United States
Department of
Agriculture

Soil
Conservation
Service

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

Soil Survey of Marion County, Kentucky

How To Use This Soil Survey

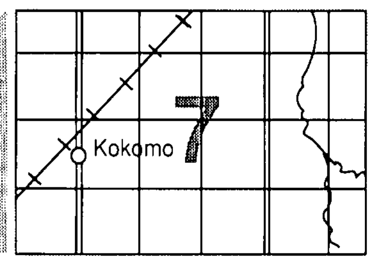
General Soil Map

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

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

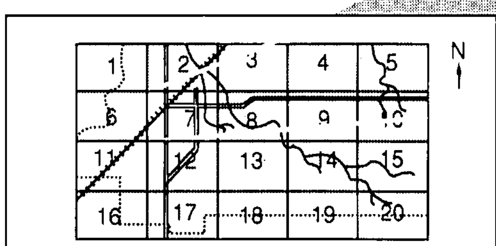
Detailed Soil Maps

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



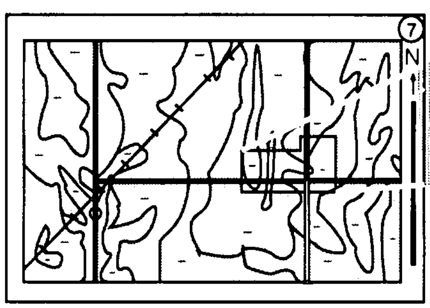
MAP SHEET

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



INDEX TO MAP SHEETS

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



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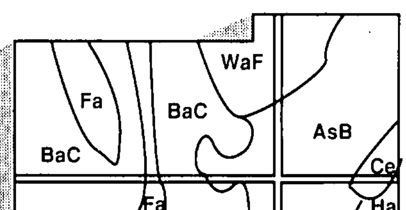

AREA OF INTEREST

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

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

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1984. Soil names and descriptions were approved in 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1986. This survey was made cooperatively by the Soil Conservation Service, the Kentucky Natural Resources and Environmental Protection Cabinet, and the Kentucky Agricultural Experiment Station. It is part of the technical assistance furnished to the Marion County Conservation District.

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

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

Cover: A farmstead and soybean field in an area of Crider silt loam, 2 to 6 percent slopes. (Cover photograph by Harold A. Woodward, public affairs specialist)

Contents

Issued August 1991

Index to Map Units

Summary of Tables

Foreword

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

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

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

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

Billy W. Milliken
State Conservationist
Soil Conservation Service

Soil Survey of
Marion County, Kentucky

By John A. Kelley and William H. Craddock, Soil Conservation Service

Fieldwork by William H. Craddock, Robert A. Eigel, John A. Kelley, Thomas R. Leathers, and James C. Ross, Soil Conservation Service, and Stephen R. Hurst, Kentucky Natural Resources and Environmental Protection Cabinet

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

MARION COUNTY is in the central part of Kentucky (fig. 1). It is in the Kentucky Bluegrass and the Highland Rim and Pennyroyal Major Land Resource Areas *(5)*. The total land area is about 347 square miles, or 221,952 acres *(34)*. In 1980, the county had a population of about 19,710, and Lebanon, the county seat, had a population of 6,590 *(33)*.

Marion County is bounded on the north by Washington County, on the east by Boyle and Casey Counties, on the south by Taylor County, and on the west by Nelson and Larue Counties.

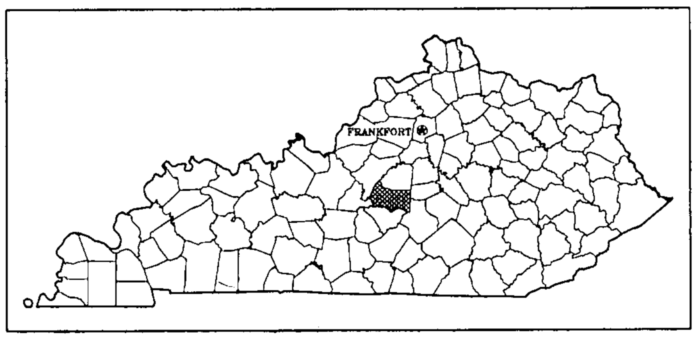

Figure 1.—Location of Marion County in Kentucky.

General Nature of the County

This section provides general information about settlement and history, climate, natural resources, farming, and topography and drainage in Marion County.

Settlement and History

Marion County was first settled in the 1770's. The first permanent settlement was established in 1776, in an area along Pleasant Run Creek south of the Marion and Washington County line. It was named Sandusky Station in honor of the families of James and Jacob Sandusky. Another early settlement was Cartwright Station, built by Samuel Cartwright and others in 1779.

Marion County was formed in 1834 from the southern part of Washington County. It was named in honor of General Francis Marion, a distinguished officer in the Revolutionary War. The division line between Marion and Washington Counties was established 4.5 miles south of Springfield at an equal distance between Springfield and Lebanon.

Lebanon was originally settled in 1789 by Scotch-Irish Presbyterians from Virginia and by English Catholics from Maryland. The city was named for the extensive cedar trees in the vicinity.

During the Civil War, several battles took place in Marion County. The most significant battle, the Battle of Lebanon, took place on July 5, 1863 *(17)*.

Climate

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

Table 1 gives data on temperature and precipitation for the survey area as recorded at Bradfordsville, Kentucky, in the period 1962 to 1981. 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 34 degrees F and the average daily minimum temperature is 23 degrees. The lowest temperature on record, which occurred at Bradfordsville on January 24, 1963, is -30 degrees. In summer, the average temperature is 74 degrees and the average daily maximum temperature is 86 degrees. The highest recorded temperature, which occurred at Bradfordsville on July 17, 1980, is 101 degrees.

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

The total annual precipitation is 53 inches. Of this, 29 inches, or 55 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 24 inches. The heaviest 1-day rainfall during the period of record was 4.6 inches at Bradfordsville on April 28, 1970. Thunderstorms occur on about 46 days each year.

The average seasonal snowfall is 20 inches. The greatest snow depth at any one time during the period of record was 14 inches. On the average, 14 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 65 percent of the time possible in summer and 45 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 10 miles per hour, in spring.

Natural Resources

The most important natural resources in Marion County are soil, water, woodland, and limestone. Other natural resources include oil and gas, oil shale, clay shale, and sand and gravel.

Ground and surface water supplies are adequate for domestic use throughout the county. All of the incorporated towns and many rural areas are served by community water systems. Most farmsteads receive their water supply from individually dug wells or cisterns. Farm ponds, small lakes, and creeks throughout the county are used for livestock water, irrigation, fishing, and swimming. The Marion County Sportsman Club Lake, which is in the central part of the county, is used for boating and fishing.

Woodland makes up about 31 percent, or about 68,100 acres, of Marion County *(31)*. Most of the forests have been logged in the past, and timber production adds to the county's present economy.

The county has moderate quantities of limestone. Several small abandoned quarry pits are in scattered areas throughout the north-central part. The only active quarry is about 2 miles south of Lebanon. Quarried limestone is used for agricultural lime, aggregate, road base, and asphalt filler.

Several test holes for oil and gas have been drilled in the county but have yielded no commercial quantities at present, though some sites have yielded sufficient quantities for individual use. Oil shale deposits are abundant in the Knobs Physiographic Region, but present commercial mining methods are not economical. Clay shale is abundant throughout the county along the base of the Knobs. In many places, it is suitable for the manufacture of bricks and tile.

Large quantities of sand and gravel are on the valley floor along Rolling Fork. Sand and gravel are used locally for road base and as aggregate for farm and county roads *(36, 37, 38, 39, 40, 41)*.

Farming

During the last two centuries, much of Marion County has been cleared or converted to farmland. The northern and central parts are used mainly for cultivated crops, hay, or pasture. The southern part is very hilly and is used mainly as second-growth hardwood forest.

Farm products are the main source of income in the county (fig. 2). According to the 1982 Census of Agriculture, the average farm size was about 150 acres. The census reported that about 69 percent of the farmers were owner operators, 18 percent part-owner operators, and 13 percent tenant operators *(35)*.

The main farm products are row crops, pasture and hay crops, livestock, and livestock products. In 1982, cultivated crops accounted for about 42 percent of the cash receipts from farming. Corn was the principal grain

Figure 2.—A farmstead in an area of Crider silt loam, 2 to 6 percent slopes. Farming is the major source of income in Marion County.

crop grown. It made up about 62 percent of the total acreage of row crops planted. About 25 percent of the corn was harvested as silage. Soybeans was also an important row crop. It made up about 17 percent of the acreage planted. Burley tobacco made up only about 10 percent of the acreage of row crops but was responsible for 74 percent of the total receipts from cash crops and about 81 percent of the total farm income (fig. 3). A small percentage of the total farm receipts was from the sale of vegetables, nursery plants, greenhouse products, and orchard crops.

Alfalfa, Kentucky 31 tall fescue, orchardgrass, red clover, and timothy are important hay crops. The chief pasture and hay species are Kentucky 31 tall fescue and orchardgrass. About 15 percent of the hay grown in the county is alfalfa. In 1985, Marion County ranked 13th in Kentucky in tons of alfalfa hay grown *(16)*. Many hay and pasture fields have been improved by including legumes, such as red clover, Korean lespedeza, and white clover, in the seeding mixture.

Livestock enterprises accounted for about 58 percent of the farm income in 1982. Dairy products accounted for about 49 percent of the cash receipts derived from the sale of livestock and livestock products. In 1985, Marion County ranked 7th in Kentucky in milk production *(16)*. Cattle and calves accounted for most of the other income derived from the sale of livestock and livestock products. The production of poultry, poultry products, hogs, and sheep was less significant. Some racehorses and show horses were bred and raised in the county.

Topography and Drainage

Marion County has a diverse topography. It is in four major Physiographic Regions *(6)* (fig. 4). The western, central, and southeastern parts are in the Knobs Physiographic Region. This area consists of a series of hills capped by long, narrow ridges and an occasional isolated knob. The sloping to very steep soils are used mostly as woodland.

The southwest corner of the county is on the northern rim of the Eastern Pennyroyal Physiographic Region. This area is capped by broad ridgetops. The nearly level to moderately steep soils are used mostly for hay, pasture, corn, or tobacco. Also included in this area are broad foot slopes and toe slopes. The nearly level to sloping soils are used mostly for row crops, hay, or pasture, and the moderately steep soils are used as pasture or woodland.

The Knobs and Eastern Pennyroyal Physiographic Regions are drained by Rolling Fork and are dissected

Figure 3.—Burley tobacco on Sensabaugh gravelly silt loam, frequently flooded. Irrigation is needed in dry growing seasons.

by many small streams and creeks. The major streams are Big South Fork, Pope Creek, Cloyd Creek, Clear Creek, and Prather Creek.

The north-central part of the county is in the Outer Bluegrass Physiographic Region. This area consists mainly of broad, rolling ridgetops and side slopes. The nearly level to sloping soils on ridgetops are used mainly for corn, tobacco, small grain, or hay. The moderately steep and steep soils on side slopes are used as pasture or woodland.

The northeastern part of the county is in the Hills of the Bluegrass Physiographic Region. This area is very hilly and has long, narrow ridgetops. The nearly level to sloping soils on the ridgetops are used mostly for hay or pasture, but some small tracts are used for tobacco. The moderately steep and steep soils on side slopes are used mostly as pasture. Many side slopes have dense stands of eastern redcedar.

The Outer Bluegrass and Hills of the Bluegrass Physiographic Regions are drained by tributaries of the Beech Fork of the Chaplin River. The major streams are Hardins Creek, Cartwright Creek, Pleasant Run, and Beech Fork.

The elevation across Marion County ranges from about 475 feet in the northwest corner, where Hardins Creek empties into Beech Fork, to about 1,245 feet in the southeast corner, near the Casey County line *(36, 38)*.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface

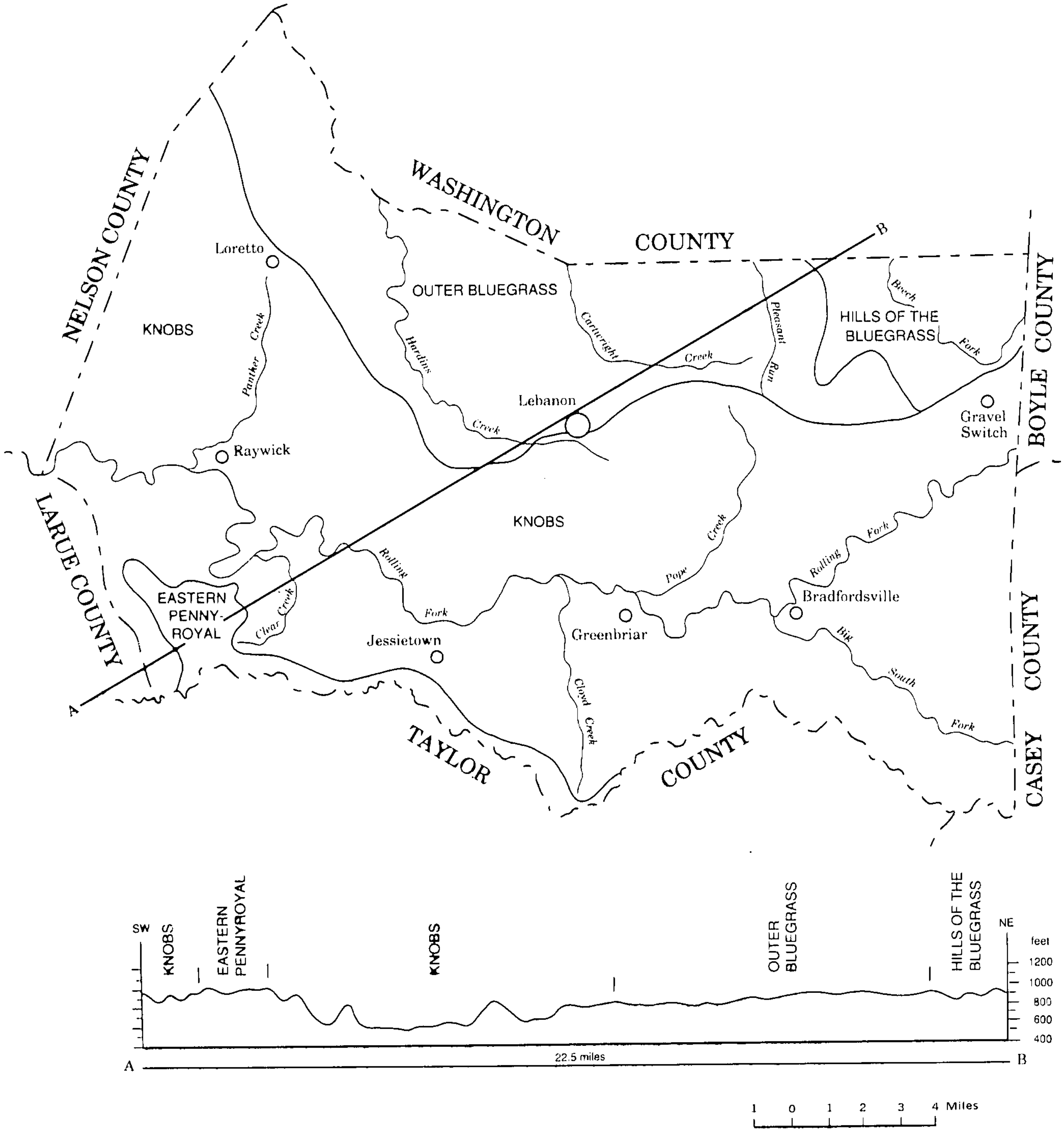

Figure 4.—Physiographic regions of Marion County.

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

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

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries *(25)*.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research *(29)*.

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

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

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

Map Unit Composition

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

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

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

General Soil Map Units

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

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

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or 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 boundary lines do not completely join with those in adjacent counties because of differences in the design of general soil map units and changes in concepts of some soil series.

Soil Descriptions

1. Carpenter-Garmon-Rohan

Gently sloping to very steep, deep to shallow, well drained soils that have a loamy subsoil; on foot slopes, side slopes, and narrow ridgetops

This map unit consists of scattered, discontinuous, irregularly shaped areas throughout the northwestern, central, and southeastern parts of the county. It is in the Knobs Physiographic Region. The major soils are underlain by shale, siltstone, and limestone. The landscape is characterized by a series of hills and foot slopes connected by long, narrow ridgetops. Most areas have isolated, conical knobs. Slopes range from 2 to 80 percent. They are dominantly 20 to 80 percent. The landscape is dissected by many small drainageways that empty into intermittent and perennial streams. Marion County Sportsman Club Lake and many small pit and embankment ponds are in areas of this map unit. The major structures are in a few small communities and housing developments.

This map unit makes up about 24 percent of the county. It is about 26 percent Carpenter soils, 20 percent Garmon soils, 17 percent Rohan soils, and 37 percent soils of minor extent (fig. 5).

Carpenter soils are deep and are gently sloping to very steep. They are on foot slopes and the lower side slopes. They formed in loamy material weathered from shale. Typically, the surface layer is brown gravelly silt loam, and the subsoil is strong brown silty clay loam. The substratum is yellowish brown, mottled channery silty clay.

Garmon soils are moderately deep and very steep. They are on side slopes. They formed in material weathered from siltstone interbedded with thin layers of limestone. Typically, the surface layer is brown channery silt loam. The upper part of the subsoil is yellowish brown channery silt loam, and the lower part is brown channery silty clay loam.

Rohan soils are shallow and are sloping to very steep. They are on narrow ridgetops, knolls, and the lower side slopes. They formed in material weathered from black shale. Typically, the surface layer is dark brown channery silt loam. The subsoil is dark yellowish brown very channery silt loam and yellowish brown extremely channery silty clay loam.

Of minor extent in this map unit are Lenberg, Frankstown, Trappist, Faywood, Cynthiana, and Sensabaugh soils. Lenberg soils are on the lower side slopes and foot slopes and are in a complex pattern with the Carpenter soils. Frankstown soils are on narrow ridgetops, and Trappist soils are on side slopes below the Rohan soils. Faywood and Cynthiana soils are on short, steep side slopes below the Rohan soils. Sensabaugh soils are on flood plains along small streams.

Most of the acreage in this map unit is forested with hardwoods. A small acreage on ridgetops and flood plains is used for tobacco, corn, hay, or pasture.

Most of the soils in this map unit are poorly suited to cultivated crops because of the slope. Some of the soils of minor extent on ridgetops and flood plains are suited

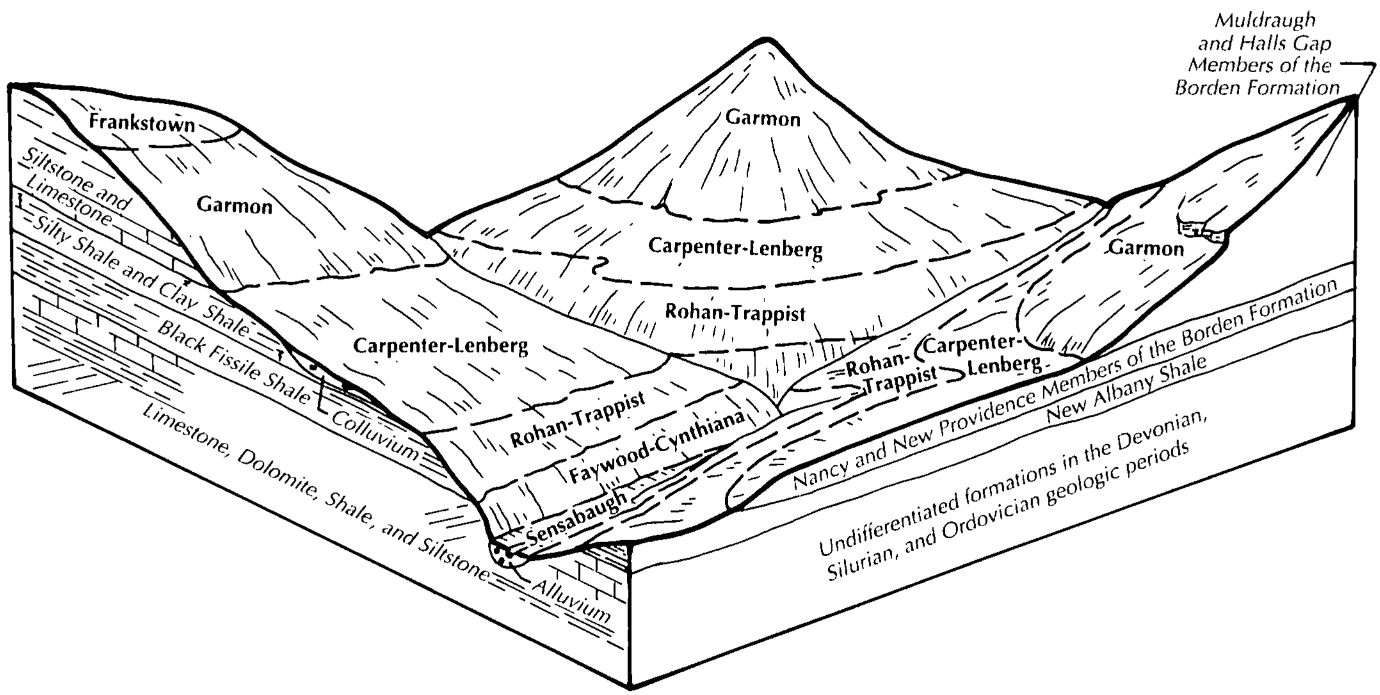

Figure 5.—Typical pattern of soils and parent material in the Carpenter-Garmon-Rohan general soil map unit.

to cultivated crops, hay, and pasture.

The soils in this map unit are well suited to woodland. The hazard of erosion, the equipment limitation, and plant competition are management concerns. The soils in the forested areas are well suited to woodland wildlife habitat.

The soils in this map unit generally are poorly suited to urban uses because of the slope, the depth to bedrock, low strength, and the hazard of slippage in areas where the soils are underlain by clayey shale. Some of the soils on ridgetops are suited to urban uses. The depth to bedrock and the slope are limitations in some of these areas.

2. Trappist-Crider-Faywood

Gently sloping to very steep, moderately deep and deep, well drained soils that have a clayey or loamy and clayey subsoil; on broad to narrow ridgetops and side slopes

This map unit consists of discontinuous, irregularly shaped areas throughout the central part of the county. It is in the Knobs Physiographic Region. The major soils are underlain by shale, limestone, and dolomite. The landscape is characterized by short side slopes and broad ridgetops. Slopes range from 2 to 60 percent. They are dominantly 6 to 25 percent. The landscape is dissected by many small drainageways, intermittent streams, and the valley along Rolling Fork. Most of the acreage is farmland. The communities of Loretto, Raywick, and Gravel Switch and many small residential developments are in areas of this map unit. The Seaboard System Railroad and gas transmission lines cross the unit.

This map unit makes up about 30 percent of the county. It is about 18 percent Trappist soils, 13 percent Crider soils, 12 percent Faywood soils, and 57 percent soils of minor extent (fig. 6).

Trappist soils are moderately deep and are gently sloping to very steep. They are on ridgetops and side slopes. They formed in material weathered from black shale. Typically, the surface layer is brown silty clay loam. The upper part of the subsoil is yellowish brown and strong brown clay, and the lower part is yellowish brown channery clay.

Crider soils are deep and are gently sloping and sloping. They are on broad ridgetops and side slopes. They formed in a mantle of loess, which is underlain by material weathered from limestone. Typically, the surface layer is brown silt loam. The upper part of the subsoil is strong brown and yellowish red silty clay loam. The lower part is yellowish red and red silty clay.

Faywood soils are moderately deep and are sloping to very steep. They are on side slopes below the Crider and Trappist soils. They formed in material weathered

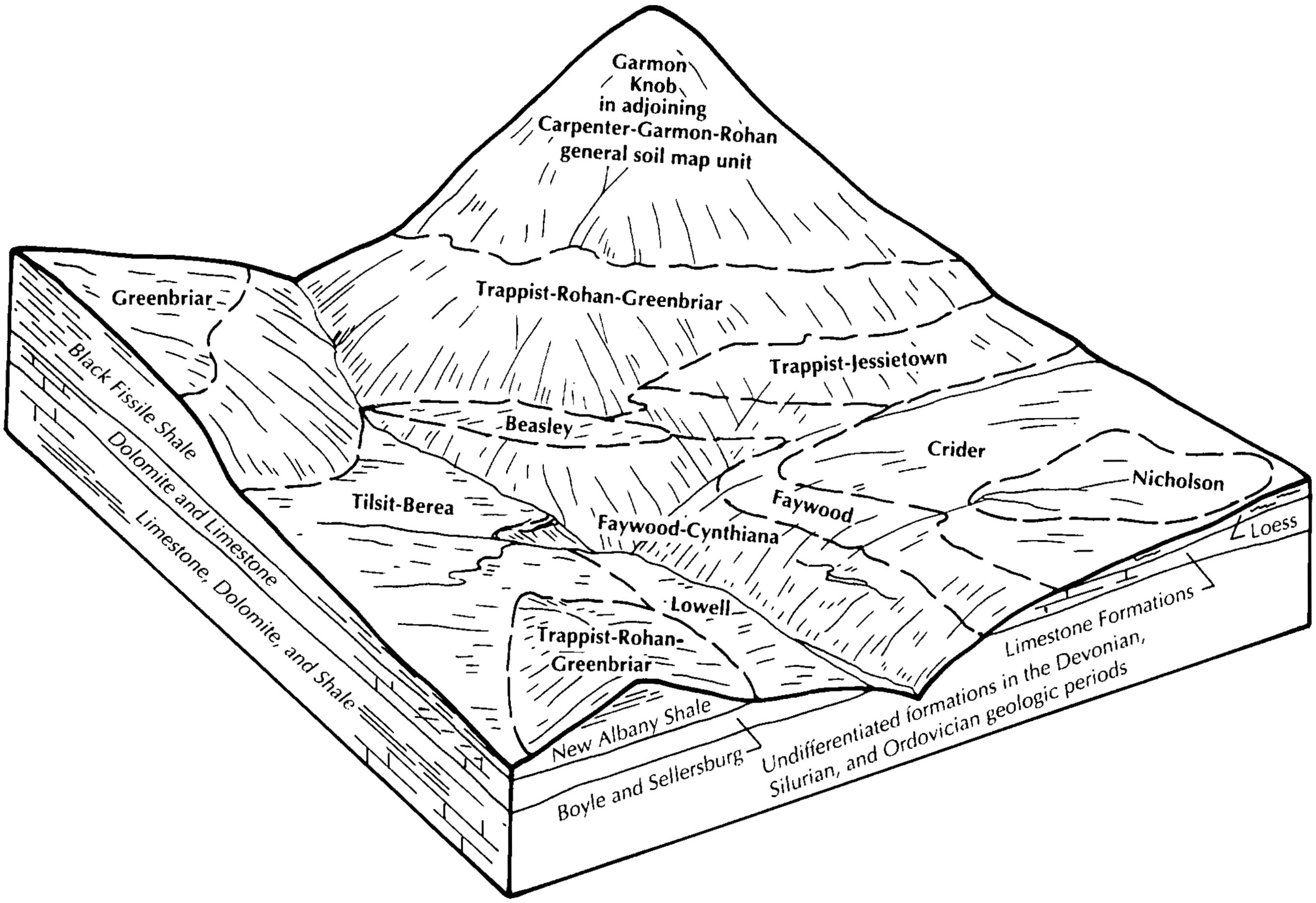

Figure 6.—Typical pattern of soils and parent material in the Trappist-Crider-Faywood general soil map unit.

mainly from limestone. Typically, the surface layer is brown silty clay loam, and the subsoil is yellowish brown and light olive brown clay.

Of minor extent in this map unit are Cynthiana, Tilsit, Greenbriar, Beasley, Jessietown, Berea, Lowell, Rohan, Nicholson, and Lawrence soils. Cynthiana soils are in a complex pattern with the Faywood soils on side slopes. Tilsit, Greenbriar, Jessietown, Berea, and Lawrence soils are on broad ridgetops. Beasley, Lowell, and Nicholson soils are on ridgetops or side slopes.

Most of the acreage on ridgetops and the upper side slopes is used for pasture, hay, or tobacco. The acreage on the lower side slopes is used as unimproved pasture or as hardwood forest.

The soils on ridgetops and the upper side slopes are suited to farming. Erosion is the main hazard in the areas used for cultivated crops, especially on the sloping and moderately steep soils.

The soils on ridgetops and the upper side slopes are well suited to woodland. Plant competition and the equipment limitation are management concerns on most of the soils. The soils on the lower side slopes are suited to woodland, but the hazard of erosion, the equipment limitation, and plant competition are management concerns. Most of the soils in the forested areas are suited to woodland wildlife habitat.

Most of the gently sloping and sloping soils in this map unit are suited to urban uses. Restricted permeability in the subsoil and the depth to bedrock are limitations in some areas. The moderately steep and very steep soils are poorly suited to urban uses. The slope and restricted permeability are limitations. The depth to bedrock and rock outcrops also are limitations in many areas.

3. Garmon-Christian-Carpenter

Very steep to gently sloping, moderately deep and deep, well drained soils that have a loamy or clayey subsoil; on ridgetops, side slopes, and foot slopes

This map unit occurs as an irregularly shaped area in the southwestern part of the county. It is on the border of the Eastern Pennyroyal and Knobs Physiographic Regions. The major soils are underlain by limestone, siltstone, and shale. The landscape is characterized by a series of hills connected by long, narrow to broad ridgetops. Slopes range from 2 to 80 percent. They are dominantly 6 to 60 percent. The landscape is dissected by many small drainageways and intermittent streams. A few small pit and embankment ponds are in scattered areas on the ridgetops. The major structures are in a few small communities and scattered housing developments.

This map unit makes up about 9 percent of the county. It is about 38 percent Garmon soils, 15 percent Christian soils, 10 percent Carpenter soils, and 37 percent soils of minor extent.

Garmon soils are moderately deep and very steep. They are on side slopes. They formed in material weathered from siltstone interbedded with thin layers of limestone. Typically, the surface layer is brown channery silt loam. The upper part of the subsoil is yellowish brown channery silt loam, and the lower part is brown channery silty clay loam.

Christian soils are deep and are sloping to very steep. They are on ridgetops and side slopes. They formed in material weathered from limestone interbedded with thin layers of siltstone, sandstone, and shale. Typically, the surface layer is brown silt loam. The upper part of the subsoil is yellowish brown silt loam and yellowish red clay loam. The next part is reddish brown and dark reddish brown, mottled clay. The lower part is dark reddish brown and yellowish red channery clay loam.

Carpenter soils are deep and are gently sloping to very steep. They are on foot slopes and the lower side slopes. They formed in loamy material weathered from shale. Typically, the surface layer is brown gravelly silt loam, and the subsoil is strong brown silty clay loam. The substratum is yellowish brown, mottled channery silty clay.

Of minor extent in this map unit are Mountview, Nicholson, Lenberg, and Rohan soils. Mountview and Nicholson soils are on broad ridgetops. Lenberg and Rohan soils are on the lower side slopes and foot slopes.

Most of the acreage on ridgetops and the upper side slopes is used for pasture, hay, or tobacco. The acreage on the lower side slopes is used as hardwood forest.

The soils on ridgetops and the upper side slopes are suited to farming. Erosion is the main hazard in the areas used for cultivated crops, especially on the sloping and moderately steep soils. The soils in this map unit are well suited to hay and pasture.

The soils on ridgetops and the upper side slopes are well suited to woodland. Plant competition and the equipment limitation are management concerns. The soils on the lower side slopes are suited to woodland, but the hazard of erosion, the equipment limitation, and plant competition are management concerns. Most of the soils in the forested areas are suited to woodland wildlife habitat.

The soils on ridgetops are suited to most urban uses. The soils on the upper side slopes are suited to some urban uses. The wetness, the depth to bedrock, and rock outcrops are limitations in some areas. The soils on the lower side slopes are poorly suited to urban uses because of the slope and the hazard of slippage in areas where the soils are underlain by clayey shale.

4. Newark-Nolin-Elk

Nearly level to sloping, deep, somewhat poorly drained and well drained soils that have a loamy subsoil; on flood plains and low stream terraces

This map unit occurs as a long, narrow area in the valleys along Rolling Fork and Big South Fork in the southern part of the county. It is in the Knobs Physiographic Region. The major soils formed in alluvial material derived from limestone, shale, siltstone, and sandstone. The landscape is characterized by broad to narrow flood plains and stream terraces that extend from the stream channels to the adjacent side slopes. Slopes range from 0 to 12 percent. Except for the structures in a few residential developments and the communities of Jessietown and Bradfordsville, the most common structures are on the many farmsteads in areas of this unit.

This map unit makes up about 9 percent of the county. It is about 29 percent Newark soils, 28 percent Nolin soils, 9 percent Elk soils, and 34 percent soils of minor extent.

Newark soils are somewhat poorly drained and nearly level. They are on flood plains and low stream terraces. Typically, the surface layer is grayish brown silt loam. The subsoil is brown and light brownish gray, mottled silt loam. The substratum is gray, mottled silty clay loam.

Nolin soils are well drained and nearly level. They are on flood plains. Typically, the surface layer and subsoil are brown silt loam. The substratum is brown gravelly silt loam.

Elk soils are well drained and are gently sloping and sloping. They are on low stream terraces. Typically, the surface layer is brown silt loam. The subsoil is brown and strong brown silty clay loam. The substratum is dark yellowish brown silty clay loam.

Of minor extent in this map unit are Lawrence, Melvin, Otwell, Sensabaugh, and Tilsit soils. Lawrence,

Figure 7.—General farming in an area of the Newark-Nolin-Elk general soil map unit. The Carpenter-Garmon-Rohan general soil map unit is in the background.

Melvin, and Otwell soils are on stream terraces, and Sensabaugh soils are on flood plains, mainly in the narrow valleys of the smaller tributary streams. Tilsit soils are on the tops of low upland ridges.

Most of the acreage in this map unit is used for cultivated crops, hay, or pasture (fig. 7). The cultivated crops are mainly corn, tobacco, and soybeans.

Most of the soils in this map unit are suited to cultivated crops, hay, and pasture. Flooding is a hazard on the flood plains and low stream terraces during the later winter months and early in spring.

The soils in this map unit are well suited to woodland. Plant competition and the equipment limitation are management concerns in some areas.

Most of the soils in this map unit are poorly suited to urban uses. Wetness and the hazard of flooding are the main management concerns. The soils on stream terraces that are not subject to flooding are suited to most urban uses.

5. Riney-Christian

Sloping to very steep, deep, well drained soils that have a loamy or clayey subsoil; on ridgetops and side slopes

This map unit occurs as a small, irregularly shaped area in the southwestern part of the county. It is on the northern border of the Eastern Pennyroyal Physiographic Region. The major soils are underlain by terrace deposits of sand and gravel, by sandstone conglomerate, or by limestone interbedded with thin layers of siltstone and shale. The landscape is a highly dissected area of narrow ridgetops and side slopes. Slopes range from 6 to 35 percent. Many small drainageways and intermittent streams are in areas of this map unit, and a few small embankment ponds are on the ridgetops. The most noticeable structures are on a few scattered farmsteads.

This map unit makes up about 1 percent of the county. It is about 60 percent Riney soils, 29 percent Christian soils, and 11 percent soils of minor extent.

The sloping to very steep Riney soils are on ridgetops and side slopes. They formed in material weathered from terrace deposits or from sandstone conglomerate. Typically, the surface layer is brown loam. The subsoil is strong brown loam and yellowish red and red clay loam.

The sloping to very steep Christian soils are on ridgetops and side slopes. They formed in material weathered from limestone, siltstone, sandstone, and shale. Typically, the surface layer is brown silt loam. The upper part of the subsoil is yellowish brown silt loam and yellowish red clay loam. The next part is reddish brown and dark reddish brown, mottled clay. The lower part is dark reddish brown and yellowish red channery clay loam.

Of minor extent in this map unit are Garmon and Frankstown soils. Garmon soils are on the lower side slopes, and Frankstown soils are on narrow ridgetops.

Most of the acreage on ridgetops and the upper side slopes are used for pasture, hay, or tobacco. The acreage on the lower side slopes is used as unimproved pasture or hardwood forest.

The soils on ridgetops and the upper side slopes are suited to farming. Erosion is the main hazard in the areas used for cultivated crops, especially on the sloping and moderately steep soils. The soils in this map unit are well suited to hay and pasture.

The soils on the ridgetops and the upper side slopes are well suited to woodland. Plant competition is a management concern. The soils on the lower side slopes are suited to woodland, but the hazard of erosion, the equipment limitation, and plant competition are management concerns. Most of the soils in the forested areas are suited to woodland wildlife habitat.

The soils on ridgetops are suited to most urban uses, and the soils on the upper side slopes are suited to some urban uses. The soils on the lower side slopes are poorly suited to urban uses because of the slope.

6. Eden-Lowell

Very steep to gently sloping, moderately deep and deep, well drained soils that have a clayey subsoil; on side slopes and ridgetops

This map unit occurs as a small, irregularly shaped area in the northeastern part of the county. It is in the Hills of the Bluegrass Physiographic Region. The major soils are underlain by shale interbedded with limestone. The landscape is a highly dissected area of narrow ridgetops and side slopes. Slopes range from 2 to 35 percent. They are dominantly 6 to 30 percent. Many small intermittent and perennial streams and hillside and embankment ponds are in areas of this map unit. The major structures are in a few small communities, on several scattered farmsteads, or along gas transmission lines.

This map unit makes up about 4 percent of the county. It is about 45 percent Eden soils, 27 percent Lowell soils, and 28 percent soils of minor extent.

Eden soils are moderately deep and are sloping to very steep. They are on side slopes and very narrow ridgetops. They formed in material weathered from shale interbedded with thin layers of limestone and siltstone. Typically, the surface layer is brown silty clay loam. The subsoil is yellowish brown silty clay and light olive brown flaggy silty clay.

Lowell soils are deep and are gently sloping to moderately steep. They are on ridgetops and side slopes. They formed in material weathered from limestone interbedded with thin layers of shale and siltstone. Typically, the surface layer is brown silty clay loam. The subsoil is strong brown silty clay and yellowish brown clay.

Of minor extent in this map unit are Faywood, Cynthiana, Elk, and Nolin soils. Faywood and Cynthiana soils are on side slopes. They are intermingled with bands of Rock outcrop. Elk soils are on low stream terraces, and Nolin soils are on flood plains.

Most of the acreage on ridgetops and the upper side slopes is used for pasture, hay, or tobacco. The acreage on the lower side slopes is used as unimproved pasture, is wooded, or supports brush.

The soils on ridgetops and the upper side slopes are suited to farming. Erosion is the main hazard in the areas used for cultivated crops. The soils on the lower side slopes are poorly suited to farming because of the slope, the hazard of erosion, and scattered flagstones on the surface. The soils in this map unit are suited to hay and pasture.

The soils on ridgetops and the upper side slopes are well suited to woodland. Plant competition is a management concern. The soils on the lower side slopes are suited to woodland, but the hazard of erosion, the equipment limitation, and seedling mortality are management concerns. Most of the soils in the forested areas are suited to woodland wildlife habitat.

The soils on ridgetops and the upper side slopes are suited to some urban uses. Restricted permeability, the clayey texture, and the slope are the main limitations. The soils on the lower side slopes are poorly suited to urban uses because of the slope, the clayey texture, and the depth to bedrock.

7. Faywood-Cynthiana-Beasley

Gently sloping to very steep, moderately deep, shallow, and deep, well drained soils that have a clayey subsoil; on ridgetops and side slopes

This map unit occurs as an irregularly shaped area in the northwestern part of the county. It is in the Outer Bluegrass Physiographic Region. The major soils are underlain by limestone and shale. The landscape is characterized by rolling, relatively narrow ridgetops and side slopes. Slopes range from 2 to 60 percent. They are dominantly 6 to 30 percent. A few small perennial creeks and many intermittent streams and embankment ponds are in areas of this map unit. A few small communities are in scattered areas throughout this map unit, but most of the structures are on farmsteads.

This map unit makes up about 7 percent of the county. It is about 45 percent Faywood soils, 14 percent Cynthiana soils, 12 percent Beasley soils, and 29 percent soils of minor extent.

Faywood soils are moderately deep and are sloping to very steep. They are on side slopes. They formed in material weathered mainly from limestone. Typically, the surface layer is brown silty clay loam. The subsoil is yellowish brown and light olive brown clay.

Cynthiana soils are shallow and are steep and very steep. They are on side slopes and narrow ridgetops. They are in a complex pattern with the Faywood soils and with Rock outcrop. They formed in material weathered from limestone interbedded with thin layers of calcareous shale. Limestone flagstones are commonly on the surface and throughout the profile. Typically, the surface layer is brown flaggy silty clay loam. The subsoil is yellowish brown clay.

Beasley soils are deep and are gently sloping to steep. They are on ridgetops and side slopes. They formed in material weathered from calcareous shale interbedded with siltstone, soft dolomite, and limestone. Typically, the surface layer is brown silty clay loam, and the subsoil is yellowish brown silty clay. The substratum is yellowish brown, mottled clay.

Of minor extent in this map unit are Lowell, Shrouts, Brassfield, Nolin, and Elk soils. Lowell soils are on ridgetops, and Shrouts and Brassfield soils are on side slopes. Nolin soils are on flood plains, and Elk soils are on low stream terraces.

Most of the acreage in this map unit is used for pasture or hay. Some of the broader ridgetops are used for cultivated crops, such as corn, soybeans, and tobacco. The steep hillsides are used as woodland or unimproved pasture.

Most of the soils in this map unit are suited to pasture and hay. The gently sloping and sloping soils on ridgetops and side slopes are suited to cultivated crops, but the hazard of erosion is moderate or severe.

The soils in this map unit are well suited to woodland. The hazard of erosion, the equipment limitation, seedling mortality, and plant competition are management concerns. The steep and very steep soils are best suited to woodland and to woodland wildlife habitat.

Most of the soils in this map unit are poorly suited to urban uses. The slope, the depth to bedrock, the clayey texture, and restricted permeability in the subsoil are limitations. The gently sloping and sloping soils are suited to some urban uses.

8. Lowell-Sandview-Faywood

Gently sloping to very steep, deep and moderately deep, well drained soils that have a clayey or loamy and clayey subsoil; on ridgetops and side slopes

This map unit occurs as a large, irregularly shaped area in the north-central part of the county. It is in the Outer Bluegrass Physiographic Region. The major soils are underlain mainly by limestone and shale. The landscape is characterized by broad rolling ridgetops and side slopes. Slopes range from 0 to 60 percent. They are dominantly 2 to 20 percent. The landscape is dissected by few perennial streams and many intermittent streams and small drainageways. A few areas have karst topography. In these areas water drains into sinkholes or depressions. Except for the city of Lebanon and a few small communities, the major structures in this map unit are the Seaboard System Railroad, are along gas transmission lines, or are on scattered farmsteads.

This map unit makes up about 16 percent of the county. It is about 43 percent Lowell soils, 19 percent Sandview soils, 13 percent Faywood soils, and 25 percent soils of minor extent (fig. 8).

Lowell soils are deep and are gently sloping to moderately steep. They are on ridgetops and side slopes. They formed in material weathered from limestone interbedded with thin layers of shale and siltstone. Typically, the surface layer is brown silty clay loam. The subsoil is strong brown silty clay and yellowish brown clay.

Sandview soils are deep and are gently sloping and sloping. They are on broad ridgetops and side slopes. They formed in a mantle of loess, which is underlain by material weathered from limestone. Typically, the surface layer is brown silt loam. The upper part of the subsoil is yellowish brown silt loam and silty clay loam, and the lower part is yellowish brown silty clay and clay. The substratum is yellowish brown and dark yellowish brown, mottled silty clay.

Faywood soils are moderately deep and are sloping

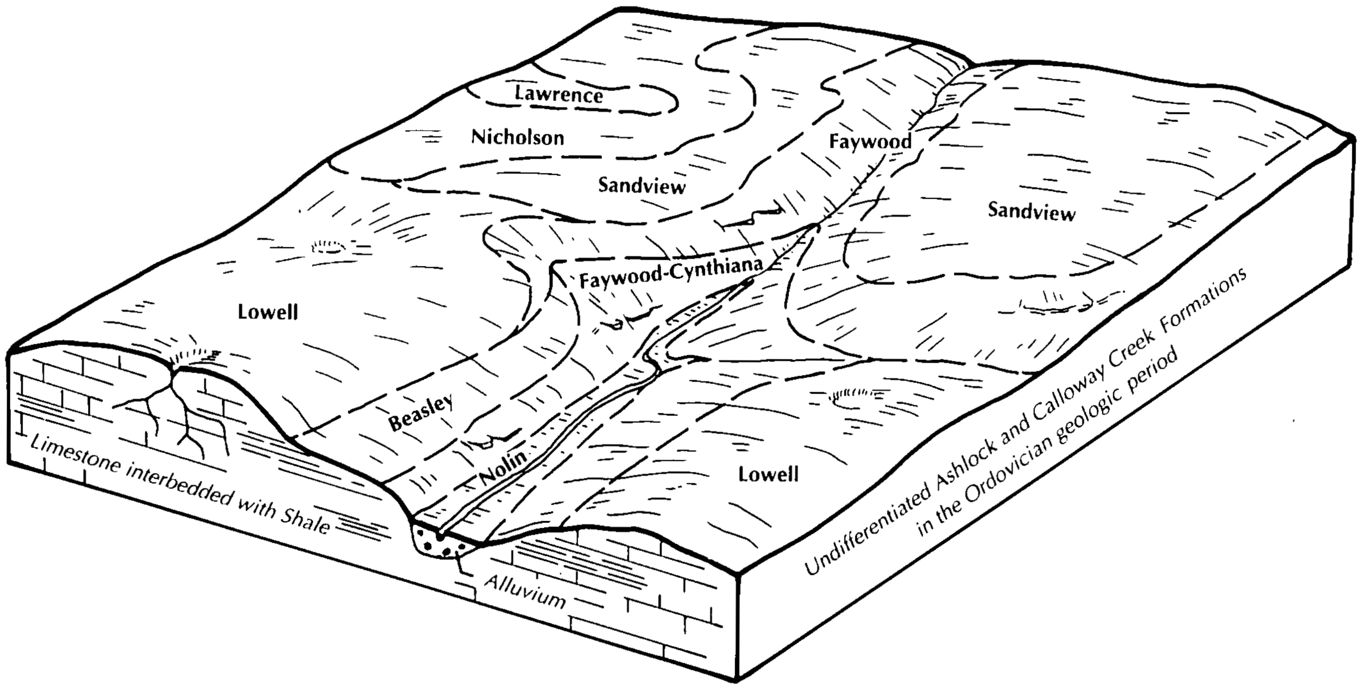

Figure 8.—Typical pattern of soils and parent material in the Lowell-Sandview-Faywood general soil map unit.

to very steep. They are on side slopes. They formed in material weathered from limestone interbedded with thin layers of calcareous shale and siltstone. Typically, the surface layer is brown silty clay loam, and the subsoil is yellowish brown and light olive brown clay.

Of minor extent in this map unit are Nicholson, Beasley, Lawrence, Cynthiana, and Nolin soils. Nicholson, Beasley, and Lawrence soils are on ridgetops and the upper side slopes, and Cynthiana soils are on the lower side slopes. Nolin soils are on flood plains.

Most of the acreage in this map unit is used for cultivated crops, hay, or pasture. A few areas on the lower side slopes are used as woodland or unimproved pasture.

The soils in most of this map unit are suited to cultivated crops, such as soybeans, corn, and tobacco, but the hazard of erosion is moderate or severe. The soils on the steeper side slopes are suited to hay, pasture, and woodland.

The soils in this map unit are well suited to woodland. The hazard of erosion, the equipment limitation, and plant competition are management concerns.

The gently sloping and sloping soils in this map unit are suited to some urban uses. The main limitations are restricted permeability in the subsoil, the clayey texture, the shrink-swell potential, and the depth to bedrock. The steeper soils on the lower side slopes are poorly suited to urban uses.

Detailed Soil Map Units

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

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

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

In this section soils are rated as to their suitability for various uses. They are divided into four groups: well suited, suited, poorly suited, and not suited.

Well suited soils have favorable properties for the specified use. Limitations are easy to overcome. Good performance and low maintenance can be expected.

Suited soils have moderately favorable properties for the selected use. One or more properties make these soils less desirable than well suited soils.

Poorly suited soils have one or more properties unfavorable for the selected use. Overcoming the limitations requires special design, extra maintenance, or costly alteration.

Not suited soils cannot be used for the selected purpose or require extreme measures to overcome the undesirable features.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the substratum, 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 substratum. 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, Lowell silt loam, 2 to 6 percent slopes, is a phase of the Lowell series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Tilsit-Berea silt loams, 6 to 12 percent slopes, eroded, is an example.

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

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

Soil boundary lines do not completely join with those in adjacent counties, particularly with those in Nelson County, because of variations in the design of map units, changes in concepts of some soil series, and differences in the scale of mapping.

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

BaB—Beasley silt loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on the slightly convex tops of ridges on uplands, mainly in the northwestern part of the county. The mapped areas are about 3 to 100 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, brown silt loam

Subsoil:
6 to 36 inches, yellowish brown silty clay that has mottles below a depth of 18 inches

Substratum:
36 to 54 inches, yellowish brown, mottled clay

Bedrock:
54 to 60 inches, soft shale interbedded with thin layers of marl

This soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderately slow, and the available water capacity is high. Surface runoff is medium. The shrink-swell potential is moderate. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Soft shale bedrock is at a depth of 40 inches or more.

Included with this soil in mapping are small areas of Brassfield, Crider, Nicholson, and Shrouts soils. These soils are in landscape positions similar to those of the Beasley soil. Also included are areas of Beasley soils that are moderately eroded and have a surface layer of silty clay loam. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Beasley soil are used for row crops, small grain, hay, or pasture. Some areas are used as sites for houses and gardens.

This soil is well suited to cultivated crops, but erosion is a moderate hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, cedar, ash, and hickory are the dominant native trees. Some of the trees preferred for planting are white oak, white ash, Virginia pine, and eastern redcedar. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition, the hazard of erosion, and the equipment limitation. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to some urban uses. The moderately slow permeability, a high content of clay, the depth to bedrock, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIe.

BcC2—Beasley silty clay loam, 6 to 12 percent slopes, eroded. This deep, well drained, sloping soil is on slightly convex ridgetops and side slopes on uplands, mainly in the northwestern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 195 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, brown silty clay loam

Subsoil:
5 to 36 inches, yellowish brown silty clay that has mottles below a depth of 18 inches

Substratum:
36 to 54 inches, yellowish brown, mottled clay

Bedrock:
54 to 60 inches, soft shale interbedded with thin layers of marl

This soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderately slow, and the available water capacity is high. Surface runoff is rapid. The shrink-swell potential is moderate. Tillage is somewhat difficult, and the optimum moisture range for cultivation is restricted because the clayey subsoil has been mixed with the surface layer. The root zone is deep. Soft shale bedrock is at a depth of 40 inches or more.

Included with this soil in mapping are small areas of Brassfield, Crider, Nicholson, and Shrouts soils. These soils are in landscape positions similar to those of the Beasley soil. Also included are areas of Beasley soils that are severely eroded and have a surface layer of silty clay. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Beasley soil are used for row crops, small grain, hay, or pasture. Some areas are used as sites for houses and gardens.

This soil is suited to cultivated crops, but erosion is a severe hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, cedar, ash, and hickory are the dominant native trees. Some of the trees preferred for planting are white oak, white ash, Virginia pine, and eastern redcedar. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition, the hazard of erosion, and the equipment limitation. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to some urban uses. The moderately slow permeability, the slope, a high content of clay, the depth to bedrock, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIe.

BeC3—Beasley silty clay, 6 to 12 percent slopes, severely eroded. This deep, well drained, sloping soil is on slightly convex ridgetops and side slopes on uplands, mainly in the northwestern part of the county. Erosion has removed more than 75 percent of the original surface layer and in places some of the subsoil. In most areas rills or small gullies have formed. The mapped areas are about 3 to 80 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, brown silty clay

Subsoil:
4 to 36 inches, yellowish brown silty clay that has mottles below a depth of 18 inches

Substratum:
36 to 54 inches, yellowish brown, mottled clay

Bedrock:
54 to 60 inches, soft shale interbedded with thin layers of marl

This soil is low in natural fertility and in organic matter content. Permeability is moderately slow, and the available water capacity is high. Surface runoff is rapid. The shrink-swell potential is moderate. The soil cannot be easily tilled, and the optimum moisture range for cultivation is significantly restricted because the clayey subsoil has been mixed with the surface layer. The root zone is deep. Soft shale bedrock is at a depth of 40 inches or more.

Included with this soil in mapping are small areas of Brassfield and Shrouts soils. These soils are in landscape positions similar to those of the Beasley soil. Also included are areas of Beasley soils that are moderately eroded and have a surface layer of silty clay loam. Included areas make up about 20 percent of this map unit and are generally less than 3 acres.

Most areas of the Beasley soil are used for hay or pasture. Some of the acreage is idle land that is reverting to brush and woodland.

This soil is poorly suited to cultivated crops because most of the original surface layer has been removed by erosion. The hazard of erosion is very severe if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is suited to woodland. Upland oaks, cedar, ash, and hickory are the dominant native trees. The trees preferred for planting include Virginia pine and eastern redcedar. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition, the hazard of erosion, the equipment limitation, and seedling mortality. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to some urban uses. The moderately slow permeability, the slope, a high content of clay, the depth to bedrock, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IVe.

BeD3—Beasley silty clay, 12 to 25 percent slopes, severely eroded. This deep, well drained, moderately steep and steep soil is on side slopes and narrow, convex ridgetops on uplands, mainly in the northwestern part of the county. Erosion has removed more than 75 percent of the original surface layer and in places some of the subsoil. In most areas rills or small gullies have formed. The mapped areas are about 3 to 105 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 4 inches, brown silty clay

Subsoil:

4 to 36 inches, yellowish brown silty clay that has mottles below a depth of 18 inches

Substratum:

36 to 54 inches, yellowish brown, mottled clay

Bedrock:

54 to 60 inches, soft shale interbedded with thin layers of marl

This soil is low in natural fertility and in organic matter content. Permeability is moderately slow, and the available water capacity is high. Surface runoff is very rapid. The shrink-swell potential is moderate. The soil cannot be easily tilled, and the optimum moisture range for cultivation is significantly restricted because the clayey subsoil has been mixed with the surface layer. The root zone is deep. Soft shale bedrock is at a depth of 40 inches or more.

Included with this soil in mapping are small areas of Brassfield and Shrouts soils. These soils are in landscape positions similar to those of the Beasley soil. Also included are areas of Beasley soils that are moderately eroded and have a surface layer of silty clay loam. Included areas make up about 20 percent of this map unit and are generally less than 3 acres.

Most areas of the Beasley soil are used as pasture. Some of the acreage is idle land that is reverting to brush and woodland.

This soil is poorly suited to cultivated crops because most of the original surface layer has been removed by erosion. The hazard of erosion is very severe if conventional tillage methods are used, and the slope is a major limitation affecting the use of most farm equipment.

This soil is suited to pasture but is poorly suited to hay. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is suited to woodland. Upland oaks, cedar, ash, and hickory are the dominant native trees. The trees preferred for planting include Virginia pine and eastern redcedar. Table 8 provides specific information relating to potential productivity. The main management concerns are the hazard of erosion, plant competition, the equipment limitation, and seedling mortality. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The slope, the moderately slow permeability, a high content of clay, the depth to bedrock, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is VIe.

CaB—Carpenter gravelly silt loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on toe slopes and colluvial fans, mainly in the southern part of the county. The mapped areas are about 3 to 15 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, brown gravelly silt loam

Subsoil:
8 to 42 inches, strong brown silty clay loam that has mottles below a depth of 22 inches

Substratum:
42 to 60 inches, yellowish brown, mottled channery silty clay

Bedrock:
60 to 70 inches, soft shale

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate in the subsoil and moderately slow or slow in the substratum. The available water capacity is high. Surface runoff is medium. The soil can be worked throughout a wide range in moisture content, but tillage is somewhat difficult because of the gravel in the surface layer. The root zone is deep and can be easily penetrated by plant roots. Soft shale bedrock is at a depth of 40 to more than 80 inches.

Included with this soil in mapping are small areas of Lenberg and Tilsit soils. These soils are in landscape positions similar to those of the Carpenter soil. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Carpenter soil are used for row crops, small grain, hay, or pasture. Some areas are used as sites for houses and gardens.

This soil is well suited to cultivated crops, but erosion is a moderate hazard if conventional tillage methods are used. The pebbles and rock fragments in the surface layer can interfere with the use of some tillage equipment. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, hickory, and pine are the dominant native trees. Some of the trees preferred for planting are yellow poplar, black walnut, white oak, northern red oak, white ash, shortleaf pine, and eastern white pine. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to most urban uses. The moderately slow or slow permeability in the substratum and the depth to bedrock are limitations affecting some sanitary facilities. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIe.

CaC—Carpenter gravelly silt loam, 6 to 12 percent slopes. This deep, well drained, sloping soil is on foot slopes and colluvial fans, mainly in the southern part of the county. The mapped areas are about 3 to 80 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, brown gravelly silt loam

Subsoil:
8 to 42 inches, strong brown silty clay loam that has mottles below a depth of 22 inches

Substratum:
42 to 60 inches, yellowish brown, mottled channery silty clay

Bedrock:
60 to 70 inches, soft shale

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate in the subsoil and moderately slow or slow in the substratum. The available water capacity is high. Surface runoff is rapid. The soil can be worked throughout a wide range in moisture content, but tillage is somewhat difficult because of the gravel in the surface layer. The root zone is deep and can be easily penetrated by plant roots. Soft shale bedrock is at a depth of 40 to more than 80 inches.

Included with this soil in mapping are small areas of Lenberg and Tilsit soils. These soils are in landscape positions similar to those of the Carpenter soil. Also included are small areas of Carpenter soils that are moderately eroded. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Carpenter soil are used for row crops, small grain, hay, or pasture. Some areas are used as sites for houses and gardens.

This soil is suited to cultivated crops, but erosion is a severe hazard if conventional tillage methods are used. The pebbles and rock fragments in the surface layer can interfere with the use of some tillage equipment. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, hickory, and pine are the dominant native trees. Some of the trees preferred for planting are yellow poplar, black walnut, white oak, northern red oak, white ash, shortleaf pine, and eastern white pine. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to some urban uses. The moderately slow or slow permeability in the substratum, the slope, and the depth to bedrock are limitations affecting most sanitary facilities and most kinds of building site development. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIe.

CaD—Carpenter gravelly silt loam, 12 to 20 percent slopes. This deep, well drained, moderately steep soil is on the lower side slopes and colluvial fans, mainly in the southern part of the county. The mapped areas are about 3 to 95 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, brown gravelly silt loam

Subsoil:
8 to 42 inches, strong brown silty clay loam that has mottles below a depth of 22 inches

Substratum:
42 to 60 inches, yellowish brown, mottled channery silty clay

Bedrock:
60 to 70 inches, soft shale

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate in the subsoil and moderately slow or slow in the substratum. The available water capacity is high. Surface runoff is very rapid. The soil can be worked throughout a wide range in moisture content, but tillage is somewhat difficult because of the gravel in the surface layer. The root zone is deep and can be easily penetrated by plant roots. Soft shale bedrock is at a depth of 40 to more than 80 inches.

Included with this soil in mapping are small areas of Lenberg soils. These soils are in landscape positions similar to those of the Carpenter soil. Also included are small areas of Carpenter soils that are moderately eroded. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Carpenter soil are used for hay, pasture, or woodland. In a few areas the cropping sequence includes cultivated crops. Some areas are used as sites for houses and gardens.

This soil generally is poorly suited to cultivated crops, but the less sloping areas are suited to occasional cultivation in a long-term rotational sequence. Erosion is a very severe hazard if conventional tillage methods are used, and the slope limits the use of farm equipment. The pebbles and rock fragments in the surface layer can interfere with the use of some tillage equipment. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

Many areas are wooded. This soil is well suited to woodland. Upland oaks, hickory, and pine are the dominant native trees. Some of the trees preferred for planting are yellow poplar, black walnut, white oak, northern red oak, white ash, shortleaf pine, and eastern white pine. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition, the hazard of erosion, and the equipment limitation. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The slope, the moderately slow or slow permeability in the substratum, and the depth to bedrock are limitations affecting most sanitary facilities and most kinds of building site development. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is iVe.

CbF2—Carpenter-Lenberg complex, 20 to 45 percent slopes, eroded. These deep and moderately deep, well drained, steep and very steep soils are on uplands in the Knobs Physiographic Region. The Carpenter soil is on foot slopes, and the Lenberg soil is on the lower side slopes in the uplands. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 500 acres.

The Carpenter soil and similar soils make up about 60 percent of this map unit, and the Lenberg soil and similar soils make up about 20 percent. The two soils were mapped together as a complex because they are in a pattern that makes separation impractical at the scale used in mapping.

Typically, the Carpenter soil is covered by a 1-inch layer of partly decomposed leaves and twigs. Under this layer, the typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, brown gravelly silt loam

Subsoil:
6 to 42 inches, strong brown silty clay loam that has mottles below a depth of 22 inches

Substratum:
42 to 60 inches, yellowish brown, mottled channery silty clay

Bedrock:
60 to 70 inches, soft shale

The Carpenter soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate in the subsoil and moderately slow or slow in the substratum. The available water capacity is high. Surface runoff is very rapid. The root zone is deep and can be easily penetrated by plant roots. Soft shale bedrock is at a depth of 40 to more than 80 inches.

Typically, the Lenberg soil is covered by a 1-inch layer of partly decomposed leaves and twigs. Under this layer, the typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, brown silt loam

Subsoil:
4 to 24 inches, yellowish brown silty clay loam and silty clay that has mottles below a depth of 14 inches

Substratum:
24 to 38 inches, olive gray, mottled channery clay

Bedrock:
38 to 45 inches, soft shale interbedded with thin layers of siltstone

The Lenberg soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and the available water capacity is high. Surface runoff is rapid. The shrink-swell potential is moderate. The root zone is moderately deep and can be easily penetrated by plant roots. Soft shale bedrock is at a depth of 20 to 40 inches.

Included with these soils in mapping are small areas of Garmon, Rohan, and Trappist soils. These included soils are in landscape positions similar to those of the Carpenter and Lenberg soils. Also included are moderately deep soils that are somewhat poorly drained and that have a clayey subsoil. Included areas make up about 20 percent of this map unit and are generally less than 3 acres.

Most areas of the Carpenter and Lenberg soils are used as woodland, and a few are used as pasture. Much of the pastured acreage is idle land that is reverting to woodland.

These soils are not suited to cultivated crops. The slope is a major limitation affecting the use of farm equipment.

These soils are not suited to hay and are poorly suited to pasture. If a pasture is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage, provide a good ground cover, and minimize the need for renovation. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, and weed control.

These soils are well suited to woodland and to woodland wildlife habitat. Upland oaks, hickory, and pine are the dominant native trees. The understory is mainly maple, dogwood, pine, and sassafras. Some of the trees preferred for planting are white oak, shortleaf pine, yellow poplar, northern red oak, black walnut, and eastern white pine. Table 8 provides specific information relating to potential productivity and the appropriate trees to plant on the warm and cool aspects of these soils.

The main management concerns in the wooded areas are the hazard of erosion, the equipment limitation, and plant competition. Steep skid trails and roads are subject to rilling and gullying unless they are protected by adequate water bars, a good plant cover, or both. The slope restricts the use of wheeled and tracked equipment on skid trails. Cable skidding is generally safer and results in less surface disturbance. After the trees are harvested, carefully managed reforestation is needed to control competition from undesirable understory plants.

These soils are not suited to urban uses. The slope, the moderately slow permeability, a high content of clay, slippage, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is VIIe.

CeB—Chenault gravelly silt loam, 2 to 8 percent slopes. This deep, well drained, gently sloping and sloping soil is on slightly convex ridgetops on old high level stream terraces that are adjacent to Rolling Fork. Most areas have karst topography. Sinkholes or depressions range from about ¼ acre to 2 acres. The mapped areas are about 5 to 35 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, brown gravelly silt loam

Subsoil:
9 to 42 inches, strong brown gravelly silty clay loam
42 to 55 inches, strong brown, mottled silty clay

Substratum:
55 to 65 inches, yellowish brown, mottled silty clay

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is medium. The soil can be worked throughout a wide range in moisture content, but tillage is somewhat difficult because of the gravel in the surface layer. The root zone is deep and can be easily penetrated by plant roots. Limestone bedrock is at a depth of 40 to 80 inches.

Included with this soil in mapping are small areas of Nicholson and Crider soils. These soils are in landscape positions similar to those of the Chenault soil. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Chenault soil are used for row crops, small grain, hay, or pasture. Some areas are used as sites for houses and gardens.

This soil is well suited to cultivated crops, but erosion is a moderate hazard if conventional tillage methods are used. The pebbles and rock fragments in the surface layer can interfere with tillage equipment. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to pasture and hay. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Poplar, upland oaks, hickory, maple, and walnut are the dominant native trees. Some of the trees preferred for planting are yellow poplar, black walnut, white oak, northern red oak, and eastern white pine. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is well suited to most urban uses. The depth to bedrock and seepage are limitations affecting some sanitary facilities. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIe.

ChC2—Christian silt loam, 6 to 12 percent slopes, eroded. This deep, well drained, sloping soil is on slightly convex ridgetops and side slopes on uplands, mainly in the southwestern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 175 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, brown silt loam

Subsoil:
5 to 20 inches, yellowish brown silt loam and yellowish red clay loam
20 to 67 inches, reddish brown and dark reddish brown, mottled clay

67 to 75 inches, dark reddish brown and yellowish red channery clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is rapid. The shrink-swell potential is moderate. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Limestone bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Nicholson, Mountview, Frankstown, and Riney soils. These soils are in landscape positions similar to those of the Christian soil. Also included are areas of Christian soils that are severely eroded and have a surface layer of brown clay loam. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Christian soil are used for row crops, small grain, hay, or pasture. Some areas are used as sites for houses and gardens.

This soil is suited to cultivated crops, but erosion is a severe hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, cedar, hickory, pine, and poplar are the dominant native trees. Some of the trees preferred for planting are yellow poplar, eastern white pine, shortleaf pine, northern red oak, and white oak. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to most urban uses. The moderate permeability, the slope, a high content of clay, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIe.

ChD2—Christian silt loam, 12 to 20 percent slopes, eroded. This deep, well drained, moderately steep soil is on convex ridgetops and side slopes on uplands, mainly in the southwestern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 130 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 5 inches, brown silt loam

Subsoil:

5 to 20 inches, yellowish brown silt loam and yellowish red clay loam

20 to 67 inches, reddish brown and dark reddish brown, mottled clay

67 to 75 inches, dark reddish brown and yellowish red channery clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is very rapid. The shrink-swell potential is moderate. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Limestone bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Frankstown and Riney soils. These soils are in landscape positions similar to those of the Christian soil. Also included are areas of Christian soils that are severely eroded and have a surface layer of brown clay loam. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Christian soil are used for hay, pasture, or woodland. In a few areas the cropping sequence includes cultivated crops. Some areas are used as sites for houses and gardens.

This soil generally is poorly suited to cultivated crops, but the less sloping areas are suited to occasional cultivation in a long-term rotational sequence. Erosion is a very severe hazard if conventional tillage methods are used, and the slope is a major limitation affecting the use of farm equipment. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, cedar, hickory, and poplar are the dominant native trees. Some of the trees preferred for planting are yellow poplar, eastern white pine, shortleaf pine, northern red oak, and white oak. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition, the hazard of erosion, and the equipment limitation. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The slope is the major limitation affecting most sanitary facilities and most kinds of building site development, and low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IVe.

CnD3—Christian clay loam, 12 to 20 percent slopes, severely eroded. This deep, well drained, moderately steep soil is on convex ridgetops and side slopes on uplands, mainly in the southwestern part of the county. Erosion has removed more than 75 percent of the original surface layer. In some areas rills or small gullies have formed. The mapped areas are about 3 to 175 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 4 inches, brown clay loam

Subsoil:

4 to 20 inches, yellowish red clay loam

20 to 67 inches, reddish brown and dark reddish brown, mottled clay

67 to 75 inches, dark reddish brown and yellowish red channery clay loam

This soil is low in natural fertility and in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is very rapid. The shrink-swell potential is moderate. Tillage is somewhat difficult, and the optimum moisture range for cultivation is restricted because the clayey subsoil has been mixed with the surface layer. The root zone is deep. Limestone bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Frankstown and Riney soils. These soils are in landscape positions similar to those of the Christian soil. Also included are areas of Christian soils that are moderately eroded and have a surface layer of dark grayish brown silt loam. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Christian soil are used for hay, pasture, or woodland. Some areas are used as sites for houses and gardens.

This soil is poorly suited to cultivated crops because most of the original surface layer has been removed by erosion. The hazard of erosion is very severe if conventional tillage methods are used, and the slope seriously limits the use of most farm equipment.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Pine, cedar, hickory, and gum are the dominant native trees. The trees preferred for planting include Virginia pine and white oak. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition, the hazard of erosion, and the equipment limitation. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The slope is the major limitation affecting most sanitary facilities, most kinds of building site development, and local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome this limitation in some areas.

The capability subclass is VIe.

CrB—Crider silt loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on the broad, slightly convex tops of ridges on uplands in the

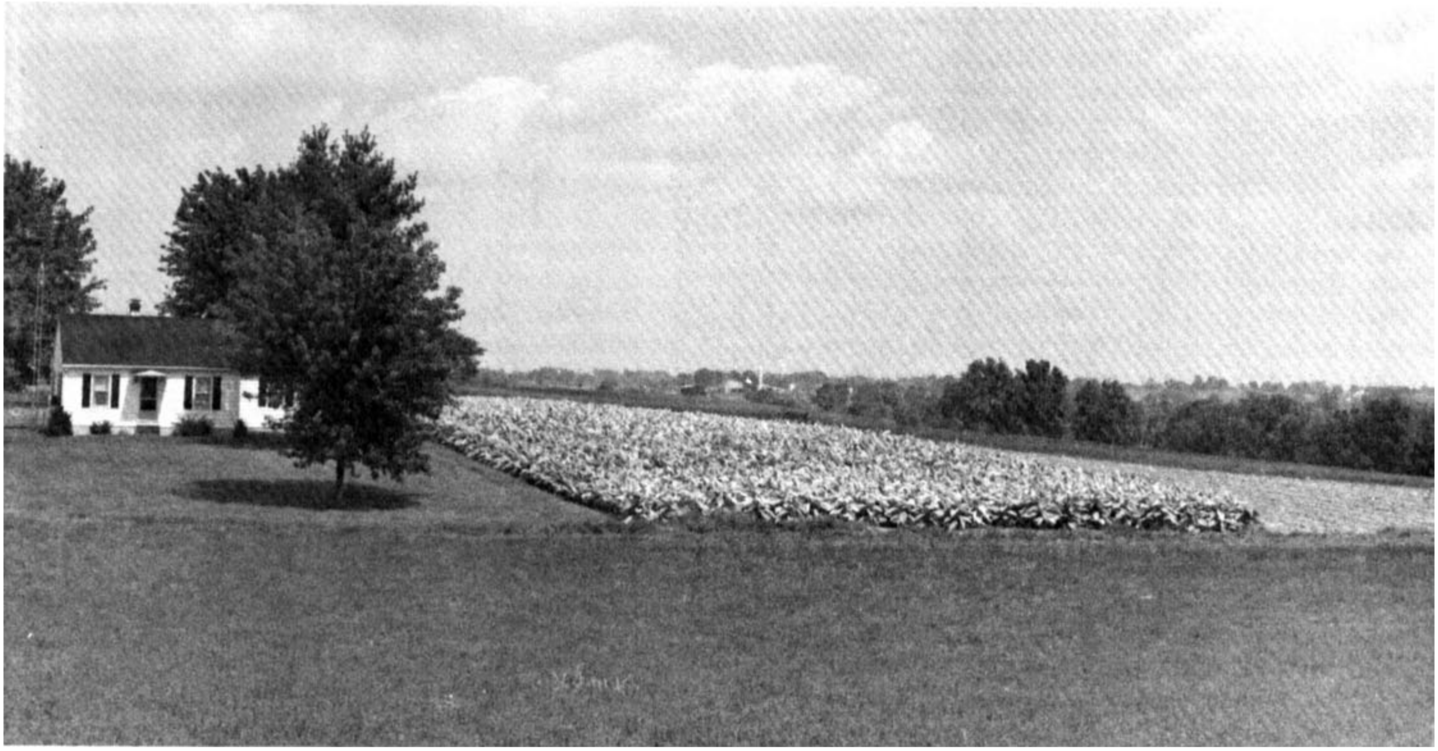

Figure 9.—Burley tobacco and alfalfa hay in an area of Crider silt loam, 2 to 6 percent slopes.

northwestern and central parts of the county. The mapped areas are about 5 to 255 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 10 inches, brown silt loam

Subsoil:

10 to 28 inches, strong brown and yellowish red silty clay loam

28 to 62 inches, yellowish red and red silty clay that has mottles below a depth of 38 inches

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is medium. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Limestone or dolomite bedrock is at a depth of 60 inches or more.

Included with this soil in mapping are small areas of Nicholson, Lawrence, Beasley, and Chenault soils. These soils are in landscape positions similar to those of the Crider soil. Also included are areas of a well drained, silty soil that is 40 to 60 inches deep over bedrock and a few eroded areas of Crider soils that have a reddish brown surface layer. Included areas make up about 20 percent of this map unit and are generally less than 3 acres.

Most areas of the Crider soil are used for row crops, small grain, hay, or pasture (fig. 9). Some areas are used for residential development.

This soil is well suited to cultivated crops, but erosion is a moderate hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to pasture and hay crops, especially alfalfa. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, ash, hickory, poplar, maple, and walnut are the dominant native trees. Some of the trees preferred for planting are eastern white pine, black oak, white oak, yellow poplar, black walnut, white ash, and northern red oak. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is well suited to most urban uses. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome this limitation in some areas.

The capability subclass is IIe.

CrC2—Crider silt loam, 6 to 12 percent slopes, eroded. This deep, well drained, sloping soil is on slightly convex ridgetops and side slopes on uplands, mainly in the northwestern and central parts of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 70 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 7 inches, brown silt loam

Subsoil:

7 to 28 inches, strong brown and yellowish red silty clay loam

28 to 62 inches, yellowish red and red silty clay that has mottles below a depth of 38 inches

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is rapid. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Limestone or dolomite bedrock is at a depth of 60 inches or more.

Included with this soil in mapping are small areas of Beasley, Chenault, Lawrence, and Nicholson soils. These soils are in landscape positions similar to those of the Crider soil. Also included are areas of a well drained, silty soil that is 40 to 60 inches deep over bedrock and a few areas of severely eroded Crider soils that have a surface layer of reddish brown silty clay loam. Included areas make up about 20 percent of this map unit and are generally less than 3 acres.

Most areas of the Crider soil are used for row crops, small grain, hay, or pasture. Some areas are used as sites for houses and gardens.

This soil is suited to cultivated crops, but erosion is a severe hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to pasture and hay crops, especially alfalfa. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, ash, hickory, poplar, maple, and walnut are the dominant native trees. Some of the trees preferred for planting are eastern white pine, black oak, white oak, yellow poplar, black walnut, white ash, and northern red oak. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to most urban uses. The slope is the major limitation affecting most sanitary facilities and most kinds of building site development. Low strength and the slope are limitations on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIe.

CyF2—Cynthiana-Faywood-Rock outcrop complex, 20 to 60 percent slopes, eroded. This map unit occurs as shallow and moderately deep, well drained, steep and very steep soils intermingled with areas of Rock outcrop. The unit is on scattered uplands throughout the western, central, and eastern parts of the county. It is mainly on short side slopes adjacent to the major creeks and streams. The Cynthiana soil is on the steeper, upper convex side slopes, and the Faywood soil is on the less sloping middle and lower side slopes. Erosion has removed about 25 to 75 percent of the original surface layer of these soils. The Rock outcrop is concentrated in bands along the steeper, more convex slopes. The mapped areas are about 3 to 95 acres.

The Cynthiana soil makes up about 40 percent of this map unit, the Faywood soil about 30 percent, and the Rock outcrop about 20 percent. The two soils and the

Rock outcrop were mapped together as a complex because they are in a pattern that makes separation impractical at the scale used in mapping.

The typical sequence, depth, and composition of the layers of the Cynthiana soil are as follows—

Surface layer:
0 to 4 inches, brown flaggy silty clay loam

Subsoil:
4 to 18 inches, yellowish brown clay

Bedrock:
18 inches, limestone interbedded with calcareous shale

The Cynthiana soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and the available water capacity is low. Surface runoff is very rapid. The shrink-swell potential is moderate. The root zone is shallow, and root penetration may be restricted because of the high content of clay. Limestone bedrock is at a depth of 10 to 20 inches.

The typical sequence, depth, and composition of the layers of the Faywood soil are as follows—

Surface layer:
0 to 4 inches, brown silty clay loam

Subsoil:
4 to 34 inches, yellowish brown and light olive brown clay that has mottles below a depth of 22 inches

Bedrock:
34 inches, limestone interbedded with thin layers of calcareous shale

The Faywood soil is medium in natural fertility and moderate or low in organic matter content. Permeability is moderately slow or slow, and the available water capacity is moderate. Surface runoff is very rapid. The shrink-swell potential is moderate. The root zone is moderately deep. Limestone bedrock is at a depth of 20 to 40 inches.

The Rock outcrop typically is limestone or dolomite bedrock. It occurs as discontinuous bands of exposed bedrock bluffs, 5 to 25 feet thick, that parallel the contour of the slopes; as scattered patches of exposed bedrock; and as isolated small areas of very shallow soil that supports little or no vegetation. In some areas flagstones, stones, and boulders are on the surface.

Included in this unit in mapping are small areas of Lowell, Beasley, Shrouts, and Brassfield soils. These soils are in landscape positions similar to those of the Cynthiana and Faywood soils. Also included are areas of Cynthiana and Faywood soils that are severely eroded. Included areas make up about 10 percent of this map unit and are generally less than 3 acres.

Most areas of the Cynthiana and Faywood soils are used as pasture, and a few are used as woodland. The areas used as pasture have sparse to dense stands of cedar. Some of the acreage is idle land that is covered with brush.

These soils are not suited to cultivated crops. The slope and the Rock outcrop seriously limit the use of farm equipment.

These soils are not suited to hay crops and are poorly suited to pasture. If a pasture is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, and weed control.

These soils are suited to woodland and are well suited to woodland wildlife habitat. Upland oaks, ash, locust, and cedar are the dominant native trees. The understory is mainly maple, dogwood, and cedar. Some of the trees preferred for planting are eastern redcedar, Virginia pine, white ash, and white oak on the Cynthiana soil and white oak, northern red oak, white ash, and eastern white pine on the Faywood soil. Table 8 provides specific information relating to potential productivity.

The main management concerns in the wooded areas are the hazard of erosion, the equipment limitation, seedling mortality, and plant competition. Steep skid trails and roads are subject to rilling and gullying unless they are protected by adequate water bars, a good plant cover, or both. The slope restricts the use of wheeled and tracked equipment on skid trails. Cable skidding is generally safer and results in less surface disturbance. The seedling mortality rate may be high in areas of the Cynthiana soil because the rooting depth is shallow. After the trees are harvested, carefully managed reforestation is needed to control competition from undesirable understory plants.

These soils are not suited to most urban uses. The slope, the moderately slow or slow permeability, the clayey texture, and the depth to bedrock are the major limitations affecting sanitary facilities and building site development. Low strength, the depth to bedrock, and the slope are limitations on sites for local roads and streets.

The Cynthiana soil is in capability subclass VIIs, the Faywood soil is in capability subclass VIIe, and the Rock outcrop is in capability subclass VIIIs.

EdD2—Eden silty clay loam, 6 to 20 percent slopes, eroded. This moderately deep, well drained, sloping and moderately steep soil is on side slopes and narrow, convex ridgetops on uplands, mainly in the northeastern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 170 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, brown silty clay loam

Subsoil:
4 to 34 inches, yellowish brown silty clay and light olive brown flaggy silty clay

Bedrock:
34 to 60 inches, soft, calcareous shale interbedded with thin layers of siltstone and limestone

This soil is medium in natural fertility and low in organic matter content. Permeability is slow, and the available water capacity is moderate. Surface runoff is very rapid. The shrink-swell potential is moderate. Tillage is somewhat difficult, and the optimum moisture range for cultivation is restricted because the clayey subsoil has been mixed with the surface layer. The root zone is moderately deep. Soft shale bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of Cynthiana, Faywood, and Lowell soils. These soils are in landscape positions similar to those of the Eden soil. Also included are areas of Eden soils that are severely eroded and have a surface layer of silty clay and some areas where loose limestone flagstones are scattered on the surface. Included areas make up about 20 percent of this map unit and are generally less than 3 acres.

Most areas of the Eden soil are used for hay or pasture, and a few are used for row crops. Some of the acreage is idle land that is reverting to brush and woodland.

This soil generally is poorly suited to cultivated crops, but the less sloping areas are suited to occasional cultivation in a long-term rotational sequence. The hazard of erosion is very severe if conventional tillage methods are used, and the slope limits the use of farm equipment. In some areas loose limestone flagstones interfere with tillage equipment. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is suited to woodland. Upland oaks, cedar, ash, walnut, and hickory are the dominant native trees. Some of the trees preferred for planting are white oak, white ash, green ash, and eastern white pine. Table 8 provides specific information relating to potential productivity. The main management concerns are the hazard of erosion, the equipment limitation, seedling mortality, and plant competition. Steep skid trails and roads are subject to rilling and gullying unless they are protected by adequate water bars, a good plant cover, or both. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The depth to bedrock, the slope, the slow permeability, a high content of clay, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength and the slope are limitations on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IVe.

EeE2—Eden-Cynthiana complex, 20 to 35 percent slopes, eroded, rocky. These moderately deep and shallow, well drained, steep and very steep soils are on uplands, mainly in the northeastern part of the county. The Eden soil is on the upper side slopes and on narrow, convex ridgetops, and the Cynthiana soil is on the lower side slopes. Erosion has removed about 25 to 75 percent of the original surface layer. Rock outcrop covers about 0.1 to 2 percent of the surface. The mapped areas are about 3 to 600 acres.

The Eden soil makes up about 75 percent of this map unit, and the Cynthiana soil makes up about 10 percent. The two soils were mapped together as a complex because they are in a pattern that makes separation impractical at the scale used in mapping.

The typical sequence, depth, and composition of the layers of the Eden soil are as follows—

Surface layer:
0 to 4 inches, brown silty clay loam

Subsoil:
4 to 34 inches, yellowish brown silty clay and light olive brown flaggy silty clay

Bedrock:
34 to 60 inches, soft, calcareous shale interbedded with thin layers of siltstone and limestone

The Eden soil is medium in natural fertility and low in organic matter content. Permeability is slow, and the available water capacity is moderate. Surface runoff is very rapid. The shrink-swell potential is moderate. The root zone is moderately deep. Soft shale bedrock is at a depth of 20 to 40 inches.

The typical sequence, depth, and composition of the layers of the Cynthiana soil are as follows—

Surface layer:
0 to 4 inches, brown flaggy silty clay loam

Subsoil:
4 to 18 inches, yellowish brown clay

Bedrock:
18 inches, limestone interbedded with calcareous shale

The Cynthiana soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and the available water capacity is low. Surface runoff is very rapid. The shrink-swell potential is moderate. The root zone is shallow, and root penetration may be restricted because of the high content of clay. Limestone bedrock is at a depth of 10 to 20 inches.

Included with these soils in mapping are small areas of Faywood and Lowell soils. These included soils are in landscape positions similar to those of the Eden and Cynthiana soils. Also included are areas of Eden and Cynthiana soils that are severely eroded and have a surface layer of silty clay and some areas where many loose flagstones are scattered on the surface of the Eden soil. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Eden and Cynthiana soils are used as pasture, and a few are used as woodland. Much of the acreage is idle land that is reverting to brush and woodland.

These soils are not suited to cultivated crops. The slope and the rock outcrop seriously limit the use of farm equipment.

These soils are not suited to hay and are poorly suited to pasture. If a pasture is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage, provide a good ground cover, and minimize the need for renovation. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, and weed control.

These soils are suited to woodland and to woodland wildlife habitat. Upland oaks, cedar, ash, locust, walnut, and hickory are the dominant native trees. The understory is mainly maple, dogwood, and cedar. Some of the trees preferred for planting are white oak, white ash, green ash, eastern white pine, and eastern redcedar. Table 8 provides specific information relating to potential productivity.

The main management concerns in the wooded areas are the hazard of erosion, the equipment limitation, seedling mortality, and plant competition. The slope restricts the use of wheeled and tracked equipment on skid trails. Steep skid trails and roads are subject to rilling and gullying unless they are protected by adequate water bars, a good plant cover, or both. Cable skidding is generally safer and results in less surface disturbance. The seedling mortality rate may be high in areas of the Cynthiana soil because the rooting depth is shallow. Reforestation can be severely limited by competition from undesirable understory plants.

These soils are poorly suited to most urban uses. The depth to bedrock, the slope, the slow permeability, a high content of clay, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength and the slope are limitations on sites for local roads and streets.

The Eden soil is in capability subclass VIe, and the Cynthiana soil is in capability subclass VIIs.

EkB—Elk silt loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on low stream terraces throughout the county. The mapped areas are about 5 to 45 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches, brown silt loam

Subsoil:
10 to 60 inches, brown and strong brown silty clay loam

Substratum:
60 to 70 inches, dark yellowish brown silty clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is medium. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Bedrock is at a depth of 60 inches or more.

Included with this soil in mapping are small areas of Chenault, Otwell, and Lawrence soils. These soils are in landscape positions similar to those of the Elk soil. Also included are a few areas of Nolin soils on flood plains. Included areas make up about 20 percent of this map unit and are generally less than 3 acres.

Most areas of the Elk soil are used for row crops, small grain, hay, or pasture. Some areas are used as sites for houses and gardens.

This soil is well suited to cultivated crops, but erosion is a moderate hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to pasture and hay crops. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, poplar, hackberry, maple, sycamore, and walnut are the dominant native trees. Some of the trees preferred for planting are eastern white pine, shortleaf pine, white oak, yellow poplar, black walnut, and northern red oak. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is well suited to most urban uses. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome this limitation in some areas.

The capability subclass is IIe.

EkC2—Elk silt loam, 6 to 12 percent slopes, eroded. This deep, well drained, sloping soil is on low stream terraces throughout the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 5 to 35 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, brown silt loam

Subsoil:
8 to 60 inches, brown and strong brown silty clay loam

Substratum:
60 to 70 inches, dark yellowish brown silty clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is rapid. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Bedrock is at a depth of 60 inches or more.

Included with this soil in mapping are small areas of Otwell and Lowell soils. These soils are in landscape positions similar to those of the Elk soil. Also included are a few areas of Nolin soils on flood plains. Included areas make up about 20 percent of this map unit and are generally less than 3 acres.

Most areas of the Elk soil are used for row crops, small grain, hay, or pasture. Some areas are used as sites for houses and gardens.

This soil is suited to cultivated crops, but erosion is a severe hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to pasture and hay crops. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, poplar, hackberry, maple, sycamore, and walnut are the dominant native trees. Some of the trees preferred for planting are eastern white pine, shortleaf pine, white oak, yellow poplar, black walnut, and northern red oak. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to most urban uses. The slope is the main limitation affecting sanitary facilities and building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIe.

FaC2—Faywood silty clay loam, 6 to 12 percent slopes, eroded. This moderately deep, well drained, sloping soil is on slightly convex ridgetops and side slopes on uplands, mainly in the central part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 315 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 4 inches, brown silty clay loam

Subsoil:

4 to 34 inches, yellowish brown and light olive brown clay that has mottles below a depth of 22 inches

Bedrock:

34 inches, limestone interbedded with thin layers of calcareous shale

This soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderately slow or slow, and the available water capacity is moderate. Surface runoff is rapid. The shrink-swell potential is moderate. Tillage is somewhat difficult, and the optimum moisture range for cultivation is restricted because the clayey subsoil has been mixed with the surface layer. The root zone is moderately deep. Limestone bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of Lowell, Cynthiana, and Eden soils. These soils are in landscape positions similar to those of the Faywood soil. Also included are areas of Faywood soils that are severely eroded and have a surface layer of silty clay. Included areas make up about 20 percent of this map unit and are generally less than 3 acres.

Most areas of the Faywood soil are used for hay or pasture, and a few are used for row crops. Some areas are used as sites for houses and gardens.

This soil is suited to cultivated crops, but erosion is a severe hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is suited to woodland, but few areas are used for the production of timber. Upland oaks, hickory, and maple are the dominant native trees. Some of the trees preferred for planting are white oak, eastern white pine, and northern red oak. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition and the equipment limitation.

This soil is suited to some urban uses. The depth to bedrock, the moderately slow permeability, the slope, a high content of clay, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIe.

FaD2—Faywood silty clay loam, 12 to 20 percent slopes, eroded. This moderately deep, well drained, moderately steep soil is on convex ridgetops and side slopes on uplands, mainly in the central part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 50 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 4 inches, brown silty clay loam

Subsoil:

4 to 34 inches, yellowish brown and light olive brown clay that has mottles below a depth of 22 inches

Bedrock:

34 inches, limestone interbedded with thin layers of calcareous shale

This soil is medium in natural fertility and low in organic matter content. Permeability is moderately slow or slow, and the available water capacity is moderate. Surface runoff is very rapid. The shrink-swell potential is moderate. Tillage is somewhat difficult, and the optimum moisture range for cultivation is restricted because the clayey subsoil has been mixed with the surface layer. The root zone is moderately deep. Limestone bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of Lowell, Cynthiana, Shrouts, Brassfield, and Eden soils. These soils are in landscape positions similar to those of the Faywood soil. Also included are areas of Faywood soils that are severely eroded and have a surface layer of silty clay. Included areas make up about 20 percent of this map unit and are generally less than 3 acres.

Most areas of the Faywood soil are used for hay or pasture. A few areas on ridgetops are used for row crops or as sites for houses and gardens.

This soil generally is poorly suited to cultivated crops, but the less sloping areas are suited to occasional cultivation in a long-term rotational sequence. Erosion is a very severe hazard if conventional tillage methods are used, and the slope limits the use of farm equipment. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is suited to woodland, but few areas are used for the production of timber. Upland oaks, hickory, and maple are the dominant native trees. Some of the trees preferred for planting are white oak, eastern white pine, and northern red oak. Table 8 provides specific information relating to potential productivity. The main management concerns are the hazard of erosion, the equipment limitation, and plant competition.

This soil is poorly suited to most urban uses. The slope, the depth to bedrock, the moderately slow permeability, a high content of clay, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IVe.

FcE2—Faywood-Cynthiana complex, 20 to 30 percent slopes, eroded, very rocky. These moderately deep and shallow, well drained, steep soils are on uplands in scattered areas throughout the western, central, and eastern parts of the county. The Faywood soil is on the less sloping middle and lower side slopes, and the Cynthiana soil is on the steeper, upper convex side slopes. Erosion has removed about 25 to 75 percent of the original surface layer. Rock outcrop covers about 2 to 10 percent of the surface. The mapped areas are about 3 to 260 acres.

The Faywood soil makes up about 50 percent of this map unit, and the Cynthiana soil makes up about 35 percent. The two soils were mapped together as a complex because they are in a pattern that makes separation impractical at the scale used in mapping.

The typical sequence, depth, and composition of the layers of the Faywood soil are as follows—

Surface layer:
0 to 4 inches, brown silty clay loam

Subsoil:
4 to 34 inches, yellowish brown and light olive brown clay that has mottles below a depth of 22 inches

Bedrock:
34 inches, limestone interbedded with thin layers of calcareous shale

The Faywood soil is medium in natural fertility and low in organic matter content. Permeability is moderately slow or slow, and the available water capacity is moderate. Surface runoff is very rapid. The shrink-swell potential is moderate. The root zone is moderately deep. Limestone bedrock is at a depth of 20 to 40 inches.

The typical sequence, depth, and composition of the layers of the Cynthiana soil are as follows—

Surface layer:
0 to 4 inches, brown flaggy silty clay loam

Subsoil:
4 to 18 inches, yellowish brown clay

Bedrock:
18 inches, limestone interbedded with calcareous shale

The Cynthiana soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and the available water capacity is low. Surface runoff is very rapid. The shrink-swell potential is moderate. The root zone is shallow.

Limestone bedrock is at a depth of 10 to 20 inches.

Included with these soils in mapping are small areas of Lowell, Beasley, Shrouts, and Brassfield soils. These included soils are in landscape positions similar to those of the Faywood and Cynthiana soils. Also included are areas of Faywood and Cynthiana soils that are severely eroded and have a surface layer of silty clay. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Faywood and Cynthiana soils are used as pasture, and a few are used as woodland. Many of the areas used as pasture have sparse to dense stands of cedar. Some of the acreage is idle land that is covered with brush.

These soils are not suited to cultivated crops. The slope and the rock outcrop seriously limit the use of farm equipment.

These soils are not suited to hay and are poorly suited to pasture. If a pasture is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover and minimize the need for renovation. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, and weed control.

These soils are suited to woodland and are well suited to woodland wildlife habitat. Upland oaks, ash, locust, and cedar are the dominant native trees. The understory is mainly maple, dogwood, and cedar. Some of the trees preferred for planting are white oak, northern red oak, and eastern white pine on the Faywood soil and eastern redcedar, white oak, and Virginia pine on the Cynthiana soil. Table 8 provides specific information relating to potential productivity.

The main management concerns in the wooded areas are the hazard of erosion, the equipment limitation, seedling mortality, and plant competition. Steep skid trails and roads are subject to rilling and gullying unless they are protected by adequate water bars, a good plant cover, or both. The slope restricts the use of wheeled and tracked equipment on skid trails. Cable skidding is generally safer and results in less surface disturbance. The seedling mortality rate may be high in areas of the Cynthiana soil because the rooting depth is shallow. After the trees are harvested, carefully managed reforestation is needed to control competition from undesirable understory plants.

These soils are poorly suited to urban uses. The slope, the moderately slow or slow permeability, the clayey texture, the depth to bedrock, and low strength are the major limitations affecting sanitary facilities, building site development, and local roads and streets.

The Faywood soil is in capability subclass VIs, and the Cynthiana soil is in capability subclass VIIs.

FrC—Frankstown gravelly silt loam, 6 to 12 percent slopes. This deep, well drained, sloping soil is on side slopes and narrow ridgetops on uplands, mainly in the southern part of the county. The mapped areas are about 3 to 185 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches, brown gravelly silt loam

Subsoil:

6 to 40 inches, yellowish brown silt loam and strong brown gravelly silty clay loam

40 to 50 inches, yellowish brown very gravelly silty clay loam

Bedrock:

50 inches, siltstone interbedded with thin layers of cherty limestone

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is rapid. The shrink-swell potential is moderate. The soil can be worked throughout a wide range in moisture content, but tillage is somewhat difficult because of the gravel in the surface layer. The root zone is deep and can be easily penetrated by plant roots. Siltstone bedrock is at a depth of 40 inches or more.

Included with this soil in mapping are small areas of Christian, Riney, and Garmon soils. These soils are in landscape positions similar to those of the Frankstown soil. Also included are small areas of Frankstown soils that are moderately eroded. Included areas make up about 20 percent of this map unit and are generally less than 3 acres.

Most areas of the Frankstown soil are used for hay or pasture. Some areas are used for row crops or small grain, and some are used as sites for houses and gardens.

This soil is suited to cultivated crops, but erosion is a severe hazard if conventional tillage methods are used. The pebbles and rock fragments in the surface layer can interfere with the use of some tillage equipment. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, poplar, pine, and ash are the dominant native trees. Some of the trees preferred for planting are yellow poplar, white oak, northern red oak, white ash, and eastern white pine. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition.

This soil is suited to most urban uses. The slope, a high content of clay, the moderate shrink-swell potential, and the depth to bedrock are limitations affecting some sanitary facilities and building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIe.

FrD—Frankstown gravelly silt loam, 12 to 20 percent slopes. This deep, well drained, moderately steep soil is on side slopes and narrow ridgetops on uplands, mainly in the southern part of the county. The mapped areas are about 3 to 210 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches, brown gravelly silt loam

Subsoil:

6 to 40 inches, yellowish brown silt loam and strong brown gravelly silty clay loam

40 to 50 inches, yellowish brown very gravelly silty clay loam

Bedrock:

50 inches, siltstone interbedded with thin layers of cherty limestone

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is very rapid. The shrink-swell potential is moderate. The soil can be worked throughout a wide range in moisture content, but tillage is somewhat difficult because of the gravel in the surface layer. The root zone is deep and can be easily penetrated by plant roots. Siltstone bedrock is at a depth of 40 inches or more.

Included with this soil in mapping are small areas of Christian, Riney, and Garmon soils. These soils are in landscape positions similar to those of the Frankstown soil. Also included are small areas of Frankstown soils that are moderately eroded. Included areas make up about 20 percent of this map unit and are generally less than 3 acres.

Most areas of the Frankstown soil are used for hay or pasture. Some areas are used for row crops or small grain, and some are used as sites for houses and gardens.

This soil generally is poorly suited to cultivated crops, but the less sloping areas are suited to occasional cultivation in a long-term rotational sequence. Erosion is a very severe hazard if conventional tillage methods are used, and the slope limits the use of farm equipment. The pebbles and rock fragments in the surface layer can interfere with the use of some tillage equipment. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

Many areas are used for timber. This soil is well suited to woodland. Upland oaks, poplar, pine, and ash are the dominant native trees. Some of the trees preferred for planting are yellow poplar, white oak, northern red oak, white ash, and eastern white pine. Table 8 provides specific information relating to potential productivity. The main management concerns are the hazard of erosion, the equipment limitation, and plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The slope is the main limitation affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IVe.

GaF—Garmon channery silt loam, 30 to 80 percent slopes, very rocky. This moderately deep, well drained, very steep soil is on convex side slopes on uplands in the Knobs Physiographic Region. The mapped areas are about 10 to more than 1,500 acres.

Typically, this soil is covered by a 1-inch layer of partly decomposed leaves and twigs. Under this layer, the typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches, brown channery silt loam

Subsoil:
7 to 25 inches, yellowish brown channery silt loam and brown channery silty clay loam

Bedrock:
25 inches, siltstone interbedded with thin layers of limestone

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately rapid, and the available water capacity is moderate. Surface runoff is very rapid. The root zone is moderately deep and can be easily penetrated by plant roots. Siltstone bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of Riney, Frankstown, Carpenter, and Lenberg soils. These soils are in landscape positions similar to those of the Garmon soil. Also included are areas of a loamy soil that is less than 20 inches deep over bedrock and areas of Garmon soils that have a channery or flaggy surface layer. Included areas make up about 25 percent of this map unit and are generally less than 10 acres.

Most areas of the Garmon soil are used as woodland, and a few are used as pasture. Some of the acreage is idle land that is reverting to woodland.

This soil is not suited to cultivated crops. The slope and the rock outcrop seriously limit the use of farm equipment.

This soil is not suited to hay and is poorly suited to pasture. If a pasture is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage, provide a good ground cover, and minimize the need for renovation.

This soil is suited to woodland and to woodland wildlife habitat. Upland oaks, poplar, hickory, maple, and cedar are the dominant native trees. The understory is mainly maple, dogwood, sassafras, and cedar. Some of the trees preferred for planting are white oak, northern red oak, eastern white pine, and Virginia pine. Table 8 provides specific information relating to potential productivity and the appropriate trees to plant on the warm and cool aspects of this soil.

The main management concerns in the wooded areas are the hazard of erosion, the equipment limitation, seedling mortality, and plant competition. Steep skid trails and roads are subject to rilling and gullying unless they are protected by adequate water bars, a good plant cover, or both. The slope restricts the use of wheeled and tracked equipment on skid trails. Cable skidding is generally safer and results in less surface disturbance. On warm aspects the seedling mortality rate may be high in the summer because of inadequate soil moisture.

This soil is not suited to urban uses. The slope and the depth to bedrock are the major limitations affecting sanitary facilities, building site development, and local roads and streets.

The capability subclass is VIIe.

GrB—Greenbriar silt loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on the broad, slightly convex tops of ridges on uplands, mainly in the west-central part of the county. The mapped areas are about 5 to 55 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches, dark yellowish brown silt loam

Subsoil:
7 to 51 inches, yellowish brown and strong brown silty clay loam that has mottles below a depth of 30 inches

Substratum:
51 to 56 inches, yellowish red, dark brown, and brown channery silty clay loam

Bedrock:
56 to 59 inches, soft shale
59 inches, hard, black shale

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is medium. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Hard, black shale is at a depth of 40 to 72 inches.

Included with this soil in mapping are small areas of Crider, Jessietown, and Tilsit soils. These soils are in landscape positions similar to those of the Greenbriar soil. Also included are areas of a deep, well drained soil that has a clayey subsoil. Included areas make up about 20 percent of this map unit and are generally less than 3 acres.

Most areas of the Greenbriar soil are used for row crops, small grain, hay, or pasture. Some areas are used as sites for houses and gardens.

This soil is well suited to cultivated crops, but erosion is a moderate hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to pasture and hay crops. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, hickory, maple, and pine are the dominant native trees. Some of the trees preferred for planting are eastern white pine, shortleaf pine, white oak, and yellow poplar. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is well suited to most urban uses. The depth to bedrock is a limitation affecting some sanitary facilities and building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIe.

JeB—Jessietown-Trappist complex, 2 to 6 percent slopes. These moderately deep, well drained, gently sloping soils are on uplands, mainly in the west-central part of the county. The Jessietown soil is on the less sloping ridgetops, and the Trappist soil is on convex side slopes and narrow ridgetops. The mapped areas are about 5 to 45 acres.

The Jessietown soil makes up about 70 percent of this map unit, and the Trappist soil makes up about 20 percent. The two soils were mapped together as a complex because they are in a pattern that makes separation impractical at the scale used in mapping.

The typical sequence, depth, and composition of the layers of the Jessietown soil are as follows—

Surface layer:
0 to 8 inches, brown silt loam

Subsoil:
8 to 30 inches, brown and yellowish brown silty clay loam
30 to 34 inches, yellowish brown channery silty clay

Bedrock:
34 to 36 inches, soft shale
36 inches, hard, black shale

The Jessietown soil is medium in natural fertility and moderate in organic matter content. Permeability and the available water capacity are moderate. Surface runoff is medium. The soil can be easily tilled throughout a wide range in moisture content. The root zone is moderately deep and can be easily penetrated by plant roots. Hard, fissile shale is at a depth of 20 to 40 inches.

The typical sequence, depth, and composition of the layers of the Trappist soil are as follows—

Surface layer:
0 to 6 inches, brown silty clay loam

Subsoil:
6 to 25 inches, yellowish brown and strong brown clay and yellowish brown channery clay that has mottles below a depth of 16 inches

Bedrock:
25 inches, hard, black shale

The Trappist soil is low in natural fertility and in organic matter content. Permeability is slow, and the available water capacity is moderate. Surface runoff is slow. The shrink-swell potential is moderate. Tillage is somewhat difficult, and the optimum moisture range for cultivation is restricted because the clayey subsoil has been mixed with the surface layer. The root zone is moderately deep, and root penetration may be restricted because of the high content of clay. Hard, fissile shale is at a depth of 20 to 40 inches.

Included with these soils in mapping are small areas of Berea, Tilsit, and Crider soils. These included soils are in landscape positions similar to those of the Jessietown and Trappist soils. Also included are areas of a moderately deep, well drained, loamy soil that has about 5 to 10 percent rock fragments in the subsoil. Included areas make up about 20 percent of this map unit and are generally less than 3 acres.

Most areas of the Jessietown and Trappist soils are used for hay or pasture. Some areas are used for row crops or small grain, and some are used as sites for houses and gardens.

These soils are suited to cultivated crops, but erosion is a moderate hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

These soils are well suited to pasture and hay crops. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

These soils are suited to woodland, but few areas are used for the production of timber. Upland oaks, hickory, maple, and pine are the dominant native trees. Some of the trees preferred for planting are shortleaf pine, white oak, and Virginia pine. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition and the equipment limitation. Reforestation can be severely limited by competition from undesirable understory plants.

These soils are suited to some urban uses. The depth to bedrock, the slow permeability, a high content of clay, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIe.

La—Lawrence silt loam. This deep, somewhat poorly drained, nearly level soil is on low stream terraces and concave upland ridgetops, mainly in the central, western, and southern parts of the county. The mapped areas are about 3 to 95 acres. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 9 inches, grayish brown silt loam

Subsoil:

9 to 32 inches, light yellowish brown, mottled silt loam

32 to 62 inches, a fragipan of gray, mottled silt loam and light brownish gray, mottled silty clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate above the fragipan and slow in the fragipan. The available water capacity is moderate. Surface runoff is slow. A seasonal high water table is at a depth of 12 to 24 inches. The soil can be easily tilled when it is at the proper moisture content. It dries out and warms up slowly in spring, however, and tillage is often delayed. The root zone can be easily penetrated by plant roots, but it is only moderately deep because of the fragipan (fig. 10). Bedrock is at a depth of 60 inches or more.

Included with this soil in mapping are small areas of Nicholson, Otwell, and Robertsville soils. These soils are in landscape positions similar to those of the Lawrence soil. Also included are a few areas of Lawrence soils that have slopes of 2 to 4 percent, some areas on ridgetops that are subject to ponding, and a few areas on stream terraces that are subject to rare flooding. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Lawrence soil are used as pasture. Some areas are used for hay or cultivated crops, and a few are used for gardens.

Unless drained, this soil is poorly suited to cultivated crops. The seasonal high water table and the fragipan are the major limitations. Planting or harvesting is sometimes delayed by the wetness. Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops increase or maintain the content of organic matter.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage. Also, the species should be those that are tolerant of wetness. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, a surface drainage system, proper seeding rates and mixtures, weed control, and a well planned clipping and harvesting schedule.

This soil is suited to woodland, but few areas are used for the production of timber. Upland oaks, poplar, gum, maple, and hackberry are the dominant native trees. Some of the trees preferred for planting are yellow poplar, green ash, American sycamore, white oak, and sweetgum. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition, the equipment limitation, and seedling mortality. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The wetness and the slow permeability are limitations affecting most sanitary facilities. The wetness is a limitation affecting most kinds of building site development, and low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation

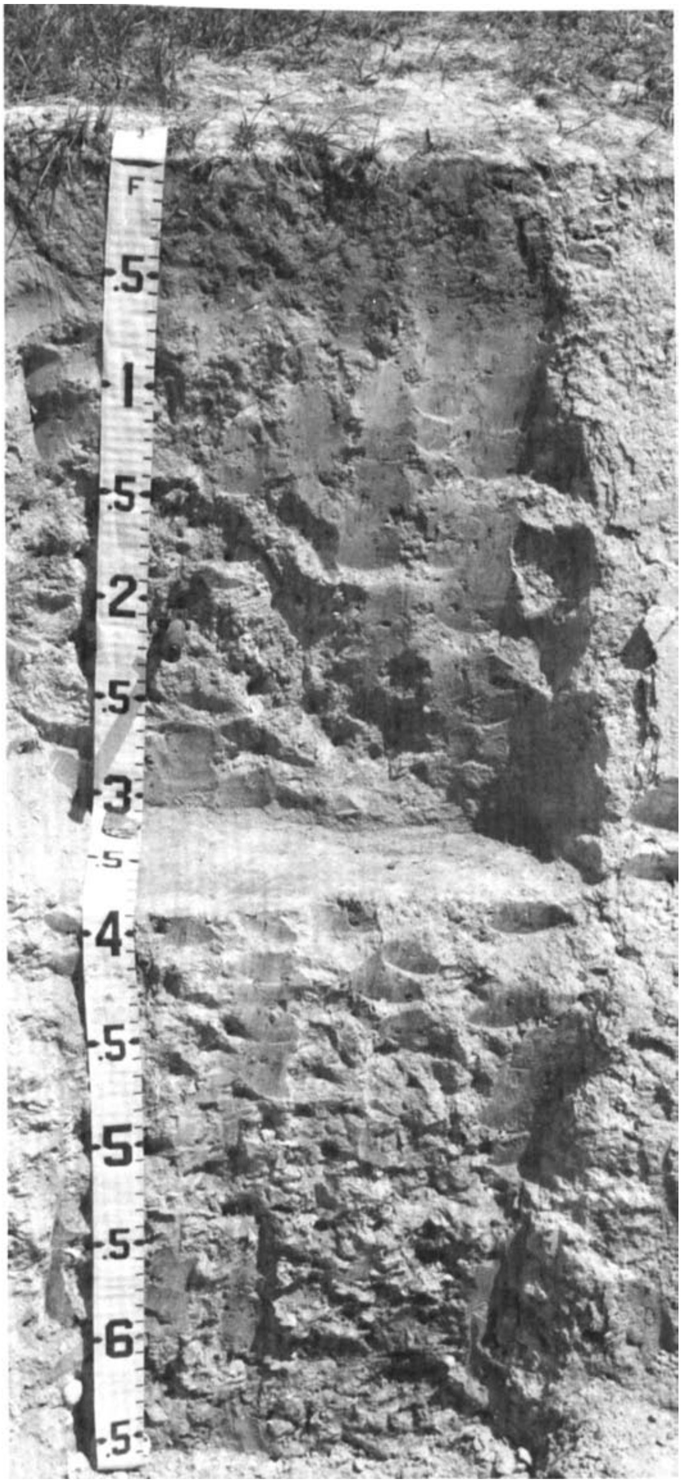

Figure 10.—Typical profile of Lawrence silt loam, which has a compact, brittle fragipan at a depth of 36 to 62 inches. Depth is marked in feet.

can minimize or overcome these limitations in some areas.

The capability subclass is IIIw.

LbC2—Lenberg silt loam, 6 to 12 percent slopes, eroded. This moderately deep, well drained, sloping soil is on convex ridgetops and side slopes on uplands, mainly in the southern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 40 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, brown silt loam

Subsoil:
4 to 24 inches, yellowish brown silty clay loam and silty clay that has mottles below a depth of 14 inches

Substratum:
24 to 38 inches, olive gray, mottled channery clay

Bedrock:
38 to 45 inches, soft shale interbedded with thin layers of siltstone

This soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderately slow, and the available water capacity is moderate. Surface runoff is rapid. The shrink-swell potential is moderate. The soil can be easily tilled throughout a wide range in moisture content. The root zone is moderately deep and can be easily penetrated by plant roots. Soft shale bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of Garmon, Carpenter, Trappist, and Rohan soils. These soils are in landscape positions similar to those of the Lenberg soil. Also included are areas of Lenberg soils that are severely eroded and have a surface layer of silty clay loam or silty clay. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Lenberg soil are used for hay or pasture, and a few are used for row crops. Some areas are used as sites for houses and gardens.

This soil is suited to cultivated crops, but erosion is a severe hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is suited to woodland, but few areas are used for the production of timber. Upland oaks, hickory, and pine are the dominant native trees. Some of the trees preferred for planting are white oak and shortleaf pine. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to some urban uses. The depth to bedrock, the moderately slow permeability, the slope, a high content of clay, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIe.

LbD2—Lenberg silt loam, 12 to 20 percent slopes, eroded. This moderately deep, well drained, moderately steep soil is on convex ridgetops and side slopes on uplands, mainly in the southern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 210 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, brown silt loam

Subsoil:
4 to 24 inches, yellowish brown silty clay loam and silty clay that has mottles below a depth of 14 inches

Substratum:
24 to 38 inches, olive gray, mottled channery clay

Bedrock:
38 to 45 inches, soft shale interbedded with thin layers of siltstone

This soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderately slow, and the available water capacity is moderate. Surface runoff is very rapid. The shrink-swell potential is moderate. The soil can be easily tilled throughout a wide range in moisture content. The root zone is moderately deep and can be easily penetrated by plant roots. Soft shale bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of Garmon, Carpenter, Trappist, and Rohan soils. These soils are in landscape positions similar to those of the Lenberg soil. Also included are areas of Lenberg soils that are severely eroded and have a surface layer of silty clay loam or silty clay. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Lenberg soil are used for hay or pasture, and a few are used for row crops. Some areas are used as sites for houses and gardens.

This soil generally is poorly suited to cultivated crops, but the less sloping areas are suited to occasional cultivation in a long-term rotational sequence. Erosion is a very severe hazard if conventional tillage methods are used, and the slope limits the use of farm equipment. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is suited to woodland, but few areas are used for the production of timber. Upland oaks, hickory, and pine are the dominant native trees. The trees preferred for planting include white oak and shortleaf pine. Table 8 provides specific information relating to potential productivity. The main management concerns are hazard of erosion, the equipment limitation, and plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The slope, the depth to bedrock, the moderately slow permeability, a high content of clay, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IVe.

LeE2—Lenberg silty clay loam, 20 to 30 percent slopes, eroded. This moderately deep, well drained, steep soil is on narrow, convex ridgetops and the lower side slopes on uplands, mainly in the southern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 110 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, brown silty clay loam

Subsoil:
5 to 24 inches, yellowish brown silty clay loam and silty clay that has mottles below a depth of 14 inches

Substratum:
24 to 38 inches, olive gray, mottled channery clay

Bedrock:
38 to 45 inches, soft shale interbedded with thin layers of siltstone

This soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderately slow, and the available water capacity is moderate. Surface runoff is very rapid. The shrink-swell potential is moderate. The root zone is moderately deep and can be easily penetrated by plant roots. Soft shale bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of Garmon, Carpenter, Trappist, and Rohan soils. These soils are in landscape positions similar to those of the Lenberg soil. Also included are areas of Lenberg soils that are severely eroded and have a surface layer of silty clay. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Lenberg soil are used as woodland. A few areas are used as pasture, and some are reverting to brush and woodland.

This soil is not suited to cultivated crops. The slope is a major limitation affecting the use of farm equipment.

This soil is not suited to hay and is poorly suited to pasture. If a pasture is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage, provide a good ground cover, and minimize the need for renovation. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, and weed control.

This soil is suited to woodland and to woodland wildlife habitat, but few areas are used for the production of timber. Upland oaks, hickory, and pine are the dominant native trees. The trees preferred for planting include white oak and shortleaf pine. Table 8 provides specific information relating to potential productivity.

The main management concerns in the wooded areas are the hazard of erosion, the equipment limitation, and plant competition. Steep skid trails and roads are subject to rilling and gullying unless they are protected by adequate water bars, a good plant cover, or both. Cable skidding is generally safer and results in less surface disturbance. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to urban uses. The slope, the depth to bedrock, the moderately slow permeability, a high content of clay, and the moderate shrink-swell potential are limitations affecting sanitary facilities and building site development. Low strength and the slope are limitations on sites for local roads and streets.

The capability subclass is VIe.

LnB—Lowell silt loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on the slightly convex tops of ridges on uplands, mainly in the north-central part of the county. The mapped areas are about 3 to 60 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, brown silt loam

Subsoil:
6 to 48 inches, strong brown silty clay and yellowish brown clay that has mottles below a depth of 21 inches

Bedrock:
48 inches, limestone interbedded with thin layers of shale

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and the available water capacity is high. Surface runoff is medium. The shrink-swell potential is moderate. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Limestone bedrock is at a depth of 40 inches or more.

Included with this soil in mapping are small areas of Sandview, Nicholson, and Faywood soils. These soils are in landscape positions similar to those of the Lowell soil. Also included are areas of Lowell soils that are moderately eroded and have a surface layer of silty clay loam. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Lowell soil are used for row crops, small grain, hay, or pasture. Some areas are used as sites for houses and gardens.

This soil is well suited to cultivated crops, but erosion is a moderate hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, ash, locust, hickory, and maple are the dominant native trees. Some of the trees preferred for planting are white oak, white ash, eastern white pine, and yellow poplar. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to some urban uses. The moderately slow permeability, a high content of clay, the depth to bedrock, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIe.

LoC2—Lowell silty clay loam, 6 to 12 percent slopes, eroded. This deep, well drained, sloping soil is on convex ridgetops and side slopes on uplands, mainly in the north-central part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 140 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 5 inches, brown silty clay loam

Subsoil:

5 to 48 inches, strong brown silty clay and yellowish brown clay that has mottles below a depth of 21 inches

Bedrock:

48 inches, limestone interbedded with thin layers of shale

This soil is medium in natural fertility and low in organic matter content. Permeability is moderately slow, and the available water capacity is high. Surface runoff is rapid. The shrink-swell potential is moderate. Tillage is somewhat difficult, and the optimum moisture range for cultivation is restricted because the clayey subsoil has been mixed with the surface layer. The root zone is deep. Limestone bedrock is at a depth of 40 inches or more.

Included with this soil in mapping are small areas of Sandview, Nicholson, Faywood, and Cynthiana soils. These soils are in landscape positions similar to those of the Lowell soil. Also included are areas of Lowell soils that are severely eroded and have a surface layer of silty clay. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Lowell soil are used for hay, pasture, row crops, or small grain. Some areas are used as sites for houses and gardens.

This soil is suited to cultivated crops, but erosion is a severe hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, ash, locust, hickory, and maple are the dominant native trees. Some of the trees preferred for planting are white oak, white ash, eastern white pine, and yellow poplar. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to some urban uses. The moderately slow permeability, a high content of clay, the depth to bedrock, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIe.

LoD2—Lowell silty clay loam, 12 to 20 percent slopes, eroded. This deep, well drained, moderately steep soil is on side slopes and convex ridgetops on uplands, mainly in the north-central part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 70 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 5 inches, brown silty clay loam

Subsoil:

5 to 48 inches, strong brown silty clay and yellowish brown clay that has mottles below a depth of 21 inches

Bedrock:

48 inches, limestone interbedded with thin layers of shale

This soil is medium in natural fertility and low in organic matter content. Permeability is moderately slow, and the available water capacity is high. Surface runoff is very rapid. The shrink-swell potential is moderate. Tillage is somewhat difficult, and the optimum moisture range for cultivation is restricted because the clayey subsoil has been mixed with the surface layer. The root zone is deep. Limestone bedrock is at a depth of 40 inches or more.

Included with this soil in mapping are small areas of Faywood, Cynthiana, and Shrouts soils. These soils are in landscape positions similar to those of the Lowell soil. Also included are areas of Lowell soils that are severely eroded and have a surface layer of silty clay. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Lowell soil are used for hay or pasture. Some are used for row crops or small grain.

This soil generally is poorly suited to cultivated crops, but the less sloping areas are suited to occasional cultivation in a long-term rotational sequence. Erosion is a very severe hazard if conventional tillage methods are used, and the slope limits the use of farm equipment. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, ash, locust, hickory, and maple are the dominant native trees. Some of the trees preferred for planting are white oak, white ash, eastern white pine, and yellow poplar. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition, the hazard of erosion, and the equipment limitation. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The slope, the moderately slow permeability, a high content of clay, the depth to bedrock, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength and the slope are limitations on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IVe.

LpC3—Lowell silty clay, 6 to 12 percent slopes, severely eroded. This deep, well drained, sloping soil is on convex ridgetops and side slopes on uplands, mainly in the north-central part of the county. Erosion has removed more than 75 percent of the original surface layer and in places some of the subsoil. In most areas rills or small gullies have formed. The mapped areas are about 3 to 50 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 4 inches, brown silty clay

Subsoil:

4 to 42 inches, strong brown silty clay and yellowish brown clay that has mottles below a depth of 21 inches

Bedrock:
42 inches, limestone interbedded with thin layers of shale

This soil is low in natural fertility and in organic matter content. Permeability is moderately slow, and the available water capacity is high. Surface runoff is rapid. The shrink-swell potential is moderate. The soil cannot be easily tilled, and the optimum moisture range for cultivation is significantly restricted because the clayey subsoil has been mixed with the surface layer. The root zone is deep. Limestone bedrock is at a depth of 40 inches or more.

Included with this soil in mapping are small areas of Faywood and Cynthiana soils. These soils are in landscape positions similar to those of the Lowell soil. Also included are areas of Lowell soils that are moderately eroded and have a surface layer of silty clay loam or silt loam. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Lowell soil are used for hay or pasture. Some are used for row crops or small grain. Some of the acreage is idle land that is reverting to brush.

This soil is poorly suited to cultivated crops because most of the original surface layer has been removed by erosion. The hazard of erosion is severe if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is suited to woodland, but few areas are used for the production of timber. Upland oaks, cedar, locust, hickory, and maple are the dominant native trees. Some of the trees preferred for planting are white oak, white ash, and eastern white pine. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition, the equipment limitation, and seedling mortality. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to some urban uses. The moderately slow permeability, a high content of clay, the depth to bedrock, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IVe.

LpD3—Lowell silty clay, 12 to 20 percent slopes, severely eroded. This deep, well drained, moderately steep soil is on side slopes and convex ridgetops on uplands, mainly in the north-central part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 70 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, brown silty clay

Subsoil:
5 to 48 inches, strong brown silty clay and yellowish brown clay that has mottles below a depth of 21 inches

Bedrock:
48 inches, limestone interbedded with thin layers of shale

This soil is medium in natural fertility and low in organic matter content. Permeability is moderately slow, and the available water capacity is high. Surface runoff is very rapid. The shrink-swell potential is moderate. Tillage is somewhat difficult, and the optimum moisture range for cultivation is restricted because the clayey subsoil has been mixed with the surface layer. The root zone is deep. Limestone bedrock is at a depth of 40 inches or more.

Included with this soil in mapping are small areas of Faywood, Cynthiana, and Shrouts soils. These soils are in landscape positions similar to those of the Lowell soil. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Lowell soil are used for hay or pasture. Some are used for row crops or small grain.

This soil generally is poorly suited to cultivated crops, but the less sloping areas are suited to occasional cultivation in a long-term rotational sequence. Erosion is a very severe hazard if conventional tillage methods are used, and the slope limits the use of farm equipment. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, ash, locust, hickory, and maple are the dominant native trees. Some of the trees preferred for planting are white oak, white ash, eastern white pine, and yellow poplar. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition, the hazard of erosion, and the equipment limitation. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The slope, the moderately slow permeability, a high content of clay, the depth to bedrock, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength and the slope are limitations on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is VIe.

LsC2—Lowell silty clay loam, shale substratum, 2 to 12 percent slopes, eroded. This deep, well drained, gently sloping and sloping soil is on the convex tops of ridges on uplands, mainly in the northeastern part of the county. It is underlain by soft shale bedrock. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 90 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, brown silty clay loam

Subsoil:
5 to 54 inches, strong brown silty clay and yellowish brown clay that has mottles below a depth of 21 inches

Bedrock:
54 to 60 inches, soft shale interbedded with thin layers of siltstone and limestone

This soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderately slow, and the available water capacity is high. Surface runoff is rapid. The shrink-swell potential is moderate. Tillage is somewhat difficult, and the optimum moisture range for cultivation is restricted because the clayey subsoil has been mixed with the surface layer. The root zone is deep and can be easily penetrated by plant roots. Soft shale bedrock is at a depth of 40 inches or more.

Included with this soil in mapping are small areas of Sandview, Nicholson, Eden, and Beasley soils. These soils are in landscape positions similar to those of the Lowell soil. Also included are areas of Lowell soils that are severely eroded and have a surface layer of silty clay. Included areas make up about 20 percent of this map unit and are generally less than 3 acres.

Most areas of the Lowell soil are used for hay, pasture, row crops, or small grain. Some areas are used as sites for houses and gardens.

This soil is suited to cultivated crops, but erosion is a severe hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, ash, locust, hickory, and maple are the dominant native trees. Some of the trees preferred for planting are white oak, white ash, eastern white pine, and yellow poplar. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to some urban uses. The moderately slow permeability, a high content of clay, the depth to bedrock, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIe.

Me—Melvin silt loam, occasionally flooded. This deep, poorly drained, nearly level soil is on low stream terraces, mainly along Rolling Fork in the south-central part of the county. The mapped areas are about 3 to 500 acres. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, dark grayish brown silt loam

Subsoil:
5 to 37 inches, gray, mottled silt loam and silty clay loam

Substratum:
37 to 65 inches, gray, mottled silty clay loam

This soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is slow. A seasonal high water table is within a depth of 12 inches. The soil is occasionally flooded for brief periods late in winter and early in spring. It can be easily tilled when it is at the proper moisture content. It dries out and warms up slowly in spring, however, and tillage is often delayed. The root zone is deep and can be easily penetrated by plant roots. Bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Lawrence, Otwell, and Newark soils. These soils are in landscape positions similar to those of the Melvin soil. Also included are some areas of very poorly drained, silty soils and a few areas of Melvin soils that have slopes of 2 to 4 percent. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

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

Unless drained, this soil is poorly suited to cultivated crops. The seasonal high water table is a major limitation. Planting or harvesting is delayed by the wetness (fig. 11). Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops increase or maintain the content of organic matter. Small grain cover crops are sometimes damaged by flooding in winter or spring.

This soil is suited to pasture and hay crops. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage. Also, the species should be those that are tolerant of wetness. Some hay crops may be damaged by flooding early in spring. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of fertilizer, a drainage system, proper seeding rates and mixtures, weed control, and a well planned clipping and harvesting schedule.

This soil is suited to woodland, but few areas are used for the production of timber. Oaks, gum, ash, hackberry, and maple are the dominant native trees. Some of the trees preferred for planting are pin oak, American sycamore, sweetgum, green ash, and willow oak. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition, the equipment limitation, and seedling mortality. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The flooding and the wetness are the major limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIw.

Mn—Melvin silt loam, frequently flooded. This deep, poorly drained, nearly level soil is on flood plains, mainly along Rolling Fork and its tributaries in the south-central part of the county. The mapped areas are about 3 to 45 acres. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, dark grayish brown silt loam

Subsoil:
5 to 37 inches, gray, mottled silt loam and silty clay loam

Substratum:
37 to 65 inches, gray, mottled silty clay loam

This soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is slow. A seasonal high water table is within a depth of 12 inches. The soil is frequently flooded for brief periods in winter and early in spring. It can be easily tilled when it is at the proper moisture

Figure 11.—Water standing in an area of Melvin silt loam, occasionally flooded. Unless drained, this soil has a seasonal high water table within a depth of 12 inches.

content. It dries out and warms up slowly in spring, however, and tillage is often delayed. The root zone is deep and can be easily penetrated by plant roots. Bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Newark and Nolin soils. These soils are in landscape positions similar to those of the Melvin soil. Also included are some areas of very poorly drained, silty soils; a few areas of poorly drained soils that have a gravelly surface layer and subsoil; and a few areas of Melvin soils that have slopes of 2 to 4 percent. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

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

Unless drained, this soil is poorly suited to cultivated crops. The seasonal high water table is the major limitation. Planting or harvesting is delayed by the wetness. Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops increase or maintain the content of organic matter. Small grain cover crops may be damaged by flooding in winter or spring.

This soil is suited to pasture and hay. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage. Also, the species should be those that are tolerant of wetness. Some hay crops may be damaged by flooding early in spring. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of fertilizer, a drainage system, proper seeding rates and mixtures, weed control, and a well planned clipping and harvesting schedule.

This soil is suited to woodland, but few areas are used for the production of timber. Bottom land oaks, gum, ash, hackberry, and maple are the dominant native trees. Some of the trees preferred for planting are pin oak, American sycamore, sweetgum, green ash, and willow oak. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition, the equipment limitation, and seedling mortality. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The flooding and the wetness are the major limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIw.

MoB—Mountview silt loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on the broad, slightly convex tops of ridges on uplands in the southwestern part of the county. The mapped areas are about 5 to 105 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 7 inches, brown silt loam

Subsoil:

7 to 28 inches, dark yellowish brown and strong brown silt loam

28 to 80 inches, yellowish red silty clay loam and silty clay that has mottles below a depth of 62 inches

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is medium. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Limestone bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Nicholson, Lawrence, and Christian soils. These soils are in landscape positions similar to those of the Mountview soil. Also included are areas of a well drained, silty soil that is 40 to 60 inches deep over bedrock and a few areas of Mountview soils that are moderately eroded. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Mountview soil are used for row crops, small grain, hay, or pasture. Some areas are used as sites for houses and gardens.

This soil is well suited to cultivated crops, but erosion is a moderate hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to pasture and hay crops, especially alfalfa. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, yellow poplar, and pine are the dominant native trees. Some of the trees preferred for planting are yellow poplar, eastern white pine, and black walnut. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is well suited to most urban uses. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome this limitation in some areas.

The capability subclass is IIe.

MoC2—Mountview silt loam, 6 to 12 percent slopes, eroded. This deep, well drained, sloping soil is on slightly convex ridgetops and side slopes on uplands in the southwestern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 5 to 115 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 5 inches, brown silt loam

Subsoil:

5 to 26 inches, dark yellowish brown and strong brown silt loam

26 to 80 inches, yellowish red silty clay that has mottles below a depth of 62 inches

This soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderate, and the available water capacity is high.

Surface runoff is rapid. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Limestone bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Nicholson, Frankstown, and Christian soils. These soils are in landscape positions similar to those of the Mountview soil. Also included are areas of a well drained, silty soil that is 40 to 60 inches deep over bedrock and a few areas of Mountview soils that are severely eroded. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Mountview soil are used for hay or pasture, and a few are used for row crops or small grain. Some areas are used as sites for houses and gardens.

This soil is suited to cultivated crops, but erosion is a severe hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to pasture and hay crops, especially alfalfa. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, yellow poplar, and pine are the dominant native trees. Some of the trees preferred for planting are yellow poplar, eastern white pine, and black walnut. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to most urban uses. The slope is the main limitation affecting sanitary facilities and building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIe.

Na—Newark silt loam, occasionally flooded. This deep, somewhat poorly drained, nearly level soil is on low stream terraces, mainly along Rolling Fork and its tributaries in the south-central part of the county. The mapped areas are about 3 to 185 acres. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, grayish brown silt loam

Subsoil:
9 to 24 inches, brown and light brownish gray, mottled silt loam

Substratum:
24 to 60 inches, gray, mottled silty clay loam

This soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is slow. A seasonal high water table is at a depth of 6 to 18 inches. The soil is occasionally flooded for brief periods in winter and early in spring. It can be easily tilled when it is at the proper moisture content. It dries out and warms up slowly in spring, however, and tillage is often delayed. The root zone is deep and can be easily penetrated by plant roots. Bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Lawrence, Otwell, and Melvin soils. These soils are in landscape positions similar to those of the Newark soil. Also included are some areas of very poorly drained, silty soils and a few areas of Newark soils that have slopes of 2 to 4 percent. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

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

This soil is suited to cultivated crops. The seasonal high water table is a limitation. Planting or harvesting is sometimes delayed by the wetness. Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops increase or maintain the content of organic matter. Small grain cover crops may be damaged by flooding in winter or spring.

This soil is well suited to pasture and hay crops. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage. Also, the species should be those that are tolerant of limited wetness. Some hay crops may be damaged by flooding early in spring. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of fertilizer, a drainage system, proper seeding rates and mixtures, weed control, and a well planned clipping and harvesting schedule.

This soil is suited to woodland, but few areas are used for the production of timber. Bottom land oaks, gum, and ash are the dominant native trees. Some of the trees preferred for planting are pin oak, American sycamore, sweetgum, green ash, and willow oak. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition, the equipment limitation, and seedling mortality. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The flooding and the wetness are the major limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIw.

Ne—Newark silt loam, frequently flooded. This deep, somewhat poorly drained, nearly level soil is on flood plains, mainly along Rolling Fork and its tributaries in the south-central part of the county. The mapped areas are about 3 to 170 acres. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, grayish brown silt loam

Subsoil:
9 to 24 inches, brown and light brownish gray, mottled silt loam

Substratum:
24 to 60 inches, gray, mottled silty clay loam

This soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is slow. A seasonal high water table is at a depth of 6 to 18 inches. The soil is frequently flooded for brief periods in winter and early in spring. It can be easily tilled when it is at the proper moisture content. It dries out and warms up slowly in spring, however, and tillage is often delayed. The root zone is deep and can be easily penetrated by plant roots. Bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Nolin and Melvin soils. These soils are in landscape positions similar to those of the Newark soil. Also included are some areas of very poorly drained, silty soils and a few areas of Newark soils that have slopes of 2 to 4 percent. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

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

This soil is suited to cultivated crops. The seasonal high water table is a limitation (fig. 12). Planting or harvesting is sometimes delayed by the wetness. Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops increase or maintain the content of organic matter. Small grain cover crops may be damaged by flooding in winter or spring.

This soil is well suited to pasture and hay crops. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage. Also, the species should be those that are tolerant of limited wetness. Some hay crops may be damaged by flooding early in spring. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of fertilizer, a drainage system, proper seeding rates and mixtures, weed control, and a well planned clipping and harvesting schedule.

This soil is suited to woodland, but few areas are used for the production of timber. Bottom land oaks, gum, and ash are the dominant native trees. Some of the trees preferred for planting are pin oak, American sycamore, sweetgum, green ash, and eastern cottonwood. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition, the equipment limitation, and seedling mortality. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The flooding and the wetness are the major limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIw.

NhB—Nicholson silt loam, 2 to 6 percent slopes. This deep, moderately well drained, gently sloping soil is on the slightly concave, broad tops of ridges on

Figure 12.—Soybeans in an area of Newark silt loam, frequently flooded. This field can be cropped intensively because a drainage system has been installed.

uplands, mainly in the central, western, and southern parts of the county. The mapped areas are about 3 to 220 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches, brown silt loam

Subsoil:

8 to 22 inches, yellowish brown silty clay loam

22 to 48 inches, a fragipan of yellowish brown, mottled silty clay loam

48 to 60 inches, strong brown, mottled silty clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate above the fragipan and slow in the fragipan. The available water capacity is moderate. Surface runoff is medium. A seasonal high water table is at a depth of 18 to 30 inches. The soil can be easily tilled when it is at the proper moisture content. The root zone can be easily penetrated by plant roots, but it is only moderately deep because of the fragipan. Limestone, shale, or siltstone bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Lawrence, Sandview, Lowell, and Robertsville soils. These soils are in landscape positions similar to those of the Nicholson soil. Also included are a few areas of Nicholson soils that are subject to ponding. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Nicholson soil are used for hay or pasture. Some areas are used for cultivated crops or small grain, and a few are wooded.

This soil is suited to cultivated crops. The seasonal high water table and the fragipan are limitations. Planting or harvesting is sometimes delayed by the wetness. Erosion is a moderate hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage. Also, the species should be those that are tolerant of limited wetness. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, a surface drainage system, proper seeding rates and mixtures, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, gum, hickory, and yellow poplar are the dominant native trees. Some of the trees preferred for planting are white oak, northern red oak, sweetgum, yellow poplar, white ash, and eastern white pine. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition and the equipment limitation. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to some urban uses. The wetness and the slow permeability are limitations affecting most sanitary facilities. The wetness is a limitation affecting most kinds of building site development, and low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIe.

NhC2—Nicholson silt loam, 6 to 12 percent slopes, eroded. This deep, moderately well drained, sloping soil is on ridgetops and side slopes on uplands, mainly in the central, western, and southern parts of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 80 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches, brown silt loam

Subsoil:

6 to 20 inches, yellowish brown silty clay loam

20 to 46 inches, a fragipan of yellowish brown, mottled silty clay loam

46 to 60 inches, strong brown, mottled silty clay loam

This soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderate above the fragipan and slow in the fragipan. The available water capacity is moderate. Surface runoff is rapid. A seasonal high water table is at a depth of 18 to 30 inches. The soil can be easily tilled when it is at the proper moisture content. The root zone can be easily penetrated by plant roots, but it is only moderately deep because of the fragipan. Limestone, shale, or siltstone bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Sandview, Lowell, and Beasley soils. These soils are in landscape positions similar to those of the Nicholson soil. Also included are a few areas of Nicholson soils that are severely eroded. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Nicholson soil are used for hay or pasture. Some areas are used for cultivated crops or small grain, and a few are wooded.

This soil is suited to cultivated crops. The seasonal high water table and the fragipan are limitations. Planting or harvesting is sometimes delayed by the wetness. Erosion is a severe hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage. Also, the species should be those that are tolerant of limited wetness. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, gum, hickory, and yellow poplar are the dominant native trees. Some of the trees preferred for planting are white oak, northern red oak, sweetgum, yellow poplar, white ash, and eastern white pine. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition and the equipment limitation. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to some urban uses. The wetness, the slow permeability, and the slope are limitations affecting most sanitary facilities. The wetness and the slope are limitations affecting most kinds of building site development, and low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIe.

No—Nolin silt loam, frequently flooded. This deep, well drained, nearly level soil is on flood plains throughout the county. The mapped areas are about 3 to 140 acres. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches, brown silt loam

Subsoil:
10 to 54 inches, brown silt loam

Substratum:
54 to 60 inches, brown gravelly silt loam

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is slow. A seasonal high water table is at a depth of 36 inches or more. The soil is frequently flooded for brief periods late in winter and early in spring. As a result of streambank overflow, low areas are subject to scouring and deposition. The soil can be easily worked throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Newark, Sensabaugh, and Melvin soils. These soils are in landscape positions similar to those of the Nolin soil. Also included, in areas adjacent to streambanks, are Nolin soils that have slopes of 2 to 12 percent. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Nolin soil are used for cultivated crops (fig. 13), hay, or pasture. Areas along streambanks are used mainly as woodland.

This soil is well suited to cultivated crops. Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops increase or maintain the content of organic matter. Small grain cover crops are sometimes damaged by flooding in winter or spring.

This soil is well suited to pasture and hay crops. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Some hay crops can be damaged by flooding early in spring. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of fertilizer, proper seeding rates and mixtures, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. River birch, gum, willow, sycamore, and poplar are the dominant native trees. Some of the trees preferred for planting are eastern cottonwood, sweetgum, black walnut, yellow poplar, and eastern white pine. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition and seedling mortality. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The flooding is the main hazard affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIw.

OtB—Otwell silt loam, 2 to 8 percent slopes. This deep, moderately well drained, gently sloping and sloping soil is on low stream terraces or benches, mainly in narrow valleys in the south-central and northern parts of the county. The mapped areas are about 3 to 45 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 11 inches, brown silt loam

Subsoil:
11 to 23 inches, brown silty clay loam
23 to 42 inches, a fragipan of light gray, mottled silty clay loam
42 to 60 inches, gray, mottled silty clay

This soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderately slow above the fragipan and very slow in the fragipan. The available water capacity is moderate. Surface runoff is slow. A seasonal high water table is at a depth of 24 to 42 inches. The soil can be easily tilled when it is at the proper moisture content. The root zone

Figure 13.—Fescue hay, burley tobacco, and corn in an area of Nolin silt loam, frequently flooded. The soils in the background are in the Carpenter-Garmon-Rohan general soil map unit.

can be easily penetrated by plant roots, but it is only moderately deep because of the fragipan. Bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Elk and Lawrence soils. These soils are in landscape positions similar to those of the Otwell soil. Also included are a few areas of Otwell soils that are subject to rare flooding and small areas of Newark soils on flood plains. Included areas make up about 10 percent of this map unit and are generally less than 3 acres.

Most areas of the Otwell soil are used for hay, pasture, row crops, or small grain. A few areas are wooded.

This soil is suited to cultivated crops. The seasonal high water table and the fragipan are limitations. Planting or harvesting is sometimes delayed by the wetness. Erosion is a moderate hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage. Also, the species should be those that are tolerant of limited wetness. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, gum, maple, and poplar are the dominant native trees. Some of the trees preferred for planting are yellow poplar, white ash, white oak, and eastern white pine. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to some urban uses. The wetness and the slow permeability are limitations affecting most sanitary facilities. The wetness is a limitation affecting most kinds of building site development, and low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIe.

Pt—Pits, quarry. This map unit occurs as three areas of open excavations from which the soil has been removed and in which limestone bedrock is exposed. These areas have been excavated so that limestone can be mined, conditioned, and stockpiled for agricultural or industrial uses. They are in the same landscape position as Lowell, Faywood, and Cynthiana soils. The mapped areas are irregular in shape and are about 25 to 80 acres.

These open excavations do not support plants. The walls are vertical, and the flat bottoms are exposed bedrock. The excavations are as much as 75 feet deep and generally are several hundred feet wide. The only active quarry is about 2 miles south of Lebanon. The quarried limestone is used for agricultural lime, aggregate, road base, and asphalt filler.

These areas are not suited to cultivated crops, hay, pasture, urban uses, or woodland. If reclaimed, they may be suited to woodland or pasture.

The capability subclass is VIIIs.

RaC—Riney loam, 6 to 12 percent slopes. This deep, well drained, sloping soil is on ridgetops and side slopes on uplands in the southwest corner of the county. The mapped areas are about 3 to 120 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 7 inches, brown loam

Subsoil:

7 to 12 inches, strong brown loam

12 to 63 inches, yellowish red and red clay loam

This soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderately rapid, and the available water capacity is high. Surface runoff is rapid. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Soft sandstone bedrock is at a depth of 48 inches or more.

Included with this soil in mapping are small areas of Christian, Frankstown, and Garmon soils. These soils are in landscape positions similar to those of the Riney soil. Also included are small areas of Riney soils that are moderately eroded. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Riney soil are used for hay or pasture. Some areas are used for row crops or small grain, and some are used as sites for houses and gardens.

This soil is suited to cultivated crops, but erosion is a severe hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, poplar, and maple are the dominant native trees. Some of the trees preferred for planting are yellow poplar, white oak, white ash, black walnut, and eastern white pine. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to most urban uses. The slope, the depth to bedrock, and seepage are limitations affecting most sanitary facilities. The slope is a limitation affecting building site development. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIe.

RcE2—Riney-Christian complex, 20 to 35 percent slopes, eroded. These deep, well drained, steep and very steep soils are on the upper side slopes and ridgetops on uplands in the southwest corner of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 450 acres.

The Riney soil makes up about 65 percent of the complex, and the Christian soil makes up about 15 percent. The two soils were mapped together as a complex because they are in a pattern that makes separation impractical at the scale used in mapping.

The typical sequence, depth, and composition of the layers of the Riney soil are as follows—

Surface layer:
0 to 5 inches, brown loam

Subsoil:
5 to 10 inches, strong brown loam
10 to 63 inches, yellowish red and red clay loam

The Riney soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderately rapid, and the available water capacity is high. Surface runoff is very rapid. The root zone is deep and can be easily penetrated by plant roots. Soft sandstone bedrock is at a depth of 48 inches or more.

The typical sequence, depth, and composition of the layers of the Christian soil are as follows—

Surface layer:
0 to 5 inches, brown silt loam

Subsoil:
5 to 20 inches, yellowish brown silt loam and yellowish red clay loam
20 to 67 inches, reddish brown and dark reddish brown, mottled clay
67 to 75 inches, dark reddish brown and yellowish red channery clay loam

The Christian soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is very rapid. The shrink-swell potential is moderate. The root zone is deep and can be easily penetrated by plant roots. Limestone bedrock is at a depth of more than 60 inches.

Included with these soils in mapping are small areas of Garmon and Frankstown soils. These included soils are in landscape positions similar to those of the Riney and Christian soils. Also included are areas of Riney and Christian soils that are severely eroded. Included areas make up about 20 percent of this map unit and are generally less than 3 acres.

Most areas of the Riney and Christian soils are used as woodland, and a few are used as pasture. Much of the pastured acreage is idle land that is reverting to woodland.

These soils are not suited to cultivated crops. The slope is a major limitation affecting the use of farm equipment.

These soils are not suited to hay and are poorly suited to pasture. If a pasture is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage, provide a good ground cover, and minimize the need for renovation. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, and weed control.

These soils are suited to woodland and are well suited to woodland wildlife habitat. Upland oaks, maple, hickory, walnut, and pine are the dominant native trees. The understory is mainly maple, dogwood, pine, and sassafras. Some of the trees preferred for planting are white oak, yellow poplar, and eastern white pine. Table 8 provides specific information relating to potential productivity.

The management concerns in the wooded areas are plant competition, the hazard of erosion, and the equipment limitation. After the trees are harvested, carefully managed reforestation is needed to control competition from undesirable understory plants. Steep skid trails and roads are subject to rilling and gullying unless they are protected by adequate water bars, a good plant cover, or both. The slope restricts the use of wheeled and tracked equipment on skid trails. Cable skidding is generally safer and results in less surface disturbance.

These soils are poorly suited to urban uses. The slope is a major limitation affecting most sanitary facilities and most kinds of building site development. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is VIe.

Ro—Robertsville silt loam. This deep, poorly drained, nearly level soil is on stream terraces and in concave upland areas, mainly in the central, western, and southern parts of the county. The mapped areas are about 3 to 45 acres. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, grayish brown silt loam

Subsoil:
5 to 30 inches, light brownish gray, mottled silt loam and silty clay loam
30 to 56 inches, a fragipan of gray, mottled silty clay loam

Substratum:
56 to 70 inches, light gray, mottled silty clay loam

This soil is medium in natural fertility and low in organic matter content. Permeability is moderate above the fragipan and slow in the fragipan. The available water capacity is moderate. Surface runoff is very slow. A seasonal high water table is within a depth of 12 inches. The soil can be easily tilled, but the optimum moisture range for cultivation is significantly restricted because of the wetness. The root zone can be easily penetrated by plant roots, but it is only moderately deep because of the fragipan. Bedrock is at a depth of 60 inches or more.

Included with this soil in mapping are small areas of Lawrence and Nicholson soils. These soils are in landscape positions similar to those of the Robertsville soil. Also included are a few areas of Robertsville soils that have slopes of 2 to 4 percent. Included areas make up about 10 percent of this map unit and are generally less than 3 acres.

Most areas of the Robertsville soil are used as woodland. Some areas are used as pasture, and a few are used for hay.

Unless drained, this soil is not suited to cultivated crops. The seasonal high water table and the fragipan are the major limitations. Planting or harvesting is delayed by the wetness. Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops increase or maintain the content of organic matter.

This soil is poorly suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage. Also, the species should be those that are tolerant of wetness. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, a surface drainage system, proper seeding rates and mixtures, weed control, and a well planned clipping and harvesting schedule.

This soil is suited to woodland and to woodland and wetland wildlife habitat. Bottom land oaks, gum, maple, and ash are the dominant native trees. Some of the trees preferred for planting are American sycamore, sweetgum, pin oak, green ash, and willow oak. Table 8 provides specific information relating to potential productivity.

The main management concerns in the wooded areas are plant competition, the equipment limitation, and seedling mortality. Reforestation can be severely limited by competition from undesirable understory plants. The seasonal high water table restricts the use of equipment to periods when the soil is dry. The trees that are selected for planting should be those that are tolerant of seasonal wetness.

This soil is not suited to most urban uses. The wetness and the slow permeability are limitations affecting most sanitary facilities. The wetness is a limitation affecting most kinds of building site development, and low strength and the wetness are limitations on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IVw.

RtD2—Rohan-Trappist complex, 6 to 20 percent slopes, eroded, very rocky. These shallow and moderately deep, well drained, sloping to moderately steep soils are on uplands throughout the western and south-central parts of the county. The Rohan soil is on the steeper, more convex, upper side slopes and on narrow ridgetops, and the Trappist soil is on the less sloping, lower side slopes. Erosion has removed about 25 to 75 percent of the original surface layer. Rock outcrop covers about 2 to 10 percent of the surface. The mapped areas are about 3 to 105 acres.

The Rohan soil makes up about 55 percent of this map unit, and the Trappist soil makes up about 30 percent. The two soils were mapped together as a complex because they are in a pattern that makes separation impractical at the scale used in mapping.

The typical sequence, depth, and composition of the layers of the Rohan soil are as follows—

Surface layer:
0 to 4 inches, dark brown channery silt loam

Subsoil:
4 to 14 inches, dark yellowish brown very channery silt loam and yellowish brown extremely channery silty clay loam

Bedrock:
14 to 18 inches, soft shale
18 inches, hard, black shale

The Rohan soil is low in natural fertility and moderate in organic matter content. Permeability is moderate or moderately slow, and the available water capacity is low. Surface runoff is very rapid. The soil cannot be easily tilled because of the rock outcrop. The root zone is shallow, and root penetration may be restricted because of the high content of rock fragments. Hard, black shale is at a depth of 10 to 20 inches.

The typical sequence, depth, and composition of the layers of the Trappist soil are as follows—

Surface layer:
0 to 4 inches, brown silty clay loam

Subsoil:
4 to 21 inches, yellowish brown and strong brown clay and yellowish brown channery clay that has mottles below a depth of 16 inches

Bedrock:
21 inches, hard, black shale

The Trappist soil is low in natural fertility and in organic matter content. Permeability is slow, and the available water capacity is moderate. Surface runoff is very rapid. The shrink-swell potential is moderate. Tillage is somewhat difficult, and the optimum moisture range for cultivation is restricted because the clayey subsoil has been mixed with the surface layer. The root zone is moderately deep. Hard, black shale is at a depth of 20 to 40 inches.

Included with these soils in mapping are small areas of Jessietown and Greenbriar soils. These included soils are in landscape positions similar to those of the Rohan and Trappist soils. Also included are areas of Rohan and Trappist soils that are severely eroded and areas that have more than 10 percent rock outcrop. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Rohan and Trappist soils are used as pasture or woodland. Some of the acreage is idle land that is covered with brush.

These soils are poorly suited to cultivated crops. The rock outcrop and the slope seriously limit the use of farm equipment. The hazard of erosion is very severe if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

These soils are poorly suited to hay but are suited to pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

These soils are suited to woodland. Upland oaks, hickory, maple, and pine are the dominant native trees. Some of the trees preferred for planting are Virginia pine, shortleaf pine, and white oak. Table 8 provides specific information relating to potential productivity.

The main management concerns in the wooded areas are the hazard of erosion, the equipment limitation, seedling mortality, and plant competition. Steep skid trails and roads are subject to rilling and gullying unless they are protected by adequate water bars, a good plant cover, or both. The slope restricts the use of wheeled and tracked equipment on skid trails. Cable skidding is generally safer and results in less surface disturbance. The seedling mortality rate may be high in the summer because of inadequate soil moisture. After the trees are harvested, carefully managed reforestation is needed to control competition from undesirable understory plants.

These soils are poorly suited to most urban uses. The slope, the moderately slow or slow permeability, the clayey texture, and the depth to bedrock are the major limitations affecting sanitary facilities and building site development. Low strength, the depth to bedrock, and the slope are limitations on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The Rohan soil is in capability subclass VIIs, and the Trappist soil is in capability subclass IVe.

RtF2—Rohan-Trappist complex, 20 to 50 percent slopes, eroded, very rocky. These shallow and moderately deep, well drained, steep and very steep soils are on uplands, mainly throughout the western, south-central, and southeastern parts of the county. The Rohan soil is on the steeper, more convex side slopes, and the Trappist soil is on the less sloping, lower side slopes. Erosion has removed about 25 to 75 percent of the original surface layer. Rock outcrop covers about 2 to 10 percent of the surface. The mapped areas are about 3 to 160 acres.

The Rohan soil makes up about 65 percent of this map unit, and the Trappist soil makes up about 20 percent. The two soils were mapped together as a complex because they are in a pattern that makes separation impractical at the scale used in mapping.

Typically, the Rohan soil is covered by a 1-inch layer of partly decomposed leaves and twigs. Under this layer, the typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 4 inches, dark brown channery silt loam

Subsoil:

4 to 14 inches, dark yellowish brown very channery silt loam and yellowish brown extremely channery silty clay loam

Bedrock:

14 to 18 inches, soft shale

18 inches, hard, black shale

The Rohan soil is low in natural fertility and moderate or high in organic matter content. Permeability is moderate or moderately slow, and the available water capacity is low. Surface runoff is very rapid. The root zone is shallow, and root penetration may be restricted because of the high content of rock fragments. Hard, black shale is at a depth of 10 to 20 inches.

Typically, the Trappist soil is covered by a 1-inch layer of partly decomposed leaves and twigs. Under this layer, the typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, brown silty clay loam

Subsoil:
4 to 21 inches, yellowish brown and strong brown clay and yellowish brown channery clay that has mottles below a depth of 16 inches

Bedrock:
21 inches, hard, black shale

The Trappist soil is low in natural fertility and low or moderate in organic matter content. Permeability is slow, and the available water capacity is moderate. Surface runoff is very rapid. The shrink-swell potential is moderate. The root zone is moderately deep. Hard, black shale is at a depth of 20 to 40 inches.

Included with these soils in mapping are small areas of Jessietown, Greenbriar, and Lenberg soils. These soils are in landscape positions similar to those of the Rohan and Trappist soils. Also included are areas of Rohan and Trappist soils that are severely eroded and areas that have more than 10 percent rock outcrop. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Rohan and Trappist soils are used as woodland. Some are used as pasture. Some of the acreage is idle land that is covered with brush.

These soils are not suited to cultivated crops. The rock outcrop and the slope seriously limit the use of farm equipment.

These soils are not suited to hay and are poorly suited to pasture. If a pasture is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, and weed control.

These soils are suited to woodland and are well suited to woodland wildlife habitat. Upland oaks, hickory, maple, and pine are the dominant native trees. Some of the trees preferred for planting are Virginia pine, shortleaf pine, and white oak. Table 8 provides specific information relating to potential productivity and the appropriate trees to plant on the warm and cool aspects of these soils.

The management concerns in the wooded areas are the hazard of erosion, the equipment limitation, seedling mortality, and plant competition. Steep skid trails and roads are subject to rilling and gullying unless they are protected by adequate water bars, a good plant cover, or both. The slope restricts the use of wheeled and tracked equipment on skid trails. Cable skidding is generally safer and results in less surface disturbance. The seedling mortality rate may be high in areas of the Rohan soil because the rooting depth is shallow.

These soils are not suited to most urban uses. The slope, the moderately slow or slow permeability, the clayey texture, and the depth to bedrock are the major limitations affecting sanitary facilities and building site development. Low strength, the depth to bedrock, and the slope are limitations on sites for local roads and streets.

The Rohan soil is in capability subclass VIIs, and the Trappist soil is in capability subclass VIIe.

SaB—Sandview silt loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on the broad, slightly convex tops of ridges on uplands in the north-central part of the county. The mapped areas are about 5 to 215 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, brown silt loam

Subsoil:
8 to 35 inches, yellowish brown silt loam and silty clay loam
35 to 70 inches, yellowish brown silty clay and clay and dark yellowish brown silty clay that has mottles below a depth of 56 inches

Substratum:
70 to 76 inches, yellowish brown and dark yellowish brown, mottled silty clay

Bedrock:
76 inches, limestone interbedded with thin layers of calcareous shale

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part. The available water capacity is high. Surface runoff is medium. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Limestone bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Nicholson, Lowell, Beasley, and Crider soils. These soils are in landscape positions similar to those of the Sandview soil. Also included are areas of a well drained, silty soil that is 40 to 60 inches deep over bedrock and a few areas of moderately eroded Sandview soils. Included areas make up about 10 percent of this map unit and are generally less than 3 acres.

Most areas of the Sandview soil are used for row crops, small grain, hay, or pasture. Some areas are used as sites for houses and gardens.

This soil is well suited to cultivated crops, but erosion is a moderate hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to pasture and hay crops, especially alfalfa. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, ash, hickory, locust, elm, cherry, and walnut are the dominant native trees. Some of the trees preferred for planting are black walnut, white oak, yellow poplar, white ash, northern red oak, and eastern white pine. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is well suited to most urban uses. The moderately slow permeability and a high content of clay in the lower part of the subsoil are limitations affecting some sanitary facilities. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIe.

SaC2—Sandview silt loam, 6 to 12 percent slopes, eroded. This deep, well drained, sloping soil is on slightly convex ridgetops and side slopes on uplands in the north-central part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 5 to 140 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, brown silt loam

Subsoil:
6 to 35 inches, yellowish brown silt loam and silty clay loam
35 to 70 inches, yellowish brown silty clay and clay and dark yellowish brown silty clay that has mottles below a depth of 56 inches

Substratum:
70 to 76 inches, yellowish brown and dark yellowish brown, mottled silty clay

Bedrock:
76 inches, limestone interbedded with thin layers of calcareous shale

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part. The available water capacity is high. Surface runoff is rapid. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Limestone bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Nicholson, Lowell, Beasley, and Crider soils. These soils are in landscape positions similar to those of the Sandview soil. Also included are areas of a well drained, silty soil that is 40 to 60 inches deep over bedrock and a few areas of severely eroded Sandview soils. Included areas make up about 10 percent of this map unit and are generally less than 3 acres.

Most areas of the Sandview soil are used for row crops, small grain, hay, or pasture. Some areas are used as sites for houses and gardens.

This soil is suited to cultivated crops, but erosion is a severe hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

This soil is well suited to pasture and hay crops, especially alfalfa. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

Figure 14.—Gravel on the surface of Sensabaugh gravelly silt loam, frequently flooded.

This soil is well suited to woodland, but few areas are used for the production of timber. Upland oaks, ash, hickory, locust, elm, cherry, and walnut are the dominant native trees. Some of the trees preferred for planting are black walnut, white oak, yellow poplar, white ash, northern red oak, and eastern white pine. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is suited to most urban uses. The moderately slow permeability and a high content of clay in the lower part of the subsoil are limitations affecting some sanitary facilities. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIe.

Se—Sensabaugh gravelly silt loam, frequently flooded. This deep, well drained, nearly level soil is on flood plains along the major streams and tributaries, mainly in the Knobs Physiographic Region. The mapped areas are about 3 to 190 acres. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches, brown gravelly silt loam

Subsoil:
8 to 40 inches, brown gravelly silt loam

Substratum:
40 to 60 inches, brown very gravelly silt loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate or moderately rapid, and the available water capacity is moderate. Surface runoff is slow. A seasonal high water table is at a depth of 48 inches or more. The soil is frequently flooded for very brief periods in winter and early in spring. As a result of streambank overflow, low areas are subject to scouring and deposition. The soil can be worked throughout a wide range in moisture content, but tillage is somewhat difficult because of the gravel in the surface layer (fig. 14). The root zone is deep and can be easily penetrated by plant roots. Bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Newark, Nolin, and Melvin soils. These soils are in landscape positions similar to those of the Sensabaugh soil. Also included, in areas adjacent to streambanks, are soils that have slopes of 2 to 12 percent. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Sensabaugh soil are used for cultivated crops, hay, or pasture. Areas along streambanks are used mainly as woodland.

This soil is well suited to cultivated crops. Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops increase or maintain the content of organic matter. Small grain cover crops may be damaged by flooding in winter or spring.

This soil is well suited to pasture and hay crops. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Some hay crops can be damaged by flooding early in spring. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, weed control, and a well planned clipping and harvesting schedule.

This soil is well suited to woodland, but few areas are used for the production of timber. Ash, poplar, bottom land oaks, and American sycamore are the dominant native trees. Some of the trees preferred for planting are black walnut, yellow poplar, white oak, and white ash. Table 8 provides specific information relating to potential productivity. The main management concerns are plant competition and seedling mortality. Reforestation can be severely limited by competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The flooding and seepage are the main limitations affecting most sanitary facilities and most kinds of building site development. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIw.

SrE2—Shrouts-Brassfield complex, 12 to 30 percent slopes, eroded, very rocky. These moderately deep, well drained, moderately steep and steep soils are on the upper convex side slopes on uplands, mainly in the northwestern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Rock outcrop covers about 2 to 10 percent of the surface. The mapped areas are about 3 to 220 acres.

The Shrouts soil makes up about 45 percent of this map unit, and the Brassfield soil makes up about 30 percent. The two soils were mapped together as a complex because they are in a pattern that makes separation impractical at the scale used in mapping.

The typical sequence, depth, and composition of the layers of the Shrouts soil are as follows—

Surface layer:
0 to 4 inches, dark brown silty clay loam

Subsoil:
4 to 26 inches, light olive brown silty clay and clay that has mottles below a depth of 12 inches

Substratum:
26 to 30 inches, olive gray clay

Bedrock:
30 to 50 inches, soft, calcareous shale interbedded with thin layers of marl

The Shrouts soil is medium in natural fertility and low in organic matter content. Permeability is slow, and the available water capacity is moderate. Surface runoff is very rapid. The shrink-swell potential is moderate. The root zone is moderately deep. Soft shale bedrock is at a depth of 20 to 40 inches.

The typical sequence, depth, and composition of the layers of the Brassfield soil are as follows—

Surface layer:
0 to 6 inches, dark grayish brown loam

Subsoil:
6 to 18 inches, light olive brown loam

Substratum:
18 to 34 inches, olive gray channery loam

Bedrock:
34 to 45 inches, soft dolomite interbedded with calcareous shale and limestone

The Brassfield soil is medium in natural fertility and low in organic matter content. Permeability and the available water capacity are moderate. Surface runoff is very rapid. The root zone is moderately deep and can be easily penetrated by plant roots. Soft dolomite bedrock is at a depth of 20 to 40 inches.

Included with these soils in mapping are small areas of Beasley, Faywood, and Cynthiana soils. These included soils are in landscape positions similar to those of the Shrouts and Brassfield soils. Also included are areas of Shrouts and Brassfield soils that are severely eroded and some areas where many loose flagstones are scattered on the surface of these soils. Included areas make up about 25 percent of this map unit and are generally less than 3 acres.

Most areas of the Shrouts and Brassfield soils are used as pasture, and a few are used as woodland. Much of the acreage is idle land that is reverting to brush and woodland.

These soils are not suited to cultivated crops. The slope and the rock outcrop seriously limit the use of farm equipment.

These soils are poorly suited to hay but are suited to pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage, provide a good ground cover, and minimize the need for renovation. The main management needs are applications of fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

These soils are suited to woodland. Upland oaks, cedar, ash, and locust are the dominant native trees. Some of the trees preferred for planting are white oak, white ash, Virginia pine, and eastern redcedar. Table 8 provides specific information relating to potential productivity.

The main management concerns in the wooded areas are the hazard of erosion, the equipment limitation, seedling mortality, and plant competition. Steep skid trails and roads are subject to rilling and gullying, especially on the Brassfield soil, unless they are protected by adequate water bars, a good plant cover, or both. Cable skidding is generally safer and results in less surface disturbance. Reforestation can be severely limited by competition from undesirable understory plants.

These soils are poorly suited to most urban uses. The slope, the depth to bedrock, the slow permeability, a high content of clay, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength and the slope are limitations on sites for local roads and streets.

The capability subclass is VIe.

TbA—Tilsit-Berea silt loams, 0 to 2 percent slopes. These deep and moderately deep, moderately well drained, nearly level soils are on the broad, slightly concave tops of low ridges on uplands, mainly in the west-central part of the county. The mapped areas are about 5 to 65 acres.

The Tilsit soil makes up about 50 percent of this map unit, and the Berea soil makes up about 35 percent. The two soils were mapped together as a complex because they are in a pattern that makes separation impractical at the scale used in mapping.

The typical sequence, depth, and composition of the layers of the Tilsit soil are as follows—

Surface layer:
- 0 to 8 inches, brown silt loam

Subsoil:
- 8 to 27 inches, yellowish brown silt loam and silty clay loam that has mottles below a depth of 21 inches
- 27 to 42 inches, a fragipan of yellowish brown, mottled silty clay loam
- 42 to 50 inches, yellowish brown, mottled channery silty clay loam

Bedrock:
- 50 to 53 inches, soft shale
- 53 inches, hard, black shale

The Tilsit soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderate above the fragipan and slow or very slow in the fragipan. The available water capacity is moderate. Surface runoff is slow. A seasonal high water table is at a depth of 18 to 30 inches. The soil can be easily tilled when it is at the proper moisture content. The root zone can be easily penetrated by plant roots, but it is only moderately deep because of the fragipan. Hard, black shale is at a depth of 40 to 120 inches.

The typical sequence, depth, and composition of the layers of the Berea soil are as follows—

Surface layer:
- 0 to 7 inches, brown silt loam

Subsoil:
- 7 to 26 inches, yellowish brown silt loam that has mottles below a depth of 18 inches
- 26 to 31 inches, gray, mottled silty clay loam

Substratum:
- 31 to 36 inches, gray, mottled channery silty clay

Bedrock:
36 to 39 inches, soft shale
39 inches, hard, black shale

The Berea soil is medium in natural fertility and low in organic matter content. Permeability is moderately slow, and the available water capacity is moderate. Surface runoff is slow. A seasonal high water table is at a depth of 18 to 36 inches. The soil can be easily tilled when it is at the proper moisture content. The root zone is moderately deep and can be easily penetrated by plant roots. Hard, black shale is at a depth of 20 to 40 inches.

Included with these soils in mapping are small areas of Greenbriar, Trappist, Lawrence, Jessietown, and Rohan soils. These included soils are in landscape positions similar to those of the Tilsit and Berea soils. Also included are areas of a moderately well drained, silty soil that has a fragipan and that is less than 40 inches deep over bedrock and areas of a somewhat poorly drained, silty soil that is less than 40 inches deep over bedrock. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Tilsit and Berea soils are used for hay or pasture. Some areas are used for row crops or small grain, and a few are wooded.

These soils are suited to cultivated crops. The seasonal high water table and the fragipan are limitations. Planting or harvesting is sometimes delayed by the wetness. Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops increase or maintain the content of organic matter.

These soils are suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage. Also, the species should be those that are tolerant of limited wetness. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, a surface drainage system, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

These soils are suited to woodland, but few areas are used for the production of timber. Upland oaks, hickory, maple, yellow poplar, and pine are the dominant native trees. Some of the trees preferred for planting are eastern white pine, shortleaf pine, white oak, and yellow poplar. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

These soils are poorly suited to most urban uses. The wetness, the slow permeability, and the depth to bedrock are the major limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIw.

TbB—Tilsit-Berea silt loams, 2 to 6 percent slopes. These deep and moderately deep, moderately well drained, gently sloping soils are on the broad, slightly concave tops of low ridges on uplands, mainly in the west-central part of the county. The mapped areas are about 5 to 55 acres.

The Tilsit soil makes up about 50 percent of this map unit, and the Berea soil makes up about 35 percent. The soils were mapped together as a complex because they are in a pattern that makes separation impractical at the scale used in mapping.

The typical sequence, depth, and composition of the layers of the Tilsit soil are as follows—

Surface layer:
0 to 8 inches, brown silt loam

Subsoil:
8 to 27 inches, yellowish brown silt loam and silty clay loam that has mottles below a depth of 21 inches
27 to 42 inches, a fragipan of yellowish brown, mottled silty clay loam
42 to 50 inches, yellowish brown, mottled channery silty clay loam

Bedrock:
50 to 53 inches, soft shale
53 inches, hard, black shale

The Tilsit soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderate above the fragipan and slow or very slow in the fragipan. The available water capacity is moderate. Surface runoff is medium. A seasonal high water table is at a depth of 18 to 30 inches. The soil can be easily tilled when it is at the proper moisture content. The root zone can be easily penetrated by plant roots, but it is only moderately deep because of the fragipan. Hard, black shale is at a depth of 40 to 120 inches.

The typical sequence, depth, and composition of the layers of the Berea soil are as follows—

Surface layer:
0 to 7 inches, brown silt loam

Subsoil:
7 to 26 inches, yellowish brown silt loam that has mottles below a depth of 18 inches
26 to 31 inches, gray, mottled silty clay loam

Substratum:
31 to 36 inches, gray, mottled channery silty clay

Bedrock:
36 to 39 inches, soft shale
39 inches, hard, black shale

The Berea soil is medium in natural fertility and low in organic matter content. Permeability is moderately slow, and the available water capacity is moderate. Surface runoff is medium. A seasonal high water table is at a depth of 18 to 36 inches. The soil can be easily tilled when it is at the proper moisture content. The root zone is moderately deep and can be easily penetrated by plant roots. Hard, black shale is at a depth of 20 to 40 inches.

Included with these soils in mapping are small areas of Greenbriar, Trappist, Lawrence, Jessietown, and Rohan soils. These included soils are in landscape positions similar to those of the Tilsit and Berea soils. Also included are areas of a moderately well drained, silty soil that has a fragipan and that is less than 40 inches deep over bedrock and areas of a somewhat poorly drained, silty soil that is less than 40 inches deep over bedrock. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Tilsit and Berea soils are used for hay or pasture. Some areas are used for row crops or small grain, and a few are wooded.

These soils are suited to cultivated crops. The seasonal high water table and the fragipan are limitations. Planting or harvesting is sometimes delayed by the wetness. Erosion is a moderate hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

These soils are suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage. Also, the species should be those that are tolerant of limited wetness. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

These soils are suited to woodland, but few areas are used for the production of timber. Upland oaks, hickory, maple, yellow poplar, and pine are the dominant native trees. Some of the trees preferred for planting are eastern white pine, shortleaf pine, white oak, and yellow poplar. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

These soils are poorly suited to most urban uses. The wetness, the slow permeability, and the depth to bedrock are the major limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIe.

TbC2—Tilsit-Berea silt loams, 6 to 12 percent slopes, eroded. These deep and moderately deep, moderately well drained, sloping soils are on ridgetops and side slopes on uplands, mainly in the west-central part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 5 to 40 acres.

The Tilsit soil makes up about 50 percent of this map unit, and the Berea soil makes up about 35 percent. The two soils were mapped together as a complex because they are in a pattern that makes separation impractical at the scale used in mapping.

The typical sequence, depth, and composition of the layers of the Tilsit soil are as follows—

Surface layer:
0 to 6 inches, brown silt loam

Subsoil:
6 to 27 inches, yellowish brown silt loam and silty clay loam that has mottles below a depth of 21 inches
27 to 42 inches, a fragipan of yellowish brown, mottled silty clay loam
42 to 50 inches, yellowish brown, mottled channery silty clay loam

Bedrock:
50 to 53 inches, soft shale
53 inches, hard, black shale

The Tilsit soil is medium in natural fertility and low in organic matter content. Permeability is moderate above the fragipan and slow or very slow in the fragipan. The available water capacity is moderate. Surface runoff is rapid. A seasonal high water table is at a depth of 18 to

30 inches. The soil can be easily tilled when it is at the proper moisture content. The root zone can be easily penetrated by plant roots, but it is only moderately deep because of the fragipan. Hard, black shale is at a depth of 40 to 120 inches.

The typical sequence, depth, and composition of the layers of the Berea soil are as follows—

Surface layer:
0 to 5 inches, brown silt loam

Subsoil:
5 to 24 inches, yellowish brown silt loam that has mottles below a depth of 18 inches
24 to 29 inches, gray, mottled silty clay loam

Substratum:
29 to 34 inches, gray, mottled channery silty clay

Bedrock:
34 to 37 inches, soft shale
37 inches, hard, black shale

The Berea soil is medium in natural fertility and low in organic matter content. Permeability is moderately slow, and the available water capacity is moderate. Surface runoff is rapid. A seasonal high water table is at a depth of 18 to 36 inches. The soil can be easily tilled when it is at the proper moisture content. The root zone is moderately deep and can be easily penetrated by plant roots. Hard, black shale is at a depth of 20 to 40 inches.

Included with these soils in mapping are small areas of Greenbriar, Trappist, Jessietown, and Rohan soils. These included soils are in landscape positions similar to those of the Tilsit and Berea soils. Also included are areas of a moderately well drained, silty soil that has a fragipan and that is less than 40 inches deep over bedrock. Included areas make up about 15 percent of this map unit and are generally less than 3 acres.

Most areas of the Tilsit and Berea soils are used for hay or pasture. Some areas are used for row crops or small grain, and a few are wooded.

These soils are suited to cultivated crops. The seasonal high water table and the fragipan are limitations. Planting or harvesting is sometimes delayed by the wetness. Erosion is a severe hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

These soils are suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage. Also, the species should be those that are tolerant of limited wetness. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

These soils are suited to woodland, but few areas are used for the production of timber. Upland oaks, hickory, maple, yellow poplar, and pine are the dominant native trees. Some of the trees preferred for planting are eastern white pine, shortleaf pine, white oak, and yellow poplar. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

These soils are poorly suited to most urban uses. The wetness, the slow permeability, the slope, and the depth to bedrock are the major limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIe.

TeC2—Trappist-Jessietown complex, 6 to 12 percent slopes, eroded. These moderately deep, well drained, sloping soils are on uplands, mainly in the west-central and south-central parts of the county. The Trappist soil is on the more convex side slopes, and the Jessietown soil is on the less sloping ridgetops and side slopes. Erosion has removed about 25 to 75 percent of the original surface layer. The mapped areas are about 3 to 75 acres.

The Trappist soil makes up about 50 percent of this map unit, and the Jessietown soil makes up about 40 percent. The two soils were mapped together as a complex because they are in a pattern that makes separation impractical at the scale used in mapping.

The typical sequence, depth, and composition of the layers of the Trappist soil are as follows—

Surface layer:
0 to 4 inches, brown silty clay loam

Subsoil:
4 to 21 inches, yellowish brown and strong brown clay and yellowish brown channery clay that has mottles below a depth of 16 inches

Bedrock:
21 inches, hard, black shale

The Trappist soil is low in natural fertility and in organic matter content. Permeability is slow, and the available water capacity is moderate. Surface runoff is rapid. The shrink-swell potential is moderate. Tillage is somewhat difficult, and the optimum moisture range for cultivation is restricted because the clayey subsoil has been mixed with the surface layer. The root zone is moderately deep. Hard, black shale is at a depth of 20 to 40 inches.

The typical sequence, depth, and composition of the layers of the Jessietown soil are as follows—

Surface layer:
0 to 6 inches, brown silt loam

Subsoil:
6 to 30 inches, brown and yellowish brown silty clay loam
30 to 34 inches, yellowish brown channery silty clay

Bedrock:
34 to 36 inches, soft shale
36 inches, hard, black shale

The Jessietown soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is rapid. The soil can be easily tilled throughout a wide range in moisture content. The root zone is moderately deep and can be easily penetrated by plant roots. Hard, black shale is at a depth of 20 to 40 inches.

Included with these soils in mapping are small areas of Greenbriar and Rohan soils. These included soils are in landscape positions similar to those of the Trappist and Jessietown soils. Also included are areas of a well drained soil that has a clayey subsoil and is more than 40 inches deep over bedrock. Included areas make up about 10 percent of this map unit and are generally less than 3 acres.

Most areas of the Trappist and Jessietown soils are used for hay or pasture. Some areas are used for row crops or small grain, and some are used as sites for houses and gardens.

These soils are suited to cultivated crops, but erosion is a severe hazard if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

These soils are well suited to hay and pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

These soils are suited to woodland, but few areas are used for the production of timber. Upland oaks, hickory, maple, and pine are the dominant native trees. Some of the trees preferred for planting are eastern white pine, shortleaf pine, and white oak. Table 8 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited by competition from undesirable understory plants.

These soils are suited to some urban uses. The depth to bedrock, the slow permeability, a high content of clay, and the moderate shrink-swell potential are limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Proper design, proper installation procedures, and adequate site preparation can minimize or overcome these limitations in some areas.

The capability subclass is IIIe.

TrD2—Trappist-Rohan-Greenbriar complex, 12 to 20 percent slopes, eroded, rocky. These moderately deep, shallow, and deep, well drained, moderately steep soils are on uplands throughout the western and south-central parts of the county. The Trappist and Rohan soils are on the steeper, more convex, upper side slopes and on narrow ridgetops, and the Greenbriar soil is on the less sloping, lower side slopes. Erosion has removed about 25 to 75 percent of the original surface layer. Rock outcrop covers about 0.1 to 2 percent of the surface. The mapped areas are about 3 to 35 acres.

The Trappist soil makes up about 35 percent of this map unit, the Rohan soil about 20 percent, and the Greenbriar soil about 20 percent. The three soils were mapped together as a complex because they are in a pattern that makes separation impractical at the scale used in mapping.

The typical sequence, depth, and composition of the layers of the Trappist soil are as follows—

Surface layer:
0 to 4 inches, brown silty clay loam

Subsoil:
4 to 21 inches, yellowish brown and strong brown

clay and yellowish brown channery clay that has mottles below a depth of 16 inches

Bedrock:
21 inches, hard, black shale

The Trappist soil is low in natural fertility and in organic matter content. Permeability is slow, and the available water capacity is moderate. Surface runoff is very rapid. The shrink-swell potential is moderate. Tillage is somewhat difficult, and the optimum moisture range for cultivation is restricted because the clayey subsoil has been mixed with the surface layer. The root zone is moderately deep. Hard, black shale is at a depth of 20 to 40 inches.

The typical sequence, depth, and composition of the layers of the Rohan soil are as follows—

Surface layer:
0 to 4 inches, dark brown channery silt loam

Subsoil:
4 to 14 inches, dark yellowish brown very channery silt loam and yellowish brown extremely channery silty clay loam

Bedrock:
14 to 18 inches, soft shale
18 inches, hard, black shale

The Rohan soil is low in natural fertility and in organic matter content. Permeability is moderate or moderately slow, and the available water capacity is low. Surface runoff is very rapid. The soil cannot be easily tilled because of the rock outcrop. The root zone is shallow, and root penetration may be restricted because of the high content of rock fragments. Hard, black shale is at a depth of 10 to 20 inches.

The typical sequence, depth, and composition of the layers of the Greenbriar soil are as follows—

Surface layer:
0 to 5 inches, dark yellowish brown silt loam

Subsoil:
5 to 51 inches, yellowish brown and strong brown silty clay loam that has mottles below a depth of 30 inches

Substratum:
51 to 56 inches, yellowish red, dark brown, and brown channery silty clay loam

Bedrock:
56 to 59 inches, soft shale
59 inches, hard, black shale

The Greenbriar soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is very rapid. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Hard, black shale is at a depth of 40 to 72 inches.

Included with these soils in mapping are small areas of Jessietown soils. These included soils are in landscape positions similar to those of the Trappist, Rohan, and Greenbriar soils. Also included are areas of Trappist, Rohan, and Greenbriar soils that are severely eroded and areas that have more than 2 percent rock outcrop. Included areas make up about 25 percent of this map unit and are generally less than 3 acres.

Most areas of the Trappist, Rohan, and Greenbriar soils are used as pasture, and a few are used as woodland. Some of the acreage is idle land that is covered with brush.

These soils are poorly suited to cultivated crops. The rock outcrop and the slope seriously limit the use of farm equipment. The hazard of erosion is very severe if conventional tillage methods are used. Contour farming, stripcropping, and conservation tillage are needed to control runoff and erosion. Tilth and the organic matter content can be maintained or improved by returning crop residue to the soil and by including grasses and legumes in the cropping sequence.

These soils are poorly suited to hay but are suited to pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

These soils are suited to woodland. Upland oaks, hickory, maple, and pine are the dominant native trees. Some of the trees preferred for planting are Virginia pine, shortleaf pine, and white oak. Table 8 provides specific information relating to potential productivity and the appropriate trees to plant on the warm and cool aspects of these soils. The main management concerns are the hazard of erosion, the equipment limitation, seedling mortality, and plant competition. After the trees are harvested, carefully managed reforestation is needed to control competition from undesirable understory plants.

These soils are poorly suited to most urban uses. The slope, the moderately slow or slow permeability, the clayey texture, and the depth to bedrock are the major limitations affecting sanitary facilities and building site development. Low strength, the depth to bedrock, and the slope are limitations on sites for local roads and streets.

The Trappist and Greenbriar soils are in capability subclass IVe, and the Rohan soil is in capability subclass VIIs.

TrD3—Trappist-Rohan-Greenbriar complex, 12 to 25 percent slopes, severely eroded, rocky. These moderately deep, shallow, and deep, well drained, moderately steep and steep soils are on uplands throughout the western and south-central parts of the county. The Trappist and Rohan soils are on the steeper, more convex, upper side slopes, and the Greenbriar soil is on the less sloping, lower side slopes. Erosion has removed more than 75 percent of the original surface layer. Rock outcrop covers about 0.1 to 2 percent of the surface. The mapped areas are about 3 to 155 acres.

The Trappist soil makes up about 35 percent of this map unit, the Rohan soil about 20 percent, and the Greenbriar soil about 20 percent. The three soils were mapped together as a complex because they are in a pattern that makes separation impractical at the scale used in mapping.

The typical sequence, depth, and composition of the layers of the Trappist soil are as follows—

Surface layer:
0 to 2 inches, brown silty clay loam

Subsoil:
2 to 21 inches, yellowish brown and strong brown clay and yellowish brown channery clay that has mottles below a depth of 16 inches

Bedrock:
21 inches, hard, black shale

The Trappist soil is low in natural fertility and in organic matter content. Permeability is slow, and the available water capacity is moderate. Surface runoff is very rapid. The shrink-swell potential is moderate. The soil cannot be easily tilled, and the optimum moisture range for cultivation is significantly restricted because the clayey subsoil has been mixed with the surface layer. The root zone is moderately deep. Hard, black shale is at a depth of 20 to 40 inches.

The typical sequence, depth, and composition of the layers of the Rohan soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery silt loam

Subsoil:
3 to 14 inches, dark yellowish brown very channery silt loam and yellowish brown extremely channery silty clay loam

Bedrock:
14 to 18 inches, soft shale
18 inches, hard, black shale

The Rohan soil is low in natural fertility and in organic matter content. Permeability is moderate or moderately slow, and the available water capacity is low. Surface runoff is very rapid. The soil cannot be easily tilled because of the rock outcrop. The root zone is shallow, and root penetration may be restricted because of the high content of rock fragments. Hard, fissile shale is at a depth of 10 to 20 inches.

The typical sequence, depth, and composition of the layers of the Greenbriar soil are as follows—

Surface layer:
0 to 4 inches, dark yellowish brown silt loam

Subsoil:
4 to 51 inches, yellowish brown and strong brown silty clay loam that has mottles below a depth of 30 inches

Substratum:
51 to 56 inches, yellowish red, dark brown, and brown channery silty clay loam

Bedrock:
56 to 59 inches, soft shale
59 inches, hard, black shale

The Greenbriar soil is medium in natural fertility and low or moderate in organic matter content. Permeability is moderate, and the available water capacity is high. Surface runoff is very rapid. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep and can be easily penetrated by plant roots. Hard, black shale is at a depth of 40 to 72 inches.

Included with these soils in mapping are small areas of Jessietown soils. These included soils are in landscape positions similar to those of the Trappist, Rohan, and Greenbriar soils. Also included are areas of Trappist, Rohan, and Greenbriar soils that are moderately eroded and areas that have more than 2 percent rock outcrop. Included areas make up about 25 percent of this map unit and are generally less than 3 acres.

Most areas of the Trappist, Rohan, and Greenbriar soils are used as pasture, and a few are used as woodland. Some of the acreage is idle land that is covered with brush.

These soils are poorly suited to cultivated crops because most of the original surface layer has been removed by erosion. The rock outcrop and the slope are the major limitations affecting the use of most farm equipment. The hazard of erosion is very severe if

Figure 15.—An area of prime farmland in the valley along Rolling Fork. This area is in the Newark-Nolin-Elk general soil map unit.

conventional tillage methods are used.

These soils are poorly suited to hay but are suited to pasture. If a pasture or hay field is to be established, the species selected for planting and the seeding rates should be those that result in a high quantity and quality of forage and a good ground cover. Pasture renovation should be frequent enough to maintain the desired plants. The main management needs are applications of lime and fertilizer, proper seeding rates and mixtures, rotation grazing, weed control, and a well planned clipping and harvesting schedule.

These soils are suited to woodland. Upland oaks, hickory, maple, and pine are the dominant native trees. Some of the trees preferred for planting are Virginia pine, shortleaf pine, and white oak. Table 8 provides specific information relating to potential productivity. The main management concerns are the hazard of erosion, the equipment limitation, seedling mortality, and plant competition. After the trees are harvested, carefully managed reforestation is needed to control competition from undesirable understory plants.

These soils are poorly suited to most urban uses. The slope, the moderately slow or slow permeability, the clayey texture, and the depth to bedrock are the major limitations affecting sanitary facilities and building site development. Low strength, the depth to bedrock, and the slope are limitations on sites for local roads and streets.

The Trappist and Greenbriar soils are in capability subclass VIe, and the Rohan soil is in capability subclass VIIe.

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 meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

About 65,300 acres in Marion County, or 29 percent of the total acreage, meets the soil requirements for prime farmland. This land is in scattered areas throughout the county, but it is mainly in general soil map units 2, 4, and 8 (fig. 15).

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Some soils that have a seasonal high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations are overcome by such drainage measures or flood control. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures.

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 behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

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

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil *(22)*.

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, Pasture, and Hayland

William H. Amos, Jr., agronomist, and Donald B. Nelson, district conservationist, Soil Conservation Service, helped prepare this section.

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

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

Cropland

About 59,100 acres in Marion County was used as cropland in 1982 *(31)*. The principal crops were corn, soybeans, wheat, tobacco, and rotation grass-legume hay. The field crops suited to the soils and climate of the county include many that are not now commonly grown. Corn, burley tobacco, and soybeans are the dominant row crops. Grain sorghum, sunflowers, and other similar crops can be grown if economic conditions are favorable. Wheat is the most common close-growing crop. Rye, barley, and oats could be grown, and grass seed could be produced from fescue, orchardgrass, and bluegrass.

The specialty crops grown in Marion County are vegetables, small fruits, tree fruits, flowers, and many nursery plants. A small acreage is used for melons, strawberries, sweet corn, tomatoes, peppers, and other vegetables and small fruits. Apples and peaches are the most important tree fruits grown in the county.

Deep soils that have good natural drainage and that warm up early in spring are especially well suited to many vegetables and small fruits. In Marion County these soils include Crider, Elk, Mountview, Lowell, and Sandview soils that have slopes of less than 6 percent. These soils make up about 40,000 acres. Crops generally can be planted and harvested earlier on these soils than on other soils in the county.

Most of the well drained soils in the county are suited to orchards and nursery plants. Soils in low positions on the landscape, where frost is frequent and air drainage is poor, generally are poorly suited to early vegetables, small fruits, and orchards.

The soils in Marion County have good potential for increased food production. In 1982, nearly 40,000 acres of pasture and 10,000 acres of forest land were in land capability classes II and III *(31)*. Much of this land has high potential for conversion to cropland. In addition to the reserve productive capacity represented by this land, food production can increase considerably by applying the latest crop production technology. This soil survey can facilitate the application of such technology.

About 7,200 acres in Marion County is urban and built-up land. The conversion of cropland and pasture to urban and built-up land is not a major trend, but this could change in the future.

Erosion is a major concern on most of the cropland and pasture in Marion County. It is a hazard if a soil has slopes of more than 2 percent. Trappist, Eden, Faywood, Lowell, and Crider soils have slopes of more than 2 percent.

Erosion of the surface layer is damaging because it reduces productivity, limits the depth of the root zone, and can result in the sedimentation of streams. Productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil, such as Beasley, Trappist, Faywood, and Lowell soils. Erosion limits the depth of the root zone in soils that have a limiting layer in or below the root zone or are shallow or moderately deep over bedrock. Nicholson and Otwell soils have a fragipan, and Eden, Cynthiana, Faywood, and Trappist soils are shallow or moderately deep over bedrock. Erosion on farmland can result in the pollution of streams. Erosion control minimizes this pollution and improves the quality of water for municipal use and recreation and for fish and wildlife.

On clayey soils in many sloping fields, preparing a good seedbed is difficult because the original friable surface layer has been eroded away. This degree of erosion is common on Trappist, Faywood, and Lowell soils.

Erosion-control practices provide a protective cover, help to control runoff, and increase the rate of water infiltration. A cropping system that keeps a plant cover on the soil for extended periods generally can hold erosion losses to amounts that will not reduce the productivity of the soil. On livestock farms, which require pasture and hay, including grasses and legumes in the cropping system helps to control erosion on sloping land. It also provides nitrogen and improves tilth for subsequent crops.

Minimizing tillage and leaving crop residue on the surface increase the rate of water infiltration and help to control runoff and erosion. These measures can be applied on most of the soils in Marion County. In sloping areas used for corn or double-cropped soybeans, no-till planting, which is becoming more common in the county, is effective in controlling erosion. It is suitable on most of the soils in the county, but it is less successful on soils that have a clayey surface layer, such as the severely eroded Beasley and Lowell soils.

Terraces and diversions reduce the length of slopes and thus help to control runoff and erosion. They are most practical on deep, well drained soils that have smooth slopes, such as Elk and Sandview soils. 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 within a depth of 40 inches.

Contour farming and contour stripcropping help to control erosion in the county. They are especially effective on soils that have smooth, uniform slopes, including most areas of Elk, Nicholson, Sandview, Lowell, Faywood, and Greenbriar soils.

Drainage is a management concern on about 8 percent of the acreage used for crops and pasture in Marion County. Some soils, such as the poorly drained Melvin soils, are so wet that production of the crops commonly grown in the county is generally difficult unless a drainage system is installed. The wetness of somewhat poorly drained soils, such as Newark soils, reduces some crop yields during most years unless a drainage system is installed. Soils that are limited by wetness make up about 9,100 acres in the county.

Small areas of wetter soils along drainageways are commonly included in areas of the moderately well drained Nicholson and Otwell soils. A drainage system generally is not installed on these soils or on the somewhat poorly drained Lawrence soils. A compact and brittle fragipan in the subsoil of Lawrence soils limits the depth to which drainage tile can be installed. Ditches have been used to improve drainage in some areas of these soils.

The design of surface and subsurface drainage systems varies with the kind of soil. A combination of surface and tile drainage has been used in many areas. Drains should be installed at closer intervals in the more slowly permeable soils.

Soil fertility is naturally low or medium in the soils on uplands in Marion County. The soils on flood plains, such as Newark, Melvin, Nolin, and Sensabaugh soils, range from medium acid to moderately alkaline and are naturally higher in content of plant nutrients than most of the soils on uplands.

Many soils on uplands and stream terraces are very strongly acid or medium acid in their natural state. If lime has never been added, applications of ground limestone are needed to raise the pH level sufficiently for the optimum yield of alfalfa and other crops that grow best on nearly neutral soils. Available phosphorus and potash levels are naturally low in most of these soils, except for Lowell soils, which commonly have a medium level of phosphorus. On all soils, applications of lime and fertilizer should be based on the results of soil tests, on the needs of the crop, and on the expected level of yields. The Cooperative Extension Service can help to determine the kind and amount of fertilizer and lime to be applied and the proper method of application.

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

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

Fall plowing is generally not recommended on soils that have a surface layer of light colored silt loam because a crust forms during the winter and spring. If plowed in the fall, many of these soils are nearly as dense and hard at planting time as they were before plowing. About nine-tenths of the cropland consists of sloping soils that are subject to damaging erosion if they are plowed in the fall.

Clayey, severely eroded soils, such as Beasley and Lowell soils, become cloddy if they are plowed beyond the narrow range in moisture content that is optimum to prevent or minimize clodding. Fall plowing on such soils generally results in better tilth in the spring. Tilth is not good in soils that have a gravelly surface layer. The content and size of the pebbles affect the use of tillage implements. Sensabaugh and Carpenter are examples of soils that have a gravelly surface layer.

Pasture and Hayland

A successful livestock enterprise depends on a forage program that supplies large quantities of homegrown feed of adequate quality. Such a program can furnish as much as 78 percent of the feed for beef and 66 percent of the feed for dairy cattle *(14)*.

In Marion County about 84,400 acres is used as pasture *(31)*. On a sizable acreage, pasture improvement, brush control, and protection from overgrazing are needed.

The soils in Marion County vary widely in their ability to provide forage because of differences in depth to bedrock or to limiting layers, internal drainage, the ability to supply moisture, and many other properties. The suitability of grasses and legumes and grass-legume combinations varies widely on the different soils in the county. Properly matching the plants or mixtures of plants with the different soils can obtain the best results and can help to conserve soil and water.

The nearly level or gently sloping, deep, well drained soils should be used for the highest yielding crops, such as corn silage, alfalfa, or a mixture of alfalfa and orchardgrass or of alfalfa and timothy. Maintaining sod-forming grasses, such as tall fescue and bluegrass, minimizes erosion on the steeper soils. Alfalfa can be grown with a cool-season grass where the soils are at least 2 feet deep and are well drained. On soils that are less than 2 feet deep or are not well drained, clover-grass mixtures or pure grass stands can be established. Legumes can be established through renovation in sods dominated by grass.

The forage species selected for planting should be suited not only to the soil but also to the intended use. They should provide maximum quality and versatility in the forage program. Legumes generally produce higher quality feed than grasses and should be grown to the maximum extent possible. Taller growing legumes, such as alfalfa and red clover, are more versatile than a legume, such as white clover, that is used mainly for grazing. Grasses, such as orchardgrass, timothy, and tall fescue, should be used for hay and silage.

Tall fescue is a cool-season grass suited to a wide range of soil conditions. It is used for pasture and hay. The growth of tall fescue that occurs from August through November is commonly permitted to accumulate in the field and is stockpiled for deferred grazing late in fall and in winter. Nitrogen fertilizer is needed for maximum production during the stockpiling period. The desired production levels determine the rate of application.

Warm-season grasses planted from early in April to late in May can alleviate the summer slump of cool-season grasses, such as tall fescue and Kentucky bluegrass. They grow well during warm periods, and their greatest growth is from mid-June to September, the months when cool-season grasses taper off. Some of the warm-season grasses grown in the county are switchgrass, big bluestem, indiangrass, and Caucasian bluestem.

Yields of pasture and hay can be increased by renovation. During renovation of pasture and hay fields, the sod is partly destroyed, lime and fertilizer are applied, and desirable forage plants are seeded *(15)*. Adding legumes to these grass fields provides high quality feed. The legumes increase forage production in summer and take nitrogen from the air. Under proper growing conditions in Kentucky, alfalfa can add 200 to 300 pounds of nitrogen per acre every year, red clover 100 to 200 pounds, and ladino clover 100 to 150 pounds. An acre of Korean lespedeza, vetch, or other annual forage legumes can fix 75 to 100 pounds of nitrogen *(15)*.

The local office of the Soil Conservation Service or the Cooperative Extension Service can provide additional information about pasture and hayland management.

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 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

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

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

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

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

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

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey *(26)*.

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 hazard is the 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 *(26)*. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

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

About 68,100 acres in Marion County, or 31 percent of the land area, is commercial forest land *(31)*. The dominant forest types include oak-hickory, which is on about 41 percent of the forest land; central mixed hardwoods, on about 38 percent; and maple-beech, oak-pine, and southern pine, on about 7 percent.

The wooded tracts in the county are generally private holdings of about 24 acres and are essentially unmanaged. Most of the forest land can produce 50 cubic feet or more of wood per acre per year, but actual production is 38 cubic feet. The forest land is essentially unmanaged in part because 30 percent of the landowners have woodland that is only part of the farm or tract. Also, many stands are not well stocked with desirable, high-quality trees, and many tracts are owned for less than 10 years.

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

The wood industry in Marion County consists mainly of two commercial sawmills, two custom mills, two cooperage plants, one furniture plant, one crosstie or timber concentration yard, and three dry kilns, including one that produces oak flooring. Wood products are rough lumber, crossties, dimension stock, posts, wood chips, cants, flooring, barrel staves, firewood, and furniture. Also, several mills in adjacent counties buy logs or standing timber from Marion County.

Table 8 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.

In table 8, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, fire lanes, and log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment or season of use is not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are the depth to the water table and the available water capacity. A rating of *slight* indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of *moderate* indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of *severe* indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands *(4, 7, 8, 9, 10, 11, 13, 19, 20, 21, 23, 30)*. 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.

The *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It is the dominant species on the soil and the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Recreation

The soils of the survey area are rated in table 9 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 sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for 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 9, 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 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

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

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

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

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

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

Wildlife Habitat

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

The principal kinds of wildlife in Marion County are cottontail rabbits, gray squirrels, fox squirrels, raccoons, opossums, skunks, red foxes, gray foxes, white-tailed deer, turkey, bobwhite quail, and mourning doves. Many species of nongame birds and mammals also inhabit the county. The county has about 33 species of mammals, 89 species of breeding birds, and 34 species of reptiles and amphibians. Although the types of habitat required by wildlife vary, deer and squirrels generally use woodland habitat; rabbits, quail, doves, and woodcock use openland habitat; and ducks and geese use wetland habitat.

Photographers, bird watchers, and others are especially interested in the flora and fauna of Marion County. The streams in the county support a variety of warm-water game fish, pan fish, and rough fish that are common throughout Kentucky. Examples of these are largemouth bass and bluegill.

Successful management of wildlife habitat requires available food, cover, and water in a suitable combination. If a tract does not have any one of these necessities or has an inadequate distribution of them, the population of the desired wildlife species can be severely reduced or eliminated. Soil information is valuable in establishing, improving, or maintaining suitable food, cover, and water for wildlife.

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 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife *(42)*. 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, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian olive, autumn olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are Virginia pine, white pine, and redcedar.

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

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

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

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

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

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

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. 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 or 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 kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (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 11 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, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

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

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

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

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

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

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

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability 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 12 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 excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

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

Construction Materials

Table 13 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, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. These soils 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 13, 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 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 or stones, 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 or stones, 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 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

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

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

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

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

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing 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 soil blowing, 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 21.

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 *(27)*. 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 classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

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

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

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

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

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 21.

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

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

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

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

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior *(24)*.

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

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

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

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

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

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

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

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and Water Features

Table 17 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 infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

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

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission. Some examples are the Carpenter, Crider, Greenbriar, and Sandview soils.

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. Some examples are the Beasley, Lenberg, Faywood, and Trappist soils.

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

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 is not considered flooding, nor is water in swamps and marshes.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs, on the average, once or less in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months.

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 17 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17. Only saturated zones within a depth of about 6 feet are indicated.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

The two numbers in the "High water table—Depth" column indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors 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 18 and the results of chemical analysis in table 19. 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 *(28)*.

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).
Available phosphorus—procedure (656) Kentucky Agricultural Station.
Field sampling—site selection (1A1).
Field sampling—soil sampling (1A2).
Laboratory preparation—standard (air dry) material (1B1).
Particles—(specified size) 2 mm (2A2).
Particles—less than 2 mm (2A1).
Data sheet symbols—(2B).
Particles—greater than 2 mm by field or laboratory weighing (3B1a).
Extractable bases—(5B1a).
Calcium carbonate equivalent—procedure (23b) USDA handbook 60, USDA salinity laboratory 1954 (6N7).

Mineralogy of Selected Soils

The results of mineralogy determinations of three typical pedons are given in table 20. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soils were analyzed by the Soil Conservation Service, National Soil Survey Laboratory, Lincoln, Nebraska. The method used in obtaining the data is Optical analysis—grain counts of 0.02-0.05 fraction (7B1a). The code in parentheses refers to published methods *(32)*.

Engineering Index Test Data

Table 21 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Soil Mechanics Laboratory, South National Technical Center, Fort Worth, Texas.

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

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 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); and Specific gravity.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(29)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 22 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning flood plain, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

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

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

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

Soil Series and Their Morphology

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

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (25)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (29)*. 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."

Beasley Series

The Beasley series consists of deep, well drained, moderately slowly permeable soils on side slopes and narrow ridgetops in the uplands. These soils formed in material weathered from calcareous shale interbedded with thin layers of siltstone, soft dolomite, and limestone. Slopes range from 2 to 25 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Beasley soils are on the same landforms as Crider, Nicholson, Shrouts, and Brassfield soils. Crider and Nicholson soils are in a fine-silty family. Nicholson soils are moderately well drained and have a fragipan. Shrouts and Brassfield soils are moderately deep over bedrock. Brassfield soils are in a fine-loamy family.

Typical pedon of Beasley silty clay loam, 6 to 12 percent slopes, eroded; about 4.2 miles north of Loretto on Kentucky Highway 49, about 600 feet north on Hagens Schoolhouse Road, 300 feet east of the road, in a cultivated field; on soil map sheet 1, east about 2,096,850 feet and north about 492,100 feet by the Kentucky coordinate grid system:

Ap—0 to 5 inches; brown (10YR 5/3) silty clay loam; weak fine granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.

Bt1—5 to 18 inches; yellowish brown (10YR 5/6) silty clay; moderate medium angular blocky structure; very firm, sticky and plastic; common fine roots; discontinuous strong brown (7.5YR 4/6) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—18 to 36 inches; yellowish brown (10YR 5/6) silty clay; common medium distinct pale brown (10YR 6/3) mottles; weak medium angular blocky structure; very firm, sticky and plastic; few fine roots; common continuous strong brown (7.5YR 4/6) clay films on faces of peds; few black concretions and black stains; very strongly acid; gradual wavy boundary.

C—36 to 54 inches; yellowish brown (10YR 5/6) clay; common medium distinct pale brown (10YR 6/3) and light brownish gray (10YR 6/2) mottles; very firm, sticky and plastic; about 10 percent shale channers; mildly alkaline; very slightly effervescent; gradual wavy boundary.

Cr—54 to 60 inches; light olive gray (5Y 6/2), soft, calcareous shale interbedded with thin layers of soft dolomite (marl).

The thickness of the solum ranges from 20 to 40 inches. The depth to soft shale bedrock is 40 inches or more. Rock fragments of limestone, dolomite, or shale make up 0 to 10 percent of the Ap and Bt horizons and 0 to 30 percent of the C horizon. Reaction ranges from very strongly acid to neutral in the Ap and Bt horizons and from neutral to moderately alkaline in the C horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is silt loam, silty clay loam, or silty clay.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 8. It generally is mottled in shades of brown, red, or yellow, but in some pedons the lower part of the horizon is mottled in shades of gray. This horizon is silty clay or clay.

The C horizon has matrix or mottle colors in shades of gray, olive, or brown. It is silty clay, clay, or the channery analogs of those textures.

Berea Series

The Berea series consists of moderately deep, moderately well drained, moderately slowly permeable soils on ridgetops and side slopes. These soils formed in a thin mantle of loess, which is underlain by material weathered from black fissile shale. They have a seasonal high water table at a depth of 18 to 36 inches. Slopes range from 0 to 12 percent. The soils are fine-silty, mixed, mesic Aquic Hapludults.

Berea soils are on the same landforms as Tilsit, Jessietown, Greenbriar, and Trappist soils. Tilsit soils are moderately well drained and have a fragipan. Jessietown and Greenbriar soils are well drained. Greenbriar soils are deep over bedrock. Trappist soils are well drained and are in a clayey family.

Typical pedon of Berea silt loam, in an area of Tilsit-Berea silt loams, 2 to 6 percent slopes; about 2.0 miles west of Bradfordsville on Kentucky Highway 49, about 1.3 miles southwest on Kentucky Highway 1157, about 250 feet south of the highway, in a pasture; on soil map sheet 25, east about 2,161,650 feet and north about 419,000 feet by the Kentucky coordinate grid system:

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

Bt1—7 to 18 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few discontinuous brown (7.5YR 5/4) clay films on faces of peds; few black concretions and black coatings; very strongly acid; clear smooth boundary.

Bt2—18 to 26 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; few discontinuous brown (7.5YR 5/4) clay films on faces of peds; few black concretions and black stains; very strongly acid; clear wavy boundary.

2Btg—26 to 31 inches; gray (10YR 5/1) silty clay loam;

many medium distinct strong brown (7.5YR 5/8) mottles; weak medium angular blocky structure; firm; about 10 percent weathered brown (7.5YR 4/2) channers; common continuous gray (10YR 6/1) silt coatings and clay films on faces of peds; few black concretions and black stains; very strongly acid; clear smooth boundary.

2Cg—31 to 36 inches; gray (10YR 5/1) channery silty clay; common medium distinct strong brown (7.5YR 5/8) mottles; massive with pockets of relict platy rock structure; firm; slightly brittle; about 25 percent weathered brown (7.5YR 4/2) shale fragments; very strongly acid; abrupt smooth boundary.

2Cr—36 to 39 inches; soft, reddish brown (5YR 5/3) clay shale; abrupt wavy boundary.

2R—39 inches; hard, black (N 2/0) fissile shale.

The thickness of the solum and the depth to hard shale bedrock range from 20 to 40 inches. The thickness of the loess mantle ranges from 10 to 30 inches. Rock fragments of siltstone or shale make up 0 to 10 percent of the Ap, Bt, and 2Btg horizons and 10 to 75 percent of the 2C horizon. In unlimed areas reaction ranges from strongly acid to extremely acid.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The Bt horizon has hue of 7.5YR, 10YR, or 2.5Y and value and chroma of 4 to 6. It is mottled in shades of brown, yellow, or gray. It is silt loam or silty clay loam.

The 2Btg horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 1 to 6. It is mottled in shades of gray, brown, olive, or red. It is silty clay loam, silty clay, clay, or the channery, very channery, or extremely channery analogs of those textures.

The 2C horizon has hue of 7.5YR to 5Y, value of 3 to 6, and chroma of 1 to 8. It is mottled in shades of gray, brown, olive, or red. It is silty clay loam, silty clay, clay, or the channery, very channery, or extremely channery analogs of those textures.

Brassfield Series

The Brassfield series consists of moderately deep, well drained, moderately permeable soils on side slopes in the uplands. These soils formed in material weathered from soft dolomite interbedded with thin layers of calcareous shale and limestone. Slopes range from 12 to 30 percent. The soils are fine-loamy, carbonatic, mesic Rendollic Eutrochrepts.

Brassfield soils are on the same landforms as Shrouts and Beasley soils. Shrouts and Beasley soils are in a fine textural family. Beasley soils are deep over soft bedrock.

Typical pedon of Brassfield loam, in an area of Shrouts-Brassfield complex, 12 to 30 percent slopes, eroded, very rocky; about 1.3 miles west of Loretto on Kentucky Highway 52, about 1.0 mile north of Saint Francis on Kentucky Highway 527, about 0.8 mile north on a farm lane, about 800 feet west of an old farmhouse at the end of the farm lane, in an unimproved pasture; on soil map sheet 2, east about 2,092,250 feet and north about 479,750 feet by the Kentucky coordinate grid system:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loam; moderate fine and medium granular structure; friable; many fine roots; about 10 percent weathered dolomite and limestone channers and flagstones; mildly alkaline; slightly effervescent; clear smooth boundary.

Bw—6 to 18 inches; light olive brown (2.5Y 5/4) loam; common medium distinct light olive gray (5Y 6/2) mottles; weak medium subangular blocky structure; friable; common fine roots; about 10 percent weathered dolomite and limestone channers and flagstones; moderately alkaline; strongly effervescent; abrupt wavy boundary.

C—18 to 34 inches; olive gray (5Y 5/2) channery loam; relict platy structure; firm; about 20 percent weathered dolomite fragments; moderately alkaline; strongly effervescent; abrupt wavy boundary.

Cr—34 to 45 inches; soft, olive yellow (2.5Y 6/6) dolomite (marl) interbedded with thin layers of shale and limestone.

The thickness of the solum ranges from 10 to 30 inches. The depth to soft dolomite or shale bedrock ranges from 20 to 40 inches. Rock fragments of dolomite, shale, or limestone make up 8 to 30 percent of the Ap, Bw, and C horizons. The soils are mildly alkaline or moderately alkaline throughout.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 3. The Bw and C horizons are loam, clay loam, silt loam, silty clay loam, or the gravelly or channery analogs of those textures. The Bw horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 to 6. It is mottled in shades of brown, yellow, olive, or gray. The gray color is inherited from the parent material. The C horizon has hue of 5Y or 5GY, value of 5 or 6, and chroma of 1 or 2.

Carpenter Series

The Carpenter series consists of deep, well drained soils on the lower side slopes, foot slopes, and colluvial fans. These soils are moderately permeable in the subsoil and moderately slowly or slowly permeable in the substratum. They formed in colluvium, which is underlain by material weathered from shale. Slopes range from 2 to 45 percent. The soils are fine-loamy, mixed, mesic Ultic Hapludalfs.

Carpenter soils are on the same landforms as Lenberg, Garmon, and Tilsit soils. Lenberg soils are in a fine textural family and are moderately deep over bedrock. Garmon soils are moderately deep over bedrock. Tilsit soils are moderately well drained, have a fragipan, and are in a fine-silty family.

Typical pedon of Carpenter gravelly silt loam, 12 to 20 percent slopes; about 1.5 miles northwest of Calvary on Kentucky Highway 208, about 800 feet northeast on a gravel lane, 300 feet north of the gravel lane, in a wooded area; on soil map sheet 8, east about 2,136,900 feet and north about 434,700 feet by the Kentucky coordinate grid system:

A—0 to 8 inches; brown (10YR 4/3) gravelly silt loam; weak fine granular structure; very friable; many fine roots; about 15 percent siltstone and shale fragments; strongly acid; clear smooth boundary.

Bt1—8 to 22 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; about 10 percent siltstone and shale fragments; few discontinuous brown (7.5YR 4/4) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—22 to 42 inches; strong brown (7.5YR 5/6) silty clay loam; many medium distinct brown (10YR 5/3) mottles; weak medium subangular blocky structure; firm; about 10 percent subrounded siltstone and shale channers; few discontinuous brown (7.5YR 4/4) clay films on faces of peds; very strongly acid; gradual wavy boundary.

2C—42 to 60 inches; yellowish brown (10YR 5/6) channery silty clay; many coarse distinct gray (10YR 6/1) mottles; about 15 percent shale fragments; very strongly acid; clear wavy boundary.

2Cr—60 to 70 inches; soft, gray (10YR 6/1) clay shale.

The thickness of the solum ranges from 40 to 60 inches. The depth to soft shale bedrock ranges from 40 to more than 80 inches. The thickness of the colluvium ranges from 20 to more than 72 inches. Rock fragments of shale, siltstone, or chert make up 0 to 35 percent of individual layers. In unlimed areas reaction ranges from very strongly acid to slightly acid in the A and Bt horizons and from very strongly acid to medium acid in the 2C horizon.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. Some pedons have an Ap horizon. This horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4.

The Bt horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 3 to 8. It generally is mottled in shades of brown, red, or yellow, but in some pedons the lower part is mottled in shades of gray. This horizon is silty clay loam, clay loam, loam, or the gravelly or channery analogs of those textures.

The 2C horizon has hue of 5YR to 5Y, value of 4 to 6, and chroma of 3 to 8. It is mottled in shades of green, gray, brown, or red. It is silty clay loam, silty clay, clay, or the gravelly or channery analogs of those textures.

Chenault Series

The Chenault series consists of deep, well drained, moderately permeable soils on the broad tops of upland ridges that are adjacent to the major streams. These soils formed in old alluvium, which is underlain by material weathered from limestone. Most areas have karst topography. Slopes range from 2 to 8 percent. The soils are fine-loamy, mixed, mesic Typic Hapludalfs.

Chenault soils are on the same landforms as Crider and Greenbriar soils. Crider and Greenbriar soils are in a fine-silty family.

Typical pedon of Chenault gravelly silt loam, 2 to 8 percent slopes; about 2.0 miles southeast of Bradfordsville on Kentucky Highway 49, about 0.4 mile west on a farm lane, about 1,800 feet north of the farm lane, in a cultivated field; on soil map sheet 26, east about 2,181,800 feet and north about 418,250 feet by the Kentucky coordinate grid system:

Ap—0 to 9 inches; brown (10YR 4/3) gravelly silt loam; moderate fine and medium granular structure; very friable; many fine and medium roots; about 20 percent chert and geode pebbles; slightly acid; abrupt wavy boundary.

Bt1—9 to 21 inches; strong brown (7.5YR 4/6) gravelly silty clay loam; moderate medium subangular blocky structure; friable; few or common medium roots; few discontinuous brown (7.5YR 4/4) clay films on faces of peds; about 20 percent chert and geode pebbles; medium acid; clear smooth boundary.

Bt2—21 to 42 inches; strong brown (7.5YR 5/6) gravelly silty clay loam; moderate medium subangular blocky structure; friable; few medium roots; few discontinuous brown (7.5YR 4/4) clay films on faces of peds; few fine black concretions; about 20 percent chert and geode pebbles; medium acid; clear smooth boundary.

2Bt3—42 to 55 inches; strong brown (7.5YR 5/6) silty clay; few medium distinct pale brown (10YR 6/3) mottles; moderate fine and medium angular blocky structure; firm; common discontinuous brown

(7.5YR 4/4) clay films on faces of peds; common fine black concretions; about 10 percent chert and geode pebbles; slightly acid; clear smooth boundary.

2C—55 to 65 inches; yellowish brown (10YR 5/6) silty clay; common medium distinct pale brown (10YR 6/3) mottles; massive; common black concretions; about 10 percent chert and geode pebbles; slightly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock ranges from 40 to 80 inches. The thickness of the old alluvium ranges from 20 to 80 inches. The content of rock fragments, mostly limestone, sandstone, chert, or geode pebbles, ranges from 10 to 30 percent. Reaction ranges from strongly acid to neutral in the Ap horizon, from strongly acid to slightly acid in the Bt horizon, and from medium acid to neutral in the 2Bt and 2C horizons.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. In some pedons it is mottled in shades of brown in the lower part. This horizon is loam, clay loam, silty clay loam, or the gravelly analogs of those textures. The 2Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. In most pedons it is mottled in shades of brown or gray. It is silty clay, clay, or the gravelly analogs of those textures.

Christian Series

The Christian series consists of deep, well drained, moderately permeable soils on ridgetops and side slopes in the uplands. These soils formed in material weathered from limestone interbedded with thin layers of siltstone, shale, and sandstone. Slopes range from 6 to 35 percent. The soils are clayey, mixed, mesic Typic Hapludults.

Christian soils are on the same landforms as Riney, Frankstown, Mountview, and Nicholson soils. Riney and Frankstown soils are in a fine-loamy family. Mountview and Nicholson soils are in a fine-silty family. Nicholson soils have a fragipan.

Typical pedon of Christian silt loam, 6 to 12 percent slopes, eroded; about 3.8 miles northwest of Jessietown on Kentucky Highway 412, about 0.7 mile south on Gault Hollow Road, about 800 feet east of Gault Hollow Road, in a stand of second-growth hardwoods; on soil map sheet 17, east about 2,111,500 feet and north about 425,250 feet by the Kentucky coordinate grid system:

Ap—0 to 5 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; many fine and few coarse roots; strongly acid; clear smooth boundary.

BA—5 to 11 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; common fine and medium roots; strongly acid; clear wavy boundary.

Bt1—11 to 20 inches; yellowish red (5YR 4/6) clay loam; moderate medium subangular blocky structure; firm; common fine roots; few strong brown (7.5YR 4/6) clay films on faces of peds; about 2 percent chert and sandstone pebbles; very strongly acid; clear wavy boundary.

Bt2—20 to 35 inches; reddish brown (2.5YR 4/4) clay; many coarse distinct yellowish red (5YR 4/6) mottles; moderate medium angular blocky structure; firm; few fine roots; many distinct yellowish red (5YR 4/6) clay films on faces of peds; about 5 percent chert and siltstone pebbles; very strongly acid; gradual wavy boundary.

Bt3—35 to 67 inches; dark reddish brown (2.5YR 3/4) clay; many coarse distinct yellowish red (5YR 4/6) mottles; strong medium angular blocky structure; very firm; few fine roots; many distinct yellowish red (5YR 5/6) clay films on faces of peds; about 10 percent soft sandstone pebbles and cobbles; very strongly acid; gradual wavy boundary.

BC—67 to 75 inches; dark reddish brown (2.5YR 3/4) and yellowish red (5YR 4/6) channery clay loam; moderate medium and coarse subangular blocky structure; very firm; many distinct yellowish red (5YR 5/6) clay films on faces of peds; about 20 percent soft sandstone channers and flagstones; very strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The depth to bedrock is more than 60 inches. Rock fragments of limestone, sandstone, shale, or chert make up 0 to 15 percent of the Ap horizon and 0 to 30 percent of the BA, Bt, and BC horizons. In unlimed areas reaction ranges from extremely acid to slightly acid throughout the profile.

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

The BA horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam, clay loam, or the gravelly analogs of those textures.

The Bt horizon has hue of 10R, 2.5YR, or 5YR, value of 3 to 5, and chroma of 4 to 8. It generally is mottled in shades of brown or yellow or has mixed shades of red, yellow, or brown. In some pedons, however, the lower part is mottled in shades of gray. This horizon is silty clay loam, clay loam, silty clay, clay, or the gravelly or channery analogs of those textures.

The BC horizon has colors and textures similar to those of the Bt horizon. In some pedons it is mottled in shades of red, brown, yellow, or gray.

Crider Series

The Crider series consists of deep, well drained, moderately permeable soils on ridgetops and side slopes in the uplands. These soils formed in a mantle of loess, which is underlain by material weathered from limestone. Slopes range from 2 to 12 percent. The soils are fine-silty, mixed, mesic Typic Paleudalfs.

Crider soils are on the same landforms as Nicholson, Lawrence, Beasley, and Chenault soils. Nicholson and Lawrence soils have a fragipan. Nicholson soils are moderately well drained. Lawrence soils are somewhat poorly drained. Beasley soils are in a fine textural family and have a solum that is 20 to 40 inches thick. Chenault soils are in a fine-loamy family.

Typical pedon of Crider silt loam, 2 to 6 percent slopes; about 4.1 miles southeast of Lebanon on Kentucky Highway 49, about 0.8 mile northeast on Ed Sullivan Road, 0.2 mile east on a farm lane, about 500 feet south of the farm lane, in a cultivated field; on soil map sheet 9, east about 2,161,000 feet and north about 436,000 feet by the Kentucky coordinate grid system:

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

Bt1—10 to 18 inches; strong brown (7.5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few discontinuous strong brown (7.5YR 4/6) clay films on faces of peds; few small black concretions; slightly acid; clear smooth boundary.

Bt2—18 to 28 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium angular blocky structure; firm; many continuous strong brown (7.5YR 4/6) clay films on faces of peds; common black concretions and black stains; medium acid; clear smooth boundary.

2Bt3—28 to 38 inches; yellowish red (5YR 4/6) silty clay; moderate medium angular blocky structure; firm; many continuous strong brown (7.5YR 4/6) clay films on faces of peds; common black concretions and black stains; medium acid; clear smooth boundary.

2Bt4—38 to 62 inches; red (2.5YR 4/6) silty clay; few fine distinct reddish yellow (5YR 6/6) mottles; moderate medium angular blocky structure; firm; common continuous reddish brown (5YR 4/4) clay films on faces of peds; many black concretions and black stains; strongly acid.

The thickness of the solum ranges from 60 to more than 100 inches. The depth to bedrock ranges from 60 to more than 160 inches. The thickness of the loess mantle ranges from 20 to 45 inches. Rock fragments make up 0 to 10 percent of the 2Bt horizon. They are mainly chert fragments. Reaction ranges from strongly acid to neutral in the Ap and Bt horizons and from very strongly acid to slightly acid in the 2Bt horizon.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. The Bt1 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The Bt2 horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. The Bt1 and Bt2 horizons are silt loam or silty clay loam. The 2Bt horizon has hue of 10R, 2.5YR, or 5YR, value of 3 to 5, and chroma of 4 to 8. In most pedons it is mottled in shades of red, brown, or yellow. In some pedons it is mottled in shades of gray in the lower part. This horizon is silty clay or clay.

Cynthiana Series

The Cynthiana series consists of shallow, well drained, moderately slowly permeable soils on side slopes and narrow ridgetops in the uplands. These soils formed in clayey material weathered from limestone interbedded with thin layers of calcareous shale. Slopes range from 20 to 60 percent. The soils are clayey, mixed, mesic Lithic Hapludalfs.

Cynthiana soils are on the same landforms as Faywood, Eden, and Lowell soils. Faywood and Eden soils are moderately deep over bedrock. Lowell soils are deep over bedrock.

Typical pedon of Cynthiana flaggy silty clay loam, in an area of Faywood-Cynthiana complex, 20 to 30 percent slopes, eroded, very rocky; about 2.8 miles south of Loretto on Morris Road, about 200 feet east of the road, in a pasture; on soil map sheet 5, east about 2,100,250 feet and north about 459,200 feet by the Kentucky coordinate grid system:

Ap—0 to 4 inches; brown (10YR 4/3) flaggy silty clay loam; moderate medium subangular blocky structure; friable; few medium and fine roots; about 15 percent limestone fragments; slightly acid; clear smooth boundary.

Bt—4 to 18 inches; yellowish brown (10YR 5/4) clay; moderate medium angular blocky structure; firm, sticky and plastic; few medium roots; common thin continuous dark yellowish brown (10YR 4/6) clay films on faces of peds; about 10 percent limestone flagstones; neutral; abrupt wavy boundary.

R—18 inches; gray (10YR 6/1) limestone interbedded with thin layers of calcareous shale.

The thickness of the solum and the depth to bedrock range from 10 to 20 inches. Rock fragments make up 0 to 30 percent of the Ap horizon and 5 to 35 percent of the Bt horizon. They are mainly limestone and shale fragments. Reaction ranges from slightly acid to mildly alkaline throughout the profile.

The Ap horizon has hue of 10YR or 2.5Y, value of 4, and chroma of 2 to 4. The Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 4 to 6. It is silty clay, clay, or the channery or flaggy analogs of those textures.

Eden Series

The Eden series consists of moderately deep, well drained, slowly permeable soils on side slopes and narrow ridgetops in the uplands. These soils formed in material weathered from shale interbedded with thin layers of siltstone and limestone. Slopes range from 6 to 35 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Eden soils are on the same landforms as Cynthiana, Faywood, and Lowell soils. Cynthiana soils are shallow over bedrock. Faywood soils are underlain by hard limestone bedrock and have 0 to 15 percent rock fragments in the solum. Lowell soils are deep over bedrock.

Typical pedon of Eden silty clay loam, in an area of Eden-Cynthiana complex, 20 to 35 percent slopes, eroded, rocky; about 2.8 miles north of Gravel Switch on Kentucky Highway 243, about 0.9 mile east on Ben Minor Ridge Road, about 200 feet southeast of a barn, in a pasture; on soil map sheet 9, east about 2,204,150 feet and north about 472,250 feet by the Kentucky coordinate grid system:

Ap—0 to 4 inches; brown (10YR 4/3) silty clay loam; weak medium granular structure; friable; common fine roots; about 10 percent limestone channers; medium acid; abrupt smooth boundary.

Bt—4 to 28 inches; yellowish brown (10YR 5/4) silty clay; moderate medium angular blocky structure; very firm, sticky and plastic; few fine roots; common yellowish brown (10YR 5/6) discontinuous clay films; about 10 percent siltstone and limestone channers; neutral; clear smooth boundary.

BC—28 to 34 inches; light olive brown (2.5Y 5/4) flaggy silty clay; weak medium angular blocky structure; very firm, sticky and plastic; common continuous yellowish brown (10YR 5/6) clay films; about 15 percent limestone fragments; neutral; clear smooth boundary.

Cr1—34 to 45 inches; olive gray (5Y 5/2), calcareous shale interbedded with thin layers of siltstone and limestone; moderately alkaline; strongly effervescent; clear wavy boundary.

Cr2—45 to 60 inches; gray (N 5/0), calcareous shale interbedded with thin layers of siltstone and limestone; moderately alkaline; strongly effervescent.

The thickness of the solum ranges from 14 to 40 inches. The depth to soft shale bedrock ranges from 20 to 40 inches. Rock fragments of siltstone, shale, and limestone make up 0 to 25 percent of the Ap horizon and 10 to 35 percent of the Bt and BC horizons. Reaction ranges from very strongly acid to moderately alkaline throughout the profile.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 3 to 6. In some pedons it is mottled in shades of olive, brown, or yellow and, in the lower part, in shades of gray. The gray color is inherited from the parent material. The BC horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 3 to 6. In some pedons it is mottled in shades of gray, olive, or brown. The Bt and BC horizons are silty clay, clay, or the flaggy or channery analogs of those textures.

Elk Series

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

Elk soils are on the same landforms as Otwell and Lawrence soils. Otwell and Lawrence soils have a fragipan. Otwell soils are moderately well drained, and Lawrence soils are somewhat poorly drained.

Typical pedon of Elk silt loam, 2 to 6 percent slopes; about 0.6 mile south of Gravel Switch on Kentucky Highway 337, about 0.6 mile southeast on Kendron Church Road, about 200 feet southwest of the road, in a cultivated field; on soil map sheet 21, east about 2,201,300 feet and north about 442,000 feet by the Kentucky coordinate grid system:

Ap—0 to 10 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine roots;

strongly acid; clear smooth boundary.

Bt1—10 to 30 inches; brown (7.5YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; few fine roots; few discontinuous dark yellowish brown (10YR 4/4) clay films on faces of peds and in pores; strongly acid; clear smooth boundary.

Bt2—30 to 60 inches; strong brown (7.5YR 5/6) silty clay loam; weak fine and medium subangular blocky structure; firm; few continuous dark yellowish brown (10YR 4/4) clay films on faces of peds; common black concretions; medium acid; clear smooth boundary.

C—60 to 70 inches; dark yellowish brown (10YR 4/4) silty clay loam; massive; firm; common black concretions; slightly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is 60 inches or more. The content of rock fragments, mostly limestone and siltstone pebbles, ranges from 0 to 5 percent in the Ap and Bt horizons and from 0 to 35 percent in the C horizon. In unlimed areas reaction ranges from very strongly acid to slightly acid throughout the profile.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. The Bt and C horizons have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The Bt horizon is silt loam or silty clay loam. The C horizon is dominantly silt loam or silty clay loam, but in some pedons it has strata of fine sandy loam, loam, clay loam, silt loam, silty clay loam, silty clay, or the gravelly analogs of those textures.

Faywood Series

The Faywood series consists of moderately deep, well drained, moderately slowly or slowly permeable soils on ridgetops and side slopes in the uplands. These soils formed in material weathered from limestone interbedded with thin layers of calcareous shale and siltstone. Slopes range from 6 to 60 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Faywood soils are on the same landforms as Cynthiana, Lowell, Eden, Sandview, and Nicholson soils. Cynthiana soils are shallow over bedrock, and Lowell soils are deep over bedrock. Eden soils are underlain by soft bedrock and have more rock fragments in the subsoil than the Faywood soils. Sandview and Nicholson soils are in a fine-silty family and are deep over bedrock. Nicholson soils have a fragipan.

Typical pedon of Faywood silty clay loam, 6 to 12 percent slopes, eroded; about 3.6 miles northwest of Lebanon on Kentucky Highway 429, about 0.7 mile north on a farm lane, about 900 feet northeast of a farm house at the end of the farm lane, in a pasture; on soil map sheet 6, east about 2,135,900 feet and north about 470,500 feet by the Kentucky coordinate grid system:

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

Bt1—4 to 22 inches; yellowish brown (10YR 5/6) clay; moderate medium angular blocky structure; very firm, sticky and plastic; few fine roots; common discontinuous dark yellowish brown (10YR 4/6) clay films on faces of peds; few limestone channers; few black concretions; neutral; clear smooth boundary.

Bt2—22 to 34 inches; light olive brown (2.5Y 5/6) clay; common medium distinct brown (10YR 5/3) mottles; moderate fine and medium angular blocky structure; very firm, sticky and plastic; common continuous dark yellowish brown (10YR 4/6) clay films on faces of peds; about 5 percent limestone channers; mildly alkaline; abrupt smooth boundary.

R—34 inches; gray (10YR 5/1) limestone interbedded with thin layers of calcareous shale.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. Rock fragments of limestone and shale make up 0 to 15 percent of the Ap and Bt horizons. Reaction ranges from strongly acid to mildly alkaline throughout the profile.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The Bt horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 4 to 8. In most pedons it is mottled in shades of brown or olive. In some pedons it is mottled in shades of gray in the lower part. This horizon is silty clay or clay.

Some pedons have a C horizon. This horizon has colors similar to those of the Bt horizon. It is silty clay, clay, or the channery or flaggy analogs of those textures. The content of limestone and shale fragments ranges from 0 to 35 percent.

Frankstown Series

The Frankstown series consists of deep, well drained, moderately permeable soils on ridgetops and side slopes in the uplands. These soils formed in material weathered from siltstone interbedded with thin layers of limestone, shale, or sandstone. Slopes range from 6 to 20 percent. The soils are fine-loamy, mixed, mesic Typic Hapludults.

Frankstown soils are on the same landforms as Christian, Garmon, and Riney soils. Christian soils are in a clayey family. Garmon soils are moderately deep over bedrock. Riney soils have less than 10 percent weatherable minerals in the control section.

Typical pedon of Frankstown gravelly silt loam, 6 to 12 percent slopes; about 4.6 miles south of Raywick on Kentucky Highway 527, about 0.6 mile northeast on a farm lane, about 100 feet southwest of the farm lane, in second-growth hardwoods; on soil map sheet 16, east about 2,093,750 feet and north about 428,300 feet by the Kentucky coordinate grid system:

Ap—0 to 6 inches; brown (10YR 5/3) gravelly silt loam; weak fine granular structure; very friable; common medium roots; about 15 percent chert pebbles; strongly acid; clear smooth boundary.

BA—6 to 16 inches; yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky structure; friable; few medium roots; about 10 percent chert pebbles; very strongly acid; gradual wavy boundary.

Bt—16 to 40 inches; strong brown (7.5YR 5/6) gravelly silty clay loam; moderate medium subangular blocky structure; firm; few discontinuous brown (7.5YR 5/4) clay films on faces of peds; about 25 percent chert pebbles; very strongly acid; gradual wavy boundary.

BC—40 to 50 inches; yellowish brown (10YR 5/6) very gravelly silty clay loam; weak medium subangular blocky structure; firm; few discontinuous brown (7.5YR 5/4) clay films on faces of peds; about 45 percent chert and siltstone fragments; very strongly acid; abrupt smooth boundary.

R—50 inches; yellowish brown (10YR 5/6) siltstone interbedded with thin layers of cherty limestone.

The thickness of the solum ranges from 30 to 60 inches. The depth to bedrock is 40 inches or more. Rock fragments of chert, siltstone, or limestone make up 0 to 25 percent of the Ap horizon, 0 to 35 percent of the BA and Bt horizons, and 20 to 50 percent of the BC horizon. In unlimed areas reaction is strongly acid or medium acid in the Ap horizon and ranges from very strongly acid to medium acid in the BA, Bt, and BC horizons.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The BA horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 6. It is silt loam, silty clay loam, or the gravelly or channery analogs of those textures. The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8. In some pedons it is mottled in shades of red, brown, or yellow and, in the lower part, in shades of gray. This horizon is silt loam, silty clay loam, clay loam, or the gravelly or channery analogs of those textures. The BC horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. In some pedons it is mottled in shades of red, brown, yellow, or gray. It is silt loam, silty clay loam, clay loam, silty clay, or the gravelly, very gravelly, channery, or very channery analogs of those textures.

Garmon Series

The Garmon series consists of moderately deep, well drained, moderately rapidly permeable on side slopes in the uplands. These soils formed in residuum of siltstone interbedded with thin layers of limestone. Slopes range from 30 to 80 percent. The soils are fine-loamy, mixed, mesic Dystric Eutrochrepts.

Garmon soils are on the same landforms as Frankstown, Riney, Carpenter, and Lenberg soils. Frankstown, Riney, and Carpenter soils are deep over bedrock. Lenberg soils are in a fine textural family.

Typical pedon of Garmon channery silt loam, 30 to 80 percent slopes, very rocky; about 5.0 miles south of Raywick on Kentucky Highway 527, about 1.5 miles west on Millen Hill Road, 0.1 mile southwest on a farm lane, about 200 feet east of the farm lane, in a wooded area; on soil map sheet 22, east about 2,080,250 feet and north about 422,700 feet by the Kentucky coordinate grid system:

A—0 to 7 inches; brown (10YR 4/3) channery silt loam; weak fine granular structure; very friable; common fine and medium roots; about 15 percent siltstone fragments; medium acid; clear smooth boundary.

Bw1—7 to 14 inches; yellowish brown (10YR 5/4) channery silt loam; weak medium subangular blocky structure; friable; few fine and medium roots; about 15 percent siltstone fragments; medium acid; gradual wavy boundary.

Bw2—14 to 25 inches; brown (7.5YR 4/4) channery silty clay loam; weak medium subangular blocky structure; friable; about 30 percent siltstone fragments; medium acid; abrupt wavy boundary.

R—25 inches; light olive brown (2.5Y 5/4) siltstone interbedded with thin layers of limestone.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. Rock fragments of siltstone, shale, limestone, and chert make up 2 to 45 percent of the solum, but the weighted average is less than 35 percent in the control section. Reaction ranges from very strongly acid to neutral in the A and Bw1 horizons and from medium acid to neutral in the Bw2 horizon.

The A horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 3 to 5, and chroma of 2 or 3. The Bw horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 4 to 8. It is loam, silt loam, silty clay loam, or the channery or flaggy analogs of those textures.

Greenbriar Series

The Greenbriar series consists of deep, well drained, moderately permeable soils on ridgetops and side slopes in the uplands. These soils formed in a silty mantle over material weathered from black fissile shale. Slopes range from 2 to 25 percent. The soils are fine-silty, mixed, mesic Typic Hapludults.

Greenbriar soils are on the same landforms as Berea, Rohan, Trappist, Jessietown, Tilsit, and Chenault soils. Berea soils are moderately well drained and are moderately deep over bedrock. Rohan soils are in a loamy-skeletal family and are shallow over bedrock. Trappist soils are in a clayey family and are moderately deep over bedrock. Jessietown soils also are moderately deep over bedrock. Tilsit soils are moderately well drained and have a fragipan. Chenault soils are in a fine-loamy family.

Typical pedon of Greenbriar silt loam, 2 to 6 percent slopes; about 2.0 miles southeast of Bradfordsville on Kentucky Highway 49, about 0.5 mile west on a farm lane, about 200 feet northeast of a small farm pond, in a pasture; on soil map sheet 26, east about 2,182,000 feet and north about 415,875 feet by the Kentucky coordinate grid system:

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine and medium granular structure; very friable; common fine roots; strongly acid; abrupt smooth boundary.

Bt1—7 to 16 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; common fine roots; few discontinuous dark yellowish brown (10YR 4/4) clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—16 to 30 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few or common continuous dark yellowish brown (10YR 4/6) clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt3—30 to 42 inches; strong brown (7.5YR 5/6) silty clay loam; few fine distinct brown (7.5YR 5/2) mottles; moderate fine and medium angular blocky structure; firm; few or common dark yellowish brown (10YR 4/6) clay films on faces of peds; very strongly acid; gradual smooth boundary.

BC—42 to 51 inches; strong brown (7.5YR 5/6) silty clay loam; common medium distinct brown (7.5YR 5/2) mottles; weak very thin platy structure parting to weak fine and medium angular blocky; firm; extremely acid; clear smooth boundary.

2C—51 to 56 inches; yellowish red (5YR 4/6), dark brown (7.5YR 4/4), and brown (7.5YR 5/2) channery silty clay loam; massive; firm; about 20 percent shale fragments; extremely acid; clear smooth boundary.

2Cr—56 to 59 inches; reddish brown (5YR 5/4), weathered, carbonaceous shale that has a very dark brown (10YR 2/2) interior; abrupt wavy boundary.

2R—59 inches; hard, black (10YR 2/1) fissile shale.

The thickness of the solum ranges from 30 to 60 inches. The depth to hard shale bedrock ranges from 40 to 72 inches. Rock fragments make up 0 to 5 percent of the Ap and Bt horizons. The BC and C horizons have few or as much as 35 percent of these fragments. In unlimed areas reaction ranges from extremely acid to strongly acid throughout the profile.

The Ap horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 3 to 5, and chroma of 3 or 4. The Bt horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 to 6, and chroma of 4 to 8. It is silt loam or silty clay loam. In some pedons it is mottled in shades of brown, yellow, or red and, in the lower part, in shades of gray. The BC horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 to 6, and chroma of 2 to 8. It is mottled in shades of brown, yellow, red, or gray. It is silt loam, silty clay loam, or the channery analogs of those textures. The 2C horizon has colors similar to those of the BC horizon. It is silty clay loam, silty clay, or the channery analogs of those textures.

Jessietown Series

The Jessietown series consists of moderately deep, well drained, moderately permeable soils on ridgetops and side slopes in the uplands. These soils formed in a thin mantle of silty material and in material weathered from black fissile shale. Slopes range from 2 to 12 percent. The soils are fine-silty, mixed, mesic Typic Hapludults.

Jessietown soils are on the same landforms as Berea, Rohan, Trappist, Greenbriar, and Tilsit soils. Berea soils are moderately well drained. Rohan soils are in a loamy-skeletal family and are shallow over bedrock. Trappist soils are in a clayey family. Greenbriar and Tilsit soils are deep over bedrock. Tilsit soils are moderately well drained and have a fragipan.

Typical pedon of Jessietown silt loam, in an area of Jessietown-Trappist complex, 2 to 6 percent slopes; about 2.0 miles west of Bradfordsville on Kentucky Highway 49, about 1.3 miles southeast on Kentucky Highway 1157, about 1,200 feet south of the highway, in a cultivated field; on soil map sheet 25, east about 2,162,350 feet and north about 418,500 feet by the Kentucky coordinate grid system:

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; moderate medium granular structure; very friable; few fine roots; strongly acid; clear smooth boundary.

Bt1—8 to 22 inches; brown (7.5YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few strong brown (7.5YR 4/6) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—22 to 30 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium angular blocky structure; friable; few or common brown (7.5YR 5/4) clay films on faces of peds; strongly acid; clear smooth boundary.

2BC—30 to 34 inches; yellowish brown (10YR 5/4) channery silty clay; few medium distinct strong brown (7.5YR 5/6) mottles; weak fine angular blocky and weak thin platy structure; friable; about 15 percent shale fragments; very strongly acid; abrupt smooth boundary.

2Cr—34 to 36 inches; reddish brown (5YR 5/4), weathered shale that has a black (10YR 2/1) interior; few fine roots along fracture faces of the rock, 5 to 10 inches apart; very strongly acid; abrupt wavy boundary.

2R—36 inches; hard, black (10YR 2/1) fissile shale.

The thickness of the solum and the depth to hard shale bedrock range from 20 to 40 inches. Rock fragments make up 0 to 5 percent of the Ap and Bt horizons. The BC and C horizons have few to as much as 35 percent of these fragments. In unlimed areas reaction ranges from extremely acid to strongly acid throughout the profile.

The Ap horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 or 5, and chroma of 3 or 4. The Bt horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 to 6, and chroma of 4 to 8. In some pedons it is mottled in shades of red, brown, or yellow and, in the lower part, in shades of gray. This horizon is silt loam or silty clay loam. The 2BC horizon has colors similar to those of the Bt horizon. It is mottled in shades of red, brown, yellow, or gray. It is silt loam, silty clay loam, silty clay, or the channery analogs of those textures.

Some pedons have a 2C horizon. This horizon has colors, mottles, and textures similar to those of the 2BC horizon. It has few to as much as 35 percent rock fragments.

Lawrence Series

The Lawrence series consists of deep, somewhat poorly drained soils on low stream terraces and concave upland ridgetops. These soils formed in a mantle of loess or alluvial material, which is underlain by material weathered from limestone interbedded with thin layers of shale or siltstone. They have a fragipan. Permeability is moderate above the fragipan and slow in the fragipan. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, mesic Aquic Fragiudalfs.

Lawrence soils are on the same landforms as Crider, Lowell, Elk, Nicholson, Tilsit, Otwell, and Robertsville soils. Crider, Lowell, and Elk soils are well drained and do not have a fragipan. Lowell soils are in a fine textural family. Nicholson, Tilsit, and Otwell soils are moderately well drained, and Robertsville soils are poorly drained.

Typical pedon of Lawrence silt loam; about 2.7 miles north of Loretto on Kentucky Highway 49, about 200 feet west of the highway, in a cultivated field; on soil map sheet 3, east about 2,098,900 feet and north about 486,100 feet by the Kentucky coordinate grid system:

Ap—0 to 9 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; very friable; common fine roots; slightly acid; clear smooth boundary.

Bt—9 to 32 inches; light yellowish brown (10YR 6/4) silt loam; common medium distinct gray (10YR 6/1) and common medium faint yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few discontinuous dark yellowish brown (10YR 4/6) clay films on faces of peds; very strongly acid; clear smooth boundary.

Btgx1—32 to 40 inches; gray (10YR 6/1) silt loam; few medium distinct yellowish brown (10YR 5/6) mottles; weak very coarse prismatic structure parting to weak coarse subangular blocky; very firm; brittle and compact; few discontinuous pale brown (10YR 6/3) clay films and silt coatings on faces of prisms; strongly acid; gradual wavy boundary.

Btgx2—40 to 62 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak very coarse prismatic structure parting to weak coarse subangular blocky; very firm; brittle and compact; few or common continuous pale brown (10YR 6/3) clay films and silt coatings on faces of prisms; strongly acid.

The thickness of the solum ranges from 40 to 80 inches. The depth to bedrock is 60 inches or more. The content of rock fragments ranges from 0 to 5 percent throughout the profile. In unlimed areas reaction ranges from very strongly acid to slightly acid above the fragipan and is very strongly acid or strongly acid in the fragipan.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The Bt and Btgx horizons are silt loam or silty clay loam. The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. It is mottled in shades of brown or gray. The Btgx horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 5 to 8, and chroma of 1 to 8, or it is neutral in hue and has value of 6 or 7. In some pedons it is equally mottled in shades of brown and gray.

Some pedons have a 2BC or 2C horizon. These horizons have hue of 5YR to 5Y, value of 4 to 7, and chroma of 1 to 6, or they are neutral in hue and have value of 4 to 7. They are silt loam, silty clay loam, silty clay, or clay. They range from very strongly acid to neutral.

Lenberg Series

The Lenberg series consists of moderately deep, well drained, moderately slowly permeable soils on side slopes and narrow ridgetops in the uplands. These soils formed in material weathered from shale interbedded with thin layers of siltstone. Slopes range from 6 to 45 percent. The soils are fine, mixed, mesic Ultic Hapludalfs.

Lenberg soils are on the same landforms as Carpenter and Garmon soils. Carpenter and Garmon soils are in a fine-loamy family. Carpenter soils are deep over bedrock.

Typical pedon of Lenberg silt loam, 12 to 20 percent slopes, eroded; about 1.4 miles south of Raywick on Kentucky Highway 527, about 400 feet south of the junction with Head Distillery Road, in a wooded area; on soil map sheet 16, east about 2,091,500 feet and north about 440,350 feet by the Kentucky coordinate grid system:

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

Bt1—4 to 14 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; firm; common fine and medium roots; common discontinuous dark yellowish brown (10YR 4/4) clay films on faces of peds and in pores; very strongly acid; clear smooth boundary.

Bt2—14 to 24 inches; yellowish brown (10YR 5/4) silty clay; few fine distinct gray (10YR 5/1) mottles; weak fine and medium angular blocky structure; firm; few medium roots; common continuous dark yellowish brown (10YR 4/4) clay films on faces of peds; about 5 percent shale channers; very strongly acid; clear smooth boundary.

C—24 to 38 inches; olive gray (5Y 5/2) channery clay; common medium distinct olive (5Y 5/4) mottles; massive; very firm; about 25 percent shale fragments; strongly acid; abrupt wavy boundary.

Cr—38 to 45 inches; light olive brown (2.5Y 5/4) shale interbedded with thin layers of siltstone.

The thickness of the solum and the depth to soft shale bedrock range from 20 to 40 inches. Rock fragments of shale or siltstone make up 0 to 30 percent of the A and Bt horizons and 5 to 60 percent of the C horizon. Reaction ranges from very strongly acid to neutral in the A horizon and is very strongly acid or strongly acid in the Bt and C horizons.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 6. It is silt loam or silty clay loam. The Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 4 to 8. In some pedons it is mottled in shades of brown, red, or yellow and, in the lower part, in shades of gray. This horizon is silty clay loam, silty clay, clay, or the channery analogs of those textures. The C horizon has matrix or mottle colors in shades of brown, yellow, red, olive, or gray. It is silty clay, clay, or the channery or very channery analogs of those textures.

Lowell Series

The Lowell series consists of deep, well drained, moderately slowly permeable soils on ridgetops and side slopes in the uplands. These soils formed in material weathered from limestone interbedded with thin layers of shale and siltstone. Slopes range from 2 to 20 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Lowell soils are on the same landforms as Faywood, Eden, Cynthiana, Sandview, Nicholson, and Lawrence soils. Faywood and Eden soils are moderately deep over bedrock, and Cynthiana soils are shallow over bedrock. Sandview, Nicholson, and Lawrence soils are in a fine-silty family. Nicholson and Lawrence soils have a fragipan. Nicholson soils are moderately well drained, and Lawrence soils are somewhat poorly drained.

Typical pedon of Lowell silty clay loam, 6 to 12 percent slopes, eroded; about 3.6 miles northwest of Lebanon on Kentucky Highway 429, about 0.7 mile north on a farm lane, about 600 feet northeast of a farmhouse at the end of the farm lane, in a pasture; on soil map sheet 6, east about 2,135,200 feet and north about 470,400 feet by the Kentucky coordinate grid system:

Ap—0 to 5 inches; brown (10YR 4/3) silty clay loam; weak fine granular structure; friable; common fine roots; strongly acid; clear smooth boundary.

Bt1—5 to 15 inches; strong brown (7.5YR 5/6) silty clay;

weak medium angular blocky structure; firm; common fine roots; few discontinuous dark yellowish brown (10YR 4/6) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—15 to 21 inches; yellowish brown (10YR 5/6) clay; moderate fine and medium angular blocky structure; firm, sticky and plastic; common continuous dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; clear smooth boundary.

Bt3—21 to 34 inches; yellowish brown (10YR 5/6) clay; few fine faint pale brown mottles; moderate medium angular blocky structure; very firm, sticky and plastic; common continuous dark yellowish brown (10YR 4/4) clay films on faces of peds; few black concretions; slightly acid; gradual wavy boundary.

BC—34 to 48 inches; yellowish brown (10YR 5/6) clay; few fine faint light brownish gray mottles; weak fine angular blocky structure; very firm, very sticky and very plastic; common discontinuous dark yellowish brown (10YR 4/6) clay films on faces of peds; few black concretions; about 5 percent limestone channers; neutral; abrupt smooth boundary.

R—48 inches; gray (10YR 6/1) limestone interbedded with thin layers of shale.

The thickness of the solum ranges from 30 to 60 inches. The depth to bedrock ranges from 40 to more than 80 inches. Rock fragments of limestone, shale, or siltstone make up 0 to 5 percent of the Ap and Bt horizons and 0 to 15 percent of the BC horizon. In unlimed areas reaction ranges from very strongly acid to slightly acid in the Ap and Bt horizons and from strongly acid to mildly alkaline in the BC horizon.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. It is silt loam, silty clay loam, or silty clay. The Bt horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 4 to 8. In most pedons it is mottled in shades of brown, red, or olive. In some pedons it is mottled in shades of gray in the lower part. This horizon is silty clay loam, silty clay, or clay. The BC horizon has matrix or mottle colors in shades of olive, brown, or gray. It is silty clay or clay.

Some pedons have a C horizon. This horizon has matrix and mottle colors in shades of brown, olive, or gray. It is silty clay, clay, or the channery, very channery, flaggy, or very flaggy analogs of those textures. It has few to as much as 50 percent rock fragments. Reaction ranges from medium acid to mildly alkaline.

Melvin Series

The Melvin series consists of deep, poorly drained, moderately permeable soils on low stream terraces and on flood plains. These soils formed in mixed alluvium washed from soils that formed in material weathered from limestone, shale, siltstone, and sandstone. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, nonacid, mesic Typic Fluvaquents.

Melvin soils are on the same landforms as Newark and Nolin soils. Newark soils are somewhat poorly drained, and Nolin soils are well drained.

Typical pedon of Melvin silt loam, occasionally flooded; about 2.3 miles northwest of Jessietown on Kentucky Highway 412, about 1,000 feet west of the highway, in a pasture; on soil map sheet 24, east about 2,114,000 feet and north about 424,500 feet by the Kentucky coordinate grid system:

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

Bg1—5 to 10 inches; gray (10YR 5/1) silt loam; few medium distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; many fine roots; slightly acid; clear smooth boundary.

Bg2—10 to 21 inches; gray (10YR 6/1) silty clay loam; common medium distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable; common fine roots; slightly acid; abrupt smooth boundary.

Bg3—21 to 37 inches; gray (10YR 5/1) silty clay loam; common medium distinct brownish yellow (10YR 6/6) mottles; weak coarse prismatic structure parting to weak medium angular blocky; firm; few fine roots; slightly acid; abrupt smooth boundary.

Cg—37 to 65 inches; gray (10YR 6/1) silty clay loam; common medium distinct brownish yellow (10YR 6/6) mottles; massive; firm; few fine roots; neutral.

The thickness of the solum ranges from 20 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments, mostly chert, limestone, and siltstone pebbles, ranges from 0 to 5 percent to a depth of 30 inches and from 0 to 20 percent below that depth. Reaction ranges from medium acid to mildly alkaline throughout the profile.

The Ap horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 7, and chroma of 1 to 3. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. It is mottled in shades of brown, yellow, olive, or red. It is silt loam or silty clay loam. The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. It is dominantly silt loam or silty clay loam. In some pedons, however, thin strata of silty clay, silty clay loam, silt loam, loam, sandy loam, loamy sand, or the gravelly analogs of those textures are below a depth of 40 inches.

Mountview Series

The Mountview series consists of deep, well drained, moderately permeable soils on side slopes and broad ridgetops in the uplands. These soils formed in a mantle of loess, which is underlain by material weathered from limestone. Slopes range from 2 to 12 percent. The soils are fine-silty, siliceous, thermic Typic Paleudults.

The Mountview soils in this survey area are taxadjuncts because they formed under a climate that is 2 to 5 degrees cooler than defined as the range for the series. This difference, however, does not affect the use or management of the soils.

Mountview soils are on the same landforms as Christian and Nicholson soils. Christian soils are in a clayey family. Nicholson soils are moderately well drained and have a fragipan.

Typical pedon of Mountview silt loam, 2 to 6 percent slopes; about 5.0 miles south of Raywick on Kentucky Highway 527, about 2.6 miles west on Millen Hill Road, about 200 feet north of the road, in a pasture; on soil map sheet 16, east about 2,079,600 feet and north about 430,900 feet by the Kentucky coordinate grid system:

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

BA—7 to 12 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine and medium subangular blocky structure; friable; common fine roots; medium acid; abrupt smooth boundary.

Bt1—12 to 28 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine roots; common continuous strong brown (7.5YR 4/6) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt2—28 to 48 inches; yellowish red (5YR 5/6) silty clay loam; moderate fine and medium angular blocky structure; firm; few very fine roots; common continuous strong brown (7.5YR 4/6) clay films on faces of peds; about 10 percent chert pebbles; few black concretions; very strongly acid; clear smooth boundary.

2Bt3—48 to 62 inches; yellowish red (5YR 4/6) silty clay loam; moderate fine and medium angular blocky structure; firm; common continuous strong brown (7.5YR 4/6) clay films on faces of peds; about 5 percent chert pebbles; few black concretions; very strongly acid; clear smooth boundary.

2Bt4—62 to 80 inches; yellowish red (5YR 4/6) silty clay; few fine distinct yellowish brown (10YR 5/4) mottles; moderate fine and medium angular blocky structure; common continuous strong brown (7.5YR 4/6) clay films on faces of peds; about 10 percent chert pebbles; few black concretions; very strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. The thickness of the loess mantle ranges from 22 to 36 inches. The content of rock fragments of chert or limestone ranges from 0 to 5 percent in the Ap, BA, and Bt horizons and from 5 to 30 percent in the 2Bt horizon. In unlimed areas reaction is very strongly acid or strongly acid throughout the profile.

The Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. The BA horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The Bt horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 6 to 8. It is silt loam or silty clay loam. The 2Bt horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 4 to 6. It is silty clay loam, silty clay, clay, or the gravelly analogs of those textures.

Newark Series

The Newark series consists of deep, somewhat poorly drained, moderately permeable soils on flood plains and low stream terraces. These soils formed in mixed alluvium washed from soils that formed in material weathered from limestone, shale, siltstone, and sandstone. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, nonacid, mesic Aeric Fluvaquents.

Newark soils are on the same landforms as Melvin, Nolin, and Sensabaugh soils. Melvin soils are poorly drained, and Nolin and Sensabaugh soils are well drained. Sensabaugh soils are in a fine-loamy family.

Typical pedon of Newark silt loam, frequently flooded; about 1.3 miles south of Raywick on Kentucky Highway 527, about 1.5 miles west on Head Distillery Road, about 2,000 feet north at the end of the road, in a cultivated field; on soil map sheet 10, east about 2,084,700 feet and north about 445,450 feet by the Kentucky coordinate grid system:

Ap—0 to 9 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; very friable; common fine roots; slightly acid; clear smooth boundary.

Bw—9 to 16 inches; brown (10YR 5/3) silt loam; few medium distinct brownish gray (10YR 5/2) mottles; weak fine and medium subangular blocky structure; friable; few medium roots; slightly acid; clear smooth boundary.

Bg—16 to 24 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; medium acid; gradual wavy boundary.

Cg—24 to 60 inches; gray (10YR 6/1) silty clay loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; massive; friable; medium acid.

The thickness of the solum ranges from 20 to 50 inches. The depth to bedrock is more than 60 inches. The content of rock fragments, mostly chert, limestone, and siltstone pebbles, ranges from 0 to 15 percent throughout the profile. Reaction ranges from medium acid to mildly alkaline throughout the profile.

The Ap and Bw horizons have hue of 7.5YR, 10YR, or 2.5Y, value of 4 or 5, and chroma of 2 to 4. In some pedons the Ap horizon is mottled in shades of brown or gray. The Bw horizon is mottled in shades of brown or gray. The Bw and Bg horizons are silt loam or silty clay loam. The Bg horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. It is mottled in shades of brown.

The Cg horizon has colors and textures similar to those of the Bg horizon. It is mottled in shades of brown, yellow, olive, or gray. In some pedons it is stratified with thin layers of loam, fine sandy loam, or silty clay.

Nicholson Series

The Nicholson series consists of deep, moderately well drained soils on ridgetops and side slopes in the uplands. These soils formed in a mantle of loess, which is underlain by material weathered from limestone interbedded with thin layers of shale or siltstone. They have a fragipan. Permeability is moderate above the fragipan and slow in the fragipan. Slopes range from 2 to 6 percent. The soils are fine-silty, mixed, mesic Typic Fragiudalfs.

The Nicholson soils are on the same landforms as Crider, Mountview, Sandview, Christian, Lowell, Faywood, Beasley, and Lawrence soils. Crider, Mountview, Sandview, and Christian soils are well drained and do not have a fragipan. Christian soils are in a clayey family. Lowell, Faywood, and Beasley soils are well drained, are in a fine textural family, and do not have a fragipan. Lawrence soils are somewhat poorly drained.

Typical pedon of Nicholson silt loam, 2 to 6 percent slopes; about 2.8 miles north of Loretto on Kentucky Highway 49, about 300 feet west of the highway, in a cultivated field; on soil map sheet 3, east about 2,099,100 feet and north about 486,800 feet by the Kentucky coordinate grid system:

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

Bt—8 to 22 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; few medium roots; few discontinuous dark yellowish brown (10YR 4/6) clay films on faces of peds; strongly acid; abrupt wavy boundary.

Btx—22 to 48 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; moderate very coarse prismatic structure parting to strong medium and coarse angular blocky; firm; compact and brittle; few discontinuous yellowish brown (10YR 5/6) clay films on faces of peds; strongly acid; gradual wavy boundary.

2Bt—48 to 60 inches; strong brown (7.5YR 5/6) silty clay loam; common medium distinct yellowish red (5YR 4/6) and few fine distinct gray (10YR 6/1) mottles; moderate medium angular blocky structure; very firm; few continuous strong brown (7.5YR 4/6) clay films on faces of peds; common black concretions; mildly alkaline.

The thickness of the solum ranges from 40 to 80 inches. The depth to bedrock is more than 60 inches. The thickness of the loess ranges from 24 to 48 inches. The Ap, Bt, and Btx horizons are generally free of rock fragments, but the content of these fragments ranges from 0 to 15 percent in the 2B horizon. In unlimed areas reaction ranges from very strongly acid to slightly acid in the Ap, Bt, and Btx horizons and from strongly acid to mildly alkaline in the 2Bt horizon.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 or 3. The Bt and Btx horizons are silt loam or silty clay loam. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. Some pedons have brown or gray mottles below the upper 10 inches of the argillic horizon. The Btx horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 3 to 5, and chroma of 4 to 8. In most pedons it is mottled in shades of gray. The 2Bt horizon has hue of 2.5YR to 2.5Y, value of 4 or 5, and chroma of 4 to 6. It is mottled in shades of gray, brown, yellow, olive, or red. It is silty clay loam, silty clay, or clay.

Some pedons have a 2C horizon. This horizon has colors and textures similar to those of the 2Bt horizon. Reaction ranges from strongly acid to mildly alkaline.

The content of rock fragments ranges from 0 to 15 percent.

Nolin Series

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

Nolin soils are on the same landforms as Newark, Melvin, and Sensabaugh soils. Newark soils are somewhat poorly drained, and Melvin soils are poorly drained. Sensabaugh soils are in a fine-loamy family.

Typical pedon of Nolin silt loam, frequently flooded; about 5.4 miles northwest of Lebanon on Kentucky Highways 49 and 52, about 800 feet northwest of the junction of Kentucky Highway 327 and Kentucky Highways 49 and 52, in a cultivated field; on soil map sheet 6, east about 2,119,000 feet and north about 462,000 feet by the Kentucky coordinate grid system:

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

Bw—10 to 54 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; neutral; gradual wavy boundary.

C—54 to 60 inches; brown (10YR 4/3) gravelly silt loam; weak fine granular structure; very friable; about 20 percent limestone, chert, and sandstone pebbles; mildly alkaline.

The solum is 40 or more inches thick, and the depth to bedrock is more than 60 inches. The content of rock fragments, mostly limestone, chert, and sandstone pebbles, ranges from 0 to 5 percent in the Ap and Bw horizons and from 0 to 35 percent in the C horizon. Reaction is medium acid to moderately alkaline throughout the profile.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. The Bw horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 or 5, and chroma of 3 or 4. In some pedons it is mottled in shades of brown below a depth of 24 inches and in shades of gray below a depth of 30 inches. It is silt loam or silty clay loam.

The C horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 or 5, and chroma of 2 to 4. In some pedons it is mottled in shades of gray or brown. It is dominantly silt loam, silty clay loam, or the gravelly analogs of those textures. In some pedons, however, it has strata of loam or sandy loam.

Otwell Series

The Otwell series consists of deep, moderately well drained soils on low stream terraces or benches, mainly in narrow valleys. These soils formed in old mixed alluvium, which is underlain by material weathered from limestone interbedded with thin layers of shale. They have a fragipan. Permeability is moderately slow above the fragipan and very slow in the fragipan. Slopes range from 2 to 8 percent. The soils are fine-silty, mixed, mesic Typic Fragiudalfs.

Otwell soils are on the same landforms as Elk and Lawrence soils. Elk soils are well drained and do not have a fragipan. Lawrence soils are somewhat poorly drained.

Typical pedon of Otwell silt loam, 2 to 8 percent slopes; about 4.7 miles northwest of Lebanon on Kentucky Highway 429, about 300 feet west of the highway, in a cultivated field; on soil map sheet 6, east about 2,132,250 feet and north about 472,650 feet by the Kentucky coordinate grid system:

Ap—0 to 11 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine roots; neutral; clear smooth boundary.

Bt—11 to 23 inches; brown (7.5YR 5/4) silty clay loam; weak medium subangular blocky structure; friable; few fine roots; few discontinuous strong brown (7.5YR 4/6) clay films on faces of peds; neutral; gradual wavy boundary.

Btx—23 to 42 inches; light gray (10YR 7/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak very coarse prismatic structure parting to moderate medium angular blocky; very firm; brittle and compact; few discontinuous strong brown (7.5YR 4/6) clay films on faces of peds; common black concretions; strongly acid; gradual wavy boundary.

2BC—42 to 60 inches; light brownish gray (10YR 6/2) silty clay; many coarse prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very firm; few black concretions; slightly acid.

The thickness of the solum ranges from 40 to 80 inches. The depth to bedrock is more than 60 inches. The content of rock fragments, mostly limestone, siltstone, sandstone, and geode pebbles, ranges from 0 to 5 percent in the Btx and 2BC horizons. Reaction ranges from very strongly acid to neutral in the Ap horizon, is very strongly acid or strongly acid in the Bt and Btx horizons, and ranges from strongly acid to slightly acid in the 2BC horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The Bt and Btx horizons are silt loam or silty clay loam. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. In some pedons it is mottled in shades of brown or gray in the lower part. The Btx horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 7, and chroma of 2 to 6. It is mottled in shades of brown, yellow, olive, or gray. The 2BC horizon has colors similar to those of the Btx horizon. It is silty clay loam or silty clay.

Some pedons have a 2C horizon. This horizon has colors similar to those of the Btx horizon. It commonly is stratified silt loam, silty clay loam, or silty clay. The content of rock fragments ranges from 0 to 15 percent. Reaction ranges from slightly acid to strongly acid in the upper part of the horizon and from strongly acid to moderately alkaline in the lower part.

Riney Series

The Riney series consists of deep, well drained, moderately rapidly permeable soils on ridgetops and side slopes in the uplands. These soils formed in old alluvium derived from terrace deposits and from material weathered from weakly consolidated sandstone. Slopes range from 6 to 35 percent. The soils are fine-loamy, siliceous, mesic Typic Hapludults.

Riney soils are on the same landforms as Garmon, Frankstown, and Christian soils. Garmon soils are moderately deep over bedrock. Frankstown soils have more than 10 percent weatherable minerals in the control section. Christian soils are in a clayey family.

Typical pedon of Riney loam, 6 to 12 percent slopes; about 6.2 miles south of Raywick on Kentucky Highway 527, about 500 feet west on a farm lane, 100 feet north of the farm lane, in a pasture; on soil map sheet 22, east about 2,087,850 feet and north about 418,400 feet by the Kentucky coordinate grid system:

Ap—0 to 7 inches; brown (10YR 4/3) loam; weak fine granular structure; very friable; many fine roots; about 5 percent quartzite pebbles; slightly acid; clear smooth boundary.

BA—7 to 12 inches; strong brown (7.5YR 5/6) loam; weak fine granular structure; friable; common fine roots; about 5 percent quartzite pebbles; very strongly acid; gradual wavy boundary.

Bt1—12 to 24 inches; yellowish red (5YR 4/6) clay loam; moderate fine subangular blocky structure; firm; few fine roots; about 5 percent quartzite pebbles; few discontinuous strong brown (7.5YR 4/6) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—24 to 63 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; firm; few continuous yellowish red (5YR 4/6) clay films on faces of peds; very strongly acid.

The thickness of the solum ranges from 40 to 80 inches. The depth to soft bedrock is 48 inches or more. Rock fragments make up 0 to 10 percent of the Ap and BA horizons and 0 to 20 percent of the Bt horizon. They are mainly quartzite pebbles. Some pedons have fragments of weakly consolidated sandstone, which crushes to sandy loam or loamy sand. Reaction ranges from strongly acid to neutral in the Ap horizon and is very strongly acid or strongly acid in the BA and Bt horizons.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. The BA horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is loam or sandy clay loam. The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. In some pedons it is mottled in shades of red or brown in the lower part. This horizon is clay loam, sandy clay loam, or the gravelly or channery analogs of those textures.

Some pedons have a C horizon. This horizon has matrix and mottle colors similar to those of Bt horizon. It is sandy clay loam, sandy loam, loamy sand, or the gravelly or channery analogs of those textures.

Robertsville Series

The Robertsville series consists of deep, poorly drained soils on stream terraces and in concave areas on uplands. These soils formed in old mixed alluvium or colluvium washed from soils that formed in material weathered from limestone, siltstone, shale, and sandstone. They have a fragipan. Permeability is moderate above the fragipan and slow in the fragipan. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, mesic Typic Fragiaqualfs.

Robertsville soils are on the same landforms as Lawrence and Tilsit soils. Lawrence soils are somewhat poorly drained, and Tilsit soils are moderately well drained.

Typical pedon of Robertsville silt loam; about 1.0 mile west of Calvary on Kentucky Highway 208, about 0.4 mile southwest on Lovers Lane, 800 feet southeast of a farmhouse, in a pasture; on soil map sheet 18, east about 2,135,900 feet and north about 430,300 feet by the Kentucky coordinate grid system:

Ap—0 to 5 inches; grayish brown (10YR 5/2) silt loam; common fine distinct dark grayish brown (10YR 4/2) mottles; weak fine granular structure; friable; few fine roots; very strongly acid; clear smooth boundary.

Btg1—5 to 18 inches; light brownish gray (10YR 6/2) silt loam; common fine distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; few discontinuous dark yellowish brown (10YR 4/6) clay films on faces of peds and in pores; very strongly acid; clear smooth boundary.

Btg2—18 to 30 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; few discontinuous dark yellowish brown (10YR 4/6) clay films on faces of peds; very strongly acid; clear smooth boundary.

Btgx1—30 to 44 inches; gray (10YR 6/1) silty clay loam; many coarse distinct yellowish brown (10YR 5/6) mottles; weak very coarse prismatic structure parting to moderate fine and medium subangular blocky; very firm; compact and brittle; common thin continuous light gray (10YR 7/1) clay films and silt coatings on faces of prisms and common thin discontinuous strong brown (7.5YR 4/6) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btgx2—44 to 56 inches; gray (10YR 6/1) silty clay loam; many coarse distinct yellowish brown (10YR 5/8) mottles; moderate very coarse prismatic structure parting to moderate medium subangular blocky; very firm; compact and brittle; common thick continuous light gray (10YR 7/1) clay films and silt coatings on faces of prisms and common thin continuous strong brown (7.5YR 5/6) clay films on faces of peds; strongly acid; gradual wavy boundary.

Cg—56 to 70 inches; light gray (10YR 7/1) silty clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; massive; firm; about 10 percent quartz pebbles; medium acid.

The thickness of the solum ranges from 40 to more than 60 inches. The depth to bedrock is 60 inches or more. The content of rock fragments, mostly small rounded pebbles, ranges from 0 to 5 percent in the Ap, Btg, and Btgx horizons and from 0 to 20 percent in the Cg horizon. In unlimed areas reaction ranges from extremely acid to strongly acid in the Ap, Btg, and Btgx horizons and from very strongly acid to neutral in the Cg horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. In most pedons it is mottled in shades of brown or gray. Some pedons have an A horizon. This horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 1 or 2. It has mottle colors and textures similar to those of the Ap horizon.

The Btg and Btgx horizons are silt loam or silty clay loam. The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 6 or 7, and chroma of 1 or 2. It is mottled in shades of brown, yellow, or gray. The Btgx horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 5 to 7. It is mottled in shades of brown, yellow, olive, or gray.

The Cg horizon has matrix and mottle colors in shades of brown and gray or is evenly mottled. It is silt loam, silty clay loam, or silty clay. In some pedons it is stratified with thin layers of loam, clay loam, or clay.

Rohan Series

The Rohan series consists of shallow, well drained, moderately permeable or moderately slowly permeable soils on side slopes and narrow ridgetops in the uplands. These soils formed in material weathered from black fissile shale. Slopes range from 6 to 50 percent. The soils are loamy-skeletal, mixed, mesic Lithic Dystrochrepts.

Rohan soils are on the same landforms as Trappist, Jessietown, and Greenbriar soils. Trappist and Jessietown soils are moderately deep over bedrock. Trappist soils are in a clayey family, and Jessietown soils are in a fine-silty family. Greenbriar soils are deep over bedrock and are in a fine-silty family.

Typical pedon of Rohan channery silt loam, in an area of Rohan-Trappist complex, 20 to 50 percent slopes, eroded, very rocky; about 1.3 miles southeast of Bradfordsville on Kentucky Highway 49, about 0.6 mile north on a farm lane, about 100 feet east of a barn at the end of the farm lane, in a wooded area; on soil map sheet 26, east about 2,182,200 feet and north about 424,000 feet by the Kentucky coordinate grid system:

Oi—1 inch to 0; loose, partly decomposed hardwood leaf litter.

A—0 to 4 inches; dark brown (10YR 3/3) channery silt loam; moderate fine and medium granular structure; friable; common fine and medium roots; about 30 percent shale fragments; very strongly acid; abrupt wavy boundary.

BA—4 to 8 inches; dark yellowish brown (10YR 4/4) very channery silt loam; weak medium subangular blocky structure parting to moderate medium granular; friable; common fine, medium, and coarse roots; few brown (10YR 4/3) organic coatings on faces of peds; about 35 percent shale fragments; extremely acid; abrupt smooth boundary.

Bw—8 to 14 inches; yellowish brown (10YR 5/4) extremely channery silty clay loam; moderate medium subangular blocky structure; friable; common medium roots; about 65 percent shale

fragments; extremely acid; abrupt wavy boundary.
Cr—14 to 18 inches; strong brown (7.5YR 4/6), weathered shale that has a black (10YR 2/1) interior; few fine roots along fracture faces of the rock, 5 to 10 inches apart; abrupt wavy boundary.
R—18 inches; hard, black (10YR 2/1) fissile shale.

The thickness of the solum ranges from 8 to 20 inches. The depth to hard shale bedrock ranges from 10 to 20 inches. The content of rock fragments ranges from 5 to 75 percent in individual horizons and averages 35 percent or more in the particle-size control section. In unlimed areas reaction ranges from very strongly acid to medium acid in the A horizon and from extremely acid to strongly acid in the BA and Bw horizons.

The A horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 3 to 5, and chroma of 2 to 4. Some pedons have an Ap horizon. This horizon has colors and textures similar to those of the A horizon.

The BA and Bw horizons have hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 3 to 6. In some pedons they are mottled in shades of red, brown, or yellow. They are loam, clay loam, silt loam, silty clay loam, or the channery, very channery, or extremely channery analogs of those textures.

Some pedons have a C horizon. This horizon has colors and textures similar to those of the BA and Bw horizons. Reaction ranges from extremely acid to strongly acid.

Sandview Series

The Sandview series consists of deep, well drained soils on broad ridgetops and side slopes in the uplands. These soils formed in a mantle of loess, which is underlain by material weathered from limestone interbedded with thin layers of shale. Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part. Slopes range from 2 to 12 percent. The soils are fine-silty, mixed, mesic Typic Hapludalfs.

Sandview soils are on the same landforms as Nicholson, Lowell, and Faywood soils. Nicholson soils have a fragipan and are moderately well drained. Lowell and Faywood soils are in a fine textural family. Faywood soils are moderately deep over bedrock.

Typical pedon of Sandview silt loam, 2 to 6 percent slopes; about 5.5 miles east of Lebanon on Kentucky Highway 52 and U.S. Highway 68, about 2.3 miles north on Mays Chapel Road to Poplar Corner, 2.4 miles northwest on a paved county road to St. Ives Church, about 700 feet northwest of the church, in a pasture; on soil map sheet 7, east about 2,176,100 feet and north about 471,300 feet by the Kentucky coordinate grid system:

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; moderate medium granular structure; very friable; common fine roots; slightly acid; abrupt smooth boundary.
Bt1—8 to 19 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few fine roots; slightly acid; abrupt smooth boundary.
Bt2—19 to 28 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common brown (7.5YR 4/4) clay films on faces of peds and in pores; medium acid; clear smooth boundary.
Bt3—28 to 35 inches; yellowish brown (10YR 5/6) silty clay loam; few fine faint pale brown mottles; moderate medium subangular blocky structure; firm; common brown (7.5YR 4/4) clay films on faces of peds and in pores; strongly acid; abrupt wavy boundary.
2Bt4—35 to 47 inches; yellowish brown (10YR 5/6) silty clay; moderate coarse angular blocky structure; very firm; common brown (7.5YR 4/4) clay films on faces of peds and in pores; about 2 percent chert pebbles; strongly acid; clear smooth boundary.
2Bt5—47 to 56 inches; yellowish brown (10YR 5/6) clay; moderate coarse angular blocky structure; very firm; common brown (7.5YR 4/4) clay films on faces of peds; few black concretions; about 5 percent chert pebbles; strongly acid; clear smooth boundary.
2Bt6—56 to 64 inches; yellowish brown (10YR 5/6) clay; few fine distinct light olive brown (2.5Y 5/4) mottles; moderate coarse angular blocky structure; very firm; few discontinuous brown (7.5YR 4/4) clay films on faces of peds; many black concretions; medium acid; clear smooth boundary.
2BC—64 to 70 inches; yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) silty clay; few fine distinct light olive brown (2.5Y 5/4) mottles; weak coarse angular blocky structure; very firm; few concretions; neutral; clear wavy boundary.
2C—70 to 76 inches; yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) silty clay; common medium distinct light yellowish brown (2.5Y 6/4) mottles; massive; very firm; few concretions; about 2 percent limestone channers; neutral; abrupt wavy boundary.
2R—76 inches; gray (10YR 5/1) limestone interbedded with thin layers of greenish gray (5G 6/1), calcareous shale.

The thickness of the solum and the depth to bedrock are more than 60 inches. The thickness of the loess mantle ranges from 24 to 50 inches. Rock fragments of limestone, shale, or chert make up 0 to 10 percent of the 2Bt, 2BC, and 2C horizons. Reaction ranges from very strongly acid to neutral in the Ap and Bt horizons and from strongly acid to mildly alkaline in the 2Bt, 2BC, and 2C horizons.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. The Bt horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 to 6, and chroma of 4 to 8. In some pedons it is mottled in shades of brown in the lower part. This horizon is silt loam or silty clay loam. The 2Bt, 2BC, and 2C horizons are silty clay or clay. The 2Bt and 2BC horizons have hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 3 to 8. In most pedons they are mottled in shades of brown or olive, and in some pedons they are mottled in shades of gray. The 2C horizon has colors similar to those of the 2Bt and 2BC horizons.

Sensabaugh Series

The Sensabaugh series consists of deep, well drained, moderately permeable or moderately rapidly permeable soils on flood plains. These soils formed in mixed alluvium washed from soils that formed in material weathered from limestone, shale, siltstone, and sandstone. Slopes range from 0 to 2 percent. The soils are fine-loamy, mixed, mesic Dystric Fluventic Eutrochrepts.

Sensabaugh soils are on the same landforms as Nolin and Newark soils. Nolin and Newark soils are in a fine-silty family. Newark soils are somewhat poorly drained.

Typical pedon of Sensabaugh gravelly silt loam, frequently flooded; about 6.6 miles southeast of Bradfordsville on Kentucky Highway 49, about 1,000 feet south on a farm lane crossing Big South Fork, 1,200 feet southeast of a farmhouse at the end of the farm lane, in a cultivated field; on soil map sheet 31, east about 2,199,550 feet and north about 404,500 feet by the Kentucky coordinate grid system:

Ap—0 to 8 inches; brown (10YR 4/3) gravelly silt loam; weak fine granular structure; very friable; many fine roots; about 20 percent limestone and sandstone pebbles; neutral; gradual wavy boundary.

Bw—8 to 40 inches; brown (10YR 4/3) gravelly silt loam; weak coarse subangular blocky structure; very friable; common fine roots; about 30 percent limestone and sandstone pebbles; neutral; gradual wavy boundary.

C—40 to 60 inches; brown (10YR 4/3) very gravelly silt loam; single grained; loose; about 50 percent limestone, chert, and sandstone pebbles; neutral.

The thickness of the solum ranges from 24 to 55 inches. The depth to bedrock is more than 60 inches. The Ap horizon has few to 25 percent rock fragments. These fragments make up 15 to 40 percent of the Bw horizon and 15 to 70 percent of the C horizon. They are mainly limestone, chert, sandstone, and siltstone pebbles. Reaction ranges from medium acid to mildly alkaline throughout the profile.

The Ap horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 2 to 4. The Bw horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 or 5, and chroma of 3 to 6. In some pedons it is mottled in shades of brown, yellow, or gray below a depth of 24 inches. It is silt loam, silty clay loam, loam, clay loam, fine sandy loam, or the gravelly or very gravelly analogs of those textures.

The C horizon has matrix and mottle colors similar to those of the Bw horizon. It is silt loam, silty clay loam, loam, clay loam, fine sandy loam, or the gravelly, very gravelly, or extremely gravelly analogs of those textures.

Shrouts Series

The Shrouts series consists of moderately deep, well drained, slowly permeable soils on side slopes in the uplands. These soils formed in material weathered from calcareous shale interbedded with soft dolomite. Slopes range from 12 to 30 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Shrouts soils are on the same landforms as Brassfield and Beasley soils. Brassfield soils are in a fine-loamy family. Beasley soils are deep over soft bedrock.

Typical pedon of Shrouts silty clay loam, in an area of Shrouts-Brassfield complex, 12 to 30 percent slopes, eroded, very rocky; about 1.3 miles west of Loretto on Kentucky Highway 52, about 1.0 mile north of Saint Francis on Kentucky Highway 527, about 0.8 mile north on a farm lane, 650 feet west of an old farmhouse at the end of the farm lane, in an unimproved pasture; on soil map sheet 2, east about 2,092,300 feet and north about 479,750 feet by the Kentucky coordinate grid system:

Ap—0 to 4 inches; dark brown (10YR 3/3) silty clay loam; weak medium subangular blocky structure parting to moderate fine and medium granular; friable; common fine and medium roots; neutral; abrupt smooth boundary.

Bt1—4 to 12 inches; light olive brown (2.5Y 5/4) silty clay; moderate medium subangular blocky structure; firm; common medium roots; few thin continuous dark yellowish brown (10YR 4/6) clay films on faces of peds; about 5 percent shale channers; mildly alkaline; clear smooth boundary.

Bt2—12 to 26 inches; light olive brown (2.5Y 5/6) clay; few medium distinct light brownish gray (10YR 6/2) mottles; moderate medium angular blocky structure; very firm; few fine and medium roots; common thin continuous olive brown (2.5Y 4/4) clay films on faces of peds; about 5 percent shale channers; mildly alkaline; clear smooth boundary.

C—26 to 30 inches; olive gray (5Y 5/2) clay; massive with pockets of relict platy structure; very firm; about 5 percent shale channers; moderately alkaline; clear wavy boundary.

Cr—30 to 50 inches; olive gray (5Y 5/2), soft, calcareous shale interbedded with thin layers of soft dolomite (marl); strongly effervescent; strongly alkaline.

The thickness of the solum ranges from 14 to 40 inches. The depth to soft shale bedrock ranges from 20 to 40 inches. Rock fragments of shale, dolomite, or limestone make up 0 to 20 percent of the Ap and Bt horizons. The C horizon has few to 35 percent of these fragments. Reaction ranges from strongly acid to moderately alkaline in the Ap and Bt horizons and from neutral to moderately alkaline in the C horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 to 4. The Bt and C horizons are silty clay, clay, or the channery analogs of those textures. The Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 to 6. The C horizon has hue of 2.5Y, 5Y, or 5GY, value of 5 or 6, and chroma of 1 to 6, or it is neutral in hue and has value of 4 to 7.

Tilsit Series

The Tilsit series consists of deep, moderately well drained soils on ridgetops and side slopes in the uplands. These soils formed in a silty mantle over material weathered from black fissile shale. They have a fragipan. Permeability is moderate above the fragipan and slow or very slow in the fragipan. Slopes range from 0 to 12 percent. The soils are fine-silty, mixed, mesic Typic Fragiudults.

Tilsit soils are on the same landforms as Berea, Robertsville, Lawrence, Jessietown, Greenbriar, and Trappist soils. Berea soils do not have a fragipan and are moderately deep over bedrock. Robertsville soils are poorly drained, and Lawrence soils are somewhat poorly drained. Jessietown and Greenbriar soils do not have a fragipan and are well drained. Trappist soils are in a clayey family and are moderately deep over bedrock.

Typical pedon of Tilsit silt loam, in an area of Tilsit-Berea silt loams, 2 to 6 percent slopes; about 0.6 mile south of Gravel Switch on Kentucky Highway 243, about 0.6 mile south on Kentucky Highway 337, about 500 feet east of a barn on the west side of the highway, in a cultivated field; on soil map sheet 15, east about 2,201,600 feet and north about 448,250 feet by the Kentucky coordinate grid system:

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

Bt1—8 to 21 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few fine roots; common discontinuous brown (7.5YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—21 to 27 inches; yellowish brown (10YR 5/6) silty clay loam; few medium distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; common continuous strong brown (7.5YR 4/6) clay films on faces of peds; strongly acid; abrupt wavy boundary.

Btx—27 to 42 inches; yellowish brown (10YR 5/6) silty clay loam; many coarse distinct light brownish gray (10YR 6/2) mottles; weak very coarse prismatic structure parting to moderate medium subangular blocky; very firm; compact and brittle; thin continuous light brownish gray (10YR 6/2) clay films and silt coatings on faces of prisms and thin discontinuous strong brown (7.5YR 4/6) clay films on faces of peds; strongly acid; gradual wavy boundary.

BC—42 to 50 inches; yellowish brown (10YR 5/4) channery silty clay loam; many coarse distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; slightly brittle; about 25 percent dark brown shale fragments; very strongly acid; clear wavy boundary.

Cr—50 to 53 inches; brown (7.5YR 4/2), weathered shale that has a black (10YR 2/1) interior; extremely acid; abrupt wavy boundary.

R—53 inches; hard, black (10YR 2/1) fissile shale.

The thickness of the solum ranges from 40 to 60 inches. The depth to hard shale bedrock ranges from 40 to 120 inches. Rock fragments make up 0 to 10 percent of the Ap, Bt, and Btx horizons and 0 to 40 percent of the BC horizon. In unlimed areas reaction ranges from extremely acid to strongly acid.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The Bt and Btx horizons are silt loam or silty clay loam. The Bt horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 4 to 8. It is mottled in shades of brown or gray. The Btx horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 2 to 8. It is mottled in shades of gray, brown, olive, or yellow. The BC horizon has matrix and mottle colors similar to those of the Btx horizon. It is silt loam, silty clay loam, or the channery analogs of those textures.

Some pedons have a C horizon. This horizon has matrix and mottle colors similar to those of the BC horizon. It is silt loam, silty clay loam, clay loam, silty clay, or the channery or very channery analogs of those textures. The content of rock fragments ranges from 10 to 50 percent.

Trappist Series

The Trappist series consists of moderately deep, well drained, slowly permeable soils on ridgetops and side slopes in the uplands. These soils formed in material weathered from black fissile shale. Slopes range from 2 to 50 percent. The soils are clayey, mixed, mesic Typic Hapludults.

Trappist soils are on the same landforms as Jessietown, Greenbriar, Berea, Tilsit, and Rohan soils. Jessietown, Greenbriar, Berea, and Tilsit soils are in a fine-silty family. Tilsit soils have a fragipan. Rohan soils are in a loamy-skeletal family and are shallow over bedrock.

Typical pedon of Trappist silty clay loam, in an area of Trappist-Jessietown complex, 6 to 12 percent slopes, eroded; about 1.3 miles north of Bradfordsville on North Fork Road, 0.2 mile northeast on a farm lane, about 500 feet east of the farm lane, on a ridgetop, in a pasture that has scattered Virginia pine; on soil map sheet 20, east about 2,177,750 feet and north about 430,000 feet by the Kentucky coordinate grid system:

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

Bt1—4 to 9 inches; yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure; firm; common fine roots; few discontinuous strong brown (7.5YR 4/6) clay films on faces of peds; about 5 percent soft shale channers; very strongly acid; clear smooth boundary.

Bt2—9 to 16 inches; strong brown (7.5YR 5/8) clay; moderate medium subangular blocky structure; very firm; few fine and medium roots; few continuous clay films on faces of peds; few soft shale channers; extremely acid; clear smooth boundary.

BC—16 to 21 inches; yellowish brown (10YR 5/4) channery clay; few fine faint brownish gray and common medium distinct brownish yellow (10YR 6/6) mottles; weak and moderate coarse subangular blocky structure; firm; few fine and medium roots; about 20 percent shale fragments; extremely acid; clear smooth boundary.

R—21 inches; hard, black (10YR 2/1) fissile shale.

The thickness of the solum and the depth to hard shale bedrock range from 20 to 40 inches. Rock fragments of shale or siltstone make up 0 to 30 percent of the Ap, Bt, and BC horizons. In unlimed areas reaction ranges from extremely acid to strongly acid throughout the profile.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. The Bt horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 to 6, and chroma of 4 to 8. In some pedons it is mottled in shades of red or brown. It is silty clay loam, silty clay, clay, or the channery analogs of those textures. The BC horizon has colors and textures similar to those of the Bt horizon. In some pedons it is mottled in shades of gray or yellow.

Some pedons have a C horizon. This horizon has matrix and mottle colors in shades of red, brown, yellow, or gray. It is silty clay loam, silty clay, clay, or the channery or very channery analogs of those textures. The content of rock fragments ranges from 25 to 75 percent.

Formation of the Soils

This section provides information concerning formation of the soils in Marion County. It describes the five factors of soil formation and explains their effects on the soils in Marion County. It also describes the geology, landscapes, and soils that have formed along a line that transects the county from southwest to northeast.

Factors of Soil Formation

The characteristics of a soil at any given point depend on the physical and chemical composition of parent material and on climate, plant and animal life, relief, and time *(12)*. Soils formed through the interaction of these five factors. The relative importance of each factor differs from one soil to another. In some areas, one factor can dominate soil formation. In other areas, another factor can dominate or the proportionate influence of any factor can change. In Marion County climate and plant and animal life are not likely to vary greatly, and their influence is relatively constant. There are some differences in relief in the county. The most varied and influential factor of soil formation in Marion County is parent material.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. A soil in the early stages of its development has properties similar to those of the parent material. As weathering takes place, these properties are modified and each soil develops its own characteristics. The nature of the parent material affects the rate of weathering and determines the texture and mineral composition of the soil. These properties affect the permeability, shrink-swell potential, and porosity of the soil.

Parent material can be weathered in place, during which time it breaks down, or it can be transported and deposited by water, wind, gravity, or ice. Most of the soils in Marion County formed in parent material weathered in place from sedimentary rock of the Mississippian, Devonian, Silurian, and Ordovician periods. Trappist, Lowell, and Faywood soils are examples. These soils have a clayey subsoil.

Some of the soils in the county formed in material deposited by water or streams. Nolin, Sensabaugh, Elk, and Melvin soils are examples. These soils have a loamy subsoil.

Wind-transported material, or loess, has been deposited on some of the broader ridgetops in the county. Sandview, Crider, and Nicholson soils formed partly in loess and partly in residual material. Their surface layer and the upper part of their subsoil formed in loess. They are loamy. The lower part of the subsoil and the substratum formed in residual material and generally are clayey.

Some soils formed in gravity-transported soil material, or colluvium, deposited above residual material. Carpenter soils on foot slopes at the base of steep side slopes are an example. These soils are loamy in the upper part of the subsoil and clayey in the lower part.

The relationship of parent material to geology and topography is described in more detail in the section "Geology, Landscapes, and Soils."

Climate

Climate affects the physical, chemical, and biological properties of the soils mostly through the influence of temperature and rainfall. Temperature affects the chemical and physical reaction rates in the soil, and these rates affect the rate of soil formation. If temperature increases 10 degrees centigrade, the rate of chemical reaction doubles. Moisture and temperature affect biochemical reactions. Moisture is essential in soil formation. Climate significantly affects the natural vegetation. Through its effects on such factors as erosion and deposition, it influences the relief of an area and the degree of soil formation to some extent *(12)*.

Changes or shifts in climate over long periods affect soil formation. Soil formation is affected by climate averages; however, weather extremes probably have had more influence on particular soil properties than on soil formation. The soils in Marion County formed in a temperate, moist climate that was probably similar to that of the present time. Present-day winters are fairly short, and periods of extremely low temperatures are short. Periods of high temperatures in summer are fairly brief. The average annual temperature in the county is about 55 degrees. The average annual precipitation, about 53 inches, is fairly evenly distributed throughout the year.

Temperature and rainfall in the county have favored almost continuous weathering of rocks and minerals, the leaching of soluble material and fine particles, and the removal and deposition of material by water. Soluble bases, including calcium and magnesium, and clay minerals have been moved to lower horizons or in some areas have been removed from the soil. As a result, many soils that formed in parent material high in content of carbonates and clay minerals are acid and have a loamy surface layer and an accumulation of clay in the subsoil. An example is Lowell soils.

Plant and Animal Life

The native vegetation in Marion County was mostly mixed hardwoods. Most of the soils formed under hardwood forests. The soils that remained wooded have a thin, dark surface layer. In the soils that have been plowed, such as Lowell and Beasley soils, the dark surface layer has been mixed with the light colored layer below it.

Earthworms, insects, and small animals mix soil material and add organic matter. Bacteria, fungi, and other micro-organisms break down plant and animal residue. Trees and other plants transport plant nutrients from the lower part of the soil to the upper part. They also add organic matter, provide a protective cover that slows erosion, and influence soil temperature. Soil material is mixed when root channels form and when trees are uprooted by the wind. The organic material added by plants and animals alters the chemical processes in the soil and forms humus. Some micro-organisms directly or symbiotically release nutrients, such as nitrogen, to the soil. The organic fraction tends to improve soil structure. The decay of the organic material releases acids that accelerate weathering.

Changes that are caused by humans are evident in soils that have been eroded, drained, excavated, or filled. In some areas erosion has removed most or all of the original surface layer and exposed the subsoil. Examples are the severely eroded areas of Beasley and Lowell soils. Cultivation, drainage systems, irrigation, applications of fertilizer, the introduction of new plants, and major land-forming activities have influenced soil formation by changing the nature and properties of the soils. Most of these changes, except for those caused by major land-forming activities, have taken place slowly.

Relief

Relief affects soil formation through its influence on drainage, erosion, plant cover, and soil temperature. Because relief varies widely, it accounts for many differences among the soils in Marion County. Relief tends to modify the effects of climate and vegetation. For example, when Melvin soils formed on nearly level flood plains, they were excessively wet. An absence of oxidation caused a gray subsoil to form. A fragipan can form under certain conditions in nearly level and gently sloping soils, such as Lawrence soils.

Gently sloping and sloping soils tend to show most clearly the influence of all of the soil-forming factors. Although excess water runs off these soils, erosion is not excessive and a relatively stable surface permits an argillic horizon to form. Lowell and Greenbriar soils are examples.

Some steep soils are shallow and show little evidence of profile development because geologic erosion takes place almost as rapidly as soil formation. Rohan soils are an example. Some steep soils, such as Carpenter soils, are deep because the parent material slowly moves down the slope and accumulates on the lower part of the slope. This movement is illustrated on foot slopes below steep slopes. Other steep soils are moderately deep because weathering of the underlying rock proceeds at a faster rate than geologic erosion. Faywood and Eden soils are examples.

In some areas of karst topography, the surface layer of soils from the surrounding karst slopes has eroded and is deposited in the basin of sinks. A low degree of weathering is common in these areas because the soil material has been recently deposited. In Marion County local alluvial areas that are large enough have been separated in mapping. The smaller alluvial areas were mapped as inclusions. These inclusions are in areas of Sandview, Lowell, and Crider soils.

Although the soil temperature and plant cover on north-facing slopes are somewhat different from those on south-facing slopes, these differences are generally slight.

Time

The time required for a soil to form depends on the intensity of the other soil-forming factors. Less time is required for a soil to form in a warm, moist climate than in a cool, dry climate. Also, some parent material is more resistant to soil-forming processes than others. For example, quartz sand can change very little even if it is exposed for long periods. Some parent material, however, can be more porous and allow for more intense weathering. The degree of profile development is more significant in the classification of the soil than the actual number of years that the soil has been in the process of forming.

Soils that have poorly developed horizons have characteristics almost identical to those of the parent material. In Marion County such soils are on flood plains where fresh deposition prevents the development of distinct soil horizons. Nolin and Sensabaugh soils are examples.

Soils that formed over long periods have well developed profiles. Christian and Jessietown soils are examples. They are deep or moderately deep over bedrock and have distinct horizons. Erosion often removes material from soils and deposits the sediments as new parent material in which other soils can form *(12)*.

Geology, Landscapes, and Soils

Beecher J. Hines, geologist, Soil Conservation Service, helped prepare this section.

The major geologic strata underlying the soils in Marion County are of the Paleozoic era. These strata were deposited in shallow seas between 310 and 500 million years ago. The sedimentary rock that formed is of the Ordovician, Devonian, Silurian, and Mississippian periods *(18)*. Many of the broad upland ridgetops are capped with a mantle of silty loess or with loamy and gravelly terrace deposits of the Quaternary and Tertiary periods. The valleys consist of alluvial material of the Quaternary period. Table 23 shows the relationship of the geologic periods, formations, members, thickness, and predominant soils that formed in Marion County.

The southern part of the county is underlain by rock of the Mississippian and Devonian periods. It is in the Knobs and the Eastern Pennyroyal Physiographic Regions. The southernmost part of the Knobs Physiographic Region, along the Larue and Taylor County line, is capped by the Salem Limestone and St. Louis Limestone Formations of the Mississippian period *(37)*. Rock strata are limestone interbedded with thin layers of siltstone and calcareous shale. Along the higher ridgetops are small areas capped by Tertiary and Quaternary terrace deposits. These deposits are made up of quartz pebbles, sand, and quartz conglomerate and are underlain by a thin, discontinuous layer of sandstone. As these deposits weathered, they formed rolling ridgetops at elevations of about 1,000 to 1,045 feet. The sloping to moderately steep soils that formed in these areas are deep and have a very strongly acid or strongly acid, loamy subsoil. Riney soils are the dominant soils that formed in material weathered from these terrace deposits.

As the limestone formations weathered, they formed broad, rolling ridgetops and short side slopes at elevations of about 900 to 1,200 feet. The soils that formed in these areas are deep and have an extremely acid to slightly acid, clayey subsoil. Christian soils are the dominant soils that formed in material weathered from limestone formations.

In most places, the broader ridgetops are capped by a thin mantle of loess and the upper part of the soils to a depth of about 30 inches formed in silty material. The lower part of the soils formed in limestone residuum and is clayey. These soils are deep and have a very strongly acid to moderately alkaline subsoil. Mountview and Nicholson soils are the dominant soils of this kind in Marion County.

The central part of the Knobs Physiographic Region is underlain mostly by rock strata of the Mississippian and Devonian periods *(40)*. It consists mainly of Harrodsburg Limestone and the Borden Formation, which includes the Muldraugh, Halls Gap, Nancy, and New Providence Shale members. In some areas it includes, at the base of the Knobs, New Albany Shale, the Boyle Dolomite Formation, and the upper part of the Drakes Formation. The rock strata are limestone, dolomite, cherty limestone, shale, or siltstone with lenses of limestone.

As the Borden Formation weathered, it formed cone-shaped hills called knobs, the origin of the name for this physiographic region. These hills occur as a series of long, winding side slopes capped by narrow ridgetops. In many places they form a single isolated knob. The continuous range of knobs that make up the southernmost part of the county is a watershed divide called Muldraugh Hill. Elevations range from about 700 feet at the base of the side slopes to about 1,245 feet at the highest point in Marion County *(38)*.

Soils on the ridgetops formed in material weathered from the cherty limestone and dolomite of the Harrodsburg Limestone Formation and in residuum of siltstone and limestone derived from the Muldraugh member of the Borden Formation. These soils are deep and have an extremely acid to slightly acid, loamy or clayey subsoil. Frankstown and Christian soils are the dominant soils on the ridgetops.

Soils on the middle and upper side slopes of the Knobs formed in material weathered from siltstone, silty limestone, and shale of the Halls Gap and Nancy members. These steep and very steep soils are moderately deep and have a very strongly acid to neutral, loamy or clayey subsoil. Garmon and Lenberg soils are the dominant soils on the middle and upper side slopes.

Soils on the lower side slopes of the Knobs formed in shale material weathered from the Nancy and New Providence Shale members or in parent material moved

Figure 16.—Rock outcrop of Boyle Dolomite below Crider soils and intermingled on the surface with some areas of Cynthiana and Faywood soils.

downslope by local wash or creep. This colluvial material is deposited at the base of side slopes. It varies in thickness and is underlain by material weathered from the New Providence Shale member. The sloping to very steep soils are moderately deep or deep and have a very strongly acid or medium acid, clayey or loamy and clayey subsoil. Lenberg soils are the dominant soils formed in the residuum, and Carpenter soils are the dominant soils formed in the colluvium underlain by residuum.

The northern part of the Knobs Physiographic Region is underlain by the Boyle and New Albany Shale

Formations of the Devonian period *(36)*. Rock strata are dolomite, limestone, and black fissile shale. The shale of the New Albany Shale Formation is commonly called black shale or slate rock because of its color and the very thin, level-bedded layers that generally are brittle and hard. This part of the Knobs Physiographic Region is separated from the Outer Bluegrass Physiographic Region by the Brumfield Fault System *(40)*. This fault zone, mainly in the northeastern and central parts of the county, has caused tilting of the bedrock, exposing older rock at elevations similar to much younger rock strata. The boundary of the physiographic regions is indefinite, and the landscape has topographic features of both the Knobs and the Outer Bluegrass Physiographic Regions along the border.

In this part of the Knobs Physiographic Region, the geologic formations weathered to form broad ridgetops that have moderately short side slopes. Elevations range from about 550 feet in the valleys to about 800 feet at the base of the Knobs. Most of these ridgetops are capped by deposits of loess *(40)*.

Broad ridgetops formed where Boyle Dolomite or Sellersburg Limestone has weathered, and most are capped by loess. The upper part of the soils to a depth of about 30 inches formed in silty material. The lower part of the soils formed in clayey material weathered from dolomite or limestone. These nearly level to sloping soils have a strongly acid to neutral subsoil. Crider and Nicholson soils are the dominant soils in areas where this pattern occurs (fig. 16).

Shallow to deep soils formed where New Albany Shale has weathered. These nearly level to very steep soils have a loamy or clayey subsoil. Unless limed, the soils have an extremely acid to medium acid subsoil. Rohan, Trappist, Jessietown, Greenbriar, Tilsit, and Berea soils are the dominant soils formed in material weathered from New Albany Shale.

The north-central and northwestern parts of the county are in the Outer Bluegrass Physiographic Region. This area is underlain by the Drakes, Grant Lake Limestone, Ashlock, and Calloway Creek Formations of the Ordovician period *(40)*. Rock strata are limestone, dolomite, and shale. In the northwestern part, the ridgetops also are capped with Laurel Dolomite, Osgood Shale, and Brassfield Dolomite of the Silurian period. As these formations weathered, they formed broad, rolling ridgetops that have short to long side slopes. Elevations range from about 475 feet in the valleys to about 975 feet on the higher ridgetops. The soils formed in material weathered from limestone, dolomite, and shale. Generally, the soils on the side slopes are shallow or moderately deep and the soils on the ridgetops are deep. Most of the soils have a strongly acid to mildly alkaline, clayey subsoil. Cynthiana, Faywood, and Lowell soils are the dominant soils formed in material weathered from the limestone and dolomite formations. Beasley and Shrouts soils are the dominant soils formed in material weathered from the shale formations.

In places the ridgetops are capped by a mantle of loess. The upper part of the soils to a depth of about 30 inches formed in silty material. The lower part of the soils formed in clayey material weathered from limestone or dolomite. Most of these nearly level to sloping soils have a strongly acid to mildly alkaline subsoil. Where this pattern occurs, Sandview and Nicholson soils are the dominant soils.

Where Brassfield Dolomite is exposed, it weathers to a soft, loamy, calcareous rock. This rock, commonly called marl, has been used locally for agricultural lime. Brassfield soils are the dominant soils formed in the loamy material weathered from this soft dolomite.

A small part of northeastern Marion County is in the Hills of the Bluegrass Physiographic Region. This area is commonly called the Eden Hills and is underlain by the Clays Ferry Formation of the Ordovician period *(39)*. Rock strata are shale interbedded with thin layers of limestone and calcareous siltstone. As this formation weathered, it formed small hills that have narrow ridgetops. Elevations range from about 750 feet in the valleys to about 950 feet on the higher ridgetops. The sloping to steep soils formed in material weathered from shale, limestone, and siltstone. They are shallow to deep and have a strongly acid to moderately alkaline, clayey subsoil. Eden and Lowell soils are the dominant soils formed in material weathered from the Clays Ferry Formation.

Young terrace deposits of the Tertiary and Quaternary periods and alluvial deposits of the Quaternary period are in scattered areas throughout Marion County. The largest areas of these deposits are along the valley of Rolling Fork. The nearly level to sloping soils in these areas are generally deep and have a strongly acid to moderately alkaline, loamy subsoil. Elk and Otwell soils are the dominant soils on the low stream terraces, and Nolin, Sensabaugh, Newark, and Melvin soils are the dominant soils on the flood plains.

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Glossary

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

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

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

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

Aspect. The direction in which a slope faces. On a warm aspect, slopes of more than 15 percent face an azimuth of 135 to 315 degrees. On a cool aspect, slopes of more than 15 percent face an azimuth of 315 to 135 degrees.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as—

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

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

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

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

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

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

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

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

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

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

Chert. An impure, very fine grained siliceous rock frequently associated with limestones, dolomites, or conglomerates.

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

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

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

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

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

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conglomerate. A coarse grained, clastic rock made up of sand and finer materal. Cements include silica, calcium, calcium carbonate, and iron oxides.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

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

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

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

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

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

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

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

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

Cemented.—Hard; little affected by moistening.

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

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

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

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

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

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

Devonian. The fourth period of the Paleozoic era of geologic time extending from the end of the Silurian period (about 405 million years ago) to the beginning of the Mississippian period (about 345 million years ago).

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

Dolomite. A sedimentary rock that is made up chiefly of calcium and magnesium carbonate in the form of the mineral dolomite.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Fissile. A characteristic or quality of any rock that allows its distinct separation into parallel laminae or layers, as in shale.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

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

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

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

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

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.

Geode. A hollow nodule, concretion, or vug lined with inwardly pointing crystals. A geode can range from an inch to a foot or more in size.

Geology. The field of science that deals with the origin, composition, structure, and history of the earth, especially as revealed by the rocks and the processes by which changes occur in the rocks.

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

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

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

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

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

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. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

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, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

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 overlying 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, an Arabic numeral, commonly a 2, precedes the letter C.

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

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

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

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

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

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

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

Intermittent stream. A small creek or stream that has flowing water interrupted by an occasional dry period.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Knob. A low, rounded hill. A small knob is a knoll.

Landform. Any physical, recognizable form or feature of the earth's surface having a characteristic shape and produced by natural causes. A landform includes major forms, such as plains, hills, valleys, or slopes.

Landscape (geology). The distinct associations of landforms, especially as modified by geologic forces, that can be seen in a single view.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Limestone. A sedimentary rock consisting chiefly of more than 50 percent calcium carbonate, mainly in the form of calcite. Limestone generally is formed by a combination of organic and inorganic processes and includes soluble and insoluble constituents; many are fossiliferous.

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.

Marl. A soft, crumbling, earthy deposit of calcium carbonate, clay, or sand in various proportions without definite shape or structure.

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

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

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

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

Mississippian. The fifth period of the Paleozoic era of geologic time extending from the end of the Devonian period (about 345 million years ago) to the beginning of the Pennsylvanian period (about 310 millions years ago).

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

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

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

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

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

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

Ordovician. The second period of the Paleozoic era of geologic time extending from the end of the Cambrian period (about 500 million years ago) to the beginning of the Silurian period (about 425 million years ago).

Organic matter. Plant and animal residue in the soil in various stages of decomposition. Terms used in this survey to describe organic matter content are:

Low	less than 2 percent
Moderate	2 to 4 percent
High	more than 4 percent

Paleozoic. The geologic era between the Precambrian and Mesozoic eras. The Paleozoic era was between 600 million and 230 million years ago and was characterized by the development of the first fishes, amphibians, reptiles, and land plants.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

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

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

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

Percolation. The downward movement of water through the soil.

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

Perennial stream. A creek or stream that has flowing water throughout the year.

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

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

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

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

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

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

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

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

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.

Quaternary. The second period of the Cenozoic era of geologic time extending from the end of the Tertiary period (about 1 million years ago) to the present.

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 degrees of acidity or alkalinity, expressed as pH values, are—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

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

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

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

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

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

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. 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 substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

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

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

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Silurian. The third period of the Paleozoic era of geologic time extending from the end of the Ordovician period (about 425 million years ago) to the beginning of the Devonian period (about 405 million years ago).

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slippage. The soil mass is susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. Terms used in this survey to describe the range of slopes are as follows:

Nearly level	0 to 2 percent
Gently sloping	2 to 6 percent
Sloping	6 to 12 percent
Moderately steep	12 to 20 percent
Steep	20 to 30 percent
Very steep	30 to 80 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stratified. Arranged in layers (strata). The term refers to geologic material. Layers in soils that result from soil formation processes are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing 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 E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Tertiary. The first period of the Cenozoic era of geologic time, following the Mesozoic era and preceding the Quaternary period (about 63 million to 1 million years ago).

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.

Topography. The relative positions and elevations of the natural or manmade features of an area that describe the configuration of its surface.

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.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1962-81 at Bradfordsville, Kentucky)

Month	Temperature: Average daily maximum	Temperature: Average daily minimum	Temperature: Average	Temperature: 2 years in 10 will have-- Maximum temperature higher than--	Temperature: 2 years in 10 will have-- Minimum temperature lower than--	Temperature: Average number of growing degree days*	Precipitation: Average	Precipitation: 2 years in 10 will have-- Less than--	Precipitation: 2 years in 10 will have-- More than--	Precipitation: Average number of days with 0.10 inch or more	Precipitation: Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	41.7	20.3	31.0	72	-17	31	3.98	1.70	5.91	9	9.2
February----	45.1	21.5	33.3	72	-9	10	3.25	1.61	4.67	6	6.7
March-------	57.4	32.8	45.1	82	6	88	5.23	2.54	7.55	8	1.9
April-------	69.2	42.7	56.0	87	24	197	5.56	3.39	7.50	8	.0
May---------	76.7	50.3	63.5	91	29	424	4.95	2.96	6.73	8	.0
June--------	84.1	59.0	71.6	95	40	648	4.25	2.96	5.43	8	.0
July--------	87.4	63.5	75.5	97	49	791	6.00	3.94	7.87	8	.0
August------	86.5	61.8	74.2	96	47	750	4.25	1.60	6.45	6	.0
September---	81.4	55.7	68.6	94	36	558	4.22	1.75	6.30	6	.0
October-----	71.0	41.9	56.5	88	21	236	2.99	1.26	4.46	6	.0
November----	57.9	34.6	46.3	79	13	23	3.95	2.20	5.48	7	.5
December----	48.1	27.0	37.6	72	1	12	4.73	1.89	7.11	7	1.3
Yearly:											
Average---	67.2	42.6	54.9	---	---	---	---	---	---	---	---
Extreme---	---	---	---	98	-17	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,768	53.36	42.89	62.11	87	19.6

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1962-81 at Bradfordsville, Kentucky)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 5	Apr. 30	May 15
2 years in 10 later than--	Apr. 1	Apr. 23	May 9
5 years in 10 later than--	Mar. 24	Apr. 12	Apr. 28
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 18	Oct. 5	Sept. 29
2 years in 10 earlier than--	Oct. 23	Oct. 10	Oct. 4
5 years in 10 earlier than--	Nov. 3	Oct. 20	Oct. 14

TABLE 3.--GROWING SEASON

(Recorded in the period 1962-81 at Bradfordsville, 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	167	145
8 years in 10	210	175	153
5 years in 10	223	191	168
2 years in 10	236	207	183
1 year in 10	243	215	191

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
BaB	Beasley silt loam, 2 to 6 percent slopes	870	0.4
BcC2	Beasley silty clay loam, 6 to 12 percent slopes, eroded	2,330	1.0
BeC3	Beasley silty clay, 6 to 12 percent slopes, severely eroded	1,140	0.5
BeD3	Beasley silty clay, 12 to 25 percent slopes, severely eroded	1,955	0.9
CaB	Carpenter gravelly silt loam, 2 to 6 percent slopes	630	0.3
CaC	Carpenter gravelly silt loam, 6 to 12 percent slopes	2,795	1.3
CaD	Carpenter gravelly silt loam, 12 to 20 percent slopes	2,705	1.2
CbF2	Carpenter-Lenberg complex, 20 to 45 percent slopes, eroded	14,460	6.5
CeB	Chenault gravelly silt loam, 2 to 8 percent slopes	320	0.1
ChC2	Christian silt loam, 6 to 12 percent slopes, eroded	1,980	0.9
ChD2	Christian silt loam, 12 to 20 percent slopes, eroded	1,070	0.5
CnD3	Christian clay loam, 12 to 20 percent slopes, severely eroded	540	0.2
CrB	Crider silt loam, 2 to 6 percent slopes	7,760	3.5
CrC2	Crider silt loam, 6 to 12 percent slopes, eroded	1,930	0.9
CyF2	Cynthiana-Faywood-Rock outcrop complex, 20 to 60 percent slopes, eroded	9,310	4.2
EdD2	Eden silty clay loam, 6 to 20 percent slopes, eroded	1,085	0.5
EeE2	Eden-Cynthiana complex, 20 to 35 percent slopes, eroded, rocky	3,355	1.5
EkB	Elk silt loam, 2 to 6 percent slopes	2,870	1.3
EkC2	Elk silt loam, 6 to 12 percent slopes, eroded	1,205	0.5
FaC2	Faywood silty clay loam, 6 to 12 percent slopes, eroded	10,460	4.7
FaD2	Faywood silty clay loam, 12 to 20 percent slopes, eroded	1,425	0.6
FcE2	Faywood-Cynthiana complex, 20 to 30 percent slopes, eroded, very rocky	11,720	5.3
FrC	Frankstown gravelly silt loam, 6 to 12 percent slopes	2,495	1.1
FrD	Frankstown gravelly silt loam, 12 to 20 percent slopes	1,115	0.5
GaF	Garmon channery silt loam, 30 to 80 percent slopes, very rocky	19,341	8.7
GrB	Greenbriar silt loam, 2 to 6 percent slopes	1,800	0.8
JeB	Jessietown-Trappist complex, 2 to 6 percent slopes	1,620	0.7
La	Lawrence silt loam	4,980	2.2
LbC2	Lenberg silt loam, 6 to 12 percent slopes, eroded	475	0.2
LbD2	Lenberg silt loam, 12 to 20 percent slopes, eroded	2,150	1.0
LeE2	Lenberg silty clay loam, 20 to 30 percent slopes, eroded	1,310	0.6
LnB	Lowell silt loam, 2 to 6 percent slopes	2,765	1.2
LoC2	Lowell silty clay loam, 6 to 12 percent slopes, eroded	12,733	5.7
LoD2	Lowell silty clay loam, 12 to 20 percent slopes, eroded	2,205	1.0
LpC3	Lowell silty clay, 6 to 12 percent slopes, severely eroded	840	0.4
LpD3	Lowell silty clay, 12 to 20 percent slopes, severely eroded	2,080	0.9
LsC2	Lowell silty clay loam, shale substratum, 2 to 12 percent slopes, eroded	1,890	0.9
Me	Melvin silt loam, occasionally flooded	1,305	0.6
Mn	Melvin silt loam, frequently flooded	630	0.3
MoB	Mountview silt loam, 2 to 6 percent slopes	1,290	0.6
MoC2	Mountview silt loam, 6 to 12 percent slopes, eroded	610	0.3
Na	Newark silt loam, occasionally flooded	1,930	0.9
Ne	Newark silt loam, frequently flooded	5,315	2.4
NhB	Nicholson silt loam, 2 to 6 percent slopes	4,916	2.2
NhC2	Nicholson silt loam, 6 to 12 percent slopes, eroded	825	0.4
No	Nolin silt loam, frequently flooded	7,470	3.4
OtB	Otwell silt loam, 2 to 8 percent slopes	1,565	0.7
Pt	Pits, quarry	127	*
RaC	Riney loam, 6 to 12 percent slopes	640	0.3
RcE2	Riney-Christian complex, 20 to 35 percent slopes, eroded	1,110	0.5
Ro	Robertsville silt loam	365	0.2
RtD2	Rohan-Trappist complex, 6 to 20 percent slopes, eroded, very rocky	5,065	2.3
RtF2	Rohan-Trappist complex, 20 to 50 percent slopes, eroded, very rocky	6,640	3.0
SaB	Sandview silt loam, 2 to 6 percent slopes	6,390	2.9
SaC2	Sandview silt loam, 6 to 12 percent slopes, eroded	1,305	0.6
Se	Sensabaugh gravelly silt loam, frequently flooded	2,125	1.0
SrE2	Shrouts-Brassfield complex, 12 to 30 percent slopes, eroded, very rocky	2,820	1.3
TbA	Tilsit-Berea silt loams, 0 to 2 percent slopes	375	0.2
TbB	Tilsit-Berea silt loams, 2 to 6 percent slopes	7,980	3.6
TbC2	Tilsit-Berea silt loams, 6 to 12 percent slopes, eroded	500	0.2
TeC2	Trappist-Jessietown complex, 6 to 12 percent slopes, eroded	6,670	3.0

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
TrD2	Trappist-Rohan-Greenbriar complex, 12 to 20 percent slopes, eroded, rocky	11,590	5.2
TrD3	Trappist-Rohan-Greenbriar complex, 12 to 25 percent slopes, severely eroded, rocky	2,680	1.2
	Total	221,952	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
BaB	Beasley silt loam, 2 to 6 percent slopes
CaB	Carpenter gravelly silt loam, 2 to 6 percent slopes
CeB	Chenault gravelly silt loam, 2 to 8 percent slopes
CrB	Crider silt loam, 2 to 6 percent slopes
EkB	Elk silt loam, 2 to 6 percent slopes
GrB	Greenbriar silt loam, 2 to 6 percent slopes
JeB	Jessietown-Trappist complex, 2 to 6 percent slopes
La	Lawrence silt loam (where drained)
LnB	Lowell silt loam, 2 to 6 percent slopes
Me	Melvin silt loam, occasionally flooded (where drained)
Mn	Melvin silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
MoB	Mountview silt loam, 2 to 6 percent slopes
Na	Newark silt loam, occasionally flooded (where drained)
Ne	Newark silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
NhB	Nicholson silt loam, 2 to 6 percent slopes
No	Nolin silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
OtB	Otwell silt loam, 2 to 8 percent slopes
Ro	Robertsville silt loam (where drained)
SaB	Sandview silt loam, 2 to 6 percent slopes
Se	Sensabaugh gravelly silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
TbA	Tilsit-Berea silt loams, 0 to 2 percent slopes
TbB	Tilsit-Berea silt loams, 2 to 6 percent slopes

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Tobacco	Soybeans	Wheat	Grass-legume hay	Alfalfa hay	Pasture
		Bu	Lb	Bu	Bu	Ton	Ton	AUM*
BaB------------- Beasley	IIe	105	2,800	35	40	4.0	4.5	8.0
BcC2------------ Beasley	IIIe	90	2,400	25	30	3.5	4.0	7.0
BeC3------------ Beasley	IVe	75	---	---	---	2.5	---	5.0
BeD3------------ Beasley	VIe	---	---	---	---	---	---	4.0
CaB------------- Carpenter	IIe	110	2,800	35	35	3.5	4.0	7.0
CaC------------- Carpenter	IIIe	100	2,400	30	30	3.0	3.5	6.0
CaD------------- Carpenter	IVe	80	2,000	---	25	2.5	---	5.0
CbF2------------ Carpenter-Lenberg	VIIe	---	---	---	---	---	---	---
CeB------------- Chenault	IIe	115	3,000	35	35	4.0	4.5	8.0
ChC2------------ Christian	IIIe	95	2,400	25	30	3.5	4.0	7.0
ChD2------------ Christian	IVe	65	2,000	20	25	3.0	3.5	6.0
CnD3------------ Christian	VIe	---	---	---	---	---	---	4.0
CrB------------- Crider	IIe	125	3,500	50	45	4.5	5.5	9.0
CrC2------------ Crider	IIIe	115	2,900	35	40	4.5	5.0	9.0
CyF2:								
Cynthiana------	VIIs	---	---	---	---	---	---	---
Faywood--------	VIIe	---	---	---	---	---	---	---
Rock outcrop---	VIIIs	---	---	---	---	---	---	---
EdD2------------ Eden	IVe	65	1,950	20	20	2.5	3.0	5.0
EeE2:								
Eden-----------	VIe	---	---	---	---	---	---	3.5
Cynthiana------	VIIs	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Tobacco	Soybeans	Wheat	Grass-legume hay	Alfalfa hay	Pasture
		Bu	Lb	Bu	Bu	Ton	Ton	AUM*
EkB------------- Elk	IIe	125	3,500	45	45	4.5	5.0	9.0
EkC2------------ Elk	IIIe	110	2,900	35	40	4.0	4.5	8.0
FaC2------------ Faywood	IIIe	80	2,200	20	25	3.0	3.5	6.0
FaD2------------ Faywood	IVe	60	1,900	15	20	2.5	3.0	5.0
FcE2:								
Faywood--------	VIs	---	---	---	---	---	---	3.5
Cynthiana------	VIIs	---	---	---	---	---	---	---
FrC------------- Frankstown	IIIe	85	2,200	30	35	3.0	3.5	6.0
FrD------------- Frankstown	IVe	75	---	---	25	2.5	3.0	5.0
GaF------------- Garmon	VIIe	---	---	---	---	---	---	---
GrB------------- Greenbriar	IIe	105	2,900	35	40	4.0	4.5	8.0
JeB------------- Jessietown-Trappist	IIe	90	2,500	30	35	3.0	3.5	6.0
La-------------- Lawrence	IIIw	80	1,900	35	30	3.0	---	6.0
LbC2------------ Lenberg	IIIe	70	2,200	20	25	2.5	---	5.0
LbD2------------ Lenberg	IVe	---	---	---	20	2.0	---	4.0
LeE2------------ Lenberg	VIe	---	---	---	---	---	---	3.0
LnB------------- Lowell	IIe	110	2,900	35	40	4.0	5.0	8.0
LoC2------------ Lowell	IIIe	95	2,500	30	35	4.0	5.0	8.0
LoD2------------ Lowell	IVe	80	2,300	25	30	3.5	4.0	7.0
LpC3------------ Lowell	IVe	80	2,100	20	30	3.0	---	6.0
LpD3------------ Lowell	VIe	---	---	---	---	2.5	---	5.0

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Tobacco	Soybeans	Wheat	Grass-legume hay	Alfalfa hay	Pasture
		Bu	Lb	Bu	Bu	Ton	Ton	AUM*
LsC2------------ Lowell	IIIe	95	2,400	25	30	3.5	4.0	7.0
Me-------------- Melvin	IIIw	80	---	35	---	3.5	---	7.0
Mn-------------- Melvin	IIIw	75	---	30	---	3.0	---	6.0
MoB------------- Mountview	IIe	120	2,900	40	45	4.0	5.0	8.0
MoC2------------ Mountview	IIIe	110	2,700	35	40	4.0	5.0	8.0
Na-------------- Newark	IIw	115	2,500	40	45	4.5	---	9.0
Ne-------------- Newark	IIw	110	2,250	35	35	4.0	---	8.0
NhB------------- Nicholson	IIe	115	3,000	40	40	4.0	4.0	8.0
NhC2------------ Nicholson	IIe	95	2,600	35	35	3.0	3.5	6.5
No-------------- Nolin	IIw	125	3,500	45	40	4.0	5.5	8.0
OtB------------- Otwell	IIe	115	3,000	40	40	4.0	3.5	8.0
Pt-------------- Pits, quarry	VIIs	---	---	---	---	---	---	---
RaC------------- Riney	IIIe	85	2,600	30	40	3.0	3.5	6.0
RcE2------------ Riney-Christian	VIe	---	---	---	---	---	---	4.0
Ro-------------- Robertsville	IVw	70	---	30	---	3.0	---	5.5
RtD2:								
Rohan-----------	VIIs	---	---	---	---	---	---	---
Trappist--------	IVe	---	---	---	---	2.5	---	5.0
RtF2:								
Rohan-----------	VIIs	---	---	---	---	---	---	---
Trappist--------	VIIe	---	---	---	---	---	---	---
SaB------------- Sandview	IIe	125	3,500	45	45	4.5	5.5	9.0
SaC2------------ Sandview	IIIe	115	2,900	40	40	4.5	5.0	9.0

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Tobacco	Soybeans	Wheat	Grass-legume hay	Alfalfa hay	Pasture
		Bu	Lb	Bu	Bu	Ton	Ton	AUM*
Se------------- Sensabaugh	IIw	95	2,800	30	35	3.5	4.0	7.0
SrE2------------ Shrouts-Brassfield	VIe	---	---	---	---	---	---	3.5
TbA------------- Tilsit-Berea	IIw	105	2,400	35	35	3.5	3.0	7.0
TbB------------- Tilsit-Berea	IIe	105	2,500	35	35	3.5	3.0	7.0
TbC2------------ Tilsit-Berea	IIIe	90	2,200	30	30	3.0	3.0	6.0
TeC2------------ Trappist-Jessietown	IIIe	80	2,300	30	30	3.0	3.5	6.0
TrD2:								
Trappist-------	IVe	60	---	---	---	2.5	---	5.0
Rohan----------	VIIs	---	---	---	---	---	---	---
Greenbriar-----	IVe	60	---	---	---	2.5	---	5.0
TrD3:								
Trappist-------	VIe	---	---	---	---	---	---	3.5
Rohan----------	VIIe	---	---	---	---	---	---	---
Greenbriar-----	VIe	---	---	---	---	---	---	3.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	---	---	---	---
II	55,866	40,776	15,090	---
III	57,883	48,843	9,040	---
IV	25,852	25,487	365	---
V	---	---	---	---
VI	21,342	14,310	---	7,032
VII	58,834	42,615	---	16,219
VIII	2,175	---	---	2,175

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
BaB, BcC2: Beasley	Moderate	Moderate	Slight	Severe	White oak	65	47	White oak, eastern redcedar, Virginia pine, white ash.
					Scarlet oak	---	---	
					Eastern redcedar	41	44	
					Chinkapin oak	58	41	
					Hickory	---	---	
					White ash	63	---	
BeC3: Beasley	Moderate	Moderate	Moderate	Severe	White oak	50	34	Virginia pine, eastern redcedar.
					Scarlet oak	---	---	
					Eastern redcedar	---	---	
					Chinkapin oak	---	---	
					Hickory	---	---	
					White ash	---	---	
BeD3: Beasley	Severe	Moderate	Moderate	Severe	White oak	50	34	Virginia pine, eastern redcedar.
					Scarlet oak	---	---	
					Eastern redcedar	---	---	
					Chinkapin oak	---	---	
					Hickory	---	---	
					White ash	---	---	
CaB, CaC: Carpenter	Slight	Slight	Slight	Severe	White oak	71	53	Yellow poplar, black walnut, northern red oak, white oak, eastern white pine, shortleaf pine, white ash.
					Virginia pine	74	114	
					Black oak	74	56	
					Chestnut oak	70	52	
					Hickory	---	---	
					Scarlet oak	75	57	
					Northern red oak	71	53	
CaD: Carpenter	Moderate	Moderate	Slight	Severe	White oak	71	53	Yellow poplar, black walnut, northern red oak, white oak, eastern white pine, shortleaf pine, white ash.
					Virginia pine	74	114	
					Black oak	74	56	
					Chestnut oak	70	52	
					Hickory	---	---	
					Scarlet oak	75	57	
					Northern red oak	71	53	
CbF2:								
Carpenter (warm aspect)	Severe	Severe	Moderate	Severe	White oak	58	41	Shortleaf pine, white oak.
					Virginia pine	64	98	
					Scarlet oak	---	---	
					Black oak	---	---	
					Chestnut oak	58	41	
					Hickory	---	---	
					Post oak	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
CbF2:								
Lenberg-------- (warm aspect)	Severe	Severe	Slight	Moderate	Virginia pine-------	61	93	Shortleaf pine, white oak.
					White oak-----------	62	45	
					Hickory-------------	---	---	
					Chestnut oak--------	56	39	
					Scarlet oak---------	66	48	
					Black oak-----------	60	43	
					Post oak------------	46	31	
CbF2:								
Carpenter------ (cool aspect)	Severe	Severe	Slight	Severe	White oak-----------	71	53	Yellow poplar, black walnut, northern red oak, white oak, eastern white pine, shortleaf pine, white ash.
					Virginia pine-------	74	114	
					Black oak-----------	74	56	
					Chestnut oak--------	70	52	
					Hickory-------------	---	---	
					Scarlet oak---------	75	57	
					Northern red oak----	71	53	
Lenberg-------- (cool aspect)	Severe	Severe	Slight	Moderate	Virginia pine-------	61	93	Shortleaf pine, white oak.
					White oak-----------	62	45	
					Hickory-------------	---	---	
					Chestnut oak--------	56	39	
					Scarlet oak---------	66	48	
					Black oak-----------	60	43	
					Post oak------------	46	31	
CeB------------ Chenault	Slight	Slight	Slight	Severe	Yellow poplar-------	90	90	Yellow poplar, black walnut, white oak, northern red oak, eastern white pine, shortleaf pine.
					White oak-----------	---	---	
					Black oak-----------	---	---	
					Sugar maple---------	---	---	
					American sycamore---	---	---	
					Hickory-------------	---	---	
					Black walnut--------	---	---	
ChC2----------- Christian	Slight	Slight	Slight	Severe	Virginia pine-------	74	114	Yellow poplar, eastern white pine, shortleaf pine, northern red oak, white oak.
					Black oak-----------	77	59	
					Eastern redcedar----	41	44	
					Yellow poplar-------	87	84	
					White oak-----------	70	52	
					Hickory-------------	---	---	
					Black walnut--------	---	---	
ChD2----------- Christian	Moderate	Moderate	Slight	Severe	Virginia pine-------	74	114	Yellow poplar, eastern white pine, shortleaf pine, northern red oak, white oak.
					Black oak-----------	77	59	
					Eastern redcedar----	41	44	
					Yellow poplar-------	87	84	
					White oak-----------	70	52	
					Hickory-------------	---	---	
					Black walnut--------	---	---	
CnD3----------- Christian	Moderate	Moderate	Moderate	Severe	Virginia pine-------	65	100	Virginia pine, white oak.
					Eastern redcedar----	---	---	
					Hickory-------------	---	---	
					Blackgum------------	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
CrB, CrC2 Crider	Slight	Slight	Slight	Severe	Yellow poplar	97	102	Eastern white pine, yellow poplar, black walnut, white ash, northern red oak, white oak, shortleaf pine.
					Sugar maple	---	---	
					Black oak	84	66	
					White ash	---	---	
					Black walnut	80	---	
					White oak	72	54	
					Hickory	---	---	
					Northern red oak	84	66	
CyF2:								
Cynthiana	Severe	Severe	Moderate	Moderate	Eastern redcedar	42	46	Eastern redcedar, Virginia pine, white ash, white oak.
					American elm	---	---	
					Honeylocust	---	---	
					Chinkapin oak	---	---	
					Hackberry	---	---	
					Black walnut	71	---	
					White ash	75	---	
					Black locust	---	---	
					Black cherry	---	---	
					Boxelder	---	---	
Faywood	Severe	Severe	Slight	Moderate	Northern red oak	70	52	White oak, eastern white pine, white ash, northern red oak.
					Scarlet oak	72	54	
					White oak	60	43	
					Hickory	---	---	
					White ash	---	---	
					Chinkapin oak	---	---	
					Sugar maple	---	---	
					Southern red oak	---	---	
Rock outcrop.								
EdD2 Eden	Severe	Moderate	Moderate	Moderate	Eastern redcedar	41	44	White oak, white ash, eastern white pine, green ash.
					Black oak	68	50	
					White oak	---	---	
					White ash	60	---	
					Scarlet oak	70	52	
					Black walnut	74	---	
					Chinkapin oak	78	60	
EeE2:								
Eden	Severe	Moderate	Moderate	Moderate	Eastern redcedar	41	44	White oak, white ash, eastern white pine, green ash.
					Black oak	68	50	
					White oak	---	---	
					White ash	60	---	
					Scarlet oak	70	52	
					Black walnut	74	---	
Cynthiana	Moderate	Moderate	Moderate	Moderate	Eastern redcedar	42	46	Eastern redcedar, Virginia pine, white oak, white ash.
					White ash	75	---	
					Black walnut	71	---	
					Hackberry	---	---	
					Chinkapin oak	---	---	
					American elm	---	---	
					Honeylocust	---	---	
					Black locust	---	---	
					Black cherry	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
EkB, EkC2 Elk	Slight	Slight	Slight	Severe	Yellow poplar	94	92	Eastern white pine, yellow poplar, black walnut, white oak, northern red oak, white ash, shortleaf pine.
					Cherrybark oak	95	92	
					Pin oak	96	93	
					Hackberry	---	---	
					Red maple	---	---	
					American sycamore	---	---	
					Black walnut	---	---	
FaC2 Faywood	Slight	Moderate	Slight	Moderate	Northern red oak	70	52	White oak, eastern white pine, white ash, northern red oak.
					Scarlet oak	72	54	
					White oak	60	43	
					Hickory	---	---	
					White ash	---	---	
					Chinkapin oak	---	---	
					Sugar maple	---	---	
					Southern red oak	---	---	
FaD2 Faywood	Moderate	Moderate	Slight	Moderate	Northern red oak	70	52	White oak, eastern white pine, white ash, northern red oak.
					Scarlet oak	72	54	
					White oak	60	43	
					Hickory	---	---	
					White ash	---	---	
					Chinkapin oak	---	---	
					Sugar maple	---	---	
					Southern red oak	---	---	
FcE2:								
Faywood	Moderate	Moderate	Slight	Moderate	Northern red oak	70	52	Eastern white pine, white oak, white ash, northern red oak.
					Scarlet oak	72	54	
					Hickory	---	---	
					White ash	---	---	
					Chinkapin oak	---	---	
					Sugar maple	---	---	
					Southern red oak	---	---	
Cynthiana	Moderate	Moderate	Moderate	Moderate	Eastern redcedar	42	46	Eastern redcedar, Virginia pine, white oak, white ash.
					White ash	75	---	
					Black walnut	71	---	
					Hackberry	---	---	
					Chinkapin oak	---	---	
					American elm	---	---	
					Honeylocust	---	---	
					Black locust	---	---	
					Black cherry	---	---	
FrC Frankstown	Moderate	Slight	Moderate	Severe	Northern red oak	79	61	Eastern white pine, yellow poplar, shortleaf pine, white ash, northern red oak, white oak.
					Yellow poplar	85	81	
					Shortleaf pine	80	130	
					Virginia pine	80	122	
					White oak	80	62	
					Black walnut	---	---	
					Black locust	---	---	
					White ash	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
FrD------------- Frankstown	Moderate	Moderate	Moderate	Severe	Northern red oak----	79	61	Eastern white pine, yellow poplar, shortleaf pine, white ash, northern red oak, white oak.
					Yellow poplar-------	85	81	
					Shortleaf pine------	80	130	
					Virginia pine-------	80	122	
					White oak-----------	80	62	
					Black walnut--------	---	---	
					Black locust--------	---	---	
					White ash-----------	---	---	
GaF------------- Garmon (warm aspect)	Severe	Severe	Severe	Moderate	Chestnut oak--------	60	43	Virginia pine, eastern redcedar, white oak.
					White oak-----------	60	43	
					Black oak-----------	68	50	
					Hickory-------------	---	---	
					Eastern redcedar----	38	40	
					Sugar maple---------	---	---	
GaF------------- Garmon (cool aspect)	Severe	Severe	Slight	Moderate	Yellow poplar-------	99	105	Yellow poplar, white ash, white oak, northern red oak, eastern white pine.
					White oak-----------	75	57	
					Northern red oak----	72	54	
					Hickory-------------	---	---	
					Sugar maple---------	---	---	
					Chestnut oak--------	65	47	
					Red maple-----------	---	---	
GrB------------- Greenbriar	Slight	Slight	Slight	Severe	Shortleaf pine------	72	114	Shortleaf pine, eastern white pine, white oak, yellow poplar.
					Virginia pine-------	69	107	
					White oak-----------	---	---	
					Post oak------------	---	---	
					Chestnut oak--------	---	---	
					Red maple-----------	---	---	
					Hickory-------------	---	---	
JeB:								
Jessietown-----	Slight	Moderate	Slight	Severe	Virginia pine-------	62	95	Virginia pine, white oak, shortleaf pine.
					White oak-----------	60	43	
					Hickory-------------	---	---	
					Black oak-----------	62	45	
					Red maple-----------	---	---	
					Eastern redcedar----	---	---	
					Chestnut oak--------	58	41	
Trappist-------	Slight	Moderate	Slight	Moderate	Virginia pine-------	62	95	White oak, shortleaf pine.
					White oak-----------	60	43	
					Hickory-------------	---	---	
					Black oak-----------	62	45	
					Red maple-----------	---	---	
					Eastern redcedar----	---	---	
					Chestnut oak--------	58	41	
					Scarlet oak---------	---	---	
					American beech------	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
La-------------- Lawrence	Slight	Moderate	Moderate	Severe	Yellow poplar-------	85	81	Yellow poplar, green ash, American sycamore, white oak, sweetgum, willow oak, eastern white
					Sweetgum------------	89	103	
					White oak-----------	74	56	
					Black oak-----------	78	60	
					Willow oak----------	76	68	
					Red maple-----------	---	---	
					Pin oak-------------	---	---	
					Hackberry-----------	---	---	
LbC2------------ Lenberg	Slight	Slight	Slight	Moderate	Virginia pine-------	61	93	Shortleaf pine, white oak.
					White oak-----------	62	45	
					Hickory-------------	---	---	
					Chestnut oak--------	56	39	
					Scarlet oak---------	66	48	
					Black oak-----------	60	43	
					Post oak------------	46	31	
LbD2------------ Lenberg	Moderate	Moderate	Slight	Moderate	Virginia pine-------	61	93	Shortleaf pine, white oak.
					White oak-----------	62	45	
					Hickory-------------	---	---	
					Chestnut oak--------	56	39	
					Scarlet oak---------	66	48	
					Black oak-----------	60	43	
					Post oak------------	46	31	
LeE2------------ Lenberg	Severe	Severe	Slight	Moderate	Virginia pine-------	61	93	Shortleaf pine, white oak.
					White oak-----------	62	45	
					Hickory-------------	---	---	
					Chestnut oak--------	56	39	
					Scarlet oak---------	66	48	
					Black oak-----------	60	43	
					Post oak------------	46	31	
LnB, LoC2------- Lowell	Slight	Slight	Slight	Severe	Black oak-----------	88	70	White ash, eastern white pine, white oak, northern red oak, yellow poplar.
					White ash-----------	75	---	
					Hickory-------------	---	---	
					Virginia pine-------	78	119	
					Black locust--------	77	---	
					Sugar maple---------	---	---	
					Northern red oak----	---	---	
LoD2------------ Lowell	Moderate	Moderate	Slight	Severe	Black oak-----------	88	70	White ash, eastern white pine, white oak, northern red oak, yellow poplar.
					White ash-----------	75	---	
					Hickory-------------	---	---	
					Virginia pine-------	78	119	
					Black locust--------	77	---	
					Sugar maple---------	---	---	
					Northern red oak----	---	---	
LpC3------------ Lowell	Slight	Moderate	Moderate	Severe	Black oak-----------	80	62	White ash, eastern white pine, white oak.
					Virginia pine-------	---	---	
					White ash-----------	70	---	
					Hickory-------------	---	---	
					Black locust--------	---	---	
					Eastern redcedar----	---	---	
					Sugar maple---------	---	---	
					American elm--------	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
LpD3------------ Lowell	Moderate	Moderate	Moderate	Severe	Black oak-----------	80	62	White ash, eastern white pine, white oak.
					Virginia pine-------	---	---	
					White ash-----------	70	---	
					Hickory-------------	---	---	
					Black locust--------	---	---	
					Eastern redcedar----	---	---	
					Sugar maple---------	---	---	
					American elm--------	---	---	
LsC2------------ Lowell	Slight	Slight	Slight	Severe	Black oak-----------	88	70	White ash, eastern white pine, white oak, northern red oak, yellow poplar.
					White ash-----------	75	---	
					Black locust--------	74	---	
					Northern red oak----	---	---	
					Hickory-------------	---	---	
					Chinkapin oak-------	81	63	
					Sugar maple---------	---	---	
Me, Mn---------- Melvin	Slight	Moderate	Moderate	Severe	Pin oak-------------	100	98	Pin oak, American sycamore, sweetgum, green ash, willow oak.
					Sweetgum------------	92	---	
					Green ash-----------	---	---	
					Hackberry-----------	---	---	
					Hickory-------------	---	---	
					Red maple-----------	---	---	
					American elm--------	---	---	
MoB, MoC2------- Mountview	Slight	Slight	Slight	Severe	White oak-----------	70	52	Yellow poplar, shortleaf pine, eastern white pine, black walnut.
					Yellow poplar-------	90	90	
					Virginia pine-------	64	98	
Na, Ne---------- Newark	Slight	Moderate	Moderate	Severe	Pin oak-------------	100	98	Eastern cottonwood, sweegum, American sycamore, green ash.
					Sweetgum------------	85	93	
					Green ash-----------	---	---	
NhB, NhC2------- Nicholson	Moderate	Slight	Slight	Severe	Black oak-----------	78	60	White oak, northern red oak, sweetgum, yellow poplar, eastern white pine, white ash.
					White oak-----------	74	56	
					Hickory-------------	---	---	
					Sweetgum------------	84	90	
					Yellow poplar-------	107	119	
					Northern red oak----	79	61	
No-------------- Nolin	Slight	Slight	Moderate	Severe	Sweetgum------------	92	112	Eastern cottonwood, black walnut, yellow poplar, sweetgum, eastern white pine.
					River birch---------	---	---	
					Black willow--------	---	---	
					American sycamore---	---	---	
					Yellow poplar-------	107	119	
OtB------------- Otwell	Slight	Slight	Slight	Severe	White oak-----------	69	51	Eastern white pine, yellow poplar, white ash, white oak.
					Yellow poplar-------	95	98	
					Sugar maple---------	---	---	
					Black oak-----------	72	54	
					Blackgum------------	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
RaC------------- Riney	Slight	Slight	Slight	Severe	Yellow poplar------- White oak----------- Red maple----------- Black oak-----------	93 78 --- 80	95 60 --- 62	Yellow poplar, white ash, white oak, black walnut, eastern white pine.
RcE2: Riney----------	Moderate	Moderate	Slight	Severe	Yellow poplar------- White oak----------- Red maple----------- Black oak-----------	93 78 --- 80	95 60 --- 62	Yellow poplar, white ash, white oak, black walnut, eastern white pine.
Christian------	Moderate	Moderate	Slight	Severe	Virginia pine------- Black oak----------- Eastern redcedar---- Yellow poplar------- White oak----------- Hickory------------- Black walnut--------	74 77 41 87 70 --- ---	114 59 44 84 52 --- ---	Yellow poplar, eastern white pine, shortleaf pine, northern red oak, white oak.
Ro-------------- Robertsville	Slight	Moderate	Moderate	Severe	Pin oak------------- Yellow poplar------- Sweetgum------------ Red maple----------- Green ash----------- Swamp chestnut oak-- Shumard oak---------	96 93 94 --- --- --- 90	93 95 119 --- --- --- 86	Sweetgum, American sycamore, pin oak, green ash, willow oak.
RtD2: Rohan----------	Moderate	Moderate	Moderate	Moderate	Chestnut oak-------- Scarlet oak--------- Hickory------------- Black oak----------- Virginia pine-------	67 56 --- 63 58	49 39 --- 46 86	Virginia pine, shortleaf pine.
Trappist-------	Moderate	Moderate	Slight	Moderate	Virginia pine------- White oak----------- Hickory------------- Black oak----------- Red maple----------- Eastern redcedar---- Chestnut oak-------- Scarlet oak---------	62 62 --- 62 --- --- 58 ---	95 45 --- 45 --- --- 41 ---	White oak, shortleaf pine.
RtF2: Rohan---------- (warm aspect)	Severe	Severe	Moderate	Slight	Chestnut oak-------- Virginia pine------- Scarlet oak--------- White oak----------- Shortleaf pine------	52 52 53 --- ---	36 73 37 --- ---	Virginia pine, shortleaf pine.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
RtF2:								
Trappist (warm aspect)	Severe	Severe	Slight	Moderate	Virginia pine	62	95	White oak, shortleaf pine.
					White oak	62	45	
					Hickory	---	---	
					Black oak	62	45	
					Red maple	---	---	
					Eastern redcedar	---	---	
					Chestnut oak	58	41	
					Scarlet oak	---	---	
RtF2:								
Rohan (cool aspect)	Severe	Severe	Moderate	Slight	Chestnut oak	67	49	Virginia pine, shortleaf pine.
					Scarlet oak	56	39	
					Hickory	---	---	
					Black oak	63	46	
					Virginia pine	58	86	
Trappist (cool aspect)	Severe	Severe	Slight	Moderate	Virginia pine	62	95	White oak, shortleaf pine.
					White oak	62	45	
					Hickory	---	---	
					Black oak	62	45	
					Red maple	---	---	
					Eastern redcedar	---	---	
					Chestnut oak	58	41	
					Scarlet oak	---	---	
SaB, SaC2 Sandview	Slight	Slight	Slight	Severe	Northern red oak	80	62	Black walnut, northern red oak, white oak, white ash, yellow poplar, eastern white pine.
					White oak	75	57	
					Bur oak	---	---	
					White ash	80	---	
					Hickory	---	---	
					Black walnut	---	---	
					Black cherry	---	---	
					Black locust	---	---	
					Hackberry	---	---	
					American elm	---	---	
Se Sensabaugh	Slight	Slight	Moderate	Severe	Yellow poplar	100	107	Yellow poplar, white oak, black walnut, white ash.
					White oak	80	62	
					White ash	---	---	
					American sycamore	---	---	
SrE2:								
Shrouts	Moderate	Moderate	Moderate	Moderate	Virginia pine	60	91	Virginia pine, white oak, eastern redcedar.
					Scarlet oak	60	43	
					Black oak	60	43	
					Eastern redcedar	45	52	
					White oak	---	---	
Brassfield	Severe	Moderate	Slight	Severe	Scarlet oak	60	43	Eastern redcedar, Virginia pine, white ash.
					Eastern redcedar	40	43	
					Chinkapin oak	---	---	
					White ash	---	---	
					Black locust	---	---	
					Eastern redbud	---	---	
					American elm	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
TbA, TbB, TbC2:								
Tilsit	Slight	Slight	Slight	Severe	Shortleaf pine	72	114	Eastern white pine, shortleaf pine, white oak, yellow poplar.
					White oak	68	50	
					Yellow poplar	92	93	
					Black oak	74	56	
					Virginia pine	73	113	
					Scarlet oak	74	56	
					Hickory	---	---	
					Red maple	---	---	
					Southern red oak	65	3	
Berea	Slight	Slight	Slight	Severe	Virginia pine	70	109	Shortleaf pine, eastern white pine, sweetgum, yellow poplar, white ash, white oak.
					White oak	70	52	
					Black oak	70	52	
					Hickory	---	---	
					Yellow poplar	---	---	
					Scarlet oak	---	---	
					Sugar maple	---	---	
TeC2:								
Trappist	Slight	Moderate	Slight	Moderate	Virginia pine	62	95	White oak, shortleaf pine.
					White oak	60	43	
					Hickory	---	---	
					Black oak	62	45	
					Red maple	---	---	
					Eastern redcedar	---	---	
					Chestnut oak	58	41	
					Scarlet oak	---	---	
Jessietown	Slight	Moderate	Slight	Severe	Virginia pine	62	95	White oak, shortleaf pine.
					White oak	60	43	
					Hickory	---	---	
					Black oak	62	45	
					Red maple	---	---	
					Eastern redcedar	---	---	
					Chestnut oak	58	41	
TrD2:								
Trappist (warm aspect)	Moderate	Moderate	Slight	Moderate	Virginia pine	62	95	White oak, shortleaf pine.
					White oak	60	43	
					Hickory	---	---	
					Black oak	62	45	
					Red maple	---	---	
					Eastern redcedar	---	---	
					Chestnut oak	58	41	
					Scarlet oak	---	---	
Rohan (warm aspect)	Moderate	Moderate	Moderate	Slight	Chestnut oak	52	36	Virginia pine, shortleaf pine.
					Virginia pine	52	73	
					Scarlet oak	53	37	
					White oak	---	---	
					Shortleaf pine	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
TrD2: Greenbriar----- (warm aspect)	Moderate	Moderate	Slight	Severe	Shortleaf pine------	72	114	Shortleaf pine, eastern white pine, white oak, yellow poplar, black walnut.
					Virginia pine-------	69	107	
					White oak-----------	---	---	
					Post oak------------	---	---	
					Chestnut oak--------	---	---	
					Red maple-----------	---	---	
					Hickory-------------	---	---	
TrD2: Trappist------- (cool aspect)	Moderate	Moderate	Slight	Moderate	Virginia pine-------	62	95	White oak, shortleaf pine.
					White oak-----------	60	43	
					Hickory-------------	---	---	
					Black oak-----------	62	45	
					Red maple-----------	---	---	
					Eastern redcedar----	---	---	
					Chestnut oak--------	58	41	
					Scarlet oak---------	---	---	
Rohan---------- (cool aspect)	Moderate	Moderate	Moderate	Slight	Chestnut oak--------	67	49	Virginia pine, shortleaf pine.
					Scarlet oak---------	56	39	
					Hickory-------------	---	---	
					Black oak-----------	63	46	
					Virginia pine-------	58	86	
Greenbriar----- (cool aspect)	Moderate	Moderate	Slight	Severe	Shortleaf pine------	72	114	Shortleaf pine, eastern white pine, white oak, yellow poplar, black walnut.
					Virginia pine-------	69	107	
					White oak-----------	---	---	
					Post oak------------	---	---	
					Chestnut oak--------	---	---	
					Red maple-----------	---	---	
					Hickory-------------	---	---	
TrD3: Trappist-------	Moderate	Moderate	Moderate	Slight	Virginia pine-------	55	80	Virginia pine.
					White oak-----------	---	---	
					Hickory-------------	---	---	
					Scarlet oak---------	---	---	
Rohan----------	Moderate	Moderate	Moderate	Slight	Chestnut oak--------	52	36	Virginia pine, shortleaf pine.
					Virginia pine-------	52	73	
					Scarlet oak---------	53	37	
					White oak-----------	---	---	
					Shortleaf pine------	---	---	
Greenbriar-----	Moderate	Moderate	Slight	Severe	Shortleaf pine------	72	114	Shortleaf pine, eastern white pine, white oak, yellow poplar, black walnut.
					Virginia pine-------	69	107	
					White oak-----------	---	---	
					Post oak------------	---	---	
					Chestnut oak--------	---	---	
					Red maple-----------	---	---	
					Hickory-------------	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 9.--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
BaB: Beasley	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly, slope.	Slight	Slight.
BcC2: Beasley	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
BeC3: Beasley	Severe: too clayey.	Severe: too clayey.	Severe: slope, too clayey.	Severe: too clayey.	Severe: too clayey.
BeD3: Beasley	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: too clayey.	Severe: slope, too clayey.
CaB: Carpenter	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
CaC: Carpenter	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
CaD: Carpenter	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
CbF2:					
Carpenter	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Lenberg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
CeB: Chenault	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
ChC2: Christian	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
ChD2, CnD3: Christian	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
CrB: Crider	Slight	Slight	Moderate: slope.	Slight	Slight.
CrC2: Crider	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
CyF2:					
Cynthiana	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope, erodes easily.	Severe: slope, thin layer.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CyF2:					
Faywood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Rock outcrop.					
EdD2 Eden	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: large stones, slope.
EeE2:					
Eden	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Cynthiana	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope, thin layer.
EkB Elk	Slight	Slight	Moderate: slope.	Slight	Slight.
EkC2 Elk	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
FaC2 Faywood	Moderate: percs slowly, slope.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
FaD2 Faywood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
FcE2:					
Faywood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Cynthiana	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope, thin layer.
FrC Frankstown	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
FrD Frankstown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
GaF Garmon	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
GrB Greenbriar	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
JeB:					
Jessietown	Slight	Slight	Moderate: slope, depth to rock.	Severe: erodes easily.	Moderate: depth to rock.
Trappist	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, depth to rock, percs slowly.	Slight	Moderate: thin layer.
La: Lawrence	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Severe: erodes easily.	Moderate: wetness.
LbC2: Lenberg	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
LbD2: Lenberg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
LeE2: Lenberg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
LnB: Lowell	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
LoC2: Lowell	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
LoD2: Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
LpC3: Lowell	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
LpD3: Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
LsC2: Lowell	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Me: Melvin	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Mn: Melvin	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
MoB: Mountview	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
MoC2: Mountview	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Na-------------------- Newark	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
Ne-------------------- Newark	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, erodes easily.	Severe: wetness, flooding.
NhB, NhC2------------- Nicholson	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness.
No-------------------- Nolin	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
OtB------------------- Otwell	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight----------	Slight.
Pt. Pits, quarry					
RaC------------------- Riney	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
RcE2:					
Riney----------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Christian------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ro-------------------- Robertsville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
RtD2:					
Rohan----------------	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight----------	Severe: depth to rock.
Trappist-------------	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
RtF2:					
Rohan----------------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Trappist-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
SaB------------------- Sandview	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
SaC2------------------ Sandview	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: erodes easily.	Moderate: slope.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Se: Sensabaugh	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
SrE2:					
Shrouts	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Moderate: slope.	Severe: slope.
Brassfield	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: erodes easily.	Severe: slope.
TbA:					
Tilsit	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: wetness.
Berea	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: small stones, wetness.	Moderate: wetness.	Moderate: wetness, thin layer.
TbB:					
Tilsit	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Berea	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness, thin layer.
TbC2:					
Tilsit	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, wetness.
Berea	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope, thin layer.
TeC2:					
Trappist	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
Jessietown	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope, depth to rock.
TrD2:					
Trappist	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Rohan	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.	Severe: slope, depth to rock.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
TrD2:					
Greenbriar-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
TrD3:					
Trappist-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Rohan----------------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.	Severe: slope, depth to rock.
Greenbriar-----------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

TABLE 10.--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
BaB: Beasley	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BcC2, BeC3: Beasley	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BeD3: Beasley	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CaB: Carpenter	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CaC: Carpenter	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CaD: Carpenter	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CbF2:										
Carpenter	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Lenberg	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CeB: Chenault	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ChC2: Christian	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ChD2, CnD3: Christian	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CrB: Crider	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CrC2: Crider	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CyF2:										
Cynthiana	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Faywood	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
EdD2: Eden	Fair	Good	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
EeE2:										
Eden	Very poor.	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
EeE2:										
Cynthiana	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
EkB Elk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EkC2 Elk	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FaC2 Faywood	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FaD2 Faywood	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FcE2:										
Faywood	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Cynthiana	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
FrC Frankstown	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FrD Frankstown	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GaF Garmon	Very poor.	Poor	Good	Good	---	Very poor.	Very poor.	Poor	Fair	Very poor.
GrB Greenbriar	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
JeB:										
Jessietown	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Trappist	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
La Lawrence	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
LbC2 Lenberg	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LbD2 Lenberg	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LeE2 Lenberg	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LnB Lowell	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LoC2 Lowell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

TABLE 10.--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
LoD2 Lowell	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LpC3 Lowell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LpD3 Lowell	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LsC2 Lowell	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.
Mn Melvin	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
MoB Mountview	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
MoC2 Mountview	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
Na, Ne Newark	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
NhB, NhC2 Nicholson	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
No Nolin	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Fair	Very poor.
OtB Otwell	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Pt. Pits, quarry										
RaC Riney	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
RcE2:										
Riney	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Christian	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ro Robertsville	Poor	Fair	Fair	Fair	Fair	Good	Good	Poor	Fair	Good.
RtD2:										
Rohan	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Trappist	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
RtF2:										
Rohan	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Trappist	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
SaB: Sandview	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
SaC2: Sandview	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Se: Sensabaugh	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
SrE2:										
Shrouts	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Brassfield	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
TbA:										
Tilsit	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Berea	Fair	Good	Good	Good	Fair	Poor	Poor	Good	Good	Poor.
TbB:										
Tilsit	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Berea	Fair	Good	Good	Good	Fair	Poor	Very poor.	Good	Good	Very poor.
TbC2:										
Tilsit	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Berea	Fair	Good	Good	Good	Fair	Very poor.	Very poor.	Good	Good	Very poor.
TeC2:										
Trappist	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Jessietown	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TrD2, TrD3:										
Trappist	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rohan	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Greenbriar	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BaB: Beasley	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
BcC2: Beasley	Moderate: slope, too clayey.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
BeC3: Beasley	Moderate: slope, too clayey.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Severe: too clayey.
BeD3: Beasley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope, too clayey.
CaB: Carpenter	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Moderate: small stones.
CaC: Carpenter	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: small stones, slope.
CaD: Carpenter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CbF2:						
Carpenter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lenberg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
CeB: Chenault	Moderate: depth to rock, too clayey.	Slight	Moderate: depth to rock.	Moderate: slope.	Moderate: low strength.	Moderate: small stones.
ChC2: Christian	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Moderate: slope.
ChD2, CnD3: Christian	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CrB: Crider	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
CrC2: Crider	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.

TABLE 11.--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
CyF2:						
Cynthiana	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, low strength, slope.	Severe: slope, thin layer.
Faywood	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Rock outcrop.						
EdD2 Eden	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope, large stones.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: large stones, slope.
EeE2:						
Eden	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Cynthiana	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, low strength, slope.	Severe: slope, thin layer.
EkB Elk	Slight	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
EkC2 Elk	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
FaC2 Faywood	Severe: depth to rock.	Moderate: slope, depth to rock, shrink-swell.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, thin layer.
FaD2 Faywood	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
FcE2:						
Faywood	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Cynthiana	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, low strength, slope.	Severe: slope, thin layer.
FrC Frankstown	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
FrD Frankstown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

TABLE 11.--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
GaF------------- Garmon	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
GrB------------- Greenbriar	Moderate: depth to rock, too clayey.	Slight---------	Moderate: depth to rock.	Moderate: slope.	Severe: low strength.	Slight.
JeB:						
Jessietown-----	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: low strength.	Moderate: depth to rock.
Trappist-------	Severe: depth to rock.	Moderate: shrink-swell, depth to rock.	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: low strength.	Moderate: thin layer.
La-------------- Lawrence	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
LbC2------------ Lenberg	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope, thin layer.
LbD2, LeE2------ Lenberg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
LnB------------- Lowell	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
LoC2------------ Lowell	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
LoD2------------ Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
LpC3------------ Lowell	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
LpD3------------ Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
LsC2------------ Lowell	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Me-------------- Melvin	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.

TABLE 11.--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
Mn: Melvin	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
MoB: Mountview	Moderate: too clayey.	Slight	Moderate: shrink-swell.	Moderate: slope.	Severe: low strength.	Slight.
MoC2: Mountview	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Na: Newark	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
Ne: Newark	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
NhB, NhC2: Nicholson	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.	Moderate: wetness.
No: Nolin	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
OtB: Otwell	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Slight.
Pt. Pits, quarry						
RaC: Riney	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
RcE2:						
Riney	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Christian	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ro: Robertsville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
RtD2:						
Rohan	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Trappist	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, thin layer.

TABLE 11.--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
RtF2:						
Rohan	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: slope, depth to rock.
Trappist	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
SaB: Sandview	Moderate: too clayey.	Slight	Moderate: shrink-swell.	Moderate: slope.	Moderate: low strength.	Slight.
SaC2: Sandview	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Se: Sensabaugh	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
SrE2:						
Shrouts	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Brassfield	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
TbA:						
Tilsit	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength.	Moderate: wetness.
Berea	Severe: depth to rock, wetness.	Moderate: wetness, depth to rock.	Severe: wetness, depth to rock.	Moderate: wetness, depth to rock.	Severe: low strength.	Moderate: wetness, thin layer.
TbB:						
Tilsit	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Severe: low strength.	Moderate: wetness.
Berea	Severe: depth to rock, wetness.	Moderate: wetness, depth to rock.	Severe: wetness, depth to rock.	Moderate: wetness, slope, depth to rock.	Severe: low strength.	Moderate: wetness, thin layer.
TbC2:						
Tilsit	Severe: wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: slope, wetness.
Berea	Severe: depth to rock, wetness.	Moderate: wetness, slope, depth to rock.	Severe: wetness, depth to rock.	Severe: slope.	Severe: low strength.	Moderate: wetness, slope, thin layer.
TeC2:						
Trappist	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, thin layer.

TABLE 11.--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
TeC2:						
Jessietown-----	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
TrD2, TrD3:						
Trappist-------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Rohan----------	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: slope, depth to rock.
Greenbriar-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BaB----------------- Beasley	Severe: percs slowly.	Moderate: slope, depth to rock.	Severe: too clayey, depth to rock.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
BcC2, BeC3---------- Beasley	Severe: percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, depth to rock.	Poor: too clayey, hard to pack.
BeD3---------------- Beasley	Severe: slope, percs slowly.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope.	Poor: slope, too clayey, hard to pack.
CaB----------------- Carpenter	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: area reclaim, too clayey.
CaC----------------- Carpenter	Severe: percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Fair: area reclaim, too clayey, slope.
CaD----------------- Carpenter	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
CbF2:					
Carpenter----------	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
Lenberg------------	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.
CeB----------------- Chenault	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Severe: seepage.	Fair: area reclaim, too clayey.
ChC2---------------- Christian	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Poor: small stones.
ChD2, CnD3---------- Christian	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
CrB----------------- Crider	Slight-----------	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.

TABLE 12.--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
CrC2: Crider	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
CyF2:					
Cynthiana	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, slope, too clayey.
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.
Rock outcrop.					
EdD2: Eden	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
EeE2:					
Eden	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Cynthiana	Severe: depth to rock, 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.
EkB: Elk	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
EkC2: Elk	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, too clayey.
FaC2: Faywood	Severe: depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
FaD2: 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.
FcE2:					
Faywood	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.

TABLE 12.--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
FcE2:					
Cynthiana	Severe: depth to rock, 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.
FrC: Frankstown	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack, small stones.
FrD: Frankstown	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, small stones.
GaF: 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.
GrB: Greenbriar	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: depth to rock, too clayey.
JeB:					
Jessietown	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Trappist	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
La: Lawrence	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
LbC2: Lenberg	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.
LbD2, LeE2: Lenberg	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.
LnB: Lowell	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
LoC2: Lowell	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.

TABLE 12.--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
LoD2: Lowell	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
LpC3: Lowell	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
LpD3: Lowell	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
LsC2: Lowell	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
Me, Mn: Melvin	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
MoB: Mountview	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack, small stones.
MoC2: Mountview	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack, small stones.
Na, Ne: Newark	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
NhB, NhC2: Nicholson	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
No: Nolin	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey.
OtB: Otwell	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
Pt. Pits, quarry					
RaC: Riney	Moderate: depth to rock, slope.	Severe: seepage, slope.	Severe: depth to rock, seepage.	Severe: seepage.	Fair: area reclaim, too clayey, slope.

TABLE 12.--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
RcE2:					
Riney	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: slope.
Christian	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Ro Robertsville	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
RtD2:					
Rohan	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
Trappist	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.
RtF2:					
Rohan	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Trappist	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.
SaB Sandview	Severe: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey.
SaC2 Sandview	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
Se Sensabaugh	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Poor: small stones.
SrE2:					
Shrouts	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Brassfield	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
TbA, TbB:					
Tilsit	Severe: percs slowly, wetness.	Severe: wetness.	Severe: depth to rock, wetness.	Moderate: wetness, depth to rock.	Fair: area reclaim, too clayey.

TABLE 12.--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
TbA, TbB:					
Berea	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: area reclaim.
TbC2:					
Tilsit	Severe: percs slowly, wetness.	Severe: slope, wetness.	Severe: depth to rock, wetness.	Moderate: slope, wetness, depth to rock.	Fair: slope, too clayey, area reclaim.
Berea	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: area reclaim.
TeC2:					
Trappist	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.
Jessietown	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
TrD2, TrD3:					
Trappist	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.
Rohan	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Greenbriar	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BaB, BcC2, BeC3------- Beasley	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
BeD3------------------ Beasley	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
CaB, CaC-------------- Carpenter	Fair: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CaD------------------- Carpenter	Fair: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CbF2:				
Carpenter------------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Lenberg--------------	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CeB------------------- Chenault	Fair: area reclaim, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
ChC2------------------ Christian	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
ChD2, CnD3------------ Christian	Fair: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
CrB------------------- Crider	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
CrC2------------------ Crider	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
CyF2:				
Cynthiana------------	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CyF2:				
Faywood	Poor: area reclaim, slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
Rock outcrop.				
EdD2 Eden	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
EeE2:				
Eden	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Cynthiana	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
EkB Elk	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
EkC2 Elk	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
FaC2 Faywood	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
FaD2 Faywood	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
FcE2:				
Faywood	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Cynthiana	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
FrC, FrD Frankstown	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
GaF Garmon	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
GrB Greenbriar	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
JeB:				
Jessietown	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, too clayey.
Trappist	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
La: Lawrence	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
LbC2: Lenberg	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey.
LbD2: Lenberg	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope, too clayey.
LeE2: Lenberg	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope, too clayey.
LnB, LoC2: Lowell	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
LoD2: Lowell	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
LpC3: Lowell	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
LpD3: Lowell	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
LsC2: Lowell	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Me, Mn: Melvin	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MoB, MoC2: Mountview	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Na, Ne: Newark	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
NhB: Nicholson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
NhC2: Nicholson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
No: Nolin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
OtB: Otwell	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Pt. Pits, quarry				
RaC: Riney	Fair: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
RcE2:				
Riney	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Christian	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
Ro: Robertsville	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
RtD2:				
Rohan	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
Trappist	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
RtF2:				
Rohan	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Trappist	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
SaB: Sandview	Moderate: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
SaC2: Sandview	Moderate: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
Se: Sensabaugh	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
SrE2:				
Shrouts	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
Brassfield	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
TbA, TbB:				
Tilsit	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, area reclaim.
Berea	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
TbC2:				
Tilsit	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey, area reclaim.
Berea	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
TeC2:				
Trappist	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Jessietown	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, too clayey, slope.
TrD2, TrD3:				
Trappist	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
Rohan	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Greenbriar	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
BaB: Beasley	Slight	Moderate: thin layer.	Deep to water	Erodes easily	Erodes easily.
BcC2, BeC3, BeD3: Beasley	Slight	Moderate: thin layer.	Deep to water	Slope	Slope.
CaB: Carpenter	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Favorable.
CaC, CaD: Carpenter	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Slope.
CbF2:					
Carpenter	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope.
Lenberg	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
CeB: Chenault	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Favorable	Favorable.
ChC2, ChD2, CnD3: Christian	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
CrB: Crider	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Favorable.
CrC2: Crider	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Slope.
CyF2:					
Cynthiana	Severe: depth to rock, slope.	Severe: hard to pack.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, erodes easily.
Faywood	Severe: slope.	Severe: thin layer, hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Rock outcrop.					
EdD2: Eden	Moderate: depth to rock.	Severe: hard to pack, large stones.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, erodes easily.
EeE2:					
Eden	Severe: slope.	Severe: hard to pack, large stones.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
EeE2:					
Cynthiana	Severe: depth to rock, slope.	Severe: hard to pack.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope.
EkB Elk	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Favorable.
EkC2 Elk	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Slope.
FaC2, FaD2 Faywood	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
FcE2:					
Faywood	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Cynthiana	Severe: depth to rock, slope.	Severe: hard to pack.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope.
FrC, FrD Frankstown	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope.
GaF Garmon	Severe: seepage, slope.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
GrB Greenbriar	Moderate: seepage, depth to rock, slope.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
JeB:					
Jessietown	Moderate: seepage, depth to rock, slope.	Severe: piping.	Deep to water	Depth to rock, erodes easily.	Erodes easily, depth to rock.
Trappist	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Deep to water	Depth to rock, erodes easily.	Erodes easily, depth to rock.
La Lawrence	Slight	Severe: piping.	Percs slowly	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
LbC2, LbD2 Lenberg	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
LeE2 Lenberg	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
LnB Lowell	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Erodes easily	Erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
LoC2, LoD2, LpC3, LpD3: Lowell	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
LsC2: Lowell	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Me, Mn: Melvin	Moderate: seepage.	Severe: piping, wetness.	Flooding	Erodes easily, wetness.	Wetness, erodes easily.
MoB: Mountview	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Erodes easily	Erodes easily.
MoC2: Mountview	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Na, Ne: Newark	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
NhB, NhC2: Nicholson	Moderate: seepage, slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
No: Nolin	Severe: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
OtB: Otwell	Moderate: slope.	Moderate: thin layer, wetness.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
Pt. Pits, quarry					
RaC: Riney	Severe: seepage.	Severe: piping.	Deep to water	Slope	Slope.
RcE2: Riney	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope.
Christian	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Ro: Robertsville	Slight	Severe: piping, wetness.	Percs slowly	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
RtD2: Rohan	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Slope, depth to rock.	Slope, droughty.
Trappist	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
RtF2:					
Rohan	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Slope, depth to rock.	Slope, droughty.
Trappist	Severe: slope.	Severe: thin layer, hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
SaB Sandview	Moderate: slope, seepage.	Slight	Deep to water	Favorable	Favorable.
SaC2 Sandview	Severe: slope.	Slight	Deep to water	Slope	Slope.
Se Sensabaugh	Severe: seepage.	Moderate: large stones.	Deep to water	Large stones	Large stones.
SrE2:					
Shrouts	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Brassfield	Severe: slope.	Severe: piping.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
TbA:					
Tilsit	Moderate: depth to rock, seepage.	Severe: piping.	Percs slowly	Erodes easily, wetness.	Erodes easily, rooting depth.
Berea	Moderate: seepage, depth to rock.	Severe: piping, wetness.	Depth to rock	Depth to rock, wetness.	Erodes easily, depth to rock.
TbB:					
Tilsit	Moderate: depth to rock, seepage.	Severe: piping.	Percs slowly, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
Berea	Moderate: seepage, depth to rock.	Severe: piping, wetness.	Depth to rock, slope.	Depth to rock, wetness.	Erodes easily, depth to rock.
TbC2:					
Tilsit	Moderate: depth to rock, seepage.	Severe: piping.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
Berea	Moderate: seepage, depth to rock.	Severe: piping, wetness.	Depth to rock, slope.	Slope, depth to rock, wetness.	Slope, erodes easily, depth to rock.
TeC2:					
Trappist	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
TeC2:					
Jessietown	Severe: slope.	Severe: piping.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
TrD2:					
Trappist	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Rohan	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Slope, depth to rock.	Slope, droughty.
Greenbriar	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
TrD3:					
Trappist	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Rohan	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Slope, depth to rock.	Slope, droughty.
Greenbriar	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
BaB-------------- Beasley	0-6	Silt loam--------	ML, CL-ML	A-4	0-5	90-100	85-100	80-100	75-100	25-35	4-10
	6-36	Silty clay, clay	CH, CL	A-7	0-5	90-100	85-100	85-100	75-100	45-70	20-40
	36-54	Silty clay, clay loam, channery silty clay.	CL, CH	A-7	0-10	70-100	55-100	50-100	50-95	40-65	15-35
	54-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
BcC2------------- Beasley	0-5	Silty clay loam	CL	A-6, A-7	0-5	90-100	85-100	80-100	75-100	34-42	15-22
	5-36	Silty clay, clay	CH, CL	A-7	0-5	90-100	85-100	85-100	75-100	45-70	20-40
	36-54	Silty clay, clay loam, channery silty clay.	CL, CH	A-7	0-10	70-100	55-100	50-100	50-95	40-65	15-35
	54-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
BeC3, BeD3------- Beasley	0-4	Silty clay-------	CL	A-6, A-7	0-5	90-100	85-100	80-100	75-100	34-42	15-22
	4-36	Silty clay, clay	CH, CL	A-7	0-5	90-100	85-100	85-100	75-100	45-70	20-40
	36-54	Silty clay, clay loam, channery silty clay.	CL, CH	A-7	0-10	70-100	55-100	50-100	50-95	40-65	15-35
	54-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
CaB, CaC, CaD---- Carpenter	0-8	Gravelly silt loam.	ML, CL-ML	A-4	0-10	70-95	60-85	55-80	55-80	<35	NP-10
	8-42	Gravelly silty clay loam, silty clay loam, clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0-10	60-95	60-90	55-80	55-80	25-45	5-20
	42-60	Channery silty clay, clay, silty clay loam.	CL, CH	A-7, A-6	0-10	65-95	65-95	65-90	65-90	30-60	15-40
	60-70	Weathered bedrock	---	---	---	---	---	---	---	---	---
CbF2:											
Carpenter-------	0-6	Gravelly silt loam.	ML, CL-ML	A-4	0-10	70-95	60-85	55-80	55-80	<35	NP-10
	6-42	Gravelly silty clay loam, silty clay loam, clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0-10	60-95	60-90	55-80	55-80	25-45	5-20
	42-60	Channery silty clay, clay, silty clay loam.	CL, CH	A-7, A-6	0-10	65-95	65-95	65-90	65-90	30-60	15-40
	60-70	Weathered bedrock	---	---	---	---	---	---	---	---	---
Lenberg---------	0-4	Silt loam--------	ML, CL, CL-ML	A-4, A-6, A-7	0-5	75-100	75-100	75-95	65-90	20-45	2-22
	4-14	Silty clay loam, silty clay, gravelly clay.	CL, CH	A-6, A-7	0-5	75-100	60-100	55-95	50-90	35-70	15-40
	14-24	Silty clay, clay, gravelly clay.	CL, CH, ML, MH	A-7	0-5	75-100	55-100	54-95	50-90	45-70	19-40
	24-38	Channery silty clay, clay, silty clay.	CL, CH, SC, GC	A-7	0-40	60-95	40-95	40-95	36-90	45-70	20-40
	38-45	Weathered bedrock	---	---	---	---	---	---	---	---	---

TABLE 15.--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	
CeB-------------- Chenault	0-9	Gravelly silt loam.	ML, CL-ML	A-4	0-5	65-90	60-90	55-85	55-85	<35	NP-10
	9-42	Gravelly silty clay loam, silty clay loam, clay loam.	CL, CL-ML	A-4, A-6	0-5	65-85	60-85	55-80	55-80	25-40	5-20
	42-65	Gravelly clay, clay, silty clay.	CL, CH	A-7	0	65-90	60-90	60-90	60-90	45-75	20-45
ChC2, ChD2------- Christian	0-11	Silt loam--------	SM, SM-SC, ML, CL-ML	A-4	0-5	85-100	85-100	70-95	40-85	<30	NP-7
	11-20	Clay loam, gravelly silty clay loam, gravelly silty clay.	ML, CL, SC, GC	A-4, A-6	0-10	70-100	50-100	40-100	36-95	20-40	2-20
	20-67	Clay, clay loam, gravelly clay.	CL, CH, SC, GC	A-7	0-10	70-100	50-100	45-100	40-90	41-70	20-42
	67-75	Clay, clay loam, gravelly clay.	CL, CH, SC, GC	A-7	0-10	70-100	50-100	45-100	40-90	41-70	20-42
CnD3------------- Christian	0-11	Clay loam--------	ML, CL, CL-ML	A-4, A-6	0-5	85-100	85-100	85-100	70-95	20-40	2-20
	11-20	Clay loam, gravelly silty clay loam, gravelly silty clay.	ML, CL, SC, GC	A-4, A-6	0-10	70-100	50-100	40-100	36-95	20-40	2-20
	20-67	Clay, clay loam, gravelly clay.	CL, CH, SC, GC	A-7	0-10	70-100	50-100	45-100	40-90	41-70	20-42
	67-75	Clay, clay loam, gravelly clay.	CL, CH, SC, GC	A-7	0-10	70-100	50-100	45-100	40-90	41-70	20-42
CrB-------------- Crider	0-10	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	85-100	25-35	3-12
	10-28	Silt loam, silty clay loam.	CL, ML, CL-ML	A-7, A-6, A-4	0	100	95-100	90-100	85-100	25-42	3-20
	28-62	Silty clay, clay, silty clay loam.	CL, CH	A-7, A-6	0-5	85-100	75-100	70-100	60-100	35-65	15-40
CrC2------------- Crider	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	85-100	25-35	3-12
	7-28	Silt loam, silty clay loam.	CL, ML, CL-ML	A-7, A-6, A-4	0	100	95-100	90-100	85-100	25-42	3-20
	28-62	Silty clay, clay, silty clay loam.	CL, CH	A-7, A-6	0-5	85-100	75-100	70-100	60-100	35-65	15-40
CyF2: Cynthiana-------	0-4	Flaggy silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0-30	70-100	65-100	60-100	55-100	25-42	4-20
	4-18	Flaggy clay, flaggy silty clay, clay.	CH, CL	A-7	5-30	70-100	65-100	60-100	55-100	45-75	20-45
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
CyF2:											
Faywood----------	0-4	Silty clay loam	CL	A-6, A-7	0-15	100	95-100	90-100	85-100	34-42	15-22
	4-34	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-15	90-100	90-100	85-100	75-100	42-70	20-45
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
EdD2-------------- Eden	0-4	Silty clay loam	CL, CH	A-7, A-6	0-15	85-100	80-100	75-100	70-100	35-65	12-35
	4-34	Flaggy silty clay, flaggy clay, silty clay.	CH, CL	A-7	10-45	75-100	55-100	50-100	50-95	45-75	20-45
	34-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
EeE2:											
Eden-------------	0-4	Silty clay loam	CL, CH	A-7, A-6	0-15	85-100	80-100	75-100	70-100	35-65	12-35
	4-34	Flaggy silty clay, flaggy clay, silty clay.	CH, CL	A-7	10-45	75-100	55-100	50-100	50-95	45-75	20-45
	34-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Cynthiana--------	0-4	Flaggy silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-30	70-100	65-100	60-100	55-100	25-42	4-20
	4-18	Flaggy clay, flaggy silty clay, clay.	MH, CH, CL	A-7	5-30	70-100	65-100	60-100	55-100	45-75	20-45
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
EkB-------------- Elk	0-10	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	70-95	25-35	3-10
	10-60	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
	60-70	Silty clay loam, silt loam, silty clay.	ML, CL, CL-ML, SM-SC	A-4, A-6	0	75-100	50-100	45-100	40-95	25-40	5-15
EkC2------------- Elk	0-8	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	70-95	25-35	3-10
	8-60	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
	60-70	Silty clay loam, silt loam, silty clay.	ML, CL, CL-ML, SM-SC	A-4, A-6	0	75-100	50-100	45-100	40-95	25-40	5-15
FaC2, FaD2-------- Faywood	0-4	Silty clay loam	CL	A-6, A-7	0-15	100	95-100	90-100	85-100	34-42	15-22
	4-34	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-15	90-100	90-100	85-100	75-100	42-70	20-45
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
FcE2:											
Faywood----------	0-4	Silty clay loam	CL	A-6, A-7	0-15	100	95-100	90-100	85-100	34-42	15-22
	4-34	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-15	90-100	90-100	85-100	75-100	42-70	20-45
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
FcE2:											
Cynthiana-------	0-4	Flaggy silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-30	70-100	65-100	60-100	55-100	25-42	4-20
	4-18	Flaggy clay, flaggy silty clay, clay.	MH, CH, CL	A-7	5-30	70-100	65-100	60-100	55-100	45-75	20-45
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
FrC, FrD--------- Frankstown	0-6	Gravelly silt loam.	ML, CL-ML	A-4, A-6	0	75-100	70-85	65-80	60-80	25-40	4-12
	6-40	Channery silty clay loam, gravelly silty clay loam, silt loam.	ML, CL, CH, GC	A-6, A-7, A-4	0	60-100	55-100	50-100	45-95	25-50	7-23
	40-50	Channery silty clay loam, channery silt loam, very gravelly clay.	MH, CL, CH, GC	A-6, A-7	0-5	45-100	40-95	40-95	35-95	30-65	11-35
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GaF-------------- Garmon	0-7	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
	7-14	Loam, channery silt loam, channery silty clay loam.	GM-GC, CL-ML, CL, SM-SC	A-4, A-6	0-15	60-85	50-85	45-80	36-70	20-40	5-20
	14-25	Channery silt loam, channery silty clay loam, channery loam.	GM-GC, CL-ML, CL, SM-SC	A-4, A-6	0-15	60-85	50-85	45-80	36-70	20-40	5-20
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GrB-------------- Greenbriar	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	70-90	25-35	5-10
	7-51	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7-6	0	95-100	85-100	80-100	70-95	25-45	4-20
	51-56	Channery silty clay loam, channery silty clay, silty clay loam.	CL, SM-SC	A-6, A-7-6	0-10	65-100	60-100	60-100	50-95	30-50	10-30
	56-59	Weathered bedrock	---	---	---	---	---	---	---	---	---
	59	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 15.--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	
JeB:											
Jessietown------	0-8	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	70-90	25-35	5-10
	8-30	Silty clay loam, silt loam.	ML, CL, CL-ML	A-4, A-6, A-7-6	0	95-100	85-100	80-100	70-95	25-45	5-20
	30-34	Channery silty clay loam, channery silty clay, silt loam.	ML, CL, CL-ML, GM-GC	A-4, A-6, A-7-6	0	65-100	50-100	45-100	40-95	25-50	5-30
	34-36	Weathered bedrock	---	---	---	---	---	---	---	---	---
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Trappist--------	0-6	Silty clay loam	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-95	22-40	4-20
	6-18	Silty clay, clay, channery silty clay.	CL, CH	A-7, A-6	0	80-100	60-100	55-100	50-95	35-60	12-30
	18-25	Very channery clay, very channery silty clay, channery clay.	GC, CL, CH, SC	A-2, A-7, A-6	0-5	30-75	20-65	20-60	15-60	35-60	12-30
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
La--------------- Lawrence	0-9	Silt loam--------	ML	A-4	0	100	95-100	90-100	80-100	25-35	2-10
	9-32	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	80-100	25-42	5-20
	32-62	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	80-100	25-42	5-20
LbC2, LbD2------- Lenberg	0-4	Silt loam--------	ML, CL, CL-ML	A-4, A-6, A-7	0-5	75-100	75-100	75-95	65-90	20-45	2-22
	4-14	Silty clay loam, silty clay, gravelly clay.	CL, CH	A-6, A-7	0-5	75-100	60-100	55-95	50-90	35-70	15-40
	14-24	Silty clay, clay, gravelly clay.	CL, CH, ML, MH	A-7	0-5	75-100	55-100	54-95	50-90	45-70	19-40
	24-38	Channery silty clay, clay, silty clay.	CL, CH, SC, GC	A-7	0-40	60-95	40-95	40-95	36-90	45-70	20-40
	38-45	Weathered bedrock	---	---	---	---	---	---	---	---	---
LeE2------------- Lenberg	0-5	Silty clay loam	ML, CL, CL-ML	A-4, A-6, A-7	0-5	75-100	75-100	75-95	65-90	20-45	2-22
	5-14	Silty clay loam, silty clay, gravelly clay.	CL, CH	A-6, A-7	0-5	75-100	60-100	55-95	50-90	35-70	15-40
	14-24	Silty clay, clay, gravelly clay.	CL, CH, ML, MH	A-7	0-5	75-100	55-100	54-95	50-90	45-70	19-40
	24-38	Channery silty clay, clay, silty clay.	CL, CH, SC, GC	A-7	0-40	60-95	40-95	40-95	36-90	45-70	20-40
	38-45	Weathered bedrock	---	---	---	---	---	---	---	---	---

TABLE 15.--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	
LnB-------------- Lowell	0-6	Silt loam--------	ML, CL, CL-ML	A-4	0	100	95-100	90-100	85-100	22-32	4-10
	6-34	Silty clay, clay, silty clay loam.	CL, CH, MH	A-7, A-6	0	100	95-100	90-100	85-100	35-65	15-32
	34-48	Clay, silty clay	CH, MH, CL	A-7	0-20	95-100	90-100	85-100	75-100	45-75	20-40
	48	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LoC2, LoD2------- Lowell	0-5	Silty clay loam	ML, CL, CL-ML	A-4	0	100	95-100	90-100	85-100	22-32	4-10
	5-34	Silty clay, clay, silty clay loam.	CL, CH, MH	A-7, A-6	0	100	95-100	90-100	85-100	35-65	15-32
	34-48	Clay, silty clay	CH, MH, CL	A-7	0-20	95-100	90-100	85-100	75-100	45-75	20-40
	48	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LpC3, LpD3------- Lowell	0-4	Silty clay-------	CL, CH, MH	A-6, A-7	0	100	95-100	90-100	85-100	34-55	15-32
	4-28	Silty clay, clay, silty clay loam.	CL, CH, MH	A-7, A-6	0	100	95-100	90-100	85-100	35-65	15-32
	28-42	Clay, silty clay	CH, MH, CL	A-7	0-20	95-100	90-100	85-100	75-100	45-75	20-40
	42	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LsC2------------- Lowell	0-5	Silty clay loam	CL	A-6, A-7	0	100	95-100	90-100	85-100	34-42	15-22
	5-47	Silty clay loam, silty clay, clay.	CL, CH, MH	A-7, A-6	0	100	95-100	90-100	85-100	35-65	15-32
	47-54	Silty clay, clay	CH, MH, CL	A-7	0-10	95-100	90-100	85-100	80-100	45-75	20-40
	54-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Me, Mn----------- Melvin	0-5	Silt loam--------	CL, CL-ML, ML	A-4	0	95-100	90-100	80-100	80-95	25-35	4-10
	5-37	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	80-98	25-40	5-20
	37-65	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	85-100	80-100	70-100	60-98	25-40	5-20
MoB-------------- Mountview	0-7	Silt loam--------	ML, CL-ML	A-4	0	100	95-100	95-100	80-96	20-30	2-7
	7-28	Silt loam, silty clay loam.	CL	A-6, A-7	0	95-100	95-100	90-100	80-96	30-43	10-23
	28-80	Clay, gravelly clay, gravelly silty clay loam.	CL, ML, MH, CH	A-6, A-7	0-20	75-100	65-100	60-98	50-96	35-65	11-32
MoC2------------- Mountview	0-5	Silt loam--------	ML, CL-ML	A-4	0	100	95-100	95-100	80-96	20-30	2-7
	5-26	Silt loam, silty clay loam.	CL	A-6, A-7	0	95-100	95-100	90-100	80-96	30-43	10-23
	26-80	Clay, gravelly clay, gravelly silty clay loam.	CL, ML, MH, CH	A-6, A-7	0-20	75-100	65-100	60-98	50-96	35-65	11-32
Na, Ne----------- Newark	0-9	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	90-100	80-100	55-95	<32	NP-10
	9-24	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	70-100	22-42	3-20
	24-60	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-3	75-100	70-100	65-100	55-95	22-42	3-20

TABLE 15.--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	
NhB-------------- Nicholson	0-8	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	80-95	25-35	5-10
	8-22	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-4, A-7	0	95-100	85-100	85-100	80-100	25-45	5-20
	22-48	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-4, A-7	0	95-100	90-100	80-100	75-100	25-45	5-20
	48-60	Silty clay loam, silty clay, channery clay.	CH, CL	A-6, A-7	0-10	80-100	70-100	60-100	55-100	34-70	16-40
NhC2------------- Nicholson	0-6	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	80-95	25-35	5-10
	6-20	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-4, A-7	0	95-100	85-100	85-100	80-100	25-45	5-20
	20-46	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-4, A-7	0	95-100	90-100	80-100	75-100	25-45	5-20
	46-60	Silty clay loam, silty clay, channery clay.	CH, CL	A-6, A-7	0-10	80-100	70-100	60-100	55-100	34-70	16-40
No--------------- Nolin	0-10	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	10-54	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	85-100	75-100	25-46	5-23
	54-60	Loam, silt loam, gravelly loam.	ML, CL, CL-ML, GM	A-4, A-6	0-10	50-100	50-100	40-95	35-95	<30	NP-15
OtB-------------- Otwell	0-11	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-95	25-35	5-15
	11-23	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6	0	100	100	95-100	70-95	25-40	5-20
	23-42	Silty clay loam, loam, silt loam.	CL	A-6, A-7	0	95-100	95-100	85-100	65-90	35-50	20-30
	42-60	Silty clay, silty clay loam.	CL, CH	A-6, A-7	0	95-100	90-100	85-100	65-95	35-55	15-25
Pt. Pits, quarry											
RaC-------------- Riney	0-12	Loam-------------	CL, ML, SM, SC	A-4	0	90-100	85-100	65-80	35-75	10-30	NP-10
	12-63	Clay loam, sandy clay loam.	ML, CL, SC, SM-SC	A-6, A-2, A-4	0	80-100	70-100	70-85	25-75	20-35	2-15
RcE2:											
Riney-----------	0-10	Loam-------------	CL, ML, SM, SC	A-4	0	90-100	85-100	65-80	35-75	10-30	NP-10
	10-63	Clay loam, sandy clay loam.	ML, CL, SC, SM-SC	A-6, A-2, A-4	0	80-100	70-100	70-85	25-75	20-35	2-15
Christian-------	0-11	Silt loam--------	SM, SM-SC, ML, CL-ML	A-4	0-5	85-100	85-100	70-95	40-85	<30	NP-7
	11-20	Clay loam, gravelly silty clay loam, gravelly silty clay.	ML, CL, SC, GC	A-4, A-6	0-10	70-100	50-100	40-100	36-95	20-40	2-20
	20-67	Clay, clay loam, gravelly clay.	CL, CH, SC, GC	A-7	0-10	70-100	50-100	45-100	40-90	41-70	20-42
	67-75	Clay, clay loam, gravelly clay.	CL, CH, SC, GC	A-7	0-10	70-100	50-100	45-100	40-90	41-70	20-42

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
Ro------------- Robertsville	0-5	Silt loam	ML	A-4	0	95-100	95-100	85-100	75-100	25-35	2-10
	5-30	Silt loam, silty clay loam.	ML, CL	A-4, A-6, A-7	0	95-100	95-100	90-100	80-100	25-45	3-20
	30-56	Silty clay loam, silt loam.	ML, CL	A-4, A-6, A-7	0	95-100	95-100	90-100	80-100	25-45	3-20
	56-70	Silty clay loam, silty clay, silt loam.	CL, CH, CL-ML	A-6, A-7, A-4	0-5	80-100	75-100	70-100	60-100	25-60	5-35
RtD2, RtF2: Rohan-----------	0-4	Channery silt loam.	CL, ML, GC, GM-GC	A-4, A-6	0-10	55-80	50-75	45-70	35-65	25-40	3-15
	4-14	Extremely channery silty clay loam, very channery silty clay loam, very channery silt loam.	GC, GM, GM-GC	A-2, A-6, A-7, A-1-b	0-15	25-60	25-55	20-50	15-40	25-45	3-20
	14-18	Weathered bedrock	---	---	---	---	---	---	---	---	---
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Trappist--------	0-4	Silty clay loam	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-95	22-40	4-20
	4-16	Silty clay, clay, channery silty clay.	CL, CH	A-7, A-6	0	80-100	60-100	55-100	50-95	35-60	12-30
	16-21	Very channery clay, very channery silty clay, channery clay.	GC, CL, CH, SC	A-2, A-7, A-6	0-5	30-75	20-65	20-60	15-60	35-60	12-30
	21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
SaB-------------- Sandview	0-8	Silt loam	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-95	25-35	5-10
	8-35	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	85-100	25-45	5-20
	35-76	Silty clay, clay	CH, CL	A-7	0-10	90-100	90-100	85-100	75-100	45-75	20-45
	76	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
SaC2------------- Sandview	0-6	Silt loam	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-95	25-35	5-10
	6-35	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	85-100	25-45	5-20
	35-76	Silty clay, clay	CH, CL	A-7	0-10	90-100	90-100	85-100	75-100	45-75	20-45
	76	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 15.--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	
Se---------------- Sensabaugh	0-8	Gravelly silt loam	CL-ML, SM-SC, ML, SM	A-4	0-18	75-90	65-75	55-65	40-55	16-29	3-9
	8-40	Gravelly loam, gravelly clay loam, gravelly silty clay loam.	CL-ML, CL, SM-SC, GC	A-4, A-6	2-18	70-95	55-90	45-75	35-65	20-35	5-14
	40-60	Very gravelly loam, gravelly clay loam, gravelly silty clay loam.	SM-SC, SC, GM-GC, GC	A-4, A-6	5-25	70-90	55-75	45-65	35-55	22-36	6-15
SrE2: Shrouts----------	0-4	Silty clay loam	ML, CL-ML	A-4, A-6	0	100	90-100	85-100	80-100	24-40	4-12
	4-26	Clay, silty clay	CH, CL	A-7	0-10	90-100	90-100	85-100	80-100	45-65	20-40
	26-30	Clay, silty clay, channery silty clay.	CH, CL	A-7	0-20	85-100	75-100	75-100	65-100	45-70	20-40
	30-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
Brassfield-------	0-18	Loam-------------	ML, CL, CL-ML	A-4, A-6	0-10	85-95	70-90	70-90	55-85	<35	NP-15
	18-34	Silt loam, channery loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	5-15	80-90	70-90	65-90	50-85	<35	NP-15
	34-45	Weathered bedrock	---	---	---	---	---	---	---	---	---
TbA, TbB: Tilsit-----------	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	90-100	85-100	75-100	60-100	20-35	4-15
	8-27	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	90-100	85-100	75-100	65-100	25-40	5-20
	27-42	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	90-100	85-100	75-100	65-100	25-45	5-25
	42-53	Silt loam, channery silty clay loam, silty clay.	CL, CH, CL-ML	A-4, A-6, A-7	0-30	70-100	65-85	60-85	55-80	25-60	5-35
	53	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Berea------------	0-7	Silt loam--------	ML, CL	A-4	0-5	90-100	85-100	75-100	60-90	25-35	3-10
	7-31	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-4	0-5	90-100	85-100	75-100	65-95	25-40	5-20
	31-39	Channery silty clay loam, very channery silty clay, clay.	GC, CL, MH, CH	A-6, A-2, A-7	0-10	40-90	20-85	20-85	15-80	35-60	15-30
	39	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
TbC2:											
Tilsit----------	0-6	Silt loam--------	CL, CL-ML	A-4, A-6	0	90-100	85-100	75-100	60-100	20-35	4-15
	6-27	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	90-100	85-100	75-100	65-100	25-40	5-20
	27-42	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	90-100	85-100	75-100	65-100	25-45	5-25
	42-53	Silt loam, channery silty clay loam, silty clay.	CL, CH, CL-ML	A-4, A-6, A-7	0-30	70-100	65-85	60-85	55-80	25-60	5-35
	53	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Berea-----------	0-5	Silt loam--------	ML, CL	A-4	0-5	90-100	85-100	75-100	60-90	25-35	3-10
	5-29	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-4	0-5	90-100	85-100	75-100	65-95	25-40	5-20
	29-37	Channery silty clay loam, very channery silty clay, clay.	GC, CL, MH, CH	A-6, A-2, A-7	0-10	40-90	20-85	20-85	15-80	35-60	15-30
	37	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
TeC2:											
Trappist--------	0-4	Silty clay loam	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-95	22-40	4-20
	4-16	Silty clay, clay, channery silty clay.	CL, CH	A-7, A-6	0	80-100	60-100	55-100	50-95	35-60	12-30
	16-21	Very channery clay, very channery silty clay, channery clay.	GC, CL, ML, CH SC	A-2, A-7, A-6	0-5	30-75	20-65	20-60	15-60	35-60	12-30
	21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Jessietown------	0-6	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	70-90	25-35	5-10
	6-30	Silty clay loam, silt loam.	ML, CL, CL-ML	A-4, A-6, A-7-6	0	95-100	85-100	80-100	70-95	25-45	5-20
	30-34	Channery silty clay loam, channery silty clay, silt loam.	ML, CL, CL-ML, GM-GC	A-4, A-6, A-7-6	0	65-100	50-100	45-100	40-95	25-50	5-30
	34-36	Weathered bedrock	---	---	---	---	---	---	---	---	---
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
TrD2:											
Trappist--------	0-4	Silty clay loam	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-95	22-40	4-20
	4-16	Silty clay, clay, channery silty clay.	CL, CH	A-7, A-6	0	80-100	60-100	55-100	50-95	35-60	12-30
	16-21	Very channery clay, very channery silty clay, channery clay.	GC, CL, CH, SC	A-2, A-7, A-6	0-5	30-75	20-65	20-60	15-60	35-60	12-30
	21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
TrD2:											
Rohan-----------	0-4	Channery silt loam.	CL, ML, GC, GM-GC	A-4, A-6	0-10	55-80	50-75	45-70	35-65	25-40	3-15
	4-14	Extremely channery silty clay loam, very channery silty clay loam, very channery silt loam.	GC, GM, GM-GC	A-2, A-6, A-7, A-1-b	0-15	25-60	25-55	20-50	15-40	25-45	3-20
	14-18	Weathered bedrock	---	---	---	---	---	---	---	---	---
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Greenbriar------	0-5	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	90-100	85-100	70-90	25-35	5-10
	5-51	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7-6	0	95-100	85-100	80-100	70-95	25-45	4-20
	51-56	Channery silty clay loam, channery silty clay, silty clay loam.	CL	A-6, A-7-6	0-10	65-100	60-100	60-100	50-95	30-50	10-30
	56-59	Weathered bedrock	---	---	---	---	---	---	---	---	---
	59	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
TrD3:											
Trappist--------	0-2	Silty clay loam	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-95	22-40	4-20
	2-16	Silty clay, clay, channery silty clay.	CL, CH	A-7, A-6	0	80-100	60-100	55-100	50-95	35-60	12-30
	16-21	Very channery clay, very channery silty clay, channery clay.	GC, CL, CH, SC	A-2, A-7, A-6	0-5	30-75	20-65	20-60	15-60	35-60	12-30
	21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rohan-----------	0-3	Channery silt loam.	CL, ML, GC, GM-GC	A-4, A-6	0-10	55-80	50-75	45-70	35-65	25-40	3-15
	3-14	Extremely channery silty clay loam, very channery silty clay loam, very channery silt loam.	GC, GM, GM-GC	A-2, A-6, A-7, A-1-b	0-15	25-60	25-55	20-50	15-40	25-45	3-20
	14-18	Weathered bedrock	---	---	---	---	---	---	---	---	---
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 15.--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	
TrD3:											
Greenbriar------	0-4	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	70-90	25-35	5-10
	4-51	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7-6	0	95-100	85-100	80-100	70-95	25-45	4-20
	51-56	Channery silty clay loam, channery silty clay, silty clay loam.	CL	A-6, A-7-6	0-10	65-100	60-100	60-100	50-95	30-50	10-30
	56-59	Weathered bedrock	---	---	---	---	---	---	---	---	---
	59	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
BaB: Beasley	0-6	12-27	1.20-1.40	0.6-2.0	0.18-0.23	4.5-7.3	Low	0.43	3	.5-4
	6-36	40-60	1.30-1.55	0.2-0.6	0.12-0.18	4.5-7.3	Moderate	0.28		
	36-54	40-60	1.50-1.70	0.2-0.6	0.10-0.16	6.6-8.4	Moderate	0.28		
	54-60	---	---	0.0-0.6	---	---	---	---		
BcC2: Beasley	0-5	27-40	1.20-1.40	0.6-2.0	0.14-0.23	4.5-7.3	Low	0.32	3	.5-2
	5-36	40-60	1.30-1.55	0.2-0.6	0.12-0.18	4.5-7.3	Moderate	0.28		
	36-54	40-60	1.50-1.70	0.2-0.6	0.10-0.16	6.6-8.4	Moderate	0.28		
	54-60	---	---	0.0-0.6	---	---	---	---		
BeC3, BeD3: Beasley	0-4	40-60	1.20-1.40	0.6-2.0	0.14-0.23	4.5-7.3	Low	0.32	3	.5-2
	4-36	40-60	1.30-1.55	0.2-0.6	0.12-0.18	4.5-7.3	Moderate	0.28		
	36-54	40-60	1.50-1.70	0.2-0.6	0.10-0.16	6.6-8.4	Moderate	0.28		
	54-60	---	---	0.0-0.6	---	---	---	---		
CaB, CaC, CaD: Carpenter	0-8	12-27	1.20-1.40	2.0-6.0	0.16-0.22	4.5-6.5	Low	0.28	4	1-4
	8-42	18-35	1.20-1.50	0.6-2.0	0.10-0.20	4.5-6.5	Low	0.28		
	42-60	30-55	1.20-1.60	0.06-0.6	0.07-0.16	4.5-6.0	Moderate	0.28		
	60-70	---	---	---	---	---	---	---		
CbF2:										
Carpenter	0-6	12-27	1.20-1.40	2.0-6.0	0.16-0.22	4.5-6.5	Low	0.28	4	1-4
	6-42	18-35	1.20-1.50	0.6-2.0	0.10-0.20	4.5-6.5	Low	0.28		
	42-60	30-55	1.20-1.60	0.06-0.6	0.07-0.16	4.5-6.0	Moderate	0.28		
	60-70	---	---	---	---	---	---	---		
Lenberg	0-4	12-27	1.30-1.50	0.6-2.0	0.18-0.23	4.5-7.3	Low	0.43	3	.5-3
	4-14	35-60	1.40-1.60	0.2-0.6	0.10-0.19	4.5-5.5	Moderate	0.37		
	14-24	40-60	1.40-1.65	0.2-0.6	0.10-0.18	4.5-5.5	Moderate	0.37		
	24-38	40-60	1.40-1.65	0.2-0.6	0.10-0.16	4.5-5.5	Moderate	0.28		
	38-45	---	---	---	---	---	---	---		
CeB: Chenault	0-9	10-27	1.20-1.40	2.0-6.0	0.16-0.22	5.1-7.3	Low	0.28	4	1-4
	9-42	18-35	1.20-1.50	0.6-2.0	0.10-0.20	5.1-6.5	Low	0.28		
	42-65	40-55	1.30-1.60	0.6-2.0	0.07-0.16	5.6-7.3	Moderate	0.28		
ChC2, ChD2: Christian	0-11	12-27	1.20-1.40	2.0-6.0	0.11-0.18	3.6-6.5	Low	0.37	3	1-3
	11-20	25-42	1.20-1.50	0.6-2.0	0.14-0.22	3.6-6.5	Moderate	0.28		
	20-67	40-60	1.30-1.60	0.6-2.0	0.10-0.16	3.6-6.5	Moderate	0.28		
	67-75	40-60	1.30-1.60	0.6-2.0	0.10-0.16	3.6-6.5	Moderate	0.28		
CnD3: Christian	0-11	27-40	1.20-1.50	0.6-2.0	0.14-0.22	3.6-6.5	Low	0.37	3	<2
	11-20	25-42	1.20-1.50	0.6-2.0	0.14-0.22	3.6-6.5	Moderate	0.28		
	20-67	40-60	1.30-1.60	0.6-2.0	0.10-0.16	3.6-6.5	Moderate	0.28		
	67-75	40-60	1.30-1.60	0.6-2.0	0.10-0.16	3.6-6.5	Moderate	0.28		
CrB: Crider	0-10	15-27	1.20-1.40	0.6-2.0	0.19-0.23	5.1-7.3	Low	0.32	5	2-4
	10-28	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.1-7.3	Low	0.28		
	28-62	30-60	1.20-1.55	0.6-2.0	0.12-0.18	4.5-6.5	Moderate	0.28		
CrC2: Crider	0-7	15-27	1.20-1.40	0.6-2.0	0.19-0.23	5.1-7.3	Low	0.32	5	2-4
	7-28	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.1-7.3	Low	0.28		
	28-62	30-60	1.20-1.55	0.6-2.0	0.12-0.18	4.5-6.5	Moderate	0.28		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
CyF2:										
Cynthiana-------	0-4	27-40	1.20-1.40	0.6-2.0	0.15-0.20	6.1-7.8	Moderate-----	0.37	2	1-4
	4-18	40-60	1.35-1.60	0.2-0.6	0.08-0.15	6.1-7.8	Moderate-----	0.28		
	18	---	---	---	---	---	-------------	----		
Faywood---------	0-4	27-40	1.30-1.40	0.6-2.0	0.18-0.22	5.1-7.8	Low----------	0.37	3	1-4
	4-34	35-60	1.35-1.45	0.06-0.6	0.12-0.17	5.1-7.8	Moderate-----	0.28		
	34	---	---	---	---	---	-------------	----		
Rock outcrop.										
EdD2------------- Eden	0-4	27-40	1.35-1.55	0.06-0.6	0.12-0.18	4.5-8.4	Moderate-----	0.43	3	.5-3
	4-34	40-60	1.45-1.65	0.06-0.2	0.08-0.13	5.1-8.4	Moderate-----	0.28		
	34-60	---	---	---	---	---	-------------	0.17		
EeE2:										
Eden------------	0-4	27-40	1.35-1.55	0.06-0.6	0.12-0.18	4.5-8.4	Moderate-----	0.43	3	.5-3
	4-34	40-60	1.45-1.65	0.06-0.2	0.08-0.13	5.1-8.4	Moderate-----	0.28		
	34-60	---	---	---	---	---	-------------	0.17		
Cynthiana-------	0-4	27-40	1.20-1.40	0.6-2.0	0.15-0.20	6.1-7.8	Moderate-----	0.37	2	1-4
	4-18	40-60	1.35-1.60	0.2-0.6	0.08-0.15	6.1-7.8	Moderate-----	0.28		
	18	---	---	---	---	---	-------------	----		
EkB-------------- Elk	0-10	12-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-6.5	Low----------	0.37	5	.5-3
	10-60	18-34	1.20-1.50	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.28		
	60-70	15-42	1.20-1.50	0.6-2.0	0.14-0.20	4.5-6.5	Low----------	0.28		
EkC2------------- Elk	0-8	12-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-6.5	Low----------	0.37	5	.5-3
	8-60	18-34	1.20-1.50	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.28		
	60-70	15-42	1.20-1.50	0.6-2.0	0.14-0.20	4.5-6.5	Low----------	0.28		
FaC2, FaD2------- Faywood	0-4	27-40	1.30-1.40	0.6-2.0	0.18-0.22	5.1-7.8	Low----------	0.37	3	1-4
	4-34	35-60	1.35-1.45	0.06-0.6	0.12-0.17	5.1-7.8	Moderate-----	0.28		
	34	---	---	---	---	---	-------------	----		
FcE2:										
Faywood---------	0-4	27-40	1.30-1.40	0.6-2.0	0.18-0.22	5.1-7.8	Low----------	0.37	3	1-4
	4-34	35-60	1.35-1.45	0.06-0.6	0.12-0.17	5.1-7.8	Moderate-----	0.28		
	34	---	---	---	---	---	-------------	----		
Cynthiana-------	0-4	15-40	1.20-1.40	0.6-2.0	0.15-0.20	6.1-7.8	Moderate-----	0.37	2	1-4
	4-18	40-60	1.35-1.60	0.2-0.6	0.08-0.15	6.1-7.8	Moderate-----	0.28		
	18	---	---	---	---	---	-------------	----		
FrC, FrD--------- Frankstown	0-6	18-27	1.20-1.40	0.6-2.0	0.16-0.20	5.1-6.0	Low----------	0.28	3	1-4
	6-40	25-35	1.30-1.50	0.6-2.0	0.14-0.20	4.5-6.0	Moderate-----	0.28		
	40-50	25-45	1.30-1.50	0.6-2.0	0.12-0.16	4.5-6.0	Moderate-----	0.28		
	50	---	---	---	---	---	-------------	----		
GaF-------------- Garmon	0-7	12-27	1.20-1.40	2.0-6.0	0.05-0.16	4.5-7.3	Low----------	0.28	3	<3
	7-14	18-34	1.20-1.50	2.0-6.0	0.05-0.16	4.5-7.3	Low----------	0.28		
	14-25	18-34	1.20-1.50	2.0-6.0	0.05-0.16	5.6-7.3	Low----------	0.20		
	25	---	---	---	---	---	-------------	----		
GrB-------------- Greenbriar	0-7	12-27	1.20-1.40	0.6-2.0	0.19-0.23	3.6-5.5	Low----------	0.43	4	.5-4
	7-51	18-34	1.20-1.50	0.6-2.0	0.18-0.23	3.6-5.5	Low----------	0.28		
	51-56	28-45	1.20-1.50	0.6-2.0	0.12-0.20	3.6-5.5	Low----------	0.28		
	56-59	---	---	---	---	---	-------------	----		
	59	---	---	---	---	---	-------------	----		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
JeB:										
Jessietown------	0-8	12-27	1.20-1.40	0.6-2.0	0.19-0.23	3.6-5.5	Low----------	0.37	3	.5-4
	8-30	12-34	1.20-1.50	0.6-2.0	0.18-0.23	3.6-5.5	Low----------	0.28		
	30-34	15-45	1.20-1.50	0.6-2.0	0.12-0.20	3.6-5.5	Low----------	0.28		
	34-36	---	---	---	---	---	-------------	----		
	36	---	---	---	---	---	-------------	----		
Trappist--------	0-6	27-40	1.20-1.40	0.6-2.0	0.15-0.23	3.6-5.5	Low----------	0.32	2	.5-2
	6-18	30-60	1.40-1.65	0.2-0.6	0.08-0.18	3.6-5.5	Moderate-----	0.28		
	18-25	35-60	1.40-1.60	0.06-0.2	0.05-0.12	3.6-5.5	Moderate-----	0.24		
	25	---	---	---	---	---	-------------	----		
La--------------- Lawrence	0-9	12-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-6.5	Low----------	0.43	3	1-4
	9-32	18-35	1.40-1.60	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.37		
	32-62	18-35	1.50-1.70	0.06-0.2	0.08-0.12	4.5-5.5	Low----------	0.43		
LbC2, LbD2------- Lenberg	0-4	12-27	1.30-1.50	0.6-2.0	0.18-0.23	4.5-7.3	Low----------	0.43	3	.5-3
	4-14	35-60	1.40-1.60	0.2-0.6	0.10-0.19	4.5-5.5	Moderate-----	0.37		
	14-24	40-60	1.40-1.65	0.2-0.6	0.10-0.18	4.5-5.5	Moderate-----	0.37		
	24-38	40-60	1.40-1.65	0.2-0.6	0.10-0.16	4.5-5.5	Moderate-----	0.28		
	38-45	---	---	---	---	---	-------------	----		
LeE2------------- Lenberg	0-5	12-35	1.30-1.50	0.6-2.0	0.18-0.23	4.5-7.3	Low----------	0.43	3	.5-3
	5-14	35-60	1.40-1.60	0.2-0.6	0.10-0.19	4.5-5.5	Moderate-----	0.37		
	14-24	40-60	1.40-1.65	0.2-0.6	0.10-0.18	4.5-5.5	Moderate-----	0.37		
	24-38	40-60	1.40-1.65	0.2-0.6	0.10-0.16	4.5-5.5	Moderate-----	0.28		
	38-45	---	---	---	---	---	-------------	----		
LnB-------------- Lowell	0-6	12-27	1.20-1.40	0.6-2.0	0.18-0.23	4.5-6.5	Low----------	0.37	3	1-4
	6-34	35-60	1.30-1.60	0.2-2.0	0.13-0.19	4.5-6.5	Moderate-----	0.28		
	34-48	40-60	1.50-1.70	0.2-0.6	0.12-0.17	5.1-7.8	Moderate-----	0.28		
	48	---	---	---	---	---	-------------	----		
LoC2, LoD2------- Lowell	0-5	28-40	1.20-1.40	0.6-2.0	0.18-0.23	4.5-6.5	Low----------	0.37	3	1-4
	5-34	35-60	1.30-1.60	0.2-2.0	0.13-0.19	4.5-6.5	Moderate-----	0.28		
	34-48	40-60	1.50-1.70	0.2-0.6	0.12-0.17	5.1-7.8	Moderate-----	0.28		
	48	---	---	---	---	---	-------------	----		
LpC3, LpD3------- Lowell	0-4	40-60	1.20-1.40	0.6-2.0	0.18-0.23	4.5-6.5	Low----------	0.37	3	.5-2
	4-28	35-60	1.30-1.60	0.2-2.0	0.13-0.19	4.5-6.5	Moderate-----	0.28		
	28-42	40-60	1.50-1.70	0.2-0.6	0.12-0.17	5.1-7.8	Moderate-----	0.28		
	42	---	---	---	---	---	-------------	----		
LsC2------------- Lowell	0-5	28-40	1.20-1.40	0.6-2.0	0.18-0.23	4.5-6.5	Low----------	0.37	3	.5-2
	5-47	35-60	1.30-1.60	0.2-2.0	0.13-0.19	5.1-6.5	Moderate-----	0.28		
	47-54	40-60	1.50-1.70	0.2-0.6	0.12-0.17	5.6-7.8	Moderate-----	0.28		
	54-60	---	---	---	---	---	-------------	----		
Me, Mn----------- Melvin	0-5	12-17	1.20-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43	5	.5-3
	5-37	12-35	1.30-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43		
	37-65	7-35	1.40-1.70	0.6-2.0	0.16-0.23	5.6-7.8	Low----------	0.43		
MoB-------------- Mountview	0-7	15-25	1.35-1.55	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.43	5	1-3
	7-28	20-35	1.40-1.60	0.6-2.0	0.17-0.20	4.5-5.5	Low----------	0.43		
	28-80	35-55	1.30-1.50	0.6-2.0	0.10-0.15	4.5-5.5	Moderate-----	0.32		
MoC2------------- Mountview	0-5	15-25	1.35-1.55	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.43	5	1-3
	5-26	20-35	1.40-1.60	0.6-2.0	0.17-0.20	4.5-5.5	Low----------	0.43		
	26-80	35-55	1.30-1.50	0.6-2.0	0.10-0.15	4.5-5.5	Moderate-----	0.32		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Na, Ne-----------	0-9	12-27	1.20-1.40	0.6-2.0	0.15-0.23	5.6-7.8	Low-----------	0.43	5	1-4
Newark	9-24	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.6-7.8	Low-----------	0.43		
	24-60	12-40	1.30-1.50	0.6-2.0	0.15-0.22	5.6-7.8	Low-----------	0.43		
NhB--------------	0-8	12-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-7.3	Low-----------	0.43	3	2-4
Nicholson	8-22	18-35	1.40-1.60	0.6-2.0	0.18-0.22	4.5-6.5	Low-----------	0.43		
	22-48	18-35	1.50-1.70	0.06-0.2	0.07-0.12	4.5-6.5	Low-----------	0.43		
	48-60	35-60	1.40-1.60	0.06-0.6	0.07-0.12	5.1-7.8	Moderate-----	0.37		
NhC2-------------	0-6	12-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-7.3	Low-----------	0.43	3	2-4
Nicholson	6-20	18-35	1.40-1.60	0.6-2.0	0.18-0.22	4.5-6.5	Low-----------	0.43		
	20-46	18-35	1.50-1.70	0.06-0.2	0.07-0.12	4.5-6.5	Low-----------	0.43		
	46-60	35-60	1.40-1.60	0.06-0.6	0.07-0.12	5.1-7.8	Moderate-----	0.37		
No---------------	0-10	12-27	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low-----------	0.43	5	2-4
Nolin	10-54	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low-----------	0.43		
	54-60	10-30	1.30-1.55	0.6-6.0	0.10-0.23	5.6-8.4	Low-----------	0.43		
OtB--------------	0-11	18-27	1.25-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low-----------	0.43	4	.5-2
Otwell	11-23	22-35	1.30-1.45	0.2-0.6	0.18-0.22	4.5-5.5	Low-----------	0.43		
	23-42	18-30	1.60-1.80	<0.06	0.06-0.08	4.5-5.5	Moderate-----	0.43		
	42-60	27-45	1.55-1.65	0.06-0.2	0.19-0.21	5.1-6.5	Moderate-----	0.43		
Pt. Pits, quarry										
RaC--------------	0-12	10-25	1.20-1.40	2.0-6.0	0.12-0.18	5.1-7.3	Low-----------	0.28	4	.5-3
Riney	12-63	20-35	1.20-1.50	2.0-6.0	0.13-0.17	4.5-5.5	Low-----------	0.28		
RcE2:										
Riney-----------	0-10	10-25	1.20-1.40	2.0-6.0	0.12-0.18	5.1-7.3	Low-----------	0.28	4	.5-3
	10-63	20-35	1.20-1.50	2.0-6.0	0.13-0.17	4.5-5.5	Low-----------	0.28		
Christian-------	0-11	12-27	1.20-1.40	2.0-6.0	0.11-0.18	3.6-6.5	Low-----------	0.37	3	1-3
	11-20	25-42	1.20-1.50	0.6-2.0	0.14-0.22	3.6-6.5	Moderate-----	0.28		
	20-67	40-60	1.30-1.60	0.6-2.0	0.10-0.16	3.6-6.5	Moderate-----	0.28		
	67-75	40-60	1.30-1.60	0.6-2.0	0.10-0.16	3.6-6.5	Moderate-----	0.28		
Ro---------------	0-5	12-27	1.30-1.50	0.6-2.0	0.19-0.23	3.6-5.5	Low-----------	0.43	3	1-3
Robertsville	5-30	15-35	1.40-1.60	0.6-2.0	0.18-0.22	3.6-5.5	Low-----------	0.43		
	30-56	18-35	1.50-1.65	0.06-0.2	0.08-0.12	3.6-5.5	Low-----------	0.43		
	56-70	15-45	1.40-1.60	0.2-0.6	0.08-0.12	4.5-7.3	Low-----------	0.37		
RtD2, RtF2:										
Rohan-----------	0-4	15-27	1.20-1.50	0.6-2.0	0.10-0.16	4.5-6.0	Low-----------	0.28	2	.5-3
	4-14	15-34	1.20-1.60	0.2-2.0	0.04-0.10	3.6-5.5	Low-----------	0.17		
	14-18	---	---	---	---	---	-------------	----		
	18	---	---	---	---	---	-------------	----		
Trappist--------	0-4	27-40	1.20-1.40	0.6-2.0	0.15-0.23	3.6-5.5	Low-----------	0.32	2	.5-2
	4-16	30-60	1.40-1.65	0.2-0.6	0.08-0.18	3.6-5.5	Moderate-----	0.28		
	16-21	35-60	1.40-1.60	0.06-0.2	0.05-0.12	3.6-5.5	Moderate-----	0.24		
	21	---	---	---	---	---	-------------	----		
SaB--------------	0-8	12-27	1.30-1.40	0.6-2.0	0.18-0.23	4.5-7.3	Low-----------	0.37	5	1-4
Sandview	8-35	18-34	1.30-1.45	0.6-2.0	0.18-0.23	4.5-7.3	Low-----------	0.32		
	35-76	40-65	1.35-1.60	0.2-0.6	0.12-0.18	5.1-7.8	Moderate-----	0.28		
	76	---	---	---	---	---	-------------	----		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
SaC2-------------Sandview	0-6	12-27	1.30-1.40	0.6-2.0	0.18-0.23	4.5-7.3	Low-----------	0.37	5	1-4
	6-35	18-34	1.30-1.45	0.6-2.0	0.18-0.23	4.5-7.3	Low-----------	0.32		
	35-76	40-65	1.35-1.60	0.2-0.6	0.12-0.18	5.1-7.8	Moderate-----	0.28		
	76	---	---	---	---	---	-------------	----		
Se---------------Sensabaugh	0-8	12-25	1.25-1.40	0.6-6.0	0.10-0.16	5.6-7.8	Low-----------	0.20	5	1-3
	8-40	18-35	1.30-1.50	0.6-6.0	0.10-0.16	5.6-7.8	Low-----------	0.20		
	40-60	12-35	1.30-1.50	0.6-6.0	0.10-0.15	5.6-7.8	Low-----------	0.17		
SrE2:										
Shrouts---------	0-4	27-40	1.40-1.55	0.06-0.2	0.15-0.20	5.1-8.4	Low-----------	0.43	2	.5-3
	4-26	40-65	1.40-1.65	0.06-0.2	0.13-0.17	5.1-8.4	Moderate-----	0.37		
	26-30	40-65	1.40-1.80	<0.06	0.08-0.14	6.6-8.4	Moderate-----	0.37		
	30-50	---	---	---	---	---	-------------	----		
Brassfield------	0-18	7-27	1.20-1.40	0.6-2.0	0.14-0.20	7.4-8.4	Low-----------	0.43	2	<3
	18-34	18-35	1.20-1.45	0.6-2.0	0.10-0.18	7.4-8.4	Low-----------	0.28		
	34-45	---	---	---	---	---	-------------	----		
TbA, TbB:										
Tilsit----------	0-8	12-25	1.20-1.55	0.6-2.0	0.16-0.22	3.6-7.3	Low-----------	0.43	3	1-3
	8-27	18-35	1.30-1.55	0.6-2.0	0.16-0.22	3.6-5.5	Low-----------	0.43		
	27-42	18-35	1.40-1.65	0.06-0.2	0.08-0.12	3.6-5.5	Low-----------	0.43		
	42-53	10-50	1.40-1.60	0.06-0.6	0.08-0.12	3.6-5.5	Low-----------	0.43		
	53	---	---	---	---	---	-------------	----		
Berea-----------	0-7	12-27	1.20-1.40	0.6-2.0	0.18-0.23	3.6-5.5	Low-----------	0.37	3	.5-3
	7-31	18-35	1.25-1.45	0.2-2.0	0.16-0.22	3.6-5.5	Low-----------	0.32		
	31-39	27-60	1.30-1.50	0.2-0.6	0.08-0.15	3.6-5.5	Moderate-----	0.28		
	39	---	---	---	---	---	-------------	----		
TbC2:										
Tilsit----------	0-6	12-25	1.20-1.55	0.6-2.0	0.16-0.22	3.6-7.3	Low-----------	0.43	3	1-3
	6-27	18-35	1.30-1.55	0.6-2.0	0.16-0.22	3.6-5.5	Low-----------	0.43		
	27-42	18-35	1.40-1.65	0.06-0.2	0.08-0.12	3.6-5.5	Low-----------	0.43		
	42-53	10-50	1.40-1.60	0.06-0.6	0.08-0.12	3.6-5.5	Low-----------	0.43		
	53	---	---	---	---	---	-------------	----		
Berea-----------	0-5	12-27	1.20-1.40	0.6-2.0	0.18-0.23	3.6-5.5	Low-----------	0.37	3	.5-3
	5-29	18-35	1.25-1.45	0.2-2.0	0.16-0.22	3.6-5.5	Low-----------	0.32		
	29-37	27-60	1.30-1.50	0.2-0.6	0.08-0.15	3.6-5.5	Moderate-----	0.28		
	37	---	---	---	---	---	-------------	----		
TeC2:										
Trappist--------	0-4	27-40	1.20-1.40	0.6-2.0	0.15-0.23	3.6-5.5	Low-----------	0.32	2	.5-2
	4-16	30-60	1.40-1.65	0.2-0.6	0.08-0.18	3.6-5.5	Moderate-----	0.28		
	16-21	35-60	1.40-1.60	0.06-0.2	0.05-0.12	3.6-5.5	Moderate-----	0.24		
	21	---	---	---	---	---	-------------	----		
Jessietown------	0-6	12-27	1.20-1.40	0.6-2.0	0.19-0.23	3.6-5.5	Low-----------	0.37	3	.5-4
	6-30	12-34	1.20-1.50	0.6-2.0	0.18-0.23	3.6-5.5	Low-----------	0.28		
	30-34	15-45	1.20-1.50	0.6-2.0	0.12-0.20	3.6-5.5	Low-----------	0.28		
	34-36	---	---	---	---	---	-------------	----		
	36	---	---	---	---	---	-------------	----		
TrD2:										
Trappist--------	0-4	27-40	1.20-1.40	0.6-2.0	0.15-0.23	3.6-5.5	Low-----------	0.32	2	.5-2
	4-16	30-60	1.40-1.65	0.2-0.6	0.08-0.18	3.6-5.5	Moderate-----	0.28		
	16-21	35-60	1.40-1.60	0.06-0.2	0.05-0.12	3.6-5.5	Moderate-----	0.24		
	21	---	---	---	---	---	-------------	----		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
TrD2:										
Rohan-----------	0-4	15-27	1.20-1.50	0.6-2.0	0.10-0.16	4.5-6.0	Low----------	0.28	2	.5-3
	4-14	15-34	1.20-1.60	0.2-2.0	0.04-0.10	3.6-5.5	Low----------	0.17		
	14-18	---	---	---	---	---	-------------	----		
	18	---	---	---	---	---	-------------	----		
Greenbriar------	0-5	12-27	1.20-1.40	0.6-2.0	0.19-0.23	3.6-5.5	Low----------	0.43	4	.5-4
	5-51	18-34	1.20-1.50	0.6-2.0	0.18-0.23	3.6-5.5	Low----------	0.28		
	51-56	28-45	1.20-1.50	0.6-2.0	0.12-0.20	3.6-5.5	Low----------	0.28		
	56-59	---	---	---	---	---	-------------	----		
	59	---	---	---	---	---	-------------	----		
TrD3:										
Trappist--------	0-2	27-40	1.20-1.40	0.6-2.0	0.15-0.23	3.6-5.5	Low----------	0.32	2	.5-2
	2-16	30-60	1.40-1.65	0.2-0.6	0.08-0.18	3.6-5.5	Moderate-----	0.28		
	16-21	35-60	1.40-1.60	0.06-0.2	0.05-0.12	3.6-5.5	Moderate-----	0.24		
	21	---	---	---	---	---	-------------	----		
Rohan-----------	0-3	15-27	1.20-1.50	0.6-2.0	0.10-0.16	4.5-6.0	Low----------	0.28	2	.5-3
	3-14	15-34	1.20-1.60	0.2-2.0	0.04-0.10	3.6-5.5	Low----------	0.17		
	14-18	---	---	---	---	---	-------------	----		
	18	---	---	---	---	---	-------------	----		
Greenbriar------	0-4	12-27	1.20-1.40	0.6-2.0	0.19-0.23	3.6-5.5	Low----------	0.43	4	.5-4
	4-51	18-34	1.20-1.50	0.6-2.0	0.18-0.23	3.6-5.5	Low----------	0.28		
	51-56	28-45	1.20-1.50	0.6-2.0	0.12-0.20	3.6-5.5	Low----------	0.28		
	56-59	---	---	---	---	---	-------------	----		
	59	---	---	---	---	---	-------------	----		

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "frequent," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
BaB, BcC2, BeC3, BeD3: Beasley	C	None	---	---	>6.0	---	---	40-60	Soft	Moderate	Moderate.
CaB, CaC, CaD: Carpenter	B	None	---	---	>6.0	---	---	>40	Soft	Low	Moderate.
CbF2:											
Carpenter	B	None	---	---	>6.0	---	---	>40	Soft	Low	Moderate.
Lenberg	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate.
CeB: Chenault	B	None	---	---	>6.0	---	---	>40	Hard	Low	Moderate.
ChC2, ChD2, CnD3: Christian	C	None	---	---	>6.0	---	---	>60	---	High	High.
CrB, CrC2: Crider	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
CyF2:											
Cynthiana	D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low.
Faywood	C	None	---	---	>6.0	---	---	20-40	Hard	High	Moderate.
Rock outcrop.											
EdD2: Eden	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Low.
EeE2:											
Eden	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Low.
Cynthiana	D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low.
EkB, EkC2: Elk	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
FaC2, FaD2: Faywood	C	None	---	---	>6.0	---	---	20-40	Hard	High	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro- logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard- ness	Uncoated steel	Concrete
					Ft			In			
FcE2:											
Faywood----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
Cynthiana--------	D	None--------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low.
FrC, FrD---------- Frankstown	B	None--------	---	---	>6.0	---	---	>40	Hard	Moderate	Moderate.
GaF--------------- Garmon	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	Moderate.
GrB--------------- Greenbriar	B	None--------	---	---	>6.0	---	---	40-72	Hard	Moderate	High.
JeB:											
Jessietown-------	B	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	High.
Trappist---------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	High.
La---------------- Lawrence	C	None--------	---	---	1.0-2.0	Perched	Dec-Apr	>60	---	High-----	High.
LbC2, LbD2, LeE2-- Lenberg	C	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate.
LnB, LoC2, LoD2, LpC3, LpD3------- Lowell	C	None--------	---	---	>6.0	---	---	>40	Hard	High-----	Moderate.
LsC2-------------- Lowell	C	None--------	---	---	>6.0	---	---	>40	Soft	High-----	Moderate.
Me---------------- Melvin	D	Occasional	Brief-----	Dec-May	0-1.0	Apparent	Dec-May	>60	---	High-----	Low.
Mn---------------- Melvin	D	Frequent----	Brief-----	Dec-May	0-1.0	Apparent	Dec-May	>60	---	High-----	Low.
MoB, MoC2--------- Mountview	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Na---------------- Newark	C	Occasional	Brief-----	Jan-Apr	0.5-1.5	Apparent	Dec-May	>60	---	High-----	Low.
Ne---------------- Newark	C	Frequent----	Brief-----	Jan-Apr	0.5-1.5	Apparent	Dec-May	>60	---	High-----	Low.
NhB, NhC2--------- Nicholson	C	None--------	---	---	1.5-2.5	Perched	Jan-Apr	>60	---	High-----	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

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			
No---------------- Nolin	B	Frequent----	Brief-----	Feb-May	3.0-6.0	Apparent	Feb-Mar	>60	---	Low------	Moderate.
OtB--------------- Otwell	C	None--------	---	---	2.0-3.5	Perched	Jan-Apr	>60	---	Moderate	High.
Pt. Pits, quarry											
RaC--------------- Riney	B	None--------	---	---	>6.0	---	---	>48	Soft	Moderate	High.
RcE2:											
Riney------------	B	None--------	---	---	>6.0	---	---	>48	Soft	Moderate	High.
Christian--------	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
Ro---------------- Robertsville	D	None--------	---	---	0-1.0	Perched	Dec-May	>60	---	High-----	High.
RtD2, RtF2:											
Rohan------------	D	None--------	---	---	>6.0	---	---	10-20	Hard	High-----	High.
Trappist---------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	High.
SaB, SaC2--------- Sandview	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Se---------------- Sensabaugh	B	Frequent----	Very brief	Jan-Apr	4.0-6.0	Apparent	Jan-Apr	>60	---	Low------	Low.
SrE2:											
Shrouts----------	D	None--------	---	---	>6.0	---	---	20-40	Soft	High-----	Low.
Brassfield-------	B	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	Low.
TbA, TbB, TbC2:											
Tilsit-----------	C	None--------	---	---	1.5-2.5	Perched	Jan-Apr	>40	Hard	High-----	High.
Berea------------	C	None--------	---	---	1.5-3.0	Apparent	Dec-Apr	20-40	Hard	Moderate	High.
TeC2:											
Trappist---------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	High.
Jessietown-------	B	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	High.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
TrD2, TrD3:											
Trappist	C	None	---	---	>6.0	---	---	20-40	Hard	High	High.
Rohan	D	None	---	---	>6.0	---	---	10-20	Hard	High	High.
Greenbriar	B	None	---	---	>6.0	---	---	40-72	Hard	Moderate	High.

TABLE 18.--PHYSICAL ANALYSES OF SELECTED SOILS

(Absence of an entry indicates that the determination was not made. The pedons are typical of the soil series in the survey area. For the location of the pedons, see the section "Soil Series and Their Morphology")

Soil name, report number, horizon, and depth in inches	Total: Sand (2-0.05)	Total: Silt (0.05-0.002)	Total: Clay (<0.002)	Sand: Very coarse (2-1)	Sand: Coarse (1-0.5)	Sand: Medium (0.5-0.25)	Sand: Fine (0.25-0.1)	Sand: Very fine (0.1-0.05)	Sand coarser than very fine (2-0.1)	Very fine sand plus silt (0.1-0.002)	Textural class	Coarse fragments: >2 mm	Coarse fragments: 2-19 mm	Coarse fragments: 19-76 mm
	Pct <2mm											Pct	Pct	Pct
Greenbriar silt loam:														
(85KY-155-1)														
Ap---- 0 to 7	4.8	71.9	23.3	1.3	1.3	0.7	0.9	0.6	4.2	72.5	sil	---	---	---
Bt1--- 7 to 16	3.1	67.3	29.6	0.4	0.7	0.6	0.8	0.6	2.5	67.9	sicl	---	---	---
Bt2--- 16 to 30	2.4	60.5	37.1	0.2	0.5	0.4	0.7	3.6	1.8	61.1	sicl	---	---	---
Bt3--- 30 to 42	2.5	61.2	36.3	0.5	0.5	0.2	0.5	0.6	1.7	62.1	sicl	---	---	---
BC---- 42 to 51	4.2	57.3	38.5	1.4	0.9	0.3	0.7	0.8	3.4	58.1	sicl	---	---	---
2C---- 51 to 56	5.7	63.1	31.2	3.2	1.5	0.3	0.4	0.3	5.4	63.4	sicl	30.0	---	---
Jessietown silt loam:														
(85KY-155-2)														
Ap---- 0 to 8	6.6	67.1	26.3	0.9	1.7	1.2	1.4	1.4	5.2	68.5	sil	---	---	---
Bt1--- 8 to 22	5.7	65.2	29.1	0.9	1.5	1.0	1.1	1.2	4.5	66.4	sicl	---	---	---
Bt2--- 22 to 30	10.8	52.6	36.6	3.8	2.8	1.2	1.4	1.6	9.2	54.2	sicl	---	---	---
2BC--- 30 to 34	4.6	52.9	42.5	0.8	1.0	0.5	1.1	1.2	3.4	54.1	sic	22.0	---	---
Rohan channery silt loam:														
(85KY-155-4)														
A----- 0 to 4	26.5	56.9	16.6	12.6	8.0	2.5	2.4	0.8	25.7	57.7	sil	42.0	---	---
BA---- 4 to 8	16.6	60.3	23.1	8.7	3.8	1.5	1.9	0.9	15.7	61.2	sil	52.0	---	---
Bw---- 8 to 14	16.2	47.8	36.0	10.1	3.1	1.1	1.4	0.0	15.6	48.4	sicl	77.0	---	---
Sandview silt loam:														
(85KY-155-5)														
Ap---- 0 to 8	8.1	72.5	19.4	1.4	2.2	1.4	1.6	1.5	6.6	74.0	sil	---	---	---
Bt1--- 8 to 19	6.8	65.4	27.8	1.7	2.6	0.7	0.9	0.9	5.9	66.3	sil	---	---	---
Bt2--- 19 to 28	15.0	55.6	29.4	5.9	4.9	1.6	1.4	1.2	13.8	56.8	sicl	---	---	---
Bt3--- 28 to 35	14.9	59.1	35.0	5.7	3.7	1.6	2.0	1.9	13.0	52.0	sicl	---	---	---
2Bt4-- 35 to 47	7.4	40.0	52.6	2.8	1.6	0.8	1.0	1.2	6.2	51.2	sic/c	---	---	---
2Bt5-- 47 to 56	5.2	38.4	56.4	1.7	1.2	0.6	0.8	0.9	4.3	39.3	c	---	---	---
2Bt6-- 56 to 64	5.9	26.5	67.6	0.4	0.5	0.6	2.0	2.4	3.5	28.9	c	---	---	---
2BC--- 64 to 70	4.6	40.5	54.9	0.2	0.3	0.3	1.3	2.6	2.0	43.1	sic/c	---	---	---
2C---- 70 to 76	5.8	39.8	54.4	0.1	0.2	0.1	1.6	3.8	2.0	43.6	sic/c	---	---	---

TABLE 18.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name, report number, horizon, and depth in inches	Total			Size class and particle diameter (mm)								Coarse fragments		
				Sand						Very fine sand plus silt (0.1-0.002)				
	Sand (2-0.05)	Silt (0.05-0.002)	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)	Sand coarser than very fine (2-0.1)		Textural class	>2 mm	2-19 mm	19-76 mm
	Pct <2mm											Pct	Pct	Pct
Trappist silty clay loam: (83KY-155-5)														
Ap---- 0 to 4	3.7	59.4	36.9	1.4	0.7	0.4	0.6	0.6	3.1	60.0	sicl	1.7	1.7	0.0
Bt1--- 4 to 9	2.0	39.8	58.2	0.3	0.4	0.3	0.4	0.6	1.4	40.4	c	7.5	6.5	1.0
Bt2--- 9 to 16	2.0	34.6	63.4	0.5	0.4	0.2	0.4	0.5	1.5	35.1	c	5.4	4.7	0.7
BC---- 16 to 21	6.8	33.3	59.9	1.6	0.8	0.4	1.1	2.9	3.9	36.2	c	9.8	4.3	5.5

TABLE 19.--CHEMICAL ANALYSES OF SELECTED SOILS

(Absence of an entry indicates that the determination was not made. The pedons are typical of the soil series in the survey area. For the location of the pedons, see the section "Soil Series and Their Morphology")

Soil name, report number, horizon, and depth in inches	pH	Extractable cations					Cation-exchange capacity		Extractable acidity	Hydrogen plus aluminum	Base saturation		Organic matter	Calcium carbonate equivalent	Phosphorus	Potassium
	H_2O 1:1	Ca	Mg	K	Na	Total (TEC)	Ammonium acetate	Sum of cations			Ammonium acetate	Sum of cations				
		Milliequivalents per 100 grams of soil									Pct	Pct	Pct	Pct	p/m	p/m
Greenbriar silt loam:																
(85KY-155-1)																
Ap----- 0 to 7	5.1	1.0	0.2	0.5	0.1	1.8	9.4	16.7	14.9	---	19.1	10.8	2.9	0.3	287	14.0
Bt1---- 7 to 16	4.8	0.7	0.2	0.3	0.1	1.3	10.3	18.5	17.2	---	12.6	7.0	1.2	0.2	208	9.0
Bt2---- 16 to 30	4.8	0.9	0.2	0.3	0.1	1.5	5.6	18.8	17.3	---	9.6	8.0	0.7	0.3	169	2.0
Bt3---- 30 to 42	4.6	0.3	0.1	0.2	0.1	0.7	13.7	19.5	18.7	---	5.1	3.6	0.5	0.3	131	1.0
BC----- 42 to 51	4.4	0.3	0.1	0.2	0.1	0.7	14.1	17.4	16.7	---	5.0	4.0	0.6	0.2	124	1.0
2C----- 51 to 56	4.3	0.2	0.1	0.2	0.1	0.6	12.6	19.7	19.1	---	4.8	3.0	1.3	0.3	129	2.0
Jessietown silt loam:																
(85KY-155-2)																
Ap----- 0 to 8	5.2	2.6	0.4	0.5	0.1	3.6	10.8	16.1	12.5	---	33.3	22.3	2.6	0.2	303	16.0
Bt1---- 8 to 22	5.4	3.9	0.6	0.2	0.1	4.8	10.9	13.2	8.4	---	44.0	36.4	1.2	0.2	187	5.0
Bt2---- 22 to 30	5.2	2.9	1.1	0.2	0.1	4.3	13.8	15.3	11.0	---	31.1	28.1	0.7	0.1	154	3.0
2BC---- 30 to 34	5.0	2.4	1.3	0.3	0.2	4.2	14.4	19.3	15.1	---	29.2	21.8	1.3	0.3	186	3.0
Rohan channery silt loam:																
(85KY-155-4)																
A------ 0 to 4	4.5	2.4	0.6	0.5	0.1	3.6	8.7	14.3	16.7	---	41.4	25.2	12.4	0.3	235	60.0
BA----- 4 to 8	4.3	0.5	0.2	0.3	0.1	1.1	10.2	15.0	13.9	---	10.8	7.3	5.4	0.3	180	69.0
Bw----- 8 to 14	4.4	0.2	0.2	0.4	0.1	0.9	11.3	16.5	15.6	---	6.0	5.4	3.6	0.2	223	29.0
Sandview silt loam:																
(85KY-155-5)																
Ap----- 0 to 8	6.3	4.8	0.4	0.8	0.1	6.1	8.2	13.8	7.6	---	74.4	44.2	2.1	0.3	500+	33.0
Bt1---- 8 to 19	6.2	5.7	0.4	0.3	0.1	6.5	9.3	17.5	11.0	---	69.9	37.1	0.6	0.3	204	10.0
Bt2---- 19 to 28	5.8	4.2	0.3	0.2	0.1	4.8	10.2	15.5	11.7	---	47.1	31.0	0.4	0.2	117	8.0
Bt3---- 28 to 35	5.2	10.5	0.6	0.2	TR	11.3	14.1	18.4	7.1	---	80.1	61.4	0.3	0.6	120	7.0
2Bt4--- 35 to 47	5.2	8.5	1.1	0.3	0.1	10.0	15.2	16.9	6.9	---	65.8	59.2	0.3	0.2	192	50.0
2Bt5--- 47 to 56	5.2	11.6	1.2	0.3	0.1	13.2	14.0	19.8	6.6	---	94.3	66.7	0.3	0.2	195	88.0
2Bt6--- 56 to 64	5.7	16.4	1.7	0.4	0.5	19.0	29.0	23.7	4.7	---	76.0	80.2	0.3	0.3	231	155.0
2BC---- 64 to 70	6.9	19.5	1.6	0.3	0.1	21.5	29.0	24.9	3.4	---	74.1	86.3	0.4	0.3	207	25.0
2C----- 70 to 76	7.3	22.0	1.4	0.2	0.1	23.7	35.2	27.3	3.6	---	67.3	86.8	0.4	0.4	182	32.0

TABLE 19.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name, report number, horizon, and depth in inches	pH	Extractable cations					Cation-exchange capacity				Base saturation					
	H_2O 1:1	Ca	Mg	K	Na	Total (TEC)	Ammonium acetate	Sum of cations	Extractable acidity	Hydrogen plus aluminum	Ammonium acetate	Sum of cations	Organic matter	Calcium carbonate equivalent	Phosphorus	Potassium
		Milliequivalents per 100 grams of soil									Pct	Pct	Pct	Pct	p/m	p/m
Trappist silty clay loam:																
(83KY-155-5)																
Ap----- 0 to 4	4.7	5.8	1.4	0.4	0.1	7.7	18.7	24.6	16.9	0.4	31.3	41.3	7.7	---	275	54.0
Bt1---- 4 to 9	4.5	2.5	0.8	0.5	0.1	3.9	22.1	27.0	23.1	2.8	14.4	17.5	1.6	---	306	138.0
Bt2---- 9 to 16	4.3	0.7	0.7	0.5	TR	1.9	24.7	27.3	25.4	8.5	7.0	7.8	1.1	---	320	151.0
BC----- 16 to 21	4.4	0.4	0.7	0.4	TR	1.5	25.9	32.3	30.8	6.0	4.6	5.8	1.7	---	253	81.0

TABLE 20.--MINERALOGY OF SELECTED SOILS

(Absence of an entry indicates that the mineral was not detected. The soils are typical of the soil series in the survey area. For the location of the pedons, see the section "Soil Series and Their Morphology")

Soil name, report number, horizon, and depth in inches	Percent resistant minerals: Quartz	Opaques*	Resistant aggregates	Total resistant minerals	Percent weatherable minerals: Biotite	Muscovite	Potassium feldspar	Weatherable aggregates
Greenbriar silt loam: (85KY-155-1) Bt1 and Bt2 --- 7 to 30	79	1	4	84	---	3	11	2
Jessietown silt loam: (85KY-155-2) Bt2 --- 22 to 30	79	2	2	83	1	1	14	1
Rohan channery silt loam: (85KY-155-4) Bw --- 8 to 14	78	4	8	90	---	5	5	---

* Includes plant opal, tourmaline, and zircon.

TABLE 21.--ENGINEERING INDEX TEST DATA

Soil name, report number, horizon, and depth in inches	Classification: AASHTO	Classification: Unified	Percentage passing sieve--: 3 in.	2 in.	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	Percentage smaller than--: .02 mm	.005 mm	.002 mm	Liquid limit	Plasticity index	Moisture density: Maximum dry density	Moisture density: Optimum moisture	Specific gravity
														Pct		Lb/cu ft	Pct	
Frankstown silt loam:* (83KY-155-3)																		
Bt1--- 9 to 22	A-4(2)	CL-ML	100	97	92	86	81	69	65	58	44	22	12	27	7	107.0	16.5	2.70
Bt2--- 22 to 33	A-4(2)	CL	100	96	90	82	76	68	60	57	48	26	12	30	8	103.0	19.0	2.72
Tilsit silt loam:** (83KY-155-2)																		
Bt1 and Bt2-- 10 to 22	A-4(9)	CL	100	100	100	100	100	100	100	96	71	38	23	31	10	108.5	17.5	2.72
Btx--- 21 to 38	A-4(6)	CL	100	100	100	100	100	100	92	79	64	38	23	31	9	106.0	19.5	2.74

* Located about 7.5 miles southwest of Lebanon, 0.7 mile southeast of the junction of Kentucky Highway 412 and Gault Hollow Road, east about 2,111,250 feet and north about 425,500 feet by the Kentucky coordinate grid system.

** Located about 9 miles west of Lebanon, 1,000 feet southeast of the junction of Horseshoe Bend Road and Sallie Ray Pike, east about 2,102,250 feet and north about 443,250 feet by the Kentucky coordinate grid system.

TABLE 22.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Beasley	Fine, mixed, mesic Typic Hapludalfs
Berea	Fine-silty, mixed, mesic Aquic Hapludults
Brassfield	Fine-loamy, carbonatic, mesic Rendollic Eutrochrepts
Carpenter	Fine-loamy, mixed, mesic Ultic Hapludalfs
Chenault	Fine-loamy, mixed, mesic Typic Hapludalfs
Christian	Clayey, mixed, mesic Typic Hapludults
Crider	Fine-silty, mixed, mesic Typic Paleudalfs
Cynthiana	Clayey, mixed, mesic Lithic Hapludalfs
Eden	Fine, mixed, mesic Typic Hapludalfs
Elk	Fine-silty, mixed, mesic Ultic Hapludalfs
Faywood	Fine, mixed, mesic Typic Hapludalfs
Frankstown	Fine-loamy, mixed, mesic Typic Hapludults
Garmon	Fine-loamy, mixed, mesic Dystric Eutrochrepts
Greenbriar	Fine-silty, mixed, mesic Typic Hapludults
Jessietown	Fine-silty, mixed, mesic Typic Hapludults
Lawrence	Fine-silty, mixed, mesic Aquic Fragiudalfs
Lenberg	Fine, mixed, mesic Ultic Hapludalfs
Lowell	Fine, mixed, mesic Typic Hapludalfs
Melvin	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
*Mountview	Fine-silty, siliceous, thermic Typic Paleudults
Newark	Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents
Nicholson	Fine-silty, mixed, mesic Typic Fragiudalfs
Nolin	Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Otwell	Fine-silty, mixed, mesic Typic Fragiudalfs
Riney	Fine-loamy, siliceous, mesic Typic Hapludults
Robertsville	Fine-silty, mixed, mesic Typic Fragiaqualfs
Rohan	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Sandview	Fine-silty, mixed, mesic Typic Hapludalfs
Sensabaugh	Fine-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
Shrouts	Fine, mixed, mesic Typic Hapludalfs
Tilsit	Fine-silty, mixed, mesic Typic Fragiudults
Trappist	Clayey, mixed, mesic Typic Hapludults

TABLE 23.--GEOLOGIC PERIODS, FORMATIONS, AND MEMBERS

Period	Formation	Member	Thickness (feet)	Predominant soils
Quaternary-----	---	Alluvium	0-40	Nolin, Sensabaugh, Newark, Melvin.
	---	Loess	0-10	Crider, Sandview, Nicholson.
Tertiary and Quaternary----	---	Terrace deposits	0-55	Elk, Otwell.
	---	Old terrace gravel	0-95	Riney.
Mississippian--	St. Louis Limestone	---	15-180	Christian, Mountview, Nicholson.
	Salem Limestone	---	15-80	
		Shale	20-45	
	Harrodsburg Limestone	---	20-45	
	Borden	Muldraugh	40-260	Garmon, Frankstown.
		Halls Gap	0-120	Garmon.
		Nancy	0-205	Carpenter, Lenberg.
		New Providence Shale	20-135	
Devonian--------	New Albany Shale	---	40-70	Trappist, Rohan, Tilsit, Greenbriar, Jessietown, Berea.
	Boyle	---	0-25	Crider, Faywood, Cynthiana.
	Sellersburg Limestone	Beechwood Limestone	0-6	Crider, Nicholson.

TABLE 23.--GEOLOGIC PERIODS, FORMATIONS, AND MEMBERS--Continued

Period	Formation	Member	Thickness (feet)	Predominant soils
Silurian-------	Laurel Dolomite	---	0-20	Cynthiana, Faywood.
	Osgood Shale	---	0-35	Beasley, Shrouts, Brassfield.
	Brassfield Dolomite	---	0-75	
Ordovician-----	Drakes	Saluda Dolomite	0-35	Faywood, Lowell, Sandview, Nicholson, Cynthiana.
		Bardstown	0-30	
		Rowland	0-60	
	Grant Lake Limestone	---	15-40	
	Ashlock	Gilbert	5-25	Lowell, Faywood, Sandview, Nicholson.
		Tate	40-50	
	Calloway Creek	---	20-140	Lowell, Faywood, Sandview.
	Garrard Siltstone	---	0-40	Eden, Lowell.
	Clays Ferry	---	70-250	

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