Low	0.43	
CaC	0-8	0.6-2.0	0.15-0.22	4.5-7.3	Low	0.43	3
Caneyville	8-17	0.2-0.6	0.12-0.18	4.5-7.3	Moderate	0.28	
	17-32	0.2-0.6	0.12-0.18	5.6-7.8	Moderate	0.28	
	32	---	---	---	---	----	
CGE*:							
Caneyville	0-8	0.6-2.0	0.15-0.22	4.5-7.3	Low	0.43	3
	8-17	0.2-0.6	0.12-0.18	4.5-7.3	Moderate	0.28	
	17-32	0.2-0.6	0.12-0.18	5.6-7.8	Moderate	0.28	
	32	---	---	---	---	----	
Garmon	0-2	2.0-6.0	0.05-0.16	4.5-7.3	Low	0.28	3
	2-12	2.0-6.0	0.05-0.16	4.5-7.3	Low	0.28	
	12-26	2.0-6.0	0.05-0.16	5.6-7.3	Low	0.20	
	26	---	---	---	---	----	
CoE	0-4	0.6-2.0	0.10-0.16	3.6-6.0	Low	0.32	2
Colyer	4-11	0.06-0.2	0.03-0.10	3.6-5.0	Low	0.17	
	11-18	0.06-0.2	0.03-0.10	3.6-5.0	Low	0.17	
	18	---	---	---	---	----	
EkB, EkC	0-9	0.6-2.0	0.19-0.23	4.5-6.5	Low	0.32	4
Elk	9-45	0.6-2.0	0.18-0.22	4.5-6.5	Low	0.28	
	45-60	0.6-2.0	0.14-0.20	5.1-6.5	Low	0.28	
FwE	0-5	0.6-2.0	0.18-0.22	5.1-7.3	Low	0.37	3
Faywood	5-39	0.06-0.6	0.12-0.17	5.1-7.3	Moderate	0.28	
	39	---	---	---	---	----	
FeB, FeC, FeD	0-10	2.0-6.0	0.15-0.24	4.5-5.5	Low	0.32	4
Frederick	10-16	0.6-2.0	0.12-0.18	4.5-5.5	Moderate	0.24	
	16-70	0.6-2.0	0.09-0.18	4.5-5.5	Moderate	0.24	
FrC3	0-5	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.32	4
Frederick	5-70	0.6-2.0	0.09-0.18	4.5-5.5	Moderate	0.24	
GCF*:							
Garmon	0-2	2.0-6.0	0.05-0.16	4.5-7.3	Low	0.28	3
	2-12	2.0-6.0	0.05-0.16	4.5-7.3	Low	0.28	
	12-26	2.0-6.0	0.05-0.16	5.6-7.3	Low	0.20	
	26	---	---	---	---	----	
Caneyville	0-8	0.6-2.0	0.15-0.22	4.5-7.3	Low	0.43	3
	8-17	0.2-0.6	0.12-0.18	4.5-7.3	Moderate	0.28	
	17-32	0.2-0.6	0.12-0.18	5.6-7.8	Moderate	0.28	
	32	---	---	---	---	----	
GpB, GpC, GpD	0-9	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.32	3
Gilpin	9-25	0.6-2.0	0.10-0.16	3.6-5.5	Low	0.28	
	25-30	0.6-2.0	0.06-0.10	3.6-5.5	Low	0.28	
	30	---	---	---	---	----	
LoB, LoC	0-7	0.6-2.0	0.18-0.20	4.5-5.5	Low	0.37	4
Lonewood	7-45	0.6-2.0	0.16-0.18	4.5-5.5	Low	0.37	
	45-84	0.6-2.0	0.14-0.17	4.5-5.5	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	Reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
Me	0-8	0.6-2.0	0.18-0.23	6.1-7.3	Low	0.43	5
Melvin	8-27	0.6-2.0	0.18-0.23	6.1-7.3	Low	0.43	
	27-60	0.6-2.0	0.16-0.23	6.1-7.3	Low	0.43	
MoB, MoC	0-9	0.6-2.0	0.18-0.22	4.5-5.5	Low	0.43	5
Mountview	9-28	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.43	
	28-65	0.6-2.0	0.10-0.15	4.5-5.5	Moderate	0.32	
No	0-8	0.6-2.0	0.18-0.23	5.6-8.4	Low	0.43	5
Nolin	8-60	0.6-2.0	0.18-0.23	5.6-8.4	Low	0.43	
Nv	0-8	2.0-6.0	0.14-0.18	5.6-7.3	Low	0.32	5
Nolin Variant	8-42	2.0-6.0	0.12-0.16	5.6-7.3	Low	0.32	
	42-60	2.0-6.0	0.12-0.16	5.6-7.3	Low	0.32	
SaB	0-8	0.6-2.0	0.20-0.23	4.5-5.5	Low	0.43	3
Sango	8-26	0.6-2.0	0.18-0.20	4.5-5.5	Low	0.43	
	26-62	0.06-0.2	0.03-0.07	4.5-5.5	Low	0.43	
	62-94	0.2-0.6	0.03-0.07	4.5-5.5	Moderate	0.28	
Sk	0-28	2.0-6.0	0.07-0.13	5.6-7.8	Low	0.17	5
Skidmore	28-60	2.0-6.0	0.04-0.10	5.6-7.8	Low	0.17	
Ta	0-31	0.6-2.0	0.20-0.22	4.5-5.5	Low	0.43	3
Taft	31-60	0.06-0.2	0.03-0.07	4.5-5.5	Low	0.43	
TrC, TrD	0-5	0.6-2.0	0.14-0.19	3.6-5.5	Low	0.28	3
Trimble	5-45	0.6-2.0	0.14-0.19	3.6-5.5	Low	0.28	
	45-60	0.6-2.0	0.14-0.19	3.6-5.5	Low	0.24	
Ud*.							
Udorthents							
WoC	0-8	0.6-2.0	0.18-0.22	6.1-7.8	Low	0.37	3
Woolper	8-21	0.2-2.0	0.13-0.19	6.1-7.8	Moderate	0.28	
	21-60	0.06-0.6	0.12-0.17	6.1-7.8	Moderate	0.28	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

[See text for definition of terms. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
Ab---------- Ashton	B	Rare--------	---	---	>6.0	---	---	>60	---	Low-------	Low.
CaC---------- Caneyville	C	None--------	---	---	>6.0	---	---	20-40	Hard	High------	Moderate.
CGE*:											
Caneyville-------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High------	Moderate.
Garmon----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low-------	Moderate.
CoE---------- Colyer	D	None--------	---	---	>6.0	---	---	8-20	Hard	High------	High.
EkB, EkC---------- Elk	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
FwE---------- Faywood	C	None--------	---	---	>6.0	---	---	20-40	Hard	High------	Moderate.
FeB, FeC, FeD, FrC3---------- Frederick	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
GCF*:											
Garmon----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low-------	Moderate.
Caneyville-------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High------	Moderate.
GpB, GpC, GpD----- Gilpin	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low-------	High.
LoB, LoC---------- Lonewood	B	None--------	---	---	>6.0	---	---	40-72	Soft	Low-------	Moderate.
Me---------- Melvin	D	Occasional--	Brief-----	Dec-May	0-1.0	Apparent	Dec-May	>60	---	High------	Low.
MoB, MoC---------- Mountview	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
No---------- Nolin	B	Occasional--	Brief-----	Jan-May	3.0-6.0	Apparent	Feb-Mar	>60	---	Low-------	Moderate.
Nv---------- Nolin Variant	B	Occasional--	Brief-----	Dec-May	4.0-6.0	Apparent	Jan-Mar	>60	---	Low-------	Moderate.
SaB---------- Sango	C	None--------	---	---	2.0-3.0	Perched	Jan-Apr	>60	---	Moderate	High.
Sk---------- Skidmore	B	Occasional--	Very brief	Dec-May	3.0-4.0	Apparent	Dec-Mar	>40	Hard	Low-------	Moderate.
Ta---------- Taft	C	None--------	---	---	1.0-2.0	Perched	Dec-Apr	>60	---	High------	High.
TrC, TrD---------- Trimble	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
Ud*. Udorthents											
WoC---------- Woolper	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.—PHYSICAL ANALYSIS OF SELECTED SOILS

Soil name, report number, horizon, and depth in inches	Total			Size class and particle diameter (mm)								Coarse fragments		
				Sand					Sand coarser than very fine (2-0.1)	Very fine sand plus silt (0.1-0.002)	Textural class			
	Sand (2-0.05)	Silt (0.05-0.002)	Int. Clay (< 0.002	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)				>2 mm	2-19 mm	19-76 mm
	Pct <2 mm											Pct	Pct	Pct
Frederick silt loam: (75KY-207-5)														
Ap—0-10	18.5	59.0	22.5	0.3	1.3	2.0	5.3	9.6	8.9	68.6	Silty loam.	1.1	0.8	0.3
B1—10-16	16.2	53.4	30.4	0.2	0.9	1.6	4.4	9.11	7.1	62.5	Silty clay loam.	2.3	1.0	1.3
B21t—16-27	17.4	39.3	43.3	0.1	0.6	1.2	3.8	11.8	5.6	51.1	Clay	0.9	0.9	0.0
B22t—27-41	22.7	38.3	39.0	0.2	1.1	1.7	4.8	14.9	7.8	53.2	Clay	4.9	1.7	3.2
B23t—41-53	24.8	35.3	39.9	0.5	2.0	3.0	5.6	13.7	11.1	49.0	Clay	16.3	2.9	13.4
B24t—53-70	22.7	36.1	41.2	0.4	1.2	2.4	4.9	13.8	8.9	49.9	Clay	22.8	3.4	19.4
Garmon channery silt loam: (75KY-207-3)														
A1—0-2	17.0	66.1	16.9	2.5	2.8	2.1	3.6	6.0	11.0	72.1	Channery silt loam.	20.4	17.2	3.2
B21—2-12	15.7	66.0	18.3	2.4	2.7	1.8	3.3	5.5	10.2	71.5	Channery silt loam.	19.6	13.5	6.1
B22—12-26	14.4	59.1	26.5	1.9	2.5	1.7	3.0	5.3	9.1	64.4	Channery silt loam.	21.1	12.7	8.4

TABLE 17.—PHYSICAL ANALYSIS OF SELECTED SOILS—Continued

Soil name, report number, horizon, and depth in inches	Total			Size class and particle diameter (mm)								Coarse fragments		
				Sand					Sand coarser than very fine (2-0.1)	Very fine sand plus silt (0.1-0.002)	Textural class			
	Sand (2-0.05)	Silt (0.05-0.002)	Int. Clay (< 0.002	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)				>2 mm	2-19 mm	19-76 mm
	Pct <2 mm											Pct	Pct	
Lonewood silt loam: (75KY-207-8)														
Ap—0-7	42.2	46.9	10.9	0.9	0.8	1.1	30.4	9.0	33.2	55.9	Loam	0.2	0.0	0.2
B1—7-14	40.7	48.3	11.0	1.0	0.7	1.0	29.0	9.0	31.7	57.3	Loam	0.3	0.0	0.3
B21t—14-26	34.5	48.5	17.0	0.7	0.7	0.9	24.8	7.4	27.1	55.9	Loam	0.2	0.0	0.2
B22t—26-45	34.4	47.3	18.3	0.8	0.7	0.9	24.6	7.4	27.0	54.7	Loam	0.9	0.0	0.9
Cr1—45-64	55.9	17.5	26.6	0.2	0.2	0.8	45.9	8.8	47.1	26.3	Sandy clay loam.	0.2	0.0	0.2
Cr2—64-84	51.7	17.3	31.0	0.2	0.2	0.3	33.8	17.2	34.5	34.5	Sandy clay loam.	0.3	0.0	0.3
Sango silt loam:* (75KY-207-6)														
Ap—0-4	26.1	65.4	8.5	1.2	1.8	1.8	7.4	13.9	12.2	79.3	Silt loam.	0.3	0.3	0.0
A2—4-8	25.9	67.0	7.1	1.4	1.7	1.8	7.1	13.9	12.0	80.9	Silt loam.	0.8	0.8	0.0
B2—8-26	21.7	65.0	13.3	1.2	1.5	1.5	5.8	11.7	10.0	76.7	Silt loam.	0.6	0.6	0.0
Bx—26-39	19.2	64.2	16.6	1.2	1.2	1.3	5.1	10.4	8.8	74.6	Silt loam.	0.5	0.5	0.0
Bx—39-51	19.4	62.1	18.5	0.6	1.0	1.2	5.3	11.3	8.1	73.4	Silt loam.	3.4	3.4	0.0
Bx—51-62	18.7	61.5	19.8	0.6	0.8	1.0	4.9	11.4	7.3	72.9	Silt loam.	0.6	0.6	0.0
B2t—62-81	18.1	56.4	25.5	0.7	0.7	1.0	5.0	10.7	7.4	67.1	Silt loam.	0.6	0.6	0.0
B2t—81-94	14.9	57.4	27.7	0.3	0.5	0.8	4.1	9.2	5.7	66.6	Silty clay loam.	0.4	0.4	0.0

*The Bx horizon and the B2t horizon were subdivided for sampling purposes.

TABLE 18.--CHEMICAL ANALYSIS OF SELECTED SOILS

[A dash indicates the element was not detected or the determination was not made]

Soil name, report number, horizon, and depth in inches	pH		Extractable cations					Cation exchange capacity		Extractable acidity	Hydrogen plus aluminum	Base saturation		Organic matter	$CaCO_3$ equivalent	Phosphorus
	H_2O	KCl 1N	Ca	Mg	K	Na	TEC	Ammonium acetate	Sum of cations			Ammonium acetate	Sum of cations			
			Milliequivalents per 100 grams of soil											Pct	Pct	P/m
Frederick silt loam: 75KY-207-5																
Ap--------0-10	5.1	4.0	2.04	0.29	0.43	0.03	2.79	8.28	13.27	10.48	0.63	34	20	--	--	--
B1--------10-16	5.2	3.8	2.19	0.55	0.22	0.03	2.99	9.07	11.79	8.80	0.89	33	25	--	--	--
B21t--------16-27	5.2	3.7	3.30	1.10	0.22	0.03	4.65	11.57	14.77	10.12	0.60	40	31	--	--	--
B22t--------27-41	5.1	3.6	2.34	0.86	0.17	0.03	3.40	11.21	14.12	10.72	1.09	30	24	--	--	--
B23t--------41-53	5.0	3.5	1.41	0.68	0.15	0.03	2.27	12.21	15.11	12.84	1.86	19	15	--	--	--
B24t--------53-70	5.0	3.5	1.13	0.07	0.16	0.03	1.39	12.99	14.59	13.20	1.76	11	10	--	--	--
Garmon channery silt loam: 75KY-207-3																
A1--------0--2	4.6	3.6	0.85	0.23	0.12	--	1.20	7.46	11.04	9.84	0.93	16	11	2.08	0.10	2.8
B21--------2-12	5.2	3.9	1.3	0.59	0.11	0.04	2.05	5.78	9.05	7.00	0.41	35	23	1.16	0.09	1.4
B22--------12-26	5.7	4.3	2.05	2.90	0.12	0.06	5.13	8.21	11.41	6.28	0.24	62	45	0.65	0.14	0.8
Lonewood silt loam: 75KY-207-8																
Ap--------0-7	5.3	5.1	3.60	0.46	0.28	0.26	4.60	4.99	11.17	6.57	0.07	92	41	--	--	--
B1--------7-14	5.2	4.3	1.65	0.19	0.07	0.15	2.06	3.10	6.05	3.99	0.13	66	34	--	--	--
B21t--------14-26	4.4	3.6	1.20	0.39	0.18	0.30	2.07	5.50	9.92	7.85	0.77	38	21	--	--	--
B22t--------26-45	4.4	3.5	0.85	0.67	0.20	0.19	1.91	6.46	9.76	7.85	0.99	30	20	--	--	--
Cr1--------45-64	4.7	3.4	--	0.87	0.18	0.30	1.35	8.03	13.34	11.99	1.68	17	10	--	--	--
Cr2--------64-84	4.6	3.3	--	0.79	0.20	0.11	1.10	11.07	15.38	14.28	2.37	10	7	--	--	--
Sango silt loam:* 75KY-207-6																
Ap--------0-4	4.2	3.7	2.1	0.61	0.10	0.33	3.16	7.89	15.72	12.56	0.54	40	20	--	--	--
A2--------4-8	4.2	3.8	0.2	0.24	0.07	0.26	0.77	3.78	7.91	7.14	0.60	20	10	--	--	--
B2--------8-26	3.6	3.6	--	0.10	0.07	0.30	0.47	4.07	7.32	6.85	0.87	12	6	--	--	--
Bx--------26-39	3.9	3.4	--	0.21	0.10	0.35	0.66	7.07	10.37	9.71	1.41	9	6	--	--	--
Bx--------39-51	3.7	3.3	--	0.10	0.13	0.30	0.53	8.07	12.09	11.56	1.79	7	4	--	--	--
Bx--------51-62	4.0	3.3	--	0.11	0.10	0.37	0.58	7.57	10.14	9.56	1.69	8	6	--	--	--
B2t--------62-81	3.7	3.2	--	0.40	0.05	0.37	0.82	10.03	13.10	12.28	2.23	8	6	--	--	--
B2t--------81-94	4.1	3.1	--	0.34	0.13	0.24	0.71	11.62	15.85	15.14	2.76	6	4	--	--	--

*The Bx horizon and the B2t horizon were subdivided for sampling purposes.

TABLE 19.--ENGINEERING INDEX TEST DATA

[Dashes indicate data were not available]

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution										Liquid limit	Plasticity index	Moisture density		California bearing ratio
			Larger than 3 inches	Percentage passing sieve--					Percentage smaller than--						Max. dry density	Optimum moisture	
	AASHTO	Unified		3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm					
			Pct										Pct		Lb/ft^3	Pct	
Frederick silt loam:[1] (S75KY-207-005)																	
B22t-----27 to 41	A-7-6(20)	CL	0	100	100	100	100	99	85	75	54	48	46	24	--	--	9
B24t-----53 to 70	A-7-6(17)	CL	0	99	99	99	98	95	78	58	37	24	48	21	--	--	13
Garmon channery silt loam:[2] (S75KY-193-003)																	
B21t------2 to 12	A-4(0)	CL-ML	15	96	92	92	92	80	59	54	31	21	22	5	112	18	20
B22t-----12 to 26	A-4(1)	CL-ML	20	91	87	83	76	70	58	49	30	22	25	5	106	18	27
Lonewood silt loam:[3] (S75KY--207-008)																	
B22t-----26 to 45	A-7(12)	ML	0	100	100	99	97	96	66	60	27	25	22	2	115	17	21
Sango silt loam:[4] (S75KY-207-006)																	
B2--------8 to 26	A-4(0)	ML	0	100	100	100	99	96	78	60	24	16	19	1	113	12	26
Bx--------26 to 62	A-4(2)	CL-ML	0	100	100	100	99	98	83	64	31	22	26	4	111	15	15
B2t------62 to 94	A-6(9)	CL	0	100	100	100	99	98	84	65	39	30	32	12	106	17	--

[1]Frederick silt loam: 500 yards west of junction of Kentucky 1680 and gravel road, 4 miles south of junction of Kentucky 1680 and Kentucky 619, and 3 miles southeast of Jamestown.

[2]Garmon channery silt loam: 75 feet south of gravel road, 1500 feet south of Cumberland Lake, 1.5 miles northwest of Jabez, and 13 miles southeast of Jamestown.

[3]Lonewood silt loam: 250 yards northeast of end of gravel road which runs northwest off U.S. 127, 1.9 miles north of Webbs Crossroads, 13 miles north Jamestown.

[4]Sango silt loam: 100 yards west of barn at end of first gravel road, west of Poplar Grove road north of junction with U.S. 127, and 11 miles north of Jamestown.

TABLE 20.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Ashton	Fine-silty, mixed, mesic Mollic Hapludalfs
Caneyville	Fine, mixed, mesic Typic Hapludalfs
Colyer	Clayey-skeletal, mixed, mesic Lithic Dystrochrepts
Elk	Fine-silty, mixed, mesic Ultic Hapludalfs
Faywood	Fine, mixed, mesic Typic Hapludalfs
Frederick	Clayey, mixed, mesic Typic Paleudults
Garmon	Fine-loamy, mixed, mesic Dystric Eutrochrepts
Gilpin	Fine-loamy, mixed, mesic Typic Hapludults
*Lonewood	Fine-loamy, siliceous, mesic Typic Hapludults
Melvin	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
*Mountview	Fine-silty, siliceous, thermic Typic Paleudults
Nolin	Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Nolin Variant	Coarse-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
*Sango	Coarse-silty, siliceous, thermic Glossic Fragiudults
Skidmore	Loamy-skeletal, mixed, mesic Dystric Fluventic Eutrochrepts
Taft	Fine-silty, siliceous, thermic Glossaquic Fragiudults
*Trimble	Fine-loamy, siliceous, mesic Typic Paleudults
Udorthents	Coarse-loamy, mesic Typic Udorthents
Woolper	Fine, mixed, mesic Typic Argiudolls

*This soil is a taxadjunct to the series. See text for description of those characteristics of the soil that are outside the range of the series.

* U.S. GOVERNMENT PRINTING OFFICE: 1982-354-363/1084

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