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 Henry and Trimble Counties, Kentucky

How To Use This Soil Survey

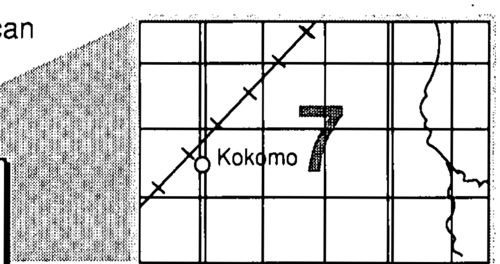
General Soil Map

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.

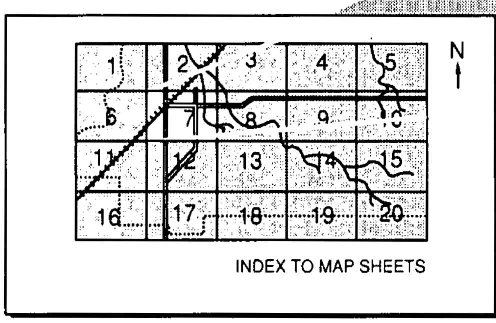
Detailed Soil Maps

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



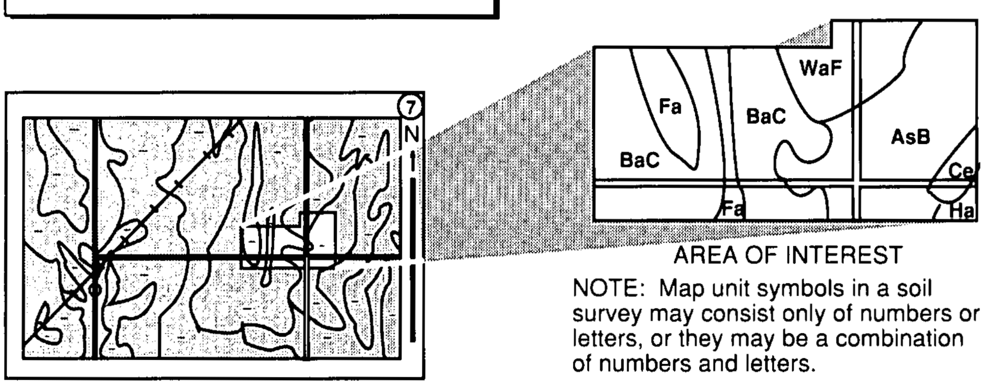
MAP SHEET

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.



MAP SHEET

AREA OF INTEREST

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

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

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

Major fieldwork for this soil survey was completed in 1988. Soil names and descriptions were approved in 1988. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This soil survey was made cooperatively by the Soil Conservation Service, the Kentucky Natural Resources and Environmental Protection Cabinet, and the Kentucky Agricultural Experiment Station. It is part of the technical assistance furnished to the Henry County Conservation District and the Trimble 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: Farmstead and pasture in an area of Lowell silt loam, 6 to 12 percent slopes.

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Issued April 1992

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Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Henry and Trimble Counties. 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.

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Soil Survey of Henry and Trimble Counties, Kentucky

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Maps compiled by Dorothy H. Brown, Soil Conservation Service

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

HENRY AND TRIMBLE COUNTIES are in the north-central part of Kentucky (fig. 1). They are in the Kentucky Bluegrass Resource Area *(4)*. The combined area of both counties is 286,323 acres, or about 447 square miles. Henry County has an area of 186,272 acres, and Trimble County has one of 100,051 acres *(28)*. In 1980, the population of Henry County was 12,740 and the population of Trimble County was 6,253 *(27)*.

The southeastern boundary of Trimble County is the northwestern boundary of Henry County. Trimble County is bounded on the east by Carroll County, on the south by Oldham County, and on the north and west by the Ohio River. Henry County is bounded on the east by the Kentucky River, on the south by Franklin and Shelby Counties, on the west by Oldham County, and on the north by Carroll County.

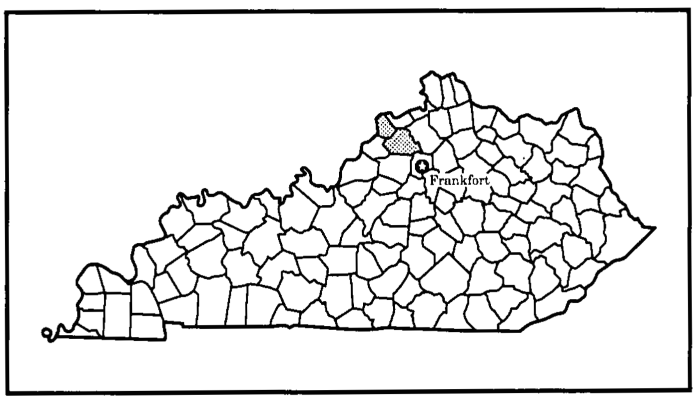

Figure 1.—Location of Henry and Trimble Counties in Kentucky.

General Nature of the Survey Area

This section provides general information concerning Henry and Trimble Counties. It describes early history, climate, natural resources, farming, and topography and drainage.

Early History

Henry County was established in 1798 as the 31st county in Kentucky. It was formed from the northern part of Shelby County. The county was named after Patrick Henry, the first Governor of Virginia.

New Castle, the county seat of Henry County, is about midway between Frankfort, Kentucky, and Madison, Indiana. It was incorporated in 1817, but several of the older homes in the town were built before that time. Eminence, which is the largest town in the county, was incorporated in the 1850's. It is in the southwestern part of the county. It is at a higher elevation than any other town between Louisville and Lexington.

Trimble County was established in 1836 as the 86th county in Kentucky. It was formed from parts of Gallatin, Henry, and Oldham Counties. The county was named after Robert Trimble, a native Virginian who was Chief Justice of the Kentucky Court of Appeals and was later appointed to the Supreme Court of the United States.

Bedford, the county seat of Trimble County, was established in 1816. It is in the central part of the county. The town of Milton, in an area along the Ohio River in the northern part of the county, was settled in 1789, which was 3 years before Kentucky attained statehood. The town's early growth was the result of the incoming and outgoing freight on the Ohio River *(14)*.

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 Shelbyville, Kentucky, in the period 1951 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 33 degrees F and the average daily minimum temperature is 23 degrees. The lowest temperature on record, which occurred at Shelbyville on January 24, 1963, is -21 degrees. In summer, the average temperature is 74 degrees and the average daily maximum temperature is 85 degrees. The highest recorded temperature, which occurred at Shelbyville on July 14, 1954, is 107 degrees.

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

The total annual precipitation is about 45 inches. Of this, more than 24 inches, or nearly 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 20 inches. The heaviest 1-day rainfall during the period of record was 5.78 inches at Shelbyville on September 14, 1979. Thunderstorms occur on about 45 days each year.

The average seasonal snowfall is about 14 inches. The greatest snow depth at any one time during the period of record was 14 inches. On an average of 10 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 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

In addition to soil, the most important natural resources in Henry and Trimble Counties are water, woodland, and limestone. Resources of minor extent include oil, gas, sand, and gravel.

Ground and surface water supplies are adequate for domestic use throughout the two counties. Most of the incorporated towns and many rural areas are served by community water systems. Wells and cisterns provide water to most farmsteads. Farm ponds, small lakes, and creeks throughout the county are used for livestock water, irrigation, fishing, and swimming. The Ohio River in Trimble County and the Kentucky River and Lake Jericho in Henry County provide opportunities for camping, fishing, and boating (fig. 2).

Woodland makes up about 46,000 acres in Henry County, or nearly 25 percent of the total acreage. It makes up about 42,200 acres in Trimble County, or nearly 45 percent of the total acreage *(13)*. Most of the woodland has been logged and supports second-growth hardwoods at various stages of maturity. Timber production contributes to the economy of both counties.

Limestone has been mined in Henry and Trimble Counties, as is indicated by several small abandoned quarry pits. The only active quarry is about 1 mile northeast of Lockport, near the Kentucky River. The quarried limestone is used as a source of agricultural lime, road metal, and aggregate. It is of the Lexington Limestone Formation.

Several test holes for oil and gas have been drilled in the two counties, but commercial quantities have not been found. A few sites have yielded sufficient quantities for individual use.

Sand and gravel for road metal and aggregate are dredged from the bed of the Ohio River. Limestone

Figure 2.—An area of the Kentucky River, which forms the eastern boundary of Henry County. Fairmount and Eden soils are in the wooded areas along the river.

gravel, which is used locally as a base for roads, is occasionally excavated from the beds of the larger creeks in the survey area *(31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43)*.

Farming

The western and central parts of Henry County are used mainly for cultivated crops, hay, or pasture. Except for the bottom land and terraces along the Kentucky River, the eastern part is very hilly and generally supports second-growth hardwoods. Some narrow ridgetops in the eastern part are used for crops or pasture.

Most of the nearly level to sloping ridgetops in Trimble County are used for cultivated crops, hay, or pasture. The eastern part of the county and the areas to the west and north that are adjacent to the Ohio River are very hilly and very steep. Most of these areas support second-growth hardwoods.

According to a national resource inventory, about 177,600 acres in Henry County, or 95 percent of the total acreage, was used for farming in 1982. Of this acreage, about 71,000 acres was used for pasture, 47,400 acres for cropland, 57,600 acres for woodland, and 1,600 acres for farmsteads and related purposes *(24)*. Some of the woodland is grazed *(13)*.

In 1982, the average farm size in Henry County was 141 acres. Of the total number of farm operators, about 65 percent were full-time operator owners, 19 percent were part-time operator owners, and 16 percent were tenants *(29)*.

The main farm products in Henry County are row crops, hay, pasture, livestock, and livestock products. Crops account for about 46 percent of the income derived from farming. Corn, the principal grain crop, is grown on about 67 percent of the total acreage of row crops, burley tobacco is grown on about 27 percent, and soybeans are grown on about 5 percent. Burley tobacco accounts for about 54 percent of the total income derived from the sale of cash crops. Vegetables, nursery crops, greenhouse products, and orchard crops account for a small percentage of the total cash receipts *(11, 29)*.

Alfalfa, fescue, orchardgrass, red clover, and timothy are important hay crops in Henry County. Most of the pasture and hayland supports Kentucky 31 fescue and orchardgrass. About 16 percent of the hay grown in the county is alfalfa. In 1987, Henry County was ranked 10th of all the counties in Kentucky in the production of alfalfa hay (fig. 3). Much of the hayland and pasture has been improved by the incorporation of legumes, such as red clover and white clover *(11)*.

Livestock enterprises account for about 54 percent of the total farm income in Henry County. Dairy products account for about 55 percent of the income derived from the sale of livestock and livestock products; cattle and calves, 39 percent; and poultry, poultry products, hogs, sheep, and other livestock, 6 percent *(11, 29)*. In 1987, Henry County was ranked 16th of all the counties in Kentucky in milk production.

According to a national resource inventory, about 92,700 acres in Trimble County, or 97 percent of the total acreage, was used for farming in 1982. Of this acreage, about 19,900 acres was used for cropland, 20,600 acres for pasture, 50,100 acres for woodland, and 2,100 acres for farmsteads and related purposes *(25)*. Some of the woodland is grazed *(13)*.

In 1982, the average farm size in Trimble County was 114 acres. Of the total number of farm operators, about 62 percent were full-time operator owners, 22 percent were part-time operator owners, and 16 percent were tenants *(30)*.

The main farm products in Trimble County are row crops, hay, pasture, livestock, and livestock products. Crops account for about 66 percent of the income derived from farming. Corn, the principal grain crop, is grown on about 40 percent of the total acreage of row crops, soybeans are grown on about 37 percent, and burley tobacco is grown on about 20 percent. Burley tobacco accounts for about 62 percent of the total income derived from the sale of cash crops. Vegetables, nursery crops, greenhouse products, and orchard crops account for about 2.5 percent of the total cash receipts *(11, 30)*.

Alfalfa, fescue, orchardgrass, red clover, and timothy are important hay crops in Trimble County. Most of the pasture and hayland supports Kentucky 31 fescue and orchardgrass. In 1987, about 20 percent of the hay grown in the county was alfalfa *(11)*. Much of the hayland and pasture has been improved by the incorporation of legumes, such as red clover and white clover.

Livestock enterprises account for about 34 percent of the total farm income in Trimble County. Dairy products account for about 40 percent of income derived from the sale of livestock and livestock products; cattle and calves, 46 percent; and poultry, poultry products, hogs, sheep, and other livestock, 14 percent *(11, 30)*.

Topography and Drainage

The topography of Henry and Trimble Counties is diversified. The counties are in parts of two major physiographic regions *(5)*. The eastern part of Henry County is in the Hills of the Bluegrass Physiographic Region. This strongly dissected region is made up of moderately steep to very steep hillsides and narrow ridgetops. The nearly level to sloping soils on the ridgetops are used mainly for hay or pasture, but some small tracts are used for tobacco. The moderately steep to very steep soils on the hillsides are used as pasture or woodland. The part of this region in Henry County is drained by tributaries of the Kentucky River. The major streams are Pot Ripple Creek, Six Mile Creek, Sulphur Creek, Drennon Creek, and Canes Run.

The central and western parts of Henry County and all of Trimble County are in the Outer Bluegrass Physiographic Region. This region is made up mainly of broad, rolling ridgetops and hillsides. The nearly level to sloping soils on the ridgetops are used mainly for corn, tobacco, small grain, or hay. The sloping and moderately steep soils on the hillsides are used mainly for pasture, and the steep and very steep soils on the hillsides are used mainly as woodland. The part of this region in Henry County is drained by the Little Kentucky River, Six Mile Creek, and Drennon Creek. The part in Trimble County is drained by tributaries of the Ohio River. The major streams are the Little Kentucky River, Canip Creek, Pattons Creek, Middle Creek, Barebone Creek, Corn Creek, and Spring Creek.

Elevation ranges from about 420 feet above sea level in an area along the Ohio River to about 980 feet on Fishers Ridge, in Trimble County *(36, 42)*.

Figure 3.—Alfalfa grown for hay in an area of Shelbyville silt loam, 2 to 6 percent slopes.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

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

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries *(19)*.

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 *(23)*.

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. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

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

Soil Descriptions for Henry County

1. Faywood-Lowell-Fairmount

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

This map unit is throughout Henry County. The landscape generally is characterized by long, narrow ridgetops, short shoulder slopes, and hillsides. Many small, intermittent streams dissect the unit. Numerous farmsteads and farm ponds dot the landscape. The communities of Turners Station, Port Royal, Bethlehem, and Sulphur are in areas of this unit.

This map unit makes up about 25 percent of Henry County. It is about 47 percent Faywood soils, 34 percent Lowell soils, 13 percent Fairmount soils, and 6 percent soils of minor extent (fig. 4).

Faywood soils are moderately deep. They are on ridgetops, shoulder slopes, and hillsides. They formed in material weathered from limestone interbedded with thin layers of calcareous shale and siltstone. Slopes range from 6 to 20 percent. Typically, the surface layer is brown silty clay loam. The upper part of the subsoil is dark yellowish brown and yellowish brown silty clay. The lower part is yellowish brown, mottled clay.

Lowell soils are deep and very deep. They are on ridgetops and shoulder slopes above the Faywood and Fairmount soils. They formed in material weathered from limestone interbedded with thin layers of calcareous shale and siltstone. Slopes range from 2 to 12 percent. Typically, the surface layer is dark yellowish brown silt loam. The upper part of the subsoil is yellowish brown and dark yellowish brown silty clay loam. The next part is mottled yellowish brown and light yellowish brown clay. The lower part is light olive brown, mottled channery silty clay. The substratum is light yellowish brown, mottled channery silty clay.

Fairmount soils are shallow. They are on hillsides below the Lowell and Faywood soils. They formed in material weathered from limestone interbedded with thin layers of calcareous shale. Slopes range from 12 to 30 percent. Typically, the surface layer is very dark grayish brown flaggy silty clay loam. The subsurface layer is dark brown flaggy silty clay. The subsoil is light olive brown channery silty clay.

Of minor extent in this map unit are Nicholson and Shelbyville soils on ridgetops, Woolper soils on the lower hillsides, foot slopes, and benches, and Nolin and Boonesboro soils on flood plains.

Most of the acreage in this map unit is used for pasture and hay. Some areas are used for cultivated crops. A few areas are wooded.

In most areas this map unit is suited to pasture and hay. Some of the gently sloping and sloping soils on ridgetops and shoulder slopes are suited to cultivated crops, but the erosion hazard is moderate or severe.

This unit is suited to woodland. Plant competition, the erosion hazard, the equipment limitation, and seedling mortality are management concerns.

Most of the soils in this map unit are poorly suited to urban uses. The gently sloping soils are suited to some urban uses. Moderately slow or slow permeability in the subsoil, the clayey texture, the shrink-swell potential, the depth to bedrock, and the slope are limitations.

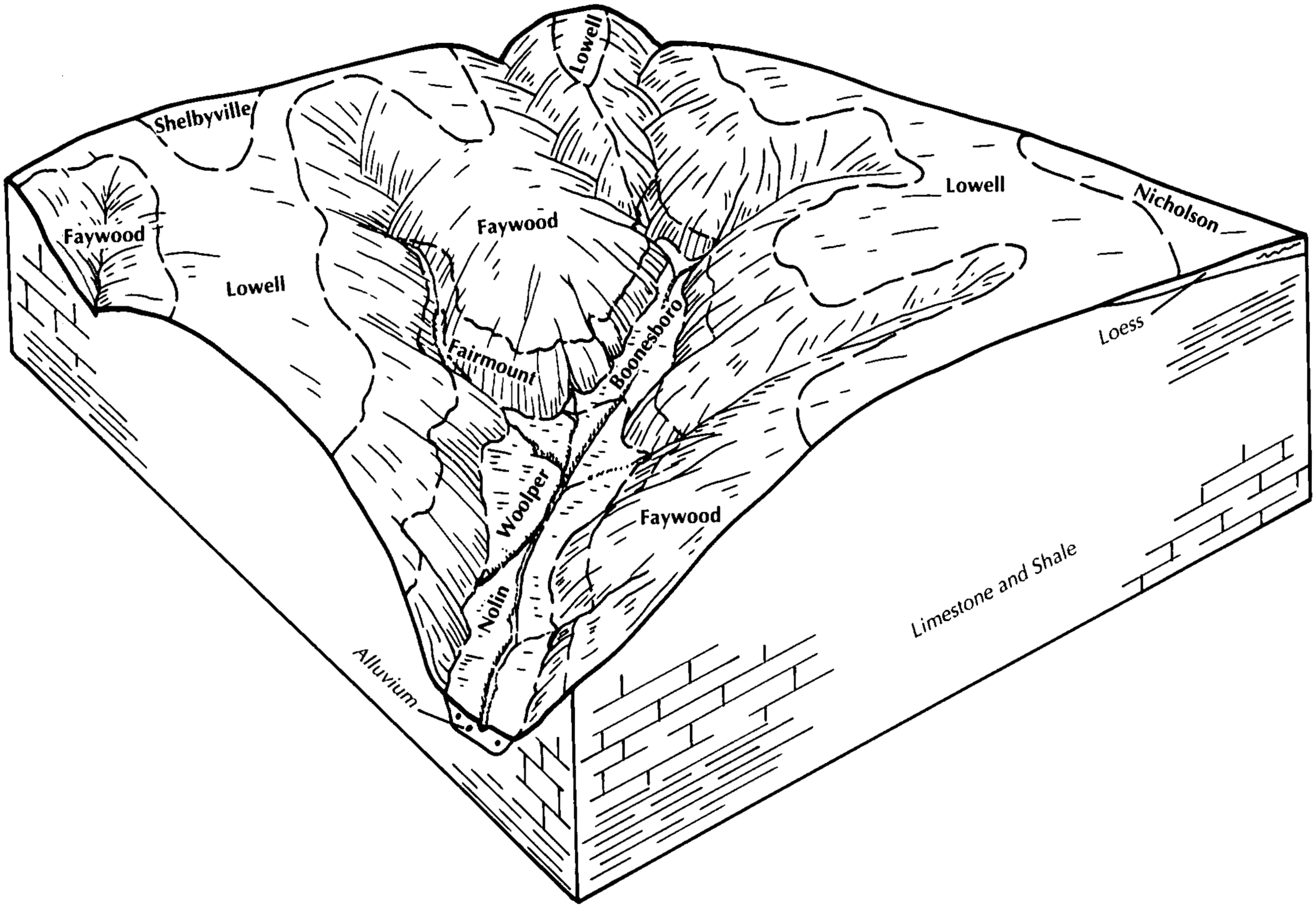

Figure 4.—Pattern of soils and parent material in the Faywood-Lowell-Fairmount general soil map unit in Henry County.

2. Fairmount-Woolper

Gently sloping to very steep, shallow and very deep, well drained soils that have a clayey subsoil; on hillsides, bluffs, and foot slopes

This map unit is in the northeastern part of Henry County. The landscape generally is characterized by long, steep and very steep hillsides and bluffs and by narrow, winding ridgetops above deep valleys. A few small creeks and intermittent streams dissect the unit. Some scattered farmsteads are the dominant manmade structures in areas of this unit.

This map unit makes up about 3 percent of Henry County. It is about 49 percent Fairmount soils, 28 percent Woolper soils, and 23 percent soils of minor extent.

Fairmount soils are shallow. They are on hillsides and bluffs. They formed in material weathered from limestone interbedded with thin layers of calcareous shale. Slopes range from 12 to 65 percent. Typically, the surface layer is very dark grayish brown flaggy silty clay loam. The subsurface layer is dark brown flaggy silty clay. The subsoil is light olive brown channery silty clay.

Woolper soils are very deep. They are on the lower hillsides, benches, and foot slopes. They formed in colluvial and alluvial material derived from limestone and shale. Slopes range from 2 to 65 percent. Typically, the surface layer is very dark grayish brown silty clay loam. The upper part of the subsoil is dark brown silty clay, the next part is brown silty clay, and the lower part is yellowish brown clay.

Of minor extent in this map unit are Faywood, Lowell, and Boonesboro soils. Faywood and Lowell soils are on ridgetops and shoulder slopes, and Boonesboro soils are on narrow flood plains.

Most of the acreage in this map unit is used as woodland. Some areas are used as pasture, and a few areas are idle.

In most areas this map unit is unsuited to cultivated crops because of the slope and the depth to bedrock. Some of the less sloping areas are suited to pasture, but suitable grasses and legumes are difficult to establish and maintain.

The potential productivity of this map unit for woodland is moderate to high. The erosion hazard, the equipment limitation, seedling mortality, and plant competition are management concerns.

The soils in this map unit are poorly suited to most urban uses. The slope, the clayey texture, moderately slow or slow permeability, and the shrink-swell potential are the main limitations.

3. Beasley-Nicholson

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

This map unit is in the western part of Henry County. The landscape generally is characterized by broad ridgetops and shoulder slopes and moderately steep hillsides. Several creeks and small, intermittent streams dissect the unit. Many farmsteads and farm ponds dot the landscape. Lake Jerrico and the communities of Sligo, Pendleton, and Jerrico are in areas of this unit.

This map unit makes up about 8 percent of Henry County. It is about 72 percent Beasley soils, 17 percent Nicholson soils, and 11 percent soils of minor extent (fig. 5).

Beasley soils are deep, are well drained, and have a clayey subsoil. They are on ridgetops, shoulder slopes, and hillsides. They formed in material weathered from soft limestone and from calcareous shale and siltstone. Slopes range from 2 to 20 percent. Typically, the surface layer is brown silt loam and yellowish brown silty clay loam. The subsoil is yellowish brown silty clay and clay. The substratum is light olive brown, light gray, and yellowish brown, mottled silty clay loam.

Nicholson soils are very deep, are moderately well drained, and have a fragipan. They are on broad ridgetops above the Beasley soils. They formed in a mantle of loess and in the underlying material weathered from limestone, siltstone, and shale. Slopes range from 2 to 12 percent. Typically, the surface layer is brown silt loam. The upper part of the subsoil is brown silt loam and dark yellowish brown silty clay loam. The next part is a very firm, compact, brittle fragipan of yellowish brown, mottled silty clay loam. The lower part is yellowish brown, mottled silty clay. The substratum is yellowish brown, mottled clay.

Of minor extent in this map unit are Nolin, Newark, Lawrence, and Otwell soils. Nolin and Newark soils are on flood plains, and Lawrence and Otwell soils are on stream terraces.

Most of the acreage in this map unit is used for cultivated crops, hay, or pasture. Some areas are used for residential development, and a few areas are idle.

The gently sloping and sloping soils on ridgetops and shoulder slopes are suited to cultivated crops, but the hazard of erosion is moderate or severe. The soils on hillsides are best suited to pasture, hay, and woodland.

This unit is suited to woodland. The equipment limitation, seedling mortality, and plant competition are management concerns. Most of the soils have good potential for openland and woodland wildlife habitat.

The gently sloping soils are suited to some urban uses. Moderately slow or slow permeability, the clayey texture, low strength, a moderate shrink-swell potential, and the slope are limitations. The more sloping soils are poorly suited to urban uses.

4. Lowell-Nicholson

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

This map unit is mainly in the central part of Henry County. The landscape generally is characterized by broad, convex ridgetops and short shoulder slopes. Many small, intermittent streams dissect the unit. Many farmsteads and farm ponds dot the landscape. The communities of Campbellsburg, New Castle, and Smithfield are in areas of this unit.

This map unit makes up about 24 percent of Henry County. It is about 60 percent Lowell soils, 20 percent Nicholson soils, and 20 percent soils of minor extent (fig. 6).

Lowell soils are deep and very deep, are well drained, and have a clayey subsoil. They are on ridgetops and shoulder slopes below the Nicholson soils. They formed in material weathered from limestone interbedded with thin layers of calcareous shale and siltstone. Slopes range from 2 to 12 percent. Typically, the surface layer is dark yellowish brown silt loam. The upper part of the subsoil is yellowish brown and dark yellowish brown silty clay loam. The next part is mottled yellowish brown and light yellowish brown clay. The lower part is light olive brown, mottled channery silty clay. The substratum is light yellowish brown, mottled channery silty clay loam.

Nicholson soils are very deep, are moderately well drained, and have a fragipan. They are on broad ridgetops above the Lowell soils. They formed in a mantle of loess and in the underlying material

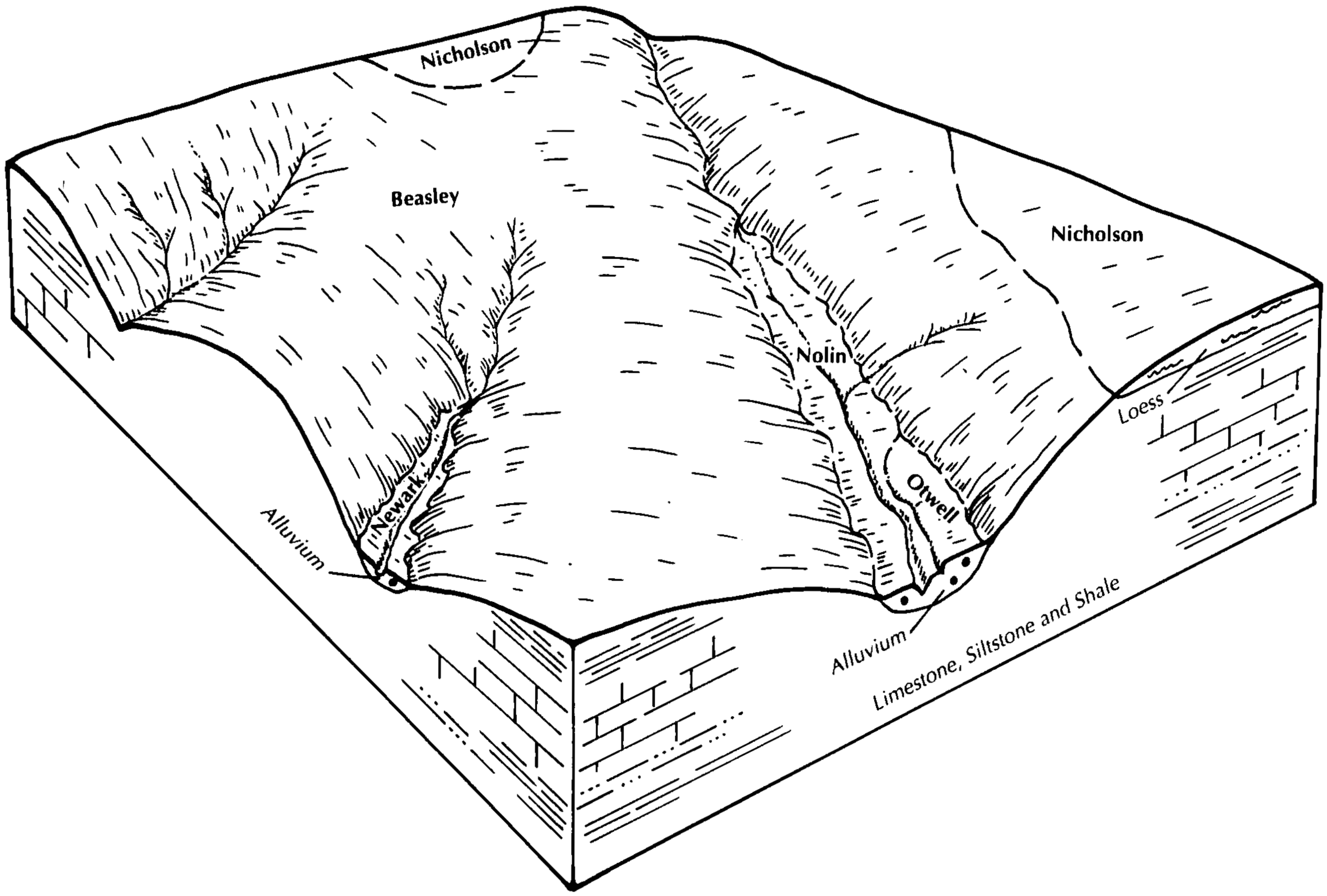

Figure 5.—Pattern of soils and parent material in the Beasley-Nicholson general soil map unit in Henry County.

weathered from limestone, siltstone, and shale. Slopes range from 2 to 12 percent. Typically, the surface layer is brown silt loam. The upper part of the subsoil is brown silt loam and dark yellowish brown silty clay loam. The next part is a very firm, compact, brittle fragipan of yellowish brown, mottled silty clay loam. The lower part is yellowish brown, mottled silty clay. The substratum is yellowish brown, mottled clay.

Of minor extent in this map unit are Shelbyville, Faywood, Nolin, and Newark soils. Shelbyville soils are on ridgetops. Faywood soils are on hillsides. Nolin and Newark soils are on flood plains.

Most of the acreage in this map unit is used for cultivated crops, hay, or pasture. A considerable acreage is used for residential development, and a few areas are wooded.

Most of the gently sloping soils on ridgetops and sloping soils on shoulder slopes are suited to cultivated crops, but the hazard of erosion is moderate or severe. The steeper, more eroded areas are best suited to pasture and hay.

The potential productivity of this map unit for woodland is high. Plant competition is a management concern. Most of the soils have good potential for openland and woodland wildlife habitat.

The gently sloping soils are suited to some urban uses. Moderately slow or slow permeability, the clayey texture, low strength, the shrink-swell potential, and the slope are limitations. The steeper minor soils are poorly suited to urban uses.

5. Eden

Sloping to very steep, moderately deep, well drained soils that have a clayey subsoil; on hillsides and narrow ridgetops

This map unit is in the eastern part of Henry County. The landscape generally is characterized by highly dissected, long and narrow ridgetops and shoulder slopes and moderately steep to very steep hillsides. Many creeks and intermittent streams dissect the unit. Numerous farmsteads and farm ponds dot the landscape. The communities of Drennon Springs, Lockport, Harpers Ferry, and Gest are in areas of this unit.

This map unit makes up about 27 percent of Henry County. It is about 82 percent Eden soils and 18 percent soils of minor extent (fig. 7).

Eden soils are on ridgetops and hillsides. They formed in material weathered from soft, calcareous shale interbedded with thin layers of limestone and siltstone. Slopes range from 6 to 35 percent. Typically, the surface layer is dark grayish brown silty clay loam. The upper part of the subsoil is light olive brown, mottled silty clay, and the lower part is light olive brown, mottled flaggy silty clay. The subsoil has limestone fragments throughout. It is underlain by soft, weathered, calcareous shale and siltstone interbedded with layers of limestone.

Of minor extent in this map unit are Lowell, Fairmount, Woolper, Faywood, and Nolin soils. Lowell soils are on ridgetops. Fairmount and Faywood soils are on hillsides. Woolper soils are on foot slopes. Nolin soils are on flood plains.

Most of the acreage in this map unit is wooded or covered with brush. A considerable acreage is used as pasture. A few areas are idle.

In most areas this map unit is poorly suited to cultivated crops because of the slope. Some of the less sloping areas are suited to pasture and hay, but suitable grasses and legumes are difficult to establish and maintain.

Potential productivity of this map unit for woodland is moderately high or moderate. The erosion hazard and the equipment limitation are management concerns. The forested areas have fair potential for woodland wildlife habitat.

This unit is poorly suited to most urban uses because of the slope, the clayey texture, slow permeability, and the shrink-swell potential.

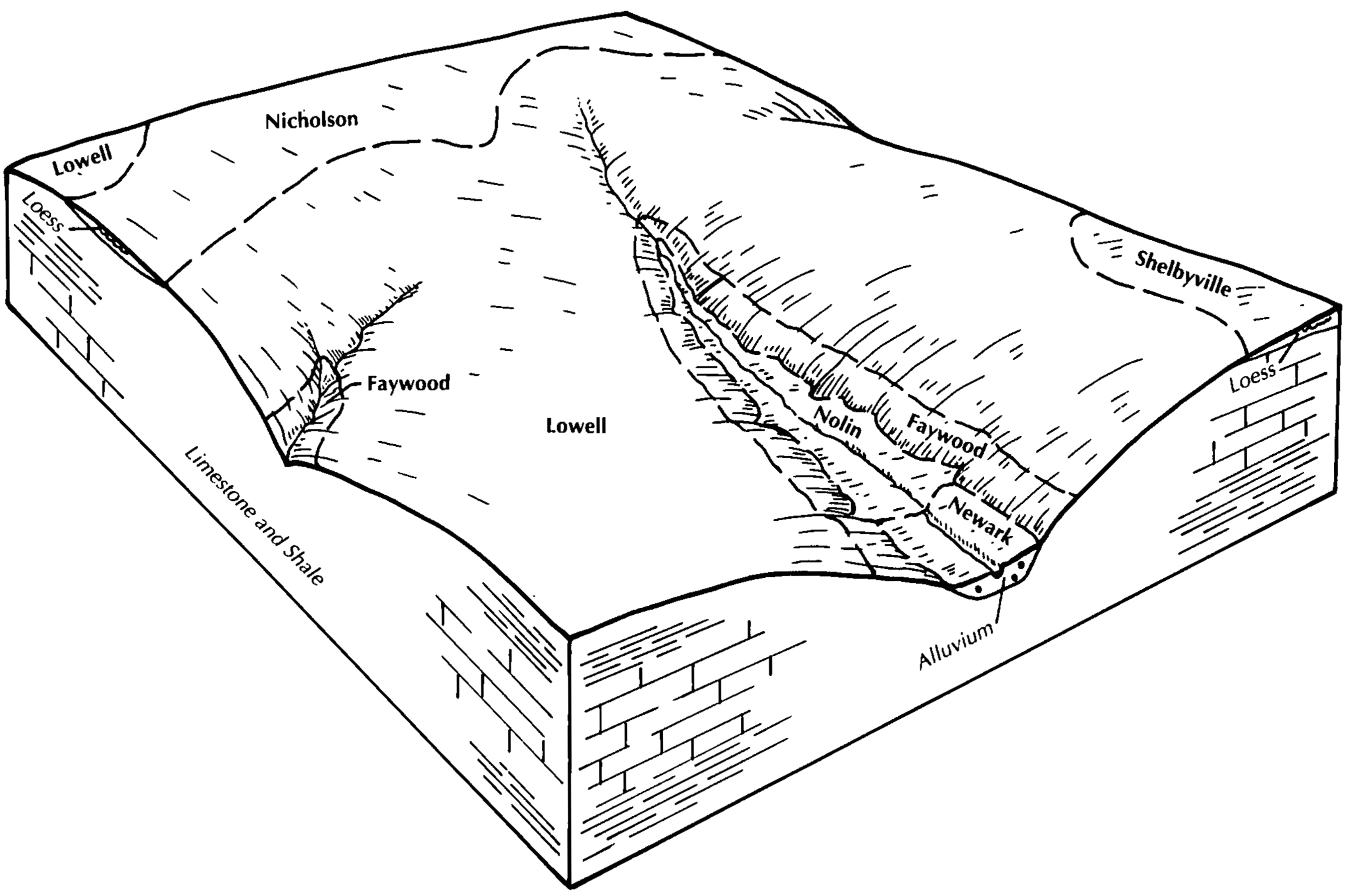

Figure 6.—Pattern of soils and parent material in the Lowell-Nicholson general soil map unit in Henry County.

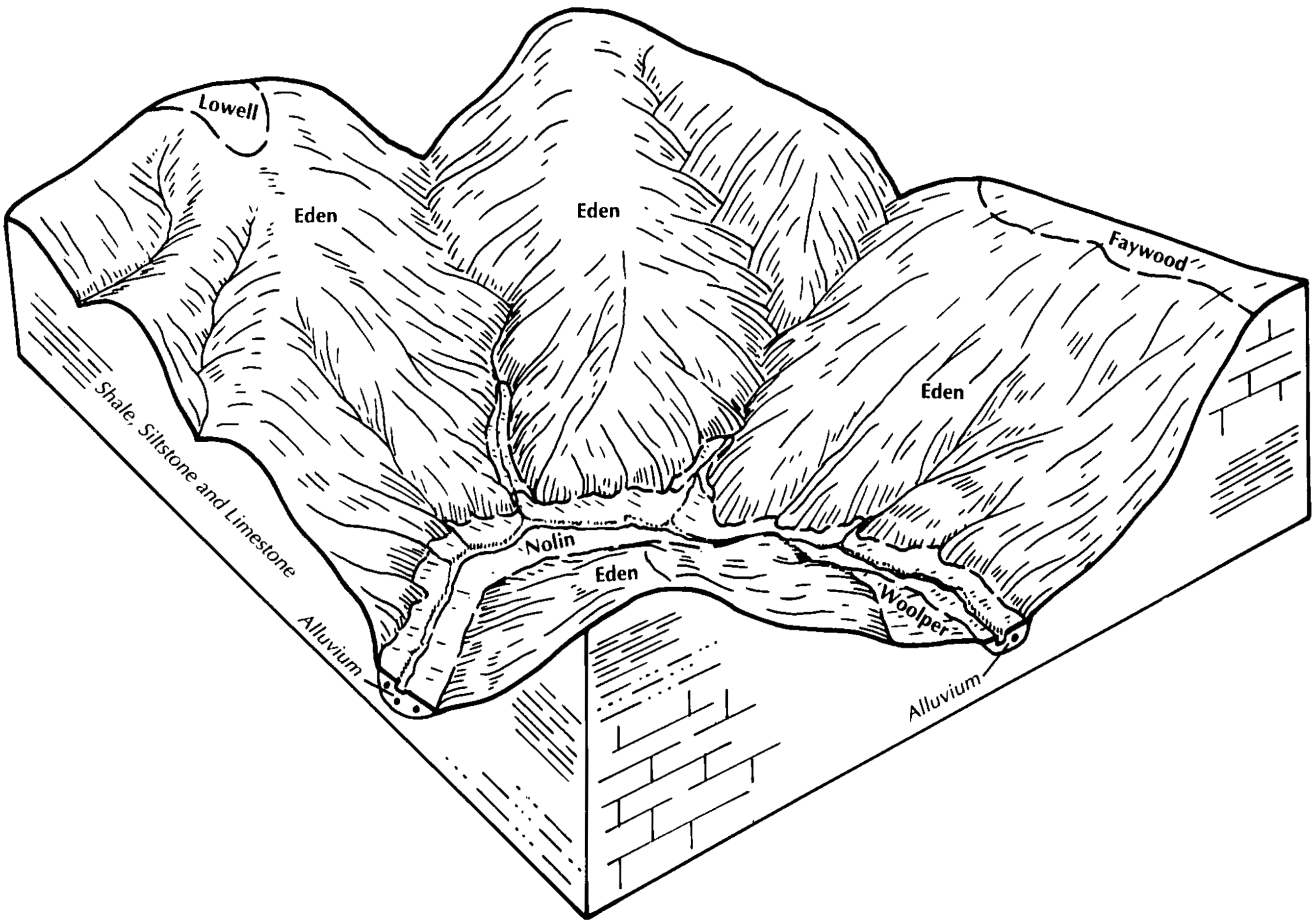

Figure 7.—Pattern of soils and parent material in the Eden general soil map unit in Henry County.

6. Nolin-Otwell-Elk

Nearly level to very steep, very deep, well drained and moderately well drained soils that have a loamy subsoil; on stream terraces and flood plains

This map unit is in areas along the Kentucky River in Henry County. The landscape generally is characterized by nearly level to sloping stream terraces and nearly level flood plains.

This map unit makes up about 5 percent of Henry County. It is about 27 percent Nolin soils, 18 percent Otwell soils, 12 percent Elk soils, and 43 percent soils of minor extent.

Nolin soils are well drained and are loamy throughout. They formed in alluvium on nearly level flood plains. Typically, the surface layer and subsoil are brown silt loam. The substratum is dark yellowish brown silt loam.

Otwell soils are moderately well drained and are loamy throughout. They formed in alluvium on low terraces. Slopes range from 0 to 6 percent. Typically, the surface layer is brown silt loam. The upper part of the subsoil is yellowish brown silty clay loam. The lower part is a firm, compact, brittle fragipan of yellowish brown, light brownish gray, and strong brown, mottled silty clay loam. The substratum is light brownish gray, yellowish brown, and light yellowish brown, mottled silty clay loam.

Elk soils are well drained and are loamy throughout. They formed in alluvium on stream terraces. Slopes range from 0 to 40 percent. Typically, the surface layer is brown silt loam. The upper part of the subsoil is dark yellowish brown silt loam, and the lower part is dark yellowish brown and yellowish brown silty clay loam. The substratum is dark yellowish brown silty clay loam.

Of minor extent in this map unit are Lawrence, Wheeling, Newark, and Woolper soils. Lawrence and Wheeling soils are on stream terraces. Newark soils are on flood plains. Woolper soils are on alluvial fans and foot slopes.

In most areas this map unit is used for cultivated crops, hay, or pasture. The wetter areas are wooded.

In most areas this map unit is suitable for cultivated crops, hay, and pasture. Occasional flooding occurs in winter and early in spring on the soils on flood plains and on most of those on stream terraces. In cultivated areas of the gently sloping and sloping soils on stream terraces, erosion is a moderate or severe hazard.

The potential productivity of this map unit for woodland is moderately high to very high. Plant competition is a management concern on all of the major soils. The equipment limitation is an additional concern on the Otwell soils. This unit has good potential for openland and woodland wildlife habitat.

Flooding is the major hazard if this map unit is developed for urban uses. The soils that are not subject to flooding are suited to most urban uses, but wetness, slow permeability, low strength, and the slope are limitations.

7. Lowell-Nicholson-Shelbyville

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

This map unit is in the south-central part of Henry County. The landscape generally is characterized by broad, convex ridgetops and short shoulder slopes. Many small, intermittent streams dissect the unit. The communities of Eminence and Pleasureville are in areas of this unit.

This map unit makes up about 8 percent of Henry County. It is about 59 percent Lowell soils, 20 percent Nicholson soils, 16 percent Shelbyville soils, and 5 percent soils of minor extent.

Lowell soils are deep and very deep, are well drained, and have a clayey subsoil. They are on ridgetops and shoulder slopes below the Nicholson and Shelbyville soils. They formed in material weathered from limestone interbedded with thin layers of calcareous shale and siltstone. Slopes range from 2 to 12 percent. Typically, the surface layer is dark yellowish brown silt loam. The upper part of the subsoil is yellowish brown and dark yellowish brown silty clay loam. The next part is mottled yellowish brown and light yellowish brown clay. The lower part is light olive brown, mottled channery silty clay. The substratum is light yellowish brown, mottled channery silty clay.

Nicholson soils are very deep, are moderately well drained, and have a fragipan. They are commonly on broad ridgetops above the Lowell soils. They formed in a mantle of loess and in the underlying material weathered from limestone, siltstone, and shale. Slopes range from 2 to 12 percent. Typically, the surface layer is brown silt loam. The upper part of the subsoil is brown silt loam and dark yellowish brown silty clay loam. The next part is a very firm, compact, brittle fragipan of yellowish brown, mottled silty clay loam. The lower part is yellowish brown, mottled silty clay. The substratum is yellowish brown, mottled clay.

Shelbyville soils are deep, are well drained, and have a loamy subsoil. They are on ridgetops. They formed in a mantle of loess and in the underlying material weathered from limestone interbedded with siltstone and calcareous shale. Slopes range from 2 to 6 percent. Typically, the surface layer is dark brown silt loam. The upper part of the subsoil is brown silty clay loam. The next part is brown, mottled silty clay. The lower part is yellowish brown, mottled silty clay.

Of minor extent in this map unit are Faywood, Nolin, Newark, and Boonesboro soils. Faywood soils are on hillsides. Nolin, Newark, and Boonesboro soils are on flood plains.

Most of the acreage in this map unit is used for cultivated crops, hay, or pasture. A considerable acreage is used for residential development, and a few areas are wooded.

Most of the gently sloping soils on ridgetops and shoulder slopes are suited to cultivated crops, but the hazard of erosion is moderate or severe. The steeper or more eroded areas are best suited to pasture and hay.

The potential productivity of this map unit for woodland is high. Plant competition is a management concern. Most of the soils have good potential for openland and woodland wildlife habitat.

The gently sloping soils are suited to some urban uses. Moderately slow or slow permeability, the clayey texture, low strength, the shrink-swell potential, and the slope are limitations. The steeper minor soils are poorly suited to urban uses.

Soil Descriptions for Trimble County

1. Fairmount-Woolper-Brassfield

Gently sloping to very steep, shallow, moderately deep, and very deep, well drained soils that have a clayey or loamy subsoil; on hillsides, bluffs, and foot slopes

This map unit is throughout Trimble County. The landscape generally is characterized by long, steep and very steep hillsides and bluffs and narrow, winding ridgetops above deep valleys. Several creeks and small, intermittent streams dissect the unit. A few

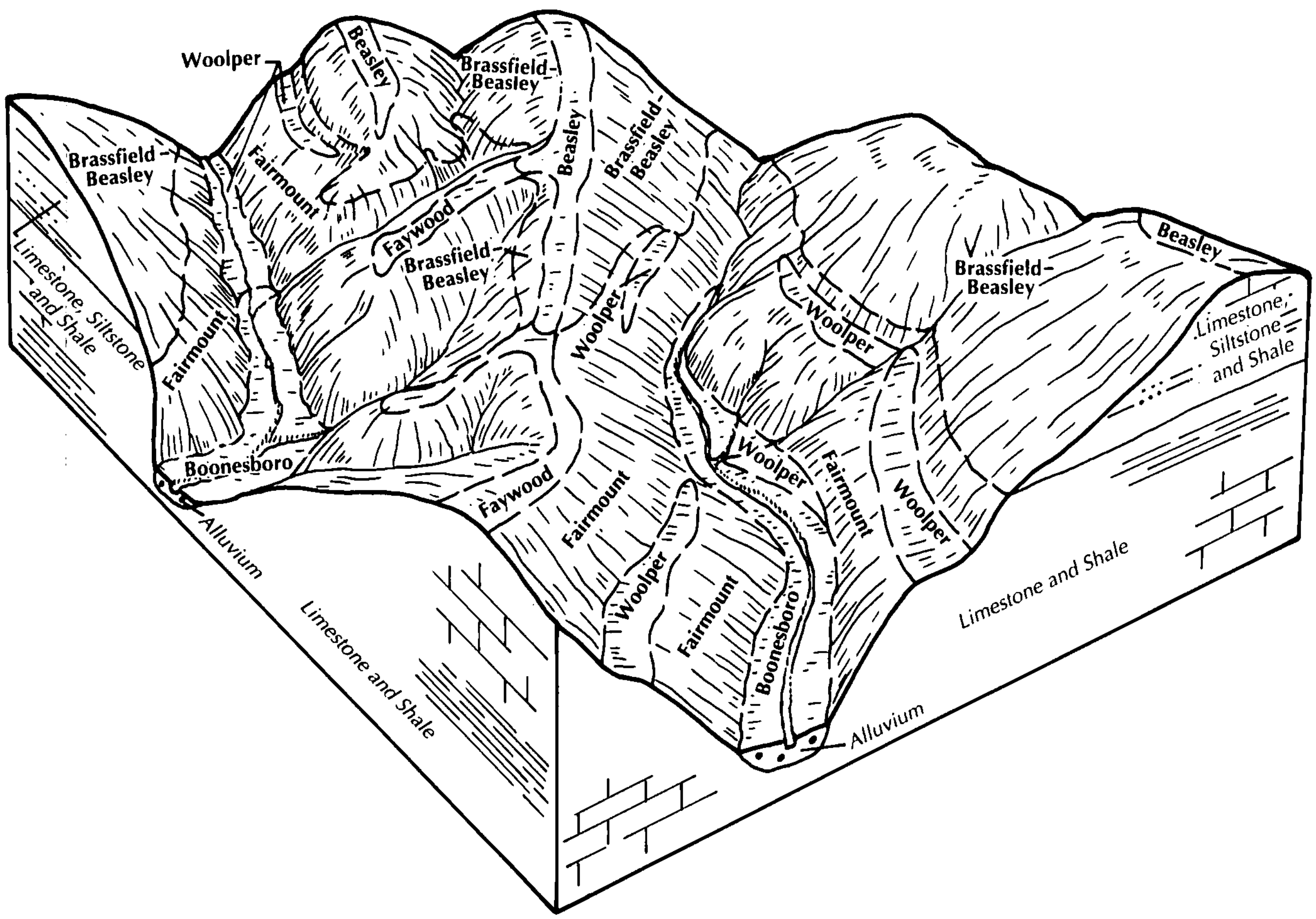

Figure 8.—Pattern of soils and parent material in the Fairmount-Woolper-Brassfield general soil map unit in Trimble County.

scattered farmsteads are the dominant manmade structures in areas of this unit.

This map unit makes up about 46 percent of Trimble County. It is about 33 percent Fairmount soils, 24 percent Woolper soils, 21 percent Brassfield soils, and 22 percent soils of minor extent (fig. 8).

Fairmount soils are shallow and have a clayey subsoil. They are on hillsides and bluffs. They formed in material weathered from limestone interbedded with thin layers of calcareous shale. Slopes range from 12 to 65 percent. Typically, the surface layer is very dark grayish brown flaggy silty clay loam. The subsurface layer is dark brown flaggy silty clay. The subsoil is light olive brown channery silty clay.

Woolper soils are very deep and have a clayey subsoil. They are on the lower hillsides, benches, and foot slopes. They formed in colluvial and alluvial material derived from limestone and shale. Slopes range from 2 to 65 percent. Typically, the surface layer is very dark grayish brown silty clay loam. The upper part of the subsoil is dark brown silty clay, the next part is brown silty clay, and the lower part is yellowish brown clay.

Brassfield soils are moderately deep and have a loamy subsoil. They are mainly on hillsides above the Fairmount soils. They formed in material weathered from soft limestone and from calcareous siltstone and shale. Slopes range from 20 to 40 percent. Typically, the surface layer is dark grayish brown silt loam. The subsoil is light yellowish brown silt loam. The substratum is light yellowish brown and olive gray, mottled silt loam.

Of minor extent in this map unit are Beasley, Boonesboro, and Faywood soils. Beasley soils are on the upper hillsides and shoulder slopes. Boonesboro soils are on flood plains. Faywood soils are on ridgetops and shoulder slopes.

Most of the acreage in this map unit is wooded. Some areas are used as pasture, and a few areas are idle.

In most areas this map unit is unsuited to cultivated crops because of the slope and the depth to bedrock.

Some of the less sloping areas are suited to pasture, but suitable grasses and legumes are difficult to establish and maintain.

The potential productivity of this map unit for woodland is moderate to high. The erosion hazard, the equipment limitation, seedling mortality, and plant competition are management concerns.

The soils in this map unit are poorly suited to most urban uses. The slope, the clayey texture, moderately slow or slow permeability, and the shrink-swell potential are the main limitations.

2. Cincinnati-Ryker-Beasley

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

This map unit is in the central part of Trimble County. The landscape generally is dominated by broad, convex ridgetops, shoulder slopes, and hillsides. Many farmsteads dot the landscape. The towns of Bedford and Milton are in areas of this unit.

This map unit makes up about 31 percent of Trimble County. It is about 28 percent Cincinnati soils, 24 percent Ryker soils, 23 percent Beasley soils, and 25 percent soils of minor extent (fig. 9).

Cincinnati soils are very deep and have a fragipan. They are on broad ridgetops and shoulder slopes. They formed in a mantle of loess and in the underlying glacial till. Slopes range from 2 to 12 percent. Typically, the surface layer is brown silt loam. The upper part of the subsoil is dark yellowish brown silt loam and yellowish brown silty clay loam. The next part is a very firm, compact, brittle fragipan of yellowish brown and strong brown, mottled silt loam. The lower part is yellowish red clay loam and dark red silty clay loam.

Ryker soils are very deep and have a loamy subsoil. They are on broad ridgetops and shoulder slopes. They formed in a mantle of loess and in the underlying glacial till. Slopes range from 2 to 12 percent. Typically, the surface layer is brown silt loam. The upper part of the subsoil is strong brown silty clay loam and silt loam, the next part is yellowish red and reddish brown silty clay loam, and the lower part is yellowish red loam.

Beasley soils are deep and have a clayey subsoil. They are on ridgetops, shoulder slopes, and hillsides. They formed in material weathered from soft limestone and from calcareous shale and siltstone. Slopes range from 2 to 20 percent. Typically, the surface layer is brown silt loam and yellowish brown silty clay loam. The subsoil is yellowish brown silty clay and clay. The substratum is light olive brown, light gray, and yellowish brown, mottled silty clay loam.

Of minor extent in this map unit are Grayford, Rossmoyne, and Nicholson soils. Grayford soils are on the upper hillsides. Rossmoyne soils are on slightly concave ridgetops. Nicholson soils are on convex ridgetops and shoulder slopes.

Most of the acreage in this map unit is used for cultivated crops, hay, or pasture. Some areas are used for orchards or vegetable crops. A few areas are used for residential development.

Most of the gently sloping soils on ridgetops and shoulder slopes are suited to cultivated crops, but the hazard of erosion is moderate or severe. The steeper or more eroded areas are better suited to pasture and hay.

The potential productivity of this map unit for woodland is moderate to very high. Plant competition, the equipment limitation, and seedling mortality are management concerns. Most of the soils have good potential for openland and woodland wildlife habitat.

The Ryker soils are suited to most urban uses. The other soils are suited to some urban uses. Slow permeability, the clayey texture, low strength, wetness, and the slope are limitations.

3. Faywood-Fairmount-Lowell

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

This map unit is in the southeastern part of Trimble County. The landscape generally is characterized by long, narrow ridgetops and shoulder slopes and moderately steep to steep hillsides above deep valleys. Several creeks and small, intermittent streams dissect the unit. Many farmsteads dot the landscape.

This map unit makes up about 13 percent of Trimble County. It is about 27 percent Faywood soils, 26 percent Fairmount soils, 26 percent Lowell soils, and 21 percent soils of minor extent.

Faywood soils are moderately deep. They are on ridgetops, shoulder slopes, and hillsides. They have formed in material weathered from limestone interbedded with thin layers of calcareous shale and siltstone. Slopes range from 6 to 20 percent. Typically, the surface layer is brown silty clay loam. The upper part of the subsoil is dark yellowish brown and yellowish brown silty clay. The lower part is yellowish brown, mottled clay.

Fairmount soils are shallow. They are on hillsides and bluffs. They formed in material weathered from limestone interbedded with thin layers of calcareous shale. Slopes range from 12 to 65 percent. Typically, the surface layer is very dark grayish brown flaggy silty clay loam. The subsurface layer is dark brown flaggy silty clay. The subsoil is light olive brown channery silty clay.

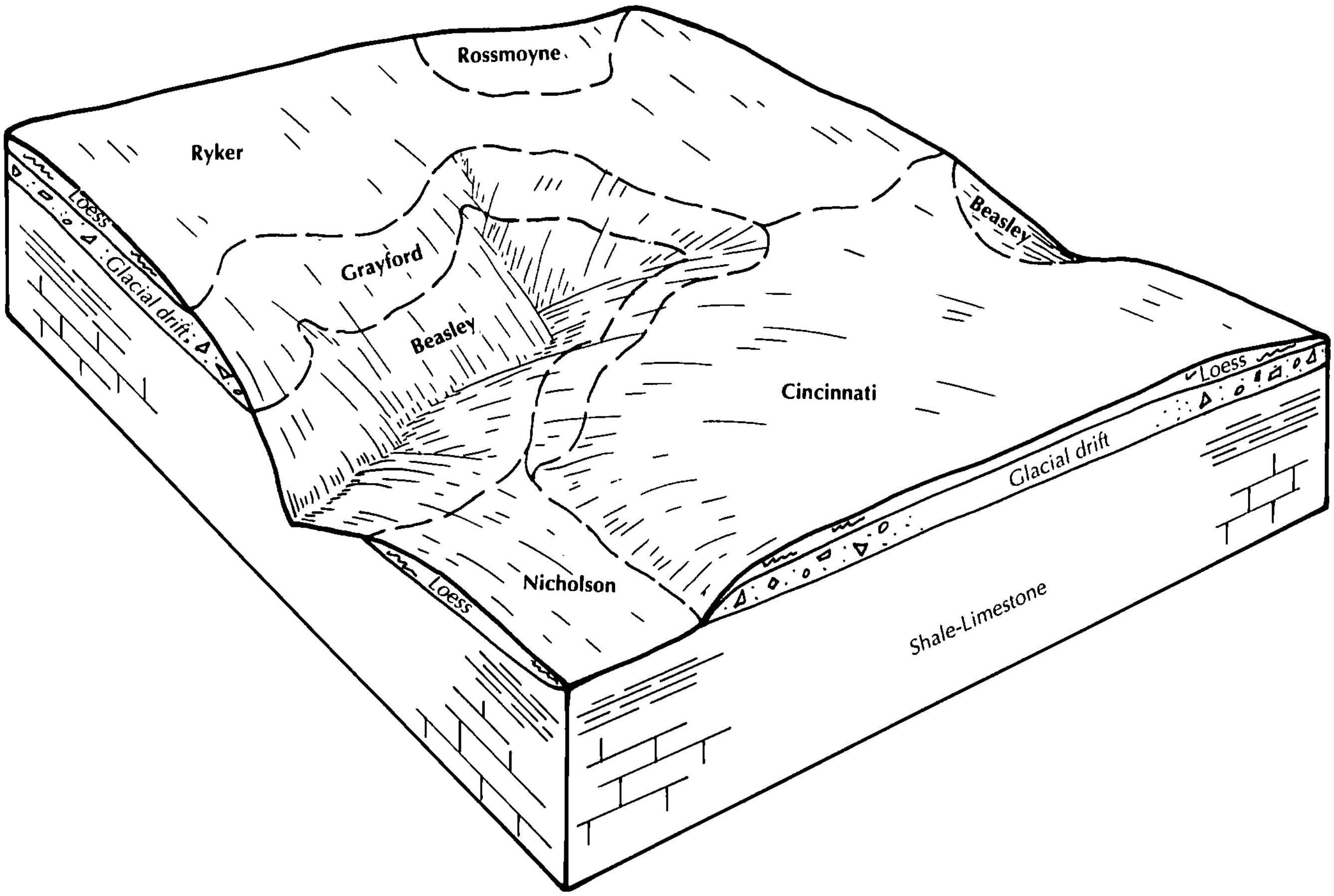

Figure 9.—Pattern of soils and parent material in the Cincinnati-Ryker-Beasley general soil map unit in Trimble County.

Lowell soils are deep and very deep. They are on ridgetops and shoulder slopes above the Faywood and Fairmount soils. They formed in material weathered from limestone interbedded with thin layers of calcareous shale and siltstone. Slopes range from 2 to 12 percent. Typically, the surface layer is dark yellowish brown silt loam. The upper part of the subsoil is yellowish brown and dark yellowish brown silty clay loam. The next part is mottled yellowish brown and light yellowish brown clay. The lower part is light olive brown, mottled channery silty clay. The substratum is light yellowish brown, mottled channery silty clay.

Of minor extent in this map unit are Nicholson, Woolper, and Boonesboro soils. Nicholson soils are on ridgetops. Woolper soils are on alluvial fans and foot slopes. Boonesboro soils are on flood plains.

Most of the acreage in this map unit is used for pasture and hay. Some areas are used for cultivated crops. A few areas are wooded.

In most areas this map unit is suited to pasture and hay. Some of the gently sloping and sloping soils on ridgetops and shoulder slopes are suited to cultivated crops, but the erosion hazard is moderate or severe.

The potential productivity of this map unit for woodland is moderate to high. Plant competition, the erosion hazard, the equipment limitation, and seedling mortality are management concerns.

Most of the soils in this map unit are poorly suited to urban uses. The gently sloping soils are suited to some urban uses. Moderately slow or slow permeability in the subsoil, the clayey texture, the shrink-swell potential, the depth to bedrock, and the slope are limitations.

4. Beasley-Nicholson

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

This map unit is in the southwestern part of Trimble County. The landscape generally is characterized by broad ridgetops and shoulder slopes and moderately steep hillsides. Several small, intermittent streams dissect the unit. Many farmsteads and farm ponds dot the landscape. The community of Abbott is in an area of this unit.

This map unit makes up about 4 percent of Trimble County. It is about 76 percent Beasley soils, 11 percent Nicholson soils, and 13 percent soils of minor extent.

Beasley soils are deep, are well drained, and have a clayey subsoil. They are on ridgetops, shoulder slopes, and hillsides. They formed in material weathered from soft limestone and from calcareous shale and siltstone. Slopes range from 2 to 20 percent. Typically, the surface layer is brown silt loam and yellowish brown silty clay loam. The subsoil is yellowish brown silty clay and clay. The substratum is light olive brown, light gray, and yellowish brown, mottled silty clay loam.

Nicholson soils are very deep, are moderately well drained, and have a fragipan. They are on broad ridgetops above the Beasley soils. They formed in a mantle of loess and in the underlying material weathered from limestone, siltstone, and shale. Slopes range from 2 to 12 percent. Typically, the surface layer is brown silt loam. The upper part of the subsoil is brown silt loam and dark yellowish brown silty clay loam. The next part is a very firm, compact, brittle fragipan of yellowish brown, mottled silty clay loam. The lower part is yellowish brown, mottled silty clay. The substratum is yellowish brown, mottled clay.

Of minor extent in this map unit are Faywood, Lowell, and Brassfield soils. Faywood soils are on shoulder slopes and hillsides. Lowell soils are on ridgetops. Brassfield soils are on hillsides.

Most of the acreage in this map unit is used for cultivated crops, hay, or pasture. Some areas are used for residential development, and a few areas are idle.

The gently sloping and sloping soils on ridgetops and shoulder slopes are suited to cultivated crops, but the hazard of erosion is moderate or severe. The soils on hillsides are better suited to pasture, hay, and woodland.

The potential productivity of this map unit for woodland is moderate to high. The equipment limitation, seedling mortality, and plant competition are management concerns. Most of the soils have good potential for openland and woodland wildlife habitat.

The gently sloping soils are suited to some urban uses. Moderately slow or slow permeability, the clayey texture, low strength, the shrink-swell potential, and the slope are limitations. The more sloping soils are poorly suited to urban uses.

5. Wheeling-Huntington

Nearly level to moderately steep, very deep, well drained soils that have a loamy subsoil; on stream terraces and flood plains

This map unit is in areas along the Ohio River in Trimble County. The landscape generally is characterized by nearly level to moderately steep, broad stream terraces and nearly level, narrow flood plains. The communities of Milton and Wise's Landing are in areas of this unit.

This map unit makes up about 4 percent of Trimble County. It is about 46 percent Wheeling soils, 35 percent Huntington soils, and 19 percent soils of minor extent.

Wheeling soils are loamy throughout. They formed in alluvium on stream terraces. Slopes range from 0 to 20 percent. Typically, the surface layer is brown silt loam. The upper part of the subsoil is dark yellowish brown silty clay loam, the next part is strong brown loam, and the lower part is strong brown fine sandy loam. The substratum is strong brown, stratified very fine sand, fine sand, and sand.

Huntington soils are loamy throughout. They formed in alluvium on flood plains. Slopes range from 0 to 2 percent. Typically, the surface layer is dark brown silt loam. The subsoil is dark yellowish brown and brown silt loam. The substratum is dark yellowish brown, mottled silt loam.

Of minor extent in this map unit are Otwell, Newark, Nolin, and Woolper soils. Otwell soils are on stream terraces. Newark and Otwell soils are on flood plains. Woolper soils are on foot slopes and alluvial fans.

Most of the acreage in this map unit is used for cultivated crops, hay, or pasture. A few small areas are wooded.

Most of the soils in this map unit are suited to cultivated crops, hay, and pasture. Occasional flooding occurs late in winter and early in spring on the soils on flood plains. In cultivated areas of the gently sloping and sloping soils on stream terraces, erosion is a moderate or severe hazard. The moderately steep soils on stream terraces are better suited to pasture, hay, and woodland than to cultivated crops.

The potential productivity of this map unit for woodland is high or very high. Plant competition is a management concern on the soils on stream terraces. This unit has good potential for openland and woodland wildlife habitat.

The soils on stream terraces are suited to most urban uses. Rapid permeability in the lower part of the subsoil, low strength, and the slope are limitations affecting some urban uses. Flooding is a major hazard affecting most urban uses on the soils on flood plains.

6. Nolin-Woolper-Elk

Nearly level to moderately steep, very deep, well drained soils that have a loamy or clayey subsoil; on flood plains, alluvial fans, foot slopes, and stream terraces

This map unit is in areas along the Little Kentucky River in Trimble County. The landscape generally is characterized by nearly level flood plains, gently sloping to moderately steep alluvial fans and foot slopes, and nearly level to sloping stream terraces.

This map unit makes up about 2 percent of Trimble County. It is about 29 percent Nolin soils, 20 percent Woolper soils, 20 percent Elk soils, and 31 percent soils of minor extent.

Nolin soils are loamy throughout. They formed in alluvium on nearly level flood plains. Typically, the surface layer and subsoil are brown silt loam. The substratum is dark yellowish brown silt loam.

Woolper soils have a clayey subsoil. They are on alluvial fans and foot slopes. They formed in colluvial and alluvial material derived from limestone and shale. Slopes range from 2 to 20 percent. Typically, the surface layer is very dark grayish brown silty clay loam. The upper part of the subsoil is dark brown silty clay, the next part is brown silty clay, and the lower part is yellowish brown clay.

Elk soils are loamy throughout. They formed in alluvium on low stream terraces. Slopes range from 0 to 12 percent. Typically, the surface layer is brown silt loam. The upper part of the subsoil is dark yellowish brown silt loam, and the lower part is dark yellowish brown and yellowish brown silty clay loam. The substratum is dark yellowish brown silty clay loam.

Of minor extent in this map unit are Boonesboro, Newark, and Otwell soils. Boonesboro and Newark soils are on flood plains, and Otwell soils are on low stream terraces.

Most of the acreage in this map unit is used for cultivated crops, hay, or pasture. Some low areas along stream channels are used as woodland.

Most of the soils in this map unit are suited to cultivated crops, hay, and pasture. Occasional flooding occurs late in winter and early in spring on the soils on flood plains and on some of those on stream terraces. In cultivated areas of the gently sloping and sloping soils on stream terraces and foot slopes, erosion is a moderate or severe hazard. The moderately steep soils on foot slopes are better suited to pasture, hay, and woodland than to cultivated crops.

The potential productivity of this map unit for woodland is high or very high. The equipment limitation and plant competition are management concerns. This unit has good potential for openland and woodland wildlife habitat.

Flooding is the major hazard if this map unit is developed for urban uses. The unit is partly protected by four flood-control structures constructed in areas along the Little Kentucky River in Henry County. The soils on stream terraces that are not subject to flooding are suited to most urban uses. The soils on foot slopes are limited as sites for urban uses because of moderately slow or slow permeability in the subsoil, the shrink-swell potential, and the clayey texture. The steeper minor soils 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 the descriptions the suitability of the soils for various uses is described. *Well suited* indicates that the soils have favorable properties for the specified use and that limitations are easy to overcome. Good performance and low maintenance can be expected. *Suited* indicates that the soils have moderately favorable properties for the selected use. One or more properties make these soils less desirable than well suited soils. *Poorly suited* indicates that the soils have one or more properties unfavorable for the selected use. Overcoming the limitations requires special design, extra maintenance, or costly alteration. *Not suited* indicates that the soils do not meet the requirements for the selected use or that extreme measures are needed to overcome the limitations.

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 or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Grayford-Beasley complex, 12 to 20 percent slopes, eroded, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Elk and Nolin silt loams, frequently flooded, is an undifferentiated group in this survey area.

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

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

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

BaB—Beasley silt loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on smooth, slightly convex ridgetops in the western part of Henry County and the central part of Trimble County. Individual areas range from about 5 to 50 acres in size.

Typically, the surface layer is about 6 inches of brown silt loam and yellowish brown silty clay loam. The subsoil extends to a depth of about 28 inches. It is yellowish brown silty clay and clay. The substratum extends to a depth of about 41 inches. It is light olive brown, light gray, and yellowish brown, mottled silty clay loam. Soft, calcareous shale bedrock is at a depth of about 41 inches.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow in the subsoil. Available water capacity is high. Runoff is medium. The soil can be fairly easily tilled, but the range in moisture content within which it can be worked without the risk of clodding or crusting is narrow. The root zone is deep. The clayey subsoil is sticky and plastic when wet and has a moderate shrink-swell potential. The depth to bedrock ranges from 40 to 60 inches.

Included with this soil in mapping are small areas of Faywood, Lowell, and Nicholson soils. These soils are in landscape positions similar to those of the Beasley soil. Also included are small areas of eroded Beasley soils that have a surface layer of silty clay loam and small areas of soils that are similar to the Beasley soil but are less than 40 inches deep over bedrock.

Most areas are used for cultivated crops, hay, or pasture. Some small tracts in western Henry County are used for building site development. This soil is well suited to most of the cultivated crops commonly grown in the survey area. Crops respond well to applications of fertilizer and lime. If cultivated crops are grown, the hazard of erosion is moderate unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control erosion and maintain maximum productivity.

This soil is well suited to all of the pasture and hay crops commonly grown in the survey area. If properly managed, it can produce high forage yields. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

Although most areas of this soil are cleared, the potential productivity for woodland is moderately high. The trees preferred for planting include white ash, Virginia pine, and white oak. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The moderately slow permeability and the clayey texture are limitations on sites for most sanitary facilities. The clayey texture is a limitation affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIe.

BeC2—Beasley silty clay loam, 6 to 12 percent slopes, eroded. This deep, well drained, sloping soil is on convex ridgetops and concave shoulder slopes in the western part of Henry County and the central part of Trimble County. Individual areas range from about 5 to 80 acres in size. Erosion has removed approximately 25 to 75 percent of the original surface layer.

Typically, the surface layer is about 6 inches of brown and dark yellowish brown silty clay loam. The subsoil extends to a depth of about 28 inches. It is yellowish brown silty clay and clay. The substratum extends to a depth of about 41 inches. It is light olive brown, gray, and yellowish brown, mottled silty clay loam. Soft, calcareous shale bedrock is at a depth of about 41 inches.

This soil is medium in natural fertility and low in organic matter content. Permeability is moderately slow in the subsoil. Available water capacity is high. Runoff is rapid. The soil is somewhat difficult to till because of the surface layer of silty clay loam. The range in moisture content within which the soil can be worked without the risk of clodding or crusting is narrow. The root zone is deep. The clayey subsoil is sticky and plastic when wet and has a moderate shrink-swell potential. The depth to bedrock ranges from 40 to 60 inches.

Included with this soil in mapping are small areas of Nicholson, Ryker, Lowell, and Faywood soils. These soils are in landscape positions similar to those of the Beasley soil. Also included are small areas of soils that are similar to the Beasley soil but are less than 40 inches deep over bedrock and small areas of the severely eroded Beasley soils.

Most areas have been cleared and are used for hay and pasture. Some of the acreage is wooded or is idle land. Although this soil is suited to occasional cultivation, it is better suited to pasture and hay. The response of crops to applications of fertilizer and lime is fair. If cultivated crops are grown, the hazard of erosion is severe unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control further erosion and maintain productivity.

This soil is well suited to pasture and hay. If properly managed, it can produce moderate forage yields. The forage species selected for planting should be those that provide a protective ground cover and thus control further erosion. The desired species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

Although most areas of this soil are cleared, the potential productivity for woodland is moderately high. The trees preferred for planting include white ash, Virginia pine, and white oak. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The moderately slow permeability, the clayey texture, and the slope are limitations on sites for most sanitary facilities. The clayey texture, the slope, and the moderate shrink-swell potential are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIIe.

BeD2—Beasley silty clay loam, 12 to 20 percent slopes, eroded. This deep, well drained, moderately steep soil is on complex hillsides in the western part of Henry County and the central part of Trimble County. Individual areas range from about 5 to 100 acres in size. Erosion has removed approximately 25 to 75 percent of the original surface layer.

Typically, the surface layer is about 6 inches of brown and dark yellowish brown silty clay loam. The subsoil extends to a depth of about 28 inches. It is yellowish brown silty clay and clay. The substratum extends to a depth of about 41 inches. It is light olive brown, gray, and yellowish brown, mottled silty clay loam. Soft, calcareous shale bedrock is at a depth of about 41 inches.

This soil is medium in natural fertility and low in organic matter content. Permeability is moderately slow in the subsoil. Available water capacity is high. Runoff is very rapid. The soil is somewhat difficult to till because of the surface layer of silty clay loam. The range in moisture content within which the soil can be worked without the risk of clodding or crusting is narrow. The root zone is deep. The clayey subsoil is sticky and plastic when wet and has a moderate shrink-swell potential. The depth to bedrock ranges from 40 to 60 inches.

Included with this soil in mapping are small areas of Brassfield, Faywood, Lowell, and Grayford soils. These soils are in landscape positions similar to those of the Beasley soil. Also included are soils that are similar to the Beasley soil but are less than 40 inches deep over bedrock and severely eroded Beasley soils that have a surface layer of brown and strong brown silty clay loam.

Most areas are used for pasture and hay. Some areas are used as woodland, and a few small tracts are used as homesites. Although this soil is suited to occasional cultivation, it is better suited to pasture and hay. The response of crops to applications of fertilizer and lime is fair. If cultivated crops are grown, the hazard of erosion is very severe unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence can help to control further erosion and maintain productivity.

This soil is well suited to pasture and hay. If properly managed, it can produce moderate forage yields. The forage species selected for planting should be those that provide a protective ground cover and thus control further erosion. The desired species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is moderately high. The trees preferred for planting include white oak, white ash, and Virginia pine. The hazard of erosion and plant competition are the main management concerns. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses. The moderately slow permeability, the clayey texture, and the slope are limitations on sites for most sanitary facilities. The slope is the main limitation affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IVe.

BfC3—Beasley silty clay, 6 to 12 percent slopes, severely eroded. This deep, well drained, sloping soil is on convex ridgetops and shoulder slopes in the western part of Henry County and the central part of Trimble County. Individual areas range from about 5 to 80 acres in size. Erosion has removed most of the original surface layer and in places some of the subsoil. In some areas rills and shallow gullies have formed.

Typically, the surface layer is about 6 inches of brown and dark yellowish brown silty clay. The subsoil extends to a depth of about 28 inches. It is yellowish brown silty clay and clay. The substratum extends to a depth of about 41 inches. It is light olive brown, gray, and yellowish brown, mottled silty clay loam. Soft, calcareous shale bedrock is at a depth of about 41 inches.

This soil is low in natural fertility and organic matter content. Permeability is moderately slow in the subsoil. Available water capacity is high. Runoff is rapid. The soil cannot be easily tilled because the surface layer consists mainly of clayey subsoil material. The root zone is deep. The clayey subsoil is sticky and plastic when wet and has a moderate shrink-swell potential. The depth to bedrock ranges from 40 to 60 inches.

Included with this soil in mapping are small areas of Faywood, Lowell, Nicholson, and Ryker soils. These soils are in landscape positions similar to those of the Beasley soil. Also included are areas of soils that are similar to the Beasley soil but are less than 40 inches deep over bedrock and some areas of the less eroded Beasley soils that have a surface layer of brown silt loam.

Most areas are used for pasture and hay. A few areas are idle. Because most of the original surface layer has been removed by erosion, this soil is poorly suited to cultivated crops. The hazard of erosion is very severe if conventional tillage is used. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence can help to control further erosion and maintain productivity.

This soil is suited to hay and pasture. If the pasture or hayland is well managed, moderate forage yields can be obtained. The vegetation is somewhat difficult to establish because erosion has removed most of the original surface layer. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is moderate. The trees preferred for planting include white oak, Virginia pine, and white ash. The hazard of erosion, the equipment limitation, seedling mortality, and plant competition are the main management concerns. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The moderately slow permeability, the clayey texture, and the slope are limitations on sites for sanitary facilities. The clayey texture, the slope, and the moderate shrink-swell potential are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IVe.

BfD3—Beasley silty clay, 12 to 20 percent slopes, severely eroded. This deep, well drained, moderately steep soil is on complex hillsides in the western part of Henry County and the central part of Trimble County. Individual areas range from about 5 to 60 acres in size. Erosion has removed most of the original surface layer and in places some of the subsoil. In some areas rills and shallow gullies have formed.

Typically, the surface layer is about 6 inches of brown and dark yellowish brown silty clay. The subsoil extends to a depth of about 28 inches. It is yellowish brown silty clay and clay. The substratum extends to a depth of about 41 inches. It is light olive brown, gray, and yellowish brown, mottled silty clay loam. Soft, calcareous shale bedrock is at a depth of about 41 inches.

This soil is low in natural fertility and organic matter content. Permeability is moderately slow in the subsoil. Available water capacity is high. Runoff is very rapid. The soil cannot be easily tilled because the surface layer consists mainly of clayey subsoil material. The root zone is deep. The clayey subsoil is sticky and plastic when wet and has a moderate shrink-swell potential. The depth to bedrock ranges from 40 to 60 inches.

Included with this soil in mapping are small areas of Brassfield, Faywood, Lowell, and Grayford soils. These soils are in landscape positions similar to those of the Beasley soil. Also included are areas of soils that are similar to the Beasley soil but are shallower over bedrock and small areas of the less eroded Beasley soils that have a surface layer of brown silt loam.

Most areas are used as pasture. Some of the acreage is wooded or is idle land. Because of past erosion and a very severe hazard of further erosion, this soil is poorly suited to cultivated crops. It is suited to pasture and hay, but good management is needed to control further erosion. The forage species selected for planting should be those that provide a protective ground cover. The desired species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is moderate. The trees preferred for planting include white oak, Virginia pine, and white ash. The hazard of erosion is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses. The moderately slow permeability, the clayey texture, and the slope are limitations on sites for sanitary facilities. The slope is the main limitation affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is VIe.

Bo—Boonesboro silt loam, frequently flooded. This moderately deep, well drained, nearly level soil is on flood plains in narrow valleys along the smaller streams. Individual areas range from about 5 to 20 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is about 10 inches of dark brown silt loam. The subsurface layer extends to a depth of about 21 inches. It is dark brown silt loam that has about 4 percent limestone flagstones. The subsoil extends to a depth of about 28 inches. It is brown very flaggy silty clay loam. The substratum extends to a depth of about 33 inches. It is dark yellowish brown very flaggy silty clay loam. Limestone bedrock is at a depth of about 33 inches.

This soil is high in natural fertility and moderate or high in organic matter content. Permeability is moderate in the surface layer and subsurface layer and rapid in the subsoil. Available water capacity is moderate. Runoff is slow. The soil can be easily tilled throughout a wide range in moisture content. The root zone is moderately deep. The soil is frequently flooded for brief periods, usually in winter and early in spring. The depth to bedrock ranges from 20 to 40 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 Boonesboro soil. Also included are small areas of Elk soils on low stream terraces, small areas of Woolper soils on foot slopes, areas of soils that do not have a dark surface layer, and small areas of Boonesboro soils that have slopes of 2 to 4 percent.

Most areas are used for hay and pasture. Some areas are used for row crops or woodland. This soil is suited to cultivated crops. If properly managed, it can produce high yields in most years. Cover crops of small grain are sometimes damaged by flooding in winter. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and applying fertilizer help to maintain desirable soil structure and the organic matter content.

This soil is well suited to pasture and hay. Some hay crops can be damaged by floodwater. The desired forage species should be maintained through frequent renovation. Proper stocking rates, applications of fertilizer, and weed control are needed.

The potential productivity for woodland is very high. The preferred species for planting include eastern cottonwood, yellow poplar, white ash, and sweetgum. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses because of the flooding and the depth to bedrock.

The capability subclass is IIw.

BsE2—Brassfield-Beasley complex, 20 to 40 percent slopes, eroded. These moderately deep and deep, well drained, steep and very steep soils are on hillsides in the western and central parts of Trimble County and in the southwestern part of Henry County. The Brassfield soil is in all slope positions but is dominantly on the middle slopes. The Beasley soil is on the upper and lower slopes. The two soils were mapped together as a complex because they occur in patterns that make separation impractical at the scale selected for mapping. Individual areas range from about 5 to 100 acres in size. Erosion has removed approximately 25 to 75 percent of the original surface layer of these soils.

Brassfield and similar soils make up about 55 percent of the complex. The Beasley soil makes up about 35 percent. The remaining soils have been mapped as inclusions.

Typically, the surface layer of the Brassfield soil is about 5 inches of dark grayish brown silt loam. The subsoil extends to a depth of about 15 inches. It is light yellowish brown silt loam. The substratum extends to a depth of about 26 inches. It is light yellowish brown and olive gray, mottled silt loam. Soft, calcareous, interbedded siltstone and shale bedrock is at a depth of about 26 inches.

The Brassfield soil is medium in natural fertility and low in organic matter content. Permeability is moderate in the subsoil. Available water capacity is moderate. Runoff is very rapid. The root zone is moderately deep. The depth to bedrock ranges from 20 to 40 inches.

Typically, the surface layer of the Beasley soil is about 6 inches of brown and dark yellowish brown silty clay loam. The subsoil extends to a depth of about 41 inches. The upper part is yellowish brown silty clay and clay. The lower part is light olive brown, gray, and yellowish brown, mottled silty clay loam. Soft, calcareous shale bedrock is at a depth of about 41 inches.

The Beasley soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow in the subsoil. Available water capacity is high. Runoff is very rapid. The root zone is moderately deep. The clayey subsoil is sticky and plastic when wet and has a moderate shrink-swell potential. The depth to bedrock ranges from 40 to 60 inches.

Included with these soils in mapping are small areas of Fairmount and Faywood soils. These included soils are in landscape positions similar to those of the Brassfield and Beasley soils. Also included are small areas of Boonesboro soils on flood plains, areas of soils that have a dark surface layer and a subsoil of clay, some areas of uneroded or severely eroded Brassfield and Beasley soils, some areas where rills and gullies have formed, and some areas that have as much as 2 percent limestone rock outcrops.

Most areas are used as pasture. A significant acreage is wooded or covered with brush. Some of the acreage is idle land. Because of the slope and a very severe hazard of further erosion, this complex is poorly suited to cultivated crops. It is suited to pasture, but good management is needed to control erosion. The forage species selected for planting should be those that provide a protective ground cover and require infrequent renovation. Forage production is moderate in midsummer. Proper stocking rates, applications of lime and fertilizer, brush control, and rotation grazing are needed. The slope limits the use of haying equipment.

The potential productivity of the Brassfield soil for woodland is moderate. The trees preferred for planting include Virginia pine and white ash. The hazard of erosion is the main management concern.

The potential productivity of the Beasley soil for woodland is moderately high. The trees preferred for planting include white ash, Virginia pine, and white oak. The hazard of erosion and plant competition are the main management concerns. See table 7 for specific information relating to potential productivity.

This complex is poorly suited to most urban uses because of the slope.

The capability subclass is VIe.

CaB—Chenault silt loam, 2 to 6 percent slopes. This deep and very deep, well drained, gently sloping soil is on high, level stream terraces and in areas of old alluvial deposits on ridgetops in the uplands. Some areas have a karst topography. Individual areas range from about 5 to 25 acres in size.

Typically, the surface layer is about 6 inches of brown silt loam. The subsoil extends to a depth of about 46 inches. The upper part is brown silty clay loam. The lower part is brown gravelly clay loam. The substratum to a depth of about 60 inches is brown clay.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate in the subsoil. Available water capacity is high. The root zone is deep or very deep. Runoff is medium. The soil can be easily tilled throughout a wide range in moisture content. The substratum has a moderate shrink-swell potential. The depth to bedrock ranges from 40 to 80 inches.

Included with this soil in mapping are small areas of Wheeling soils and areas of soils that are similar to the Chenault soil but are deeper and have a lower base saturation. These soils are in landscape positions similar to those of the Chenault soil. Also included are some areas of Chenault soils that have fewer coarse fragments in the upper 2 or 3 feet and a few small areas of Chenault soils that have slopes of 6 to 12 percent.

Most areas are used for cultivated crops, hay, or pasture. This soil is well suited to most of the cultivated crops commonly grown in the survey area. If well managed, it can produce high yields. Crops respond well to applications of lime and fertilizer. If cultivated crops are grown, the hazard of erosion is moderate unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control erosion and maintain productivity.

This soil is well suited to all of the pasture and hay crops commonly grown in the survey area. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include yellow poplar, black walnut, white oak, northern red oak, and eastern white pine. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The moderate permeability and the depth to bedrock are limitations on sites for some sanitary facilities. The depth to bedrock is a limitation affecting some kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIe.

CaC—Chenault silt loam, 6 to 12 percent slopes. This deep and very deep, well drained, sloping soil is on high stream terraces and in areas of old alluvial deposits on shoulder slopes in the uplands. Some areas have a karst topography. Individual areas range from about 10 to 50 acres in size.

Typically, the surface layer is about 6 inches of brown silt loam. The subsoil extends to a depth of about 46 inches. The upper part is brown silty clay loam. The lower part is brown gravelly clay loam. The substratum to a depth of about 60 inches is brown clay. Limestone bedrock is at a depth of about 60 inches.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate in the subsoil. Available water capacity is high. The root zone is deep or very deep. Runoff is rapid. The soil can be easily tilled throughout a wide range in moisture content. The substratum has a moderate shrink-swell potential. The depth to bedrock ranges from 40 to 80 inches.

Included with this soil in mapping are small areas of Wheeling soils and areas of soils that are similar to the Chenault soil but are deeper and have a lower base saturation. These soils are in landscape positions similar to those of the Chenault soil. Also included are some areas of Chenault soils that have fewer coarse fragments in the upper 2 or 3 feet, a few areas of Chenault soils that have slopes of 12 to 20 percent, small areas of Eden and Faywood soils, and a few areas of the eroded Chenault soils.

Most areas are used for pasture and hay. Some areas are used for cultivated crops. This soil is suited to most of the cultivated crops commonly grown in the survey area. If well managed, it can produce high yields. Crops respond well to applications of lime and fertilizer. If cultivated crops are grown, the hazard of erosion is severe unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control erosion and maintain productivity.

This soil is well suited to all of the pasture and hay crops commonly grown in the survey area. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include yellow poplar, black walnut, white oak, northern red oak, and eastern white pine. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The slope, the moderate permeability, and the depth to bedrock are limitations on sites for some sanitary facilities. The depth to bedrock and the slope are limitations affecting some kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIIe.

CcB—Cincinnati silt loam, 2 to 6 percent slopes. This very deep, well drained, gently sloping soil is on convex ridgetops in the north-central part of Trimble County. Individual areas range from about 5 to more than 100 acres in size.

Typically, the surface layer is about 10 inches of brown silt loam. The subsoil extends to a depth of 93 inches or more. The upper part is dark yellowish brown silt loam and yellowish brown silty clay loam. The next part is a very firm, compact, brittle fragipan of yellowish brown and strong brown, mottled silt loam. The lower part is yellowish red clay loam and dark red silty clay loam.

The soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate above the fragipan and moderately slow or slow in and below the fragipan. Available water capacity is moderate. Runoff is medium. The soil can be easily tilled throughout a wide range in moisture content. The root zone is only moderately deep because of the fragipan. The seasonal high water table is at a depth of 24 to 48 inches. The lower part of the subsoil has a moderate shrink-swell potential. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Nicholson, Rossmoyne, and Ryker soils. These soils are in landscape positions similar to those of the Cincinnati soil. Also included are a few areas of Cincinnati soils that have slopes of less than 2 percent and small areas of moderately well drained or somewhat poorly drained soils that are in depressions and do not have a fragipan.

Most areas are used for cultivated crops, hay, or pasture. A few areas are used for orchards or vegetables. This soil is well suited to most of the cultivated crops commonly grown in the survey area. The seasonal high water table can limit the production of tobacco during wet growing seasons. Crops respond well to applications of lime and fertilizer. If cultivated crops are grown, the hazard of erosion is moderate unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control erosion and maintain productivity.

This soil is well suited to most of the pasture and hay crops commonly grown in the survey area. The fragipan restricts the rooting depth and can limit the production of deep-rooted legumes in some years. The desired forage species should be maintained through renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include yellow poplar, eastern white pine, white oak, and northern red oak. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The slow permeability in the fragipan and the wetness are limitations on sites for most sanitary facilities. The wetness is a limitation affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIe.

CcC—Cincinnati silt loam, 6 to 12 percent slopes. This very deep, well drained, sloping soil is on shoulder slopes and ridgetops in the north-central part of Trimble County. Slopes are smooth or slightly concave. Individual areas range from about 3 to 20 acres in size.

Typically, the surface layer is about 9 inches of brown silt loam. The subsoil extends to a depth of 93 inches or more. The upper part is yellowish brown silt loam and silty clay loam. The next part is a very firm, compact, brittle fragipan of dark yellowish brown, mottled silt loam and silty clay loam. The lower part is yellowish brown and strong brown clay loam and silty clay loam.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate above the fragipan and moderately slow or slow in and below the fragipan. Available water capacity is moderate. Runoff is rapid. The soil can be easily tilled throughout a wide range in moisture content. The root zone is only moderately deep because of the fragipan. The seasonal high water table is at a depth of 24 to 48 inches. The lower part of the subsoil has a moderate shrink-swell potential. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Beasley, Grayford, Nicholson, Rossmoyne, and Ryker soils. These soils are in landscape positions similar to those of the Cincinnati soil. Also included are a few areas of Cincinnati soils that have slopes of 2 to 6 percent.

Most areas are used for cultivated crops, hay, or pasture. A few areas are used for orchards or vegetables. This soil is suited to most of the cultivated crops commonly grown in the survey area. Crops respond well to applications of lime and fertilizer. If cultivated crops are grown, the hazard of erosion is severe unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control erosion and maintain productivity.

This soil is well suited to most of the pasture and hay crops commonly grown in the survey area. The fragipan restricts the rooting depth and can limit the production of deep-rooted legumes in some years. The desired forage species should be maintained through renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include yellow poplar, eastern white pine, white oak, and northern red oak. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The slow permeability in the fragipan and the slope are limitations on sites for most sanitary facilities. The wetness and the slope are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIIe.

EdC2—Eden silty clay loam, 6 to 20 percent slopes, eroded. This moderately deep, well drained, sloping and moderately steep soil is on narrow, convex ridgetops and shoulder slopes, mainly in the eastern part of Henry County. Individual areas range from about 5 to 100 acres in size. Erosion has removed approximately 25 to 75 percent of the original surface layer.

Typically, the surface layer is about 4 inches of dark grayish brown silty clay loam. The subsoil extends to a depth of about 29 inches. The upper part is light olive brown, mottled silty clay. The lower part is light olive brown, mottled flaggy silty clay. Below this to a depth of about 50 inches is soft, weathered, calcareous shale and siltstone bedrock interbedded with thin layers of limestone.

This soil is medium in natural fertility and low in organic matter content. Permeability is slow in the subsoil. Available water capacity is moderate. Runoff is rapid or very rapid. The soil is somewhat difficult to till because of the surface layer of silty clay loam. The range in moisture content within which the soil can be worked without the risk of clodding or crusting is narrow. The root zone is moderately deep. The clayey subsoil has a moderate shrink-swell potential. The depth to bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Faywood and Lowell soils. These soils are in landscape positions similar to those of the Eden soil. Also included are a few areas of severely eroded Eden soils and some areas of Eden soils that have slopes of more than 20 percent.

Most areas are used for pasture and hay. A few areas are used for tobacco. Some of the acreage is idle land that is being revegetated naturally by eastern redcedar. Although this soil is suited to occasional cultivation, it is best suited to pasture and hay. The slope and a very severe hazard of erosion limit the suitability for cultivated crops. Returning crop residue to the soil, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence help to control erosion.

This soil is suited to pasture and hay, but good management is needed to control further erosion. The forage species selected for planting should be those that provide a protective ground cover. Forage production is low in midsummer. Proper stocking rates, applications of lime and fertilizer, frequent renovation, rotation grazing, and weed control are needed.

The potential productivity for woodland is moderate. The trees preferred for planting include white oak, white ash, green ash, and eastern white pine. The hazard of erosion, the equipment limitation, seedling mortality, and plant competition are the main management concerns. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses because of the depth to bedrock, the slope, the slow permeability, the clayey texture, and the moderate shrink-swell potential.

The capability subclass is IVe.

EdE2—Eden silty clay loam, 20 to 35 percent slopes, eroded. This moderately deep, well drained, steep and very steep soil is on complex hillsides, mainly in the eastern part of Henry County. Individual areas range from about 10 to several hundred acres in size. Erosion has removed approximately 25 to 75 percent of the original surface layer.

Typically, the surface layer is about 4 inches of dark grayish brown silty clay loam. The subsoil extends to a depth of about 29 inches. The upper part is light olive brown, mottled silty clay. The lower part is light olive brown, mottled flaggy silty clay. Below this to a depth of about 50 inches is soft, weathered, calcareous shale and siltstone bedrock interbedded with thin layers of limestone.

This soil is medium in natural fertility and low in organic matter content. Permeability is slow in the subsoil. Available water capacity is moderate. Runoff is very rapid. The root zone is moderately deep. The clayey subsoil has a moderate shrink-swell potential. The depth to bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Faywood, Fairmount, and Lowell soils. These soils are in landscape positions similar to those of the Eden soil. Also included are small areas of Boonesboro soils on narrow flood plains; Woolper soils on foot slopes; Eden soils that have slopes of more than 35 percent; small areas of soils that are similar to the Eden soil but are more than 40 inches deep over bedrock; a few areas of the severely eroded Eden soils and other Eden soils that have 15 to 25 percent flagstones on the surface; and a few areas where rills and gullies have formed.

Most areas are wooded or covered with brush. A significant acreage is used as pasture. Some of the acreage is idle land that is being revegetated naturally by eastern redcedar. Because of the slope and a very severe hazard of further erosion, this soil is poorly suited to cultivated crops.

This soil is suited to pasture, but good management is needed to control further erosion. The forage species selected for planting should be those that provide a protective ground cover and require infrequent renovation. Forage production is low during midsummer. Proper stocking rates, applications of lime and fertilizer, brush control, and rotation grazing are needed. The slope and the flagstones on the surface limit the use of haying equipment.

The potential productivity for woodland is moderate. The trees preferred for planting include white oak, white ash, green ash, and eastern white pine. The hazard of erosion is the main management concern. Some included soils, particularly the Boonesboro soils on narrow flood plains and the deeper soils on foot slopes and benches, produce higher quality hardwoods than this soil. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses because of the slope, slippage, the depth to bedrock, the clayey texture, and the slow permeability. Low strength is a limitation on sites for local roads.

The capability subclass is VIe.

EkA—Elk silt loam, occasionally flooded, 0 to 2 percent slopes. This very deep, well drained, nearly level soil is on stream terraces throughout the survey area. Individual areas range from about 5 to 50 acres in size.

Typically, the surface layer is about 10 inches of brown silt loam. The subsoil extends to a depth of about 44 inches. The upper part is dark yellowish brown silt loam. The lower part is dark yellowish brown and yellowish brown silty clay loam. The substratum to a depth of 64 inches is dark yellowish brown silty clay loam.

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate in the subsoil. Available water capacity is high. Runoff is slow. The soil can be easily tilled throughout a wide range in moisture content. It is occasionally flooded for brief periods, usually in winter and early in spring. The root zone is very deep. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Otwell soils. These soils are in landscape positions similar to those of the Elk soil. Also included are small areas of Newark and Otwell soils on flood plains and a few small areas of Elk soils that are not subject to flooding.

Most areas are used for cultivated crops, hay, or pasture. This soil is well suited to all of the cultivated crops commonly grown in the survey area. If well managed, it can produce high yields. Cover crops of small grain can be damaged by flooding in winter. The hazard of erosion is slight in cultivated areas. Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops can help to maintain desirable soil structure and the organic matter content.

This soil is well suited to all of the pasture and hay crops commonly grown in the survey area. Some hay crops can be damaged by floodwater. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include eastern white pine, white oak, yellow poplar, black walnut, and northern red oak. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses because of the flooding.

The capability subclass is IIw.

EkB—Elk silt loam, rarely flooded, 2 to 6 percent slopes. This very deep, well drained, gently sloping soil is on stream terraces and alluvial fans throughout the survey area. It is higher on the landscape than the Elk soils that have slopes of 0 to 2 percent and 6 to 12 percent. Individual areas range from about 3 to 30 acres in size.

Typically, the surface layer is about 10 inches of brown silt loam. The subsoil extends to a depth of about 44 inches. The upper part is dark yellowish brown silt loam. The lower part is dark yellowish brown and yellowish brown silty clay loam. The substratum to a depth of 64 inches is dark yellowish brown silty clay loam.

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate in the subsoil. Available water capacity is high. Runoff is medium. The soil can be easily tilled throughout a wide range in moisture content. It is rarely flooded. The root zone is very deep. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Otwell soils. These soils are in landscape positions similar to those of the Elk soil. Also included are small areas of Boonesboro, Newark, and Nolin soils on flood plains; Woolper soils on foot slopes that are not subject to flooding; and soils that are on low terraces and have a clayey subsoil.

Most areas are used extensively for cultivated crops, hay, or pasture. This soil is well suited to all of the cultivated crops commonly grown in the survey area. If well managed, it can produce high yields. Crops respond well to applications of lime and fertilizer. If cultivated crops are grown, the hazard of erosion is moderate unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control erosion and maintain productivity.

This soil is well suited to all of the pasture and hay crops commonly grown in the survey area. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include eastern white pine, white oak, yellow poplar, black walnut, and northern red oak. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The rare flooding is a hazard affecting some kinds of building site development and sanitary facilities. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIe.

EkC—Elk silt loam, occasionally flooded, 6 to 12 percent slopes. This very deep, well drained, sloping soil is on stream terraces and alluvial fans throughout the survey area. It is lower on the landscape than the Elk soil that has slopes of 2 to 6 percent. Individual areas range from 3 to 30 acres in size.

Typically, the surface layer is about 10 inches of brown silt loam. The subsoil extends to a depth of about 44 inches. The upper part is dark yellowish brown silt loam. The lower part is dark yellowish brown and yellowish brown silty clay loam. The substratum to a depth of 64 inches is dark yellowish brown silty clay loam.

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate in the subsoil. Available water capacity is high. Runoff is rapid. The soil can be easily tilled throughout a wide range in moisture content. It is occasionally flooded for brief periods, usually in winter and early in spring. The root zone is very deep. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Chenault soils. These soils are in landscape positions similar to those of the Elk soil. Also included are small areas of Boonesboro and Nolin soils on flood plains, small areas of Woolper soils on foot slopes, and some areas of Elk soils that are not subject to flooding or are subject to rare flooding.

Most areas are used for cultivated crops, hay, or pasture. This soil is suited to all of the cultivated crops commonly grown in the survey area. If well managed, it can produce high yields. Crops respond well to applications of lime and fertilizer. Cover crops of small grain can be damaged by flooding in winter. If cultivated crops are grown, the hazard of erosion is severe unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control erosion and maintain productivity.

This soil is well suited to all of the pasture and hay crops commonly grown in the survey area. Some hay crops are damaged by floodwater. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include eastern white pine, white oak, yellow poplar, black walnut, and northern red oak. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses because of the flooding. The slope is a limitation affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIIe.

En—Elk and Nolin silt loams, frequently flooded. These very deep, well drained soils are on steep terrace escarpments and nearly level, steep, and very steep flood plains. The two soils occur in an irregular pattern along the Kentucky River in Henry County. The Elk soil is on the stream terraces. It has slopes of 20 to 40 percent. The Nolin soil is on the flood plains. It has slopes of 0 to 25 percent. Some areas of each soil are large enough to be mapped separately. Because of present and predicted land uses, however, the soils are mapped as one unit. Individual areas are long and are 75 to 300 feet wide. They range from 5 to 50 acres in size.

Elk and similar soils make up about 55 percent of the map unit. The Nolin soil makes up about 20 percent. The remaining soils have been mapped as inclusions.

Typically, the surface layer of the Elk soil is about 10 inches of brown silt loam. The subsoil extends to a depth of about 44 inches. The upper part is dark yellowish brown silt loam. The lower part is dark yellowish brown and yellowish brown silty clay loam. The substratum to a depth of 64 inches is dark yellowish brown silty clay loam.

The Elk soil is high in natural fertility and moderate in organic matter content. Permeability is moderate in the subsoil. Available water capacity is high. Runoff is very rapid. The soil is frequently flooded for brief periods, usually in winter and early in spring. The root zone is very deep. The depth to bedrock is more than 5 feet.

Typically, the surface layer of the Nolin soil is about 9 inches of brown silt loam. The subsoil extends to a depth of about 68 inches. It is brown silt loam. The substratum to a depth of 78 inches is yellowish brown silt loam.

The Nolin soil is high in natural fertility and moderate in organic matter content. Permeability is moderate in the subsoil. Available water capacity is high. Runoff is slow to very rapid, depending on the slope. The less sloping areas can be tilled throughout a wide range in moisture content. The seasonal high water table is at a depth of 3 to 6 feet. The soil is frequently flooded for brief periods, usually in winter and early in spring. The root zone is very deep. The depth to bedrock is more than 5 feet.

Included with these soils in mapping are small areas of Wheeling, Otwell, and Newark soils. These included soils are in landscape positions similar to those of the Elk and Nolin soils. Also included, on steep riverbanks, are soils that formed in mixed alluvium of various textures.

Most areas are wooded or covered with brush. A small acreage is used as pasture. Because of the short, steep slopes and the flooding, this unit is poorly suited to cultivated crops. Some small areas are suited to pasture. They can produce high forage yields, but they cannot be easily managed because of their size, the slope, and the frequent flooding.

The potential productivity of the Elk soil for woodland is high. The trees preferred for planting include eastern white pine, white oak, yellow poplar, black walnut, and northern red oak. The hazard of erosion and plant competition are the main management concerns.

The potential productivity of the Nolin soil for woodland is very high. The trees preferred for planting include sweetgum, yellow poplar, eastern cottonwood, and green ash. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This unit is poorly suited to most urban uses because of the flooding and the slope.

The capability subclass is VIe.

FaE—Fairmount flaggy silty clay loam, 12 to 30 percent slopes, very rocky. This shallow, well drained, moderately steep and steep soil is on hillsides throughout the survey area. Individual areas range from about 10 to more than 100 acres in size. Rock outcrops cover about 2 to 10 percent of the surface in most areas.

Typically, the surface layer is about 4 inches of very dark grayish brown flaggy silty clay loam. The subsurface layer extends to a depth of about 11 inches. It is dark brown flaggy silty clay. The subsoil extends to a depth of about 17 inches. It is light olive brown channery silty clay. Hard limestone bedrock interbedded with thin layers of calcareous shale is at a depth of about 17 inches.

This soil is medium in natural fertility and high in organic matter content. Permeability is moderately slow or slow in the subsoil. Available water capacity is low. Runoff is very rapid. The root zone is shallow. The subsoil has a moderate shrink-swell potential. The depth to bedrock ranges from 10 to 20 inches.

Included with this soil in mapping are small areas of Eden, Faywood, Lowell, and Woolper soils. These soils are in landscape positions similar to those of the Fairmount soil. Also included are some areas that are not rocky, some areas of uneroded or severely eroded soils, and areas of soils that are similar to the Fairmount soil but have a lighter colored surface layer and a subsoil of clay.

Most areas are used as woodland. Some areas are covered with brush and low-quality pasture plants. Because of the slope, the depth to bedrock, and the rock outcrops, this soil is not suited to cultivated crops. It is poorly suited to pasture and hay because of the slope and the rock outcrops. Maintaining the desired species of grasses and legumes is difficult because of the depth to bedrock and the rockiness. The forage species selected for planting should be those that require infrequent renovation and provide a protective ground cover. Proper stocking rates are needed to prevent overgrazing.

The potential productivity for woodland is moderate. The trees preferred for planting include Virginia pine, white ash, and white oak. Seedling mortality is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses because of the slope, the moderately slow or slow permeability, the clayey texture, low strength, and the depth to bedrock.

The capability subclass is VIIs.

FwF—Fairmount-Woolper complex, 30 to 65 percent slopes. These shallow and very deep, well drained, very steep soils are on hillsides and bluffs near the Ohio River and the Little Kentucky River in Trimble County and adjacent to the valley of the Kentucky River in northeastern Henry County. Generally, the Fairmount soil is on the upper and middle slopes, and the Woolper soil is on the lower slopes and benches. The two soils were mapped together as a complex because they occur in patterns that make separation impractical at the scale selected for mapping. Individual areas range from about 30 to several hundred acres in size.

Fairmount and similar soils make up about 40 percent of the complex. The Woolper soil makes up about 35 percent. The remaining soils have been mapped as inclusions.

Typically, the surface layer of the Fairmount soil is about 4 inches of very dark grayish brown flaggy silty clay loam. The subsurface layer extends to a depth of 11 inches. It is dark brown flaggy silty clay. The subsoil extends to a depth of about 17 inches. It is light olive brown channery silty clay. Hard limestone bedrock interbedded with thin layers of calcareous shale is at a depth of about 17 inches.

The Fairmount soil is medium in natural fertility and high in organic matter content. Permeability is moderately slow or slow in the subsoil. Available water capacity is low. Runoff is very rapid. The root zone is shallow. The subsoil has a moderate shrink-swell potential. The depth to bedrock ranges from 10 to 20 inches.

Typically, the surface layer of the Woolper soil is about 8 inches of very dark grayish brown silty clay loam. The subsoil extends to a depth of about 64 inches. The upper part is dark brown silty clay. The next part is brown silty clay. The lower part is yellowish brown clay.

The Woolper soil is high in natural fertility and organic matter content. Permeability is moderately slow in the subsoil. Available water capacity is high. Runoff is very rapid. The root zone is very deep. The subsoil has a moderate shrink-swell potential. The depth to bedrock is more than 5 feet.

Included with these soils in mapping are small areas of Beasley, Brassfield, and Faywood soils. These included soils are in landscape positions similar to those of the Fairmount and Woolper soils. Also included are small areas of Boonesboro soils on flood plains; areas of the lower lying soils that are similar to the Woolper soil but have a lighter colored surface layer and a significant increase in clay content in the subsoil; areas of rock outcrop, mostly on the upper slopes;

some areas of soils that are similar to the Fairmount soil but have a lighter colored surface layer and a subsoil of clay; and some areas of eroded or severely eroded Fairmount soils.

Most areas are wooded. Because of the slope and the depth to bedrock, this complex is unsuited to cultivated crops and poorly suited to pasture and hay.

The potential productivity of the Fairmount soil for woodland is moderate. The trees preferred for planting include Virginia pine, white ash, and white oak. The hazard of erosion and the equipment limitation are the main management concerns.

The potential productivity of the Woolper soil for woodland is high. The trees preferred for planting include yellow poplar, white oak, northern red oak, eastern white pine, and white ash. The hazard of erosion, the equipment limitation, and plant competition are the main management concerns. See table 7 for specific information relating to potential productivity.

This complex is poorly suited to most urban uses because of the slope, the moderately slow or slow permeability, the clayey texture, low strength, and the depth to bedrock.

The capability subclass is VIIe.

FyC2—Faywood silty clay loam, 6 to 12 percent slopes, eroded. This moderately deep, well drained, sloping soil is on convex ridgetops and shoulder slopes throughout the survey area. Individual areas range from about 5 to 50 acres in size. Erosion has removed approximately 25 to 75 percent of the original surface layer.

Typically, the surface layer is about 4 inches of brown silty clay loam. The subsurface layer is about 3 inches of dark yellowish brown silty clay loam. The subsoil extends to a depth of about 26 inches. The upper part is yellowish brown silty clay. The lower part is yellowish brown, mottled silty clay and clay. Hard limestone bedrock interbedded with layers of calcareous shale is at a depth of about 26 inches.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow or slow in the subsoil. Available water capacity is moderate. Runoff is rapid. The soil is somewhat difficult to till because of the surface layer of silty clay loam. The range in moisture content within which the soil can be worked without the risk of clodding or crusting is narrow. The root zone is moderately deep. The subsoil has a moderate shrink-swell potential. The depth to bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Beasley, Eden, Lowell, and Fairmount soils. These soils are in landscape positions similar to those of the Faywood soil. Also included are a few areas of Faywood soils that have slopes of 2 to 6 percent, some areas of severely eroded Faywood soils, a few areas of soils that have flagstones and rock outcrops on the surface, a few areas of Faywood soils that have a surface layer of silt loam and are uneroded or only slightly eroded, and small areas of Chenault soils.

Most areas are used for pasture and hay. Although this soil is suited to occasional cultivation, it is better suited to pasture and hay. If well managed, it can produce moderate yields of cultivated crops. If cultivated crops are grown, the hazard of erosion is severe unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, including grasses and legumes in the cropping sequence, and growing cover crops help to control further erosion and maintain productivity.

This soil is well suited to most of the hay and pasture crops commonly grown in the survey area. If the pasture or hayland is well managed, moderate forage yields can be obtained. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is moderately high. The trees preferred for planting include white oak, eastern white pine, and northern red oak. The equipment limitation and plant competition are the main management concerns. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses. The depth to bedrock, the moderately slow or slow permeability, and the clayey texture 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. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIIe.

FyD2—Faywood silty clay loam, 12 to 20 percent slopes, eroded. This moderately deep, well drained, moderately steep soil is on shoulder slopes and hillsides throughout the survey area. Some areas have a karst topography. Individual areas range from about 5 to 50 acres in size. Erosion has removed approximately 25 to 75 percent of the original surface layer.

Typically, the surface layer is about 4 inches of brown silty clay loam. The subsurface layer is about 3 inches of dark yellowish brown silty clay loam. The subsoil extends to a depth of about 26 inches. The upper part is yellowish brown silty clay. The lower part is yellowish brown, mottled silty clay and clay. Hard limestone bedrock interbedded with layers of calcareous shale is at a depth of about 26 inches.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow or slow in the subsoil. Available water capacity is moderate. Runoff is very rapid. The soil is somewhat difficult to till because of the surface layer of silty clay loam. The range in moisture content within which the soil can be worked without the risk of clodding or crusting is narrow. The root zone is moderately deep. The subsoil has a moderate shrink-swell potential. The depth to bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Beasley, Eden, Fairmount, Grayford, and Lowell soils. These soils are in landscape positions similar to those of the Faywood soil. Also included are small areas of Chenault soils on high terraces, a few areas of Faywood soils that have slopes of 20 to 30 percent, some severely eroded areas of Faywood soils that have a surface layer of yellowish brown silty clay loam, and a few areas of Faywood soils that have flagstones and rock outcrops on the surface.

Most areas are used for pasture. A few areas are used for hay or cultivated crops. Some areas are wooded. Although this soil is suited to occasional cultivation, it is better suited to pasture and hay. If cultivated crops are grown, the hazard of erosion is very severe unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control runoff and further erosion.

This soil is suited to most of the pasture and hay crops commonly grown in the survey area. If the pasture or hayland is well managed, moderate forage yields can be obtained. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is moderately high. The trees preferred for planting include white oak, eastern white pine, and northern red oak. The hazard of erosion, the equipment limitation, and plant competition are the main management concerns. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to urban uses. The slope, the depth to bedrock, the moderately slow or slow permeability, and the clayey texture 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. Also, it limits the use of the soil as roadfill material.

The capability subclass is IVe.

GbD2—Grayford-Beasley complex, 12 to 20 percent slopes, eroded. These deep, well drained, moderately steep soils are on the upper hillsides in the northern and central parts of Trimble County. Generally, the Grayford soil is on the upper and middle slopes above the Beasley soil. The two soils occur as areas so intricately mixed that they could not be separated at the scale selected for mapping. Individual areas range from about 5 to 50 acres in size. Erosion has removed approximately 25 to 75 percent of the original surface layer of these soils.

Grayford and similar soils make up about 60 percent of the complex. Beasley and similar soils make up about 30 percent. The remaining soils are mapped as inclusions.

Typically, the surface layer of the Grayford soil is about 4 inches of brown silt loam. The subsoil extends to a depth of about 49 inches. The upper part is brown, yellowish brown, and reddish brown silty clay loam. The lower part is strong brown, mottled clay. Soft, calcareous siltstone bedrock is at a depth of about 49 inches.

The Grayford soil is medium in natural fertility and low in organic matter content. Permeability is moderate in the subsoil. Available water capacity is high. Runoff is very rapid. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep. The shrink-swell potential is moderate in the upper part of the subsoil and high in the lower part. The depth to bedrock ranges from 40 to 60 inches.

Typically, the surface layer of the Beasley soil is about 6 inches of brown and yellowish brown silty clay loam. The subsoil extends to a depth of about 28 inches. It is yellowish brown silty clay and clay. The substratum extends to a depth of about 41 inches. It is light olive brown, gray, and yellowish brown, mottled silty clay loam. Soft, calcareous shale bedrock is at a depth of about 41 inches.

The Beasley soil is medium in natural fertility and low in organic matter content. Permeability is moderately slow in the subsoil. Available water capacity is high. Runoff is very rapid. The soil is somewhat difficult to till because of the surface layer of silty clay loam. The range in moisture content within which the soil can be worked without the risk of clodding or crusting is narrow. The root zone is deep. The clayey subsoil has a moderate shrink-swell potential. The depth to bedrock ranges from 40 to 60 inches.

Included with these soils in mapping are small areas of Brassfield, Faywood, Nicholson, and Ryker soils. These included soils are in landscape positions similar to those of the Grayford and Beasley soils. Also included are areas of deep soils in which the upper part of the subsoil is yellowish red silty clay, areas of soils that are similar to the Grayford soil but are underlain by hard limestone bedrock at a depth of 40 to 60 inches, some areas of uneroded or severely eroded Grayford and Beasley soils, and some areas where rills and gullies have formed.

Most areas are used for pasture and hay. A few areas are wooded or covered with brush. Although this complex is suited to occasional cultivation, it is better suited to pasture and hay. Crops respond well to applications of fertilizer and lime. If cultivated crops are grown, the hazard of erosion is very severe unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence can help to control further erosion and maintain productivity.

This complex is well suited to pasture and hay. If properly managed, it can produce moderate forage yields. The forage species selected for planting should be those that provide a protective ground cover and thus help to control further erosion. The desired species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity of the Grayford soil for woodland is high. The trees preferred for planting include eastern white pine, black walnut, yellow poplar, northern red oak, and white ash. Plant competition is the main management concern.

The potential productivity of the Beasley soil for woodland is moderately high. The trees preferred for planting include white oak, Virginia pine, and white ash. The hazard of erosion and plant competition are the main management concerns. See table 7 for specific information relating to potential productivity.

This complex is poorly suited to most urban uses. The slope is a limitation affecting sanitary facilities, building site development, and local roads and streets. The moderately slow permeability and clayey texture of the Beasley soil are limitations on sites for sanitary facilities.

The capability subclass is IVe.

Hu—Huntington silt loam, occasionally flooded. This very deep, well drained, nearly level soil is on flood plains in wide valleys along the Ohio River in Trimble County. Individual areas range from about 5 to 30 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is about 11 inches of dark brown silt loam. The subsoil extends to a depth of about 58 inches. It is dark grayish brown and brown silt loam. The substratum to a depth of about 72 inches is dark yellowish brown, mottled silt loam.

This soil is high in natural fertility and organic matter content. Permeability is moderate in the subsoil. Available water capacity is high. Runoff is slow. The soil can be easily tilled throughout a wide range in moisture content. The root zone is very deep. The soil is occasionally flooded for brief periods, usually in winter and early in spring. The depth to bedrock is more than 5 feet.

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 Huntington soil. Also included are small areas of Elk, Otwell, and Wheeling soils on low stream terraces; a few narrow areas adjacent to the Ohio River where the soils are more sandy throughout than the Huntington soil; and a few areas of Huntington soils that have slopes of more than 2 percent.

Most areas are used for cultivated crops. Some areas are used for hay, pasture, or small grain. This soil is well suited to cultivated crops. It is productive and can be cropped intensively if fertility is maintained. Cover crops of small grain can be damaged by flooding in winter. Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops help to maintain desirable soil structure and the organic matter content.

This soil is well suited to all of the pasture and hay crops commonly grown in the survey area. Some hay crops can be damaged by floodwater. The desired forage species should be maintained through renovation. Weed control, proper stocking rates, and applications of lime and fertilizer are needed.

The potential productivity for woodland is very high. The trees preferred for planting include yellow poplar, eastern white pine, white ash, northern red oak, and black walnut. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses because of the flooding.

The capability subclass is IIw.

Lc—Lawrence silt loam, rarely flooded. This very deep, somewhat poorly drained, nearly level soil is on stream terraces throughout the survey area. Individual areas range from about 5 to 50 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is about 8 inches of grayish brown silt loam. The subsoil extends to a depth of about 78 inches. The upper part is yellowish brown and strong brown, mottled silty clay loam. The lower part is a compact, brittle fragipan of dark yellowish brown, mottled silty clay loam and silt loam.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is slow in the fragipan. Available water capacity is moderate. Runoff is slow. The soil can be easily tilled, but cultivation can be delayed early in spring because of a seasonal high water table at a depth of 12 to 24 inches. The root zone is only moderately deep because of the fragipan. The soil is subject to rare flooding. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Otwell soils. These soils are in landscape positions similar to those of the Lawrence soil. Also included are small areas of Newark soils on flood plains; a few areas of Lawrence soils that have slopes of 2 to 4 percent; areas of poorly drained, silty soils that do not have a fragipan; some areas of soils that are subject to ponding; and some areas of soils that are not subject to flooding.

Most areas are used for pasture, hay, or cultivated crops. A few areas are wooded or covered with brush. If a surface drainage system is installed, this soil is suited to corn and soybeans and produces moderate yields. The seasonal high water table and the fragipan are the major limitations. Planting and harvesting can be delayed by wetness. Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops help to maintain desirable soil structure and the organic matter content.

This soil is suited to pasture and hay crops that can tolerate some wetness. The fragipan restricts the suitability for deep-rooted legumes. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, a drainage system, proper stocking rates, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include yellow poplar, green ash, American sycamore, white oak, eastern white pine, and sweetgum. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses. The wetness, the flooding, and the slow permeability in the fragipan are limitations on sites for most sanitary facilities. The wetness and the flooding are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIIw.

LoB—Lowell silt loam, 2 to 6 percent slopes. This deep and very deep, well drained, gently sloping soil is on convex ridgetops throughout Henry County and in the southeastern part of Trimble County. Individual areas range from about 5 to more than 100 acres in size.

Typically, the surface layer is about 8 inches of dark yellowish brown silt loam. The subsoil extends to a depth of about 60 inches. The upper part is yellowish brown and dark yellowish brown silty clay loam. The next part is mottled yellowish brown and light yellowish brown clay. The lower part is light olive brown, mottled channery silty clay. The substratum to a depth of about 74 inches is light yellowish brown, mottled channery silty clay loam. Hard limestone bedrock is at a depth of about 74 inches.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow in the subsoil. Available water capacity is high. Runoff is medium. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep or very deep. The clayey subsoil has a moderate shrink-swell potential. The depth to bedrock is more than 40 inches.

Included with this soil in mapping are small areas of Beasley, Faywood, Nicholson, and Shelbyville soils. These soils are in landscape positions similar to those of the Lowell soil. Also included are a few areas of the eroded Lowell soils.

Most areas are used for cultivated crops, hay, or pasture. This soil is well suited to all of the cultivated crops commonly grown in the survey area. If well managed, it can produce high yields. Crops respond well to applications of lime and fertilizer. If cultivated crops are grown, the hazard of erosion is moderate unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control erosion and maintain productivity.

This soil is well suited to all of the pasture and hay crops commonly grown in the survey area. If properly managed, it can produce high forage yields. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include yellow poplar, white oak, eastern white pine, northern red oak, and white ash. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The moderately slow permeability, the clayey texture, and the depth to bedrock are limitations on sites for most sanitary facilities. The depth to bedrock and the moderate shrink-swell potential are limitations affecting some kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIe.

LoC—Lowell silt loam, 6 to 12 percent slopes. This deep and very deep, well drained, sloping soil is on convex ridgetops and shoulder slopes throughout Henry County and in the southeastern part of Trimble County. Individual areas range from about 5 to more than 100 acres in size.

Typically, the surface layer is about 8 inches of dark yellowish brown silt loam. The subsoil extends to a depth of about 60 inches. The upper part is yellowish brown and dark yellowish brown silty clay loam. The next part is mottled yellowish brown and light yellowish brown clay. The lower part is light olive brown, mottled channery silty clay. The substratum to a depth of about 74 inches is light yellowish brown, mottled channery silty clay loam. Hard limestone bedrock is at a depth of about 74 inches.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow in the subsoil. Available water capacity is high. Runoff is rapid. The soil can be easily tilled throughout a wide range in moisture content. The root zone is deep or very deep. The clayey subsoil has a moderate shrink-swell potential. The depth to bedrock is more than 40 inches.

Included with this soil in mapping are small areas of Beasley, Eden, Faywood, Nicholson, and Shelbyville soils. These soils are in landscape positions similar to those of the Lowell soil. Also included are a few small areas of soils along narrow drainageways on bottom land and a few areas of the eroded Lowell soils.

Most areas are used for pasture, hay, or cultivated crops. This soil is suited to all of the cultivated crops commonly grown in the survey area (fig. 10). If well managed, it can produce high yields. Crops respond well to applications of lime and fertilizer. If cultivated crops are grown, the hazard of erosion is severe unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control erosion and maintain productivity.

This soil is well suited to all of the pasture and hay crops commonly grown in the survey area. If properly managed, it can produce high forage yields. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include yellow poplar, eastern white pine, white oak, northern red oak, and white ash. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The moderately slow permeability, the clayey texture, the slope, and the depth to bedrock are limitations on sites for most sanitary facilities. The depth to bedrock, the moderate shrink-swell potential, and the slope are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIIe.

LsC3—Lowell silty clay loam, 6 to 12 percent slopes, severely eroded. This deep, well drained, sloping soil is on convex ridgetops and shoulder slopes throughout Henry County and in the southeastern part of Trimble County. Individual areas range from about 3 to 30 acres in size. Erosion has removed most of the original surface layer and in places some of the subsoil. In some areas rills and shallow gullies have formed.

Typically, the surface layer is about 4 inches of dark yellowish brown and yellowish brown silty clay loam. The subsoil extends to a depth of about 43 inches. The upper part is yellowish brown silty clay loam. The next part is mottled yellowish brown and light yellowish brown clay. The lower part is olive brown, mottled channery silty clay. The substratum to a depth of about 53 inches is light olive brown, mottled silty clay. Hard limestone bedrock is at a depth of about 53 inches.

This soil is low in natural fertility and organic matter content. Permeability is moderately slow in the subsoil. Available water capacity is high. Runoff is rapid. The soil is somewhat difficult to till because the surface layer consists mainly of clayey subsoil material. The root zone is deep. The range in moisture content within which the soil can be worked without the risk of clodding or crusting is narrow. The clayey subsoil has a moderate shrink-swell potential. The depth to bedrock is more than 40 inches.

Included with this soil in mapping are small areas of Beasley, Eden, and Faywood soils. These soils are in landscape positions similar to those of the Lowell soil. Also included are a few areas of the uneroded Lowell soils.

Most areas are used for pasture and hay. A few areas are used for cultivated crops. Some of the acreage is idle land that in places is covered with brush. This soil is poorly suited to cultivation. It is better suited to pasture and hay. Erosion has removed most of the original surface layer. The response of crops to applications of lime and fertilizer is fair. If cultivated crops are grown, the hazard of erosion is very severe unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to

Figure 10.—Corn and alfalfa in an area of Lowell silt loam, 6 to 12 percent slopes. The grassed waterway helps to control erosion.

the soil, growing cover crops, and including grasses and legumes in the cropping sequence can help to control further erosion and maintain productivity.

This soil is suited to hay and pasture. If the pasture or hayland is well managed, moderate forage yields can be obtained. The vegetation is somewhat difficult to establish because most of the original surface layer has been removed by erosion. Forage yields and the desired forage species should be maintained through renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is moderately high. The trees preferred for planting include eastern white pine, white ash, and white oak. The equipment limitation, seedling mortality, and plant competition are the main management concerns. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The moderately slow permeability, the clayey texture, the slope, and the depth to bedrock are limitations on sites for most sanitary facilities. The depth to bedrock, the moderate shrink-swell potential, and the slope are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IVe.

Mc—McGary silt loam. This very deep, somewhat poorly drained, nearly level soil is dominantly in a broad upland depression in southwestern Henry County. In a few small areas it is on stream terraces along the major creeks in Henry County. Individual areas range from about 3 to more than 70 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is about 9 inches of grayish brown silt loam. The subsoil extends to a depth of about 38 inches. It is grayish brown, yellowish brown, and gray, mottled silty clay. The substratum extends to a depth of about 85 inches. The upper part is gray silty clay. The lower part is gray, yellowish brown, and dark yellowish brown, mottled silty clay loam stratified with silt loam and loam.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is slow or very slow in the subsoil. Available water capacity is high. Runoff is slow. The soil can be easily tilled, but cultivation may be delayed early in spring because of a seasonal high water table at a depth of 12 to 36 inches. The root zone is very deep. The clayey subsoil has a high shrink-swell potential. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Nicholson and Lowell soils on uplands and Elk and Otwell soils on stream terraces.

Most areas are used for pasture and hay. Some areas are used for residential or urban development. This soil is suited to cultivated crops, but the seasonal high water table and the clayey texture of the subsoil are limitations. The wetness can delay planting and harvesting and can reduce yields. If a surface drainage system is installed, the soil is better suited to some cultivated crops and produces moderate yields. Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops help to maintain desirable soil structure and the organic matter content.

This soil is suited to pasture and hay crops that can tolerate wetness. The seasonal high water table and the clayey texture restrict the suitability for deep-rooted legumes. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, a drainage system, proper stocking rates, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include eastern white pine, green ash, white ash, pin oak, and American sycamore. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses. The wetness, the very slow permeability, and the clayey texture are limitations on sites for most sanitary facilities. The wetness and the high shrink-swell potential are limitations affecting most kinds of building site development. The high shrink-swell potential and low strength are limitations on sites for local roads and streets. Also, low strength limits the use of the soil as roadfill material.

The capability subclass is IIIw.

Ne—Newark silt loam, frequently flooded. This very deep, somewhat poorly drained, nearly level soil is on flood plains throughout the survey area. Individual areas range from about 3 to 30 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is about 7 inches of dark grayish brown silt loam. The subsoil extends to a depth of about 36 inches. It is brown, mottled silt loam in the upper part and grayish brown, mottled silty clay loam in the lower part. The substratum to a depth of about 80 inches is grayish brown and gray, mottled silty clay loam.

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate in the subsoil. Available water capacity is high. Runoff is slow. The soil can be easily tilled, but cultivation may be delayed early in spring because of wetness. The seasonal high water table is at a depth of 6 to 18 inches. The root zone is very deep. The soil is frequently flooded for brief periods, usually in winter and early in spring. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Boonesboro and Nolin soils. These soils are in landscape positions similar to those of the Newark soil. Also included are small areas of Lawrence and Otwell soils on low terraces; some areas of poorly drained and very poorly drained soils; a few areas of Newark soils that have slopes of 2 to 4 percent; and small areas of clayey, poorly drained soils that have a thick, dark surface layer.

Most areas are used for cultivated crops, hay, or pasture. A few small tracts are wooded. If drained, this soil is well suited to corn and soybeans and can be cropped intensively. The seasonal high water table is the major limitation. Cover crops of small grain can be damaged by flooding in winter. Planting and harvesting can be delayed by wetness. Tile drainage systems are commonly used to reduce the wetness. Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops help to maintain desirable soil structure and the organic matter content.

This soil is well suited to pasture and hay crops that can tolerate some wetness. Some hay crops can be damaged by floodwater. Forage yields and the desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, a drainage system, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is very high. The trees preferred for planting include eastern cottonwood, sweetgum, green ash, and American sycamore. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses. The flooding and the wetness are the main limitations.

The capability subclass is IIw.

NhB—Nicholson silt loam, 2 to 6 percent slopes. This very deep, moderately well drained, gently sloping soil is on slightly convex ridgetops throughout the survey area. Individual areas range from about 5 to 100 acres in size.

Typically, the surface layer is about 8 inches of brown silt loam. The subsoil extends to a depth of about 48 inches. The upper part is brown silt loam and dark yellowish brown silty clay loam. The next part is a very firm, compact, brittle fragipan of yellowish brown, mottled silty clay loam. The lower part is yellowish brown, mottled silty clay. The substratum to a depth of about 74 inches is yellowish brown, mottled clay.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate above the fragipan and slow in the fragipan. Available water capacity is moderate. Runoff is medium. The soil can be easily tilled throughout a wide range in moisture content. The root zone is only moderately deep because of the fragipan. The seasonal high water table is at a depth of 18 to 30 inches. The lower part of the subsoil and the substratum have a moderate shrink-swell potential. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Faywood, Lawrence, Lowell, and Shelbyville soils. These soils are in landscape positions similar to those of the Nicholson soil. Also included are areas of moderately well drained soils that do not have a fragipan and a few areas of soils that are similar to the Nicholson soil but are well drained and formed in old alluvium at the higher elevations.

Most areas are used for cultivated crops, hay, or pasture. This soil is well suited to most of the cultivated crops commonly grown in the survey area. The seasonal high water table can limit the production of tobacco during wet growing seasons. Crops respond well to applications of lime and fertilizer. If cultivated crops are grown, the hazard of erosion is moderate unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control erosion and maintain desirable soil structure and the organic matter content.

This soil is well suited to most of the pasture and hay crops commonly grown in the survey area. The fragipan restricts the rooting depth and can limit the production of deep-rooted legumes. The desired forage species should be maintained through renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include yellow poplar, eastern white pine, white oak, northern red oak, white ash, and sweetgum. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The slow permeability in the fragipan and the wetness are limitations on sites for most sanitary facilities. The wetness is a limitation affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIe.

NhC—Nicholson silt loam, 6 to 12 percent slopes. This very deep, moderately well drained, sloping soil is on convex ridgetops and shoulder slopes throughout the survey area. Individual areas range from about 3 to 6 acres in size.

Typically, the surface layer is about 8 inches of brown silt loam. The subsoil extends to a depth of about 48 inches. The upper part is brown silt loam and dark yellowish brown silty clay loam. The next part is a very firm, compact, brittle fragipan of yellowish brown, mottled silty clay loam. The lower part is yellowish brown, mottled silty clay. The substratum to a depth of about 74 inches is yellowish brown, mottled clay.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is slow in the fragipan. Available water capacity is moderate. Runoff is rapid. The soil can be easily tilled throughout a wide range in moisture content. The root zone is only moderately deep because of the fragipan. The seasonal high water table is at a depth of 18 to 30 inches. The lower part of the subsoil and the substratum have a moderate shrink-swell potential. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Eden, Faywood, and Lowell soils. These soils are in landscape positions similar to those of the Nicholson soil. Also included are areas of moderately well drained soils that do not have a fragipan, a few areas of soils that are similar to the Nicholson soil but formed in old alluvium at the higher elevations, and a few areas of eroded Nicholson soils.

Most areas are used for hay and pasture. Some areas are used for cultivated crops. This soil is suited to most of the cultivated crops commonly grown in the survey area. The seasonal high water table can limit the production of tobacco during wet growing seasons. Crops respond well to applications of lime and fertilizer. If cultivated crops are grown, the hazard of erosion is severe unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control erosion and maintain desirable soil structure and the organic matter content.

This soil is well suited to most of the pasture and hay crops commonly grown in the survey area. The fragipan restricts the rooting depth and may limit the production of deep-rooted legumes. The desired forage species should be maintained through renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include yellow poplar, eastern white pine, white oak, northern red oak, white ash, and sweetgum. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The slow permeability in the fragipan, the wetness, and the slope are limitations on sites for most sanitary facilities. The wetness and the slope are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIIe.

No—Nolin silt loam, occasionally flooded. This very deep, well drained, nearly level soil is on flood plains throughout the survey area. Individual areas range from about 6 to 50 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is about 9 inches of brown silt loam. The subsoil extends to a depth of about 68 inches. It is brown silt loam. The substratum to a depth of about 78 inches is dark yellowish brown silt loam.

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate in the subsoil. Available water capacity is high. Runoff is slow. The soil can be easily tilled throughout a wide range in moisture content. The root zone is very deep. The seasonal high water table is at a depth of 3 to 6 feet. The soil is occasionally flooded for brief periods, usually in winter and early in spring. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Boonesboro and Newark soils. These soils are in landscape positions similar to those of the Nolin soil. Also included are small areas of Elk soils on low terraces; small areas of Woolper soils on foot slopes; narrow areas, along the major streambanks, of soils that are similar to the Nolin soil but have slopes of 2 to 12 percent and are subject to frequent erosion and deposition by fluctuating streams; small areas that have deposits of sand and gravel; and some areas of Nolin soils that are frequently flooded.

Most areas are used for cultivated crops, hay, or pasture. This soil is well suited to cultivated crops. It can be cropped intensively if fertility and the organic matter content are maintained. Cover crops of small grain can be damaged by flooding in winter. Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops help to maintain desirable soil structure and the organic matter content.

This soil is well suited to all of the pasture and hay crops commonly grown in the survey area. Hay crops can be damaged by floodwater. The desired forage species should be maintained through renovation. Weed control, proper stocking rates, and applications of lime and fertilizer are needed.

The potential productivity for woodland is very high. The trees preferred for planting include sweetgum, yellow poplar, eastern white pine, eastern cottonwood, and black walnut. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses because of the flooding.

The capability subclass is IIw.

OtA—Otwell silt loam, occasionally flooded, 0 to 2 percent slopes. This very deep, moderately well drained, nearly level soil is on stream terraces throughout the survey area. Individual areas range from about 5 to 40 acres in size.

Typically, the surface layer is about 8 inches of brown silt loam. The subsoil extends to a depth of about 53 inches. The upper part is yellowish brown silty clay loam. The lower part is a very firm, compact, brittle fragipan of yellowish brown, light brownish gray, and strong brown, mottled silty clay loam. The substratum to a depth of about 81 inches is light brownish gray, yellowish brown, and light yellowish brown, mottled silty clay loam.

This soil is medium in natural fertility and low in organic matter content. Permeability is moderate above the fragipan and very slow in the fragipan. Available water capacity is moderate. Runoff is slow. The soil can be easily tilled throughout a wide range in moisture content. The root zone is only moderately deep because of the fragipan. The seasonal high water table is at a depth of 24 to 42 inches. The soil is occasionally flooded for brief periods, usually in winter and early in spring. The subsoil has a moderate shrink-swell potential. The depth to bedrock is more than 5 feet.

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 small areas of Newark and Nolin soils on flood plains, areas of Otwell soils that have slopes of 2 to 4 percent, a few areas of Otwell soils that are frequently flooded, small areas of soils that contain more sand throughout than the Otwell soil, and areas of soils that have no fragipan or have a weakly expressed fragipan.

Most areas are used for cultivated crops, hay, or pasture. This soil is well suited to most of the cultivated crops commonly grown in the survey area. If properly managed, it can be cropped intensively. The seasonal high water table can limit the production of tobacco during wet growing seasons. Cover crops of small grain can be damaged by flooding in winter. Crops respond well to applications of lime and fertilizer. If cultivated crops are grown, the hazard of erosion is slight. Returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to maintain desirable soil structure and the organic matter content.

This soil is well suited to most of the pasture and hay crops commonly grown in the survey area. The fragipan restricts the rooting depth and can limit the production of deep-rooted legumes. The desired forage species should be maintained through renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is moderately high. The trees preferred for planting include eastern white pine, white oak, and yellow poplar. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses. The flooding, the wetness, and the very slow permeability in the fragipan are limitations on sites for most sanitary facilities. The flooding and the wetness are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIw.

OtB—Otwell silt loam, rarely flooded, 2 to 6 percent slopes. This very deep, moderately well drained, gently sloping soil is on stream terraces throughout the survey area. Individual areas range from about 5 to 30 acres in size.

Typically, the surface layer is about 8 inches of brown silt loam. The subsoil extends to a depth of about 53 inches. The upper part is yellowish brown silty clay loam. The lower part is a very firm, compact, brittle fragipan of yellowish brown, light brownish gray, and strong brown, mottled silty clay loam. The substratum to a depth of about 81 inches is light brownish gray, yellowish brown, and light yellowish brown, mottled silty clay loam.

This soil is medium in natural fertility and low in organic matter content. Permeability is moderate above the fragipan and very slow in the fragipan. Available water capacity is moderate. Runoff is medium. The soil can be easily tilled throughout a wide range in moisture content. The root zone is only moderately deep because of the fragipan. The seasonal high water table is at a depth of 24 to 36 inches. The soil is rarely flooded. The subsoil has a moderate shrink-swell potential. The depth to bedrock is more than 5 feet.

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 small areas of Newark soils on flood plains, a few areas of Otwell soils that are at the slightly higher elevations and are not subject to flooding, some small areas of Otwell soils that have slopes of 0 to 2 percent, small areas of soils that contain more sand throughout than the Otwell soil, and areas of soils that do not have a fragipan or have a weakly expressed fragipan.

Most areas are used for cultivated crops, hay, or pasture. This soil is well suited to most of the cultivated crops commonly grown in the survey area. The seasonal high water table can limit the production of tobacco during wet growing seasons. Crops respond well to applications of lime and fertilizer. If cultivated crops are grown, the hazard of erosion is moderate unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops help to control erosion and maintain desirable soil structure and the organic matter content.

This soil is well suited to most of the pasture and hay crops commonly grown in the survey area. The fragipan restricts the rooting depth and can limit the production of deep-rooted legumes. The desired forage species should be maintained through renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is moderately high. The trees preferred for planting include eastern white pine, white oak, and yellow poplar. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses. The wetness and the very slow permeability in the fragipan are limitations on sites for sanitary facilities. The flooding and the wetness are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIe.

Pt—Pits, quarries. This map unit consists of open excavations from which the soil has been removed so that limestone can be mined, conditioned, and stored for agricultural and industrial uses. The largest area of this unit is near Lockport, in Henry County. The limestone bedrock in this area is removed and used as a source of road construction material and agricultural lime. Individual areas are irregular in shape and range from about 5 to 100 acres in size.

These open excavations support no plant life. The walls are vertical, and the flat bottoms are exposed bedrock. The excavations are as much as 100 feet deep and in some areas are several hundred feet wide.

Currently, only one area of this unit is being quarried. The unit is poorly suited to agricultural and urban uses. Some selected spots where overburden is stored are suited to limited use as woodland.

The capability subclass is VIIIs.

RoA—Rossmoyne silt loam, 0 to 2 percent slopes. This deep, moderately well drained, nearly level soil is in slightly convex or concave areas on broad upland ridges in the northern part of Trimble County. Individual areas range from about 10 to 40 acres in size.

Typically, the surface layer is about 8 inches of dark brown silt loam. The subsoil extends to a depth of about 82 inches. The upper part is dark yellowish brown silt loam and yellowish brown, mottled silt loam. The next part is a compact, brittle fragipan of yellowish brown, mottled silty clay loam and silt loam. The lower part is yellowish brown, mottled silty clay loam and silty clay.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow or slow in and below the fragipan. Available water capacity is moderate. Runoff is slow. The soil can be easily tilled, but cultivation may be delayed early in spring because of wetness. The root zone is only moderately deep because of the fragipan. The seasonal high water table is at a depth of 18 to 36 inches. The subsoil has a moderate shrink-swell potential. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Cincinnati soils and some areas of Rossmoyne soils that have slopes of 2 to 6 percent. Cincinnati soils are in landscape positions similar to those of the Rossmoyne soil. Also included, in small depressions, are somewhat poorly drained or poorly drained soils that do not have a fragipan.

Most areas are used for cultivated crops, hay, or pasture. This soil is well suited to most cultivated crops. It can be cropped intensively if a drainage system is installed and fertility and the organic matter content are maintained. Crops are damaged by wetness in some years. The response of crops to applications of fertilizer and lime is fair. Erosion is not a hazard on this soil. Applying a system of conservation tillage, returning crop residue to the soil, and growing cover crops help to maintain desirable soil structure and the organic matter content.

This soil is well suited to pasture and hay crops that can tolerate some wetness. If properly managed, it can produce high forage yields. The fragipan restricts the rooting depth and can limit the production of deep-rooted legumes. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, a drainage system, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is moderately high. The trees preferred for planting include yellow poplar, white ash, white oak, eastern white pine, and northern red oak. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The wetness and the moderately slow permeability in the fragipan are limitations on sites for most sanitary facilities. The wetness is a limitation affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIw.

RoB—Rossmoyne silt loam, 2 to 6 percent slopes. This very deep, moderately well drained, gently sloping soil is on the slightly convex tops of ridges on uplands in the northern part of Trimble County. Individual areas range from about 5 to 50 acres in size.

Typically, the surface layer is about 8 inches of dark grayish brown silt loam. The subsoil extends to a depth of about 82 inches. The upper part is dark yellowish brown and yellowish brown, mottled silt loam. The next part is a compact, brittle fragipan of yellowish brown, mottled silty clay loam and silt loam. The lower part is yellowish brown, mottled silty clay loam and silty clay.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow or slow in and below the fragipan. Available water capacity is moderate. Runoff is medium. The soil can be easily tilled, but cultivation may be delayed early in spring because of wetness. The root zone is only moderately deep because of the fragipan. The seasonal high water table is at a depth of 18 to 36 inches. The subsoil has a moderate shrink-swell potential. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Cincinnati, Lawrence, and Ryker soils and a few areas of Rossmoyne soils that have slopes of 0 to 2 percent. Cincinnati, Lawrence, and Ryker soils are in landscape positions similar to those of the Rossmoyne soil. Also included, in small depressions, are areas of somewhat poorly drained or poorly drained soils that do not have a fragipan.

Most areas are used for cultivated crops, hay, or pasture. A few areas are used for orchards or woodland. This soil is well suited to most cultivated crops. Tobacco can be damaged by wetness in some years. Crops respond well to applications of fertilizer and lime. If cultivated crops are grown, the hazard of erosion is moderate unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control erosion and maintain productivity.

This soil is well suited to most of the pasture and hay crops commonly grown in the survey area. If properly managed, it can produce high forage yields. The fragipan restricts the rooting depth and can limit the production of deep-rooted legumes. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, a drainage system, proper stocking rates, rotation grazing, and weed control are the main management concerns.

The potential productivity for woodland is moderately high. The trees preferred for planting include yellow poplar, white ash, white oak, eastern white pine, and northern red oak. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The wetness and the moderately slow permeability in the fragipan are limitations on sites for most sanitary facilities. The wetness is a limitation affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIe.

RyB—Ryker silt loam, 2 to 6 percent slopes. This very deep, well drained, gently sloping soil is on convex ridgetops in the north-central part of Trimble County. Some areas have a karst topography. Individual areas range from about 10 to more than 100 acres in size.

Typically, the surface layer is about 9 inches of brown silt loam. The subsoil extends to a depth of about 90 inches. The upper part is strong brown silty clay loam and silt loam. The next part is yellowish red and reddish brown silty clay loam. The lower part is yellowish red loam.

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate in the subsoil. Available water capacity is high. Runoff is medium. The soil can be easily tilled throughout a wide range in moisture content. The root zone is very deep. The subsoil has a moderate shrink-swell potential. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Cincinnati, Grayford, and Rossmoyne soils. These soils are in landscape positions similar to those of the Ryker soil. Also included are soils that are similar to the Ryker soil but have a reddish brown, clayey subsoil.

Most areas are used for cultivated crops, hay, or pasture. Some areas are used for orchard or vegetable crops (fig. 11). This soil is well suited to all of the cultivated crops commonly grown in the survey area. If well managed, it can produce high yields. Crops respond well to applications of lime and fertilizer. If cultivated crops are grown, the hazard of erosion is moderate unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control erosion and maintain productivity.

This soil is well suited to all of the pasture and hay crops commonly grown in the survey area. If properly managed, it can produce high forage yields. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is very high. The trees preferred for planting include eastern white pine, yellow poplar, black walnut, northern red oak, white oak, and white ash. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to most urban uses. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIe.

RyC—Ryker silt loam, 6 to 12 percent slopes. This very deep, well drained, sloping soil is on convex ridgetops and shoulder slopes in the north-central part of Trimble County. Individual areas range from about 3

Figure 11.—Kale greens in an area of Ryker silt loam, 2 to 6 percent slopes. Several orchard and vegetable crops are grown in areas of this soil in Trimble County.

to more than 50 acres in size.

Typically, the surface layer is about 9 inches of brown silt loam. The subsoil extends to a depth of about 90 inches. The upper part is strong brown silty clay loam and silt loam. The next part is yellowish red and reddish brown silty clay loam. The lower part is yellowish red loam.

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate in the subsoil. Available water capacity is high. Runoff is rapid. The soil can be easily tilled throughout a wide range in moisture content. The root zone is very deep. The subsoil has a moderate shrink-swell potential. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Beasley, Cincinnati, and Grayford soils. These soils are in landscape positions similar to those of the Ryker soil. Also included are a few areas of eroded Ryker soils and areas of soils that are similar to the Ryker soil but have a reddish brown, clayey subsoil.

Most areas are used for cultivated crops, hay, or pasture. Some areas are used for orchards or vegetable crops. This soil is suited to all of the cultivated crops commonly grown in the survey area. If well managed, it can produce high yields. Crops respond well to applications of lime and fertilizer. If cultivated crops are grown, the hazard of erosion is severe unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control erosion and maintain productivity.

This soil is well suited to all of the pasture and hay crops commonly grown in the survey area. If properly managed, it can produce high forage yields. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is very high. The trees preferred for planting include eastern white pine, yellow poplar, black walnut, northern red oak, white oak, and white ash. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to most urban uses. The slope is a limitation affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIIe.

ShB—Shelbyville silt loam, 2 to 6 percent slopes. This deep and very deep, well drained, gently sloping soil is on convex ridgetops, mainly in the central and south-central parts of Henry County. Individual areas range from about 5 to more than 100 acres in size.

Typically, the surface layer is about 8 inches of dark brown silt loam. The subsoil extends to a depth of about 80 inches. The upper part is brown silty clay loam. The next part is brown, mottled silty clay. The lower part is yellowish brown, mottled silty clay.

This soil is high 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. Available water capacity is high. Runoff is medium. The soil can be easily tilled throughout a wide range in moisture content. The lower part of the subsoil is clayey and has a moderate shrink-swell potential. The root zone is deep or very deep. The depth to bedrock is more than 50 inches.

Included with this soil in mapping are small areas of Lowell and Nicholson soils. These soils are in landscape positions similar to those of the Shelbyville soil. Also included are areas of soils that are similar to the Shelbyville soil but have a lighter colored surface layer, some areas of Shelbyville soils that have slopes of 0 to 2 percent, a few areas of eroded Shelbyville soils, and a few areas of soils that are less than 50 inches deep over bedrock.

Most areas are used for cultivated crops, hay, or pasture. This soil is well suited to all of the cultivated crops commonly grown in the survey area (fig. 12). If the soil is well managed, high yields can be obtained. If cultivated crops are grown, the hazard of erosion is moderate unless erosion-control measures are applied. Applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to control erosion and maintain productivity.

This soil is well suited to all of the pasture and hay crops commonly grown in the survey area. If properly managed, it can produce high forage yields. Forage yields and the desired forage species can be maintained through renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include eastern white pine, yellow poplar, black walnut, white ash, white oak, and northern red oak. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to most urban uses. The moderately slow permeability and the clayey texture of the lower part of the subsoil are limitations on sites for some sanitary facilities. The moderate shrink-swell potential is a limitation affecting some kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIe.

WeD—Wheeling loam, 6 to 20 percent slopes. This very deep, well drained, sloping and moderately steep soil is on stream terraces, mainly along the Ohio and Kentucky Rivers. Individual areas range from about 5 to 80 acres in size.

Typically, the surface layer is about 9 inches of brown loam. The subsoil extends to a depth of about 60 inches. The upper part is dark yellowish brown silty clay loam. The next part is strong brown loam. The lower part is strong brown fine sandy loam. The substratum to a depth of about 75 inches is strong brown, stratified very fine sand, fine sand, and sand.

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate in the upper part of the subsoil and rapid in the lower part and in the substratum. Available water capacity is high. The root zone is very deep. Runoff is rapid or very rapid. The soil can be easily tilled throughout a wide range in moisture content. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Elk and Otwell soils. These soils are in landscape positions similar to those of the Wheeling soil. Also

Figure 12.—Corn and tobacco in an area of Shelbyville silt loam, 2 to 6 percent slopes, which is one of the most productive soils in the survey area.

included are small areas of Huntington soils on flood plains, small areas of Woolper soils on foot slopes, small areas of soils that are similar to the Wheeling soil but have more sand throughout, some areas of Wheeling soils that have a surface layer of fine sandy loam or silt loam, a few areas of eroded Wheeling soils, a few areas of Wheeling soils that have slopes of 20 to 30 percent, and some low areas that are subject to rare flooding.

Most areas are used for hay and pasture. Some areas are used for cultivated crops, and others are wooded. Although this soil is suited to occasional cultivation, it is best suited to pasture and hay. If cultivated crops are grown, the hazard of erosion is severe or very severe unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control runoff and erosion.

This soil is suited to all of the pasture and hay crops commonly grown in the survey area. If the pasture or hayland is well managed, high forage yields can be obtained. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include eastern white pine, yellow poplar, northern red oak, white oak, and black walnut. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to some urban uses. The slope and the rapid permeability in the lower part of the subsoil and in the substratum are limitations on sites for most sanitary facilities. The slope can be a limitation affecting building site development. The slope and low strength are limitations on sites for local roads and streets. Also, low strength limits the use of the soil as roadfill material.

The capability subclass is IVe.

WhB—Wheeling silt loam, 0 to 6 percent slopes. This very deep, well drained, nearly level and gently sloping soil is on stream terraces, mainly along the Ohio and Kentucky Rivers. Individual areas range from about 3 to 400 acres in size.

Typically, the surface layer is about 9 inches of brown silt loam. The subsoil extends to a depth of about 60 inches. The upper part is dark yellowish brown silty clay loam. The next part is strong brown loam. The lower part is strong brown fine sandy loam. The substratum to a depth of about 75 inches is strong brown, stratified very fine sand, fine sand, and sand.

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate in the upper part of the subsoil and rapid in the lower part and in the substratum. Available water capacity is high. The root zone is very deep. Runoff is slow or medium. The soil can be easily tilled throughout a wide range in moisture content. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Elk and Otwell soils. These soils are in landscape positions similar to those of the Wheeling soil. Also included are small areas of Huntington and Newark soils on flood plains, small areas of Woolper soils on foot slopes, small areas of soils that are similar to the Wheeling soil but have more sand throughout, some areas of Wheeling soils that have a surface layer of loam or fine sandy loam, a few areas of eroded Wheeling soils, a few areas of Wheeling soils that have short slopes of 6 to 12 percent, and some low areas that are subject to rare flooding.

Most areas are used for cultivated crops, hay, or pasture. A large generating plant near Wise's Landing in Trimble County is in an area of this soil. The soil is well suited to all of the cultivated crops commonly grown in the survey area. If well managed, it can produce high yields. Crops respond well to applications of lime and fertilizer. If cultivated crops are grown, the hazard of erosion is moderate unless erosion-control measures are applied in the areas where slopes are more than 2 percent. Applying a system of conservation tillage, returning crop residue to the soil, growing cover crops, and including grasses and legumes in the cropping sequence help to control erosion and maintain productivity.

This soil is well suited to all of the pasture and hay crops commonly grown in the survey area. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include eastern white pine, yellow poplar, northern red oak, white oak, and black walnut. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to most urban uses. The rapid permeability in the lower part of the subsoil and in the substratum is a limitation on sites for some sanitary facilities. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIe.

WoB—Woolper silty clay loam, 2 to 6 percent slopes. This very deep, well drained, gently sloping soil is on concave foot slopes throughout the survey area. Individual areas range from about 3 to 12 acres in size.

Typically, the surface layer is about 8 inches of very dark grayish brown silty clay loam. The subsoil extends to a depth of about 64 inches. The upper part is dark brown silty clay. The next part is brown silty clay. The lower part is yellowish brown clay.

This soil is high in natural fertility and organic matter content. Permeability is moderately slow or slow in the subsoil. Available water capacity is high. Runoff is medium. The soil is somewhat difficult to till because of the surface layer of silty clay loam. The range in moisture content within which the soil can be worked without the risk of clodding or crusting is narrow. The root zone is very deep. The subsoil has a moderate shrink-swell potential. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Lowell soils. These soils are in landscape positions similar to those of the Woolper soil. Also included are small areas of Boonesboro and Nolin soils on flood plains, small areas of Elk soils on low terraces, areas of soils that are similar to the Woolper soil but are moderately well drained, some areas of soils that contain less clay throughout than the Woolper soil, and some areas of Woolper soils that have slopes of 6 to 12 percent.

Most areas are used for pasture, hay, or cultivated crops. This soil is well suited to all of the cultivated crops commonly grown in the survey area. If well managed, it can produce high yields. Diversion channels are commonly used to keep runoff away from the adjacent hillsides. If cultivated crops are grown, the hazard of erosion is moderate unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, including grasses and legumes in the cropping sequence, and growing cover crops help to control erosion and maintain productivity.

This soil is well suited to all of the pasture and hay crops commonly grown in the survey area. If well managed, it can produce high forage yields. The desired forage species should be maintained through renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include yellow poplar, white ash, northern red oak, eastern white pine, and white oak. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The clayey texture and the moderately slow or slow permeability in the subsoil are limitations on sites for most sanitary facilities. The clayey texture and the moderate shrink-swell potential are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIe.

WoC—Woolper silty clay loam, 6 to 12 percent slopes. This very deep, well drained, sloping soil is on alluvial fans and concave foot slopes throughout the survey area. Individual areas range from about 3 to 15 acres in size.

Typically, the surface layer is about 8 inches of very dark grayish brown silty clay loam. The subsoil extends to a depth of about 64 inches. The upper part is dark brown silty clay. The next part is brown silty clay. The lower part is yellowish brown clay.

This soil is high in natural fertility and organic matter content. Permeability is moderately slow or slow in the subsoil. Available water capacity is high. Runoff is rapid. The soil is somewhat difficult to till because of the surface layer of silty clay loam. The range in moisture content within which the soil can be worked without the risk of clodding or crusting is narrow. The root zone is very deep. The subsoil has a moderate shrink-swell potential. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Faywood and Lowell soils. These soils are in landscape positions similar to those of the Woolper soil. Also included are small areas of Boonesboro and Nolin soils on flood plains; small areas of Elk soils on low terraces; areas of soils that are similar to the Woolper soil but are moderately well drained; a few small areas that are wet and seepy; and some areas of soils that are similar to the Woolper soil but do not have a dark surface layer.

Most areas are used for pasture and hay. Some areas are used for cultivated crops. This soil is suited to all of the cultivated crops commonly grown in the survey area. If well managed, it can produce high yields. Diversion channels are commonly used to keep runoff away from the adjacent hillsides. If cultivated crops are grown, the hazard of erosion is severe unless erosion-control measures are applied. Applying a system of conservation tillage, returning crop residue to the soil, including grasses and legumes in the cropping sequence, and growing cover crops help to control erosion and maintain productivity.

This soil is well suited to all of the pasture and hay crops commonly grown in the survey area. If well managed, it can produce high forage yields. The desired forage species should be maintained through renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include yellow poplar, white ash, northern red oak, eastern white pine, and white oak. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is suited to some urban uses. The clayey texture, the slope, and the moderately slow or slow permeability in the subsoil are limitations on sites for most sanitary facilities. The clayey texture, the moderate shrink-swell potential, and the slope are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Also, it limits the use of the soil as roadfill material.

The capability subclass is IIIe.

WoD—Woolper silty clay loam, 12 to 20 percent slopes. This very deep, well drained, moderately steep soil is on concave foot slopes throughout the survey area. Individual areas range from 3 to 10 acres in size.

Typically, the surface layer is about 8 inches of very dark grayish brown silty clay loam. The subsoil extends to a depth of about 64 inches. The upper part is dark brown silty clay. The next part is brown silty clay. The lower part is yellowish brown clay.

This soil is high in natural fertility and organic matter content. Permeability is moderately slow or slow in the subsoil. Available water capacity is high. Runoff is very rapid. The soil is somewhat difficult to till because of the surface layer of silty clay loam. The range in moisture content within which the soil can be worked without the risk of clodding or crusting is narrow. The root zone is very deep. The subsoil has a moderate shrink-swell potential. The depth to bedrock is more than 5 feet.

Included with this soil in mapping are small areas of Eden, Fairmount, Faywood, and Lowell soils. These soils are in landscape positions similar to those of the Woolper soil. Also included are small areas of Boonesboro soils on flood plains, small areas of Elk soils on low terraces, areas of Woolper soils that have a flaggy surface layer, and some areas of soils that do not have a dark surface layer.

Most areas are used for pasture and hay. Some areas are used for cultivated crops. Although this soil is suited to occasional cultivation, it is better suited to pasture and hay. If cultivated crops are grown, the hazard of erosion is very severe. Measures that control erosion and runoff are needed. Applying a system of conservation tillage, returning crop residue to the soil, including grasses and legumes in the cropping sequence, and growing cover crops help to control erosion and maintain the organic matter content.

This soil is suited to most of the pasture and hay crops commonly grown in the survey area. If the pasture or hayland is well managed, moderate forage yields can be obtained. The desired forage species should be maintained through frequent renovation. Applications of lime and fertilizer, proper stocking rates, rotation grazing, and weed control are needed.

The potential productivity for woodland is high. The trees preferred for planting include yellow poplar, white ash, northern red oak, eastern white pine, and white oak. Plant competition is the main management concern. See table 7 for specific information relating to potential productivity.

This soil is poorly suited to most urban uses. The slope, the moderate shrink-swell potential, the moderately slow or slow permeability, and the clayey texture 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. Also, it limits the use of the soil as roadfill material.

The capability subclass is IVe.

Prime Farmland

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

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

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

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

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

About 42,577 acres in Henry County and 19,290 acres in Trimble County meet the soil requirements for prime farmland. This land is in scattered areas throughout the counties, mainly in general soil map units 3, 4, 6, and 7 in Henry County (fig. 13) and general soil map units 2, 4, 5, and 6 in Trimble County.

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

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

The soils identified as prime farmland in Henry and Trimble Counties are:

BaB	Beasley silt loam, 2 to 6 percent slopes
Bo	Boonesboro silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
CaB	Chenault silt loam, 2 to 6 percent slopes
CcB	Cincinnati silt loam, 2 to 6 percent slopes
EkA	Elk silt loam, occasionally flooded, 0 to 2 percent slopes
EkB	Elk silt loam, rarely flooded, 2 to 6 percent slopes
Hu	Huntington silt loam, occasionally flooded
Lc	Lawrence silt loam, rarely flooded (where drained)
LoB	Lowell silt loam, 2 to 6 percent slopes
Mc	McGary silt loam (where drained)

Figure 13.—Tobacco in an area of Nolin silt loam, occasionally flooded, on a nearly level flood plain in Henry County. This soil is considered prime farmland.

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, occasionally flooded
OtA	Otwell silt loam, occasionally flooded, 0 to 2 percent slopes
OtB	Otwell silt loam, rarely flooded, 2 to 6 percent slopes
RoA	Rossmoyne silt loam, 0 to 2 percent slopes
RoB	Rossmoyne silt loam, 2 to 6 percent slopes
RyB	Ryker silt loam, 2 to 6 percent slopes
ShB	Shelbyville silt loam, 2 to 6 percent slopes
WhB	Wheeling silt loam, 0 to 6 percent slopes
WoB	Woolper silty clay loam, 2 to 6 percent slopes

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 for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the 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 that is in harmony with nature.

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

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

Crops and Pasture

William H. Amos, Jr., agronomist, Soil Conservation Service, assisted in writing this section.

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

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

In 1982, more than 67,000 acres in Henry and Trimble Counties was used for crops *(24, 25)*. Nearly 92,000 acres in the survey area was used as permanent pasture.

The field crops suited to the soils and climate of Henry and Trimble Counties include many that are not now commonly grown. Corn, burley tobacco, and soybeans are the dominant row crops. Grain sorghum, sunflowers, and similar crops can be grown if economic conditions are favorable.

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

The specialty crops grown in the survey area are vegetables, small fruits, tree fruits, flowers, and many nursery plants. Some areas are used for melons, strawberries, sweet corn, tomatoes, peppers, or other vegetables and small fruits. Apples and peaches are the most common tree fruits.

Deep and very deep soils that are characterized by good natural drainage and warm up early in spring are especially well suited to many vegetables and small fruits. These soils include the Shelbyville, Ryker, Lowell, Wheeling, and Chenault soils that have slopes of less than 6 percent. They make up about 26,000 acres in the survey area. Crops generally can be planted and harvested earlier on these soils than on other soils in the survey area.

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

The latest information about growing specialty crops can be obtained from local offices of the Kentucky Cooperative Extension Service and the Soil Conservation Service.

The soils in the survey area generally are well suited to row crops. Most of the row crops are grown on uplands because the acreage of bottom land and stream terraces is limited. The broad ridges and the more nearly level areas are suitable for grain crops. Deep, well drained soils, such as Lowell, Shelbyville, Ryker, and Wheeling soils, are suited to tobacco and alfalfa. During years of normal rainfall, Nicholson and Cincinnati soils produce high yields of tobacco. The more sloping Beasley, Eden, Faywood, Grayford, and Lowell soils are commonly used for hay and pasture. In addition to the land currently being cropped, some land that is idle, wooded, or pastured has good potential for use as cropland *(12)*. Food production could be increased considerably by applying the latest technology to all of the cropland in the survey area. The information in this soil survey can facilitate the application of such technology.

Managing Cropland

The management systems needed on cropland are those that protect or improve the soil, help to control erosion, and minimize the water pollution caused by plant nutrients, soil particles, and plant residue carried by runoff.

Water erosion is a major hazard on most of the soils used for crops or pasture in Henry and Trimble Counties. It is a hazard where slopes are more than 2 percent. Shelbyville, Eden, Lowell, Ryker, Cincinnati, and Grayford are examples of soils that have slopes of more than 2 percent. As the slope increases, the hazard of erosion and the difficulty in controlling erosion also increase.

Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil, such as Beasley, Woolper, Faywood, Eden, and Lowell soils, and on soils that have a layer in or below the subsoil that limits the depth of the root zone, such as the fragipan in Nicholson, Cincinnati, Rossmoyne, and Otwell soils and the bedrock in Eden, Fairmount, Faywood, and Boonesboro soils. Second, erosion on farmland results in the sedimentation of streams. Control of erosion minimizes this pollution and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

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

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

Minimizing tillage and leaving crop residue on the surface increase the rate of water infiltration and reduce the hazards of runoff and erosion. These practices can be effective on most of the soils in the survey area. In the more sloping areas used for corn or double cropped soybeans, no-till farming is effective in controlling erosion. It is effective on most of the soils in the survey area but 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 effective on deep, well drained soils that have regular slopes, such as Elk, Ryker, and Shelbyville soils. These measures are less effective on soils that have irregular slopes, would be excessively wet in the terrace channels, have a clayey subsoil that would be exposed in the terrace channels, or have bedrock within a depth of 40 inches.

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

Information about erosion-control measures for each kind of soil in the survey area is available at the local offices of the Soil Conservation Service.

Soil drainage is a management concern on about 8 percent of the acreage in Henry and Trimble Counties used for crops and pasture. Some soils are so wet that production of the crops commonly grown in the survey area is difficult unless a drainage system is installed. Newark, McGary, and other somewhat poorly drained soils are so wet that crops are damaged during most years unless a drainage system is installed. These soils make up about 861 acres in the survey area.

Small areas of wetter soils along drainageways are commonly included with the moderately well drained Nicholson, Rossmoyne, and Otwell soils in mapping. A drainage system generally is not installed in these included soils or in the somewhat poorly drained Lawrence soils, which have a hard, compact, brittle fragipan in the subsoil. The fragipan limits the depth to which properly functioning tile drains can be installed. Ditches are used to improve drainage in some areas of these soils.

The design of both surface and subsurface drainage systems varies with the kind of soil. A combination of surface drains and tile drainage is needed in most areas of the somewhat poorly drained Newark and McGary soils that are intensively row cropped. Drains should be installed at closer intervals in the more slowly permeable soils, such as McGary soils, than in the more rapidly permeable soils, such as Newark soils.

Natural fertility is low or medium in the soils on uplands in the two counties. The soils on flood plains, such as Newark, Nolin, and Huntington soils, are moderately acid to moderately alkaline and have a higher content of plant nutrients than most of the soils on uplands.

Many soils on uplands and stream terraces are very strongly acid to moderately acid unless the surface has been limed. Applications of ground limestone are needed to raise the pH level sufficiently for the production of alfalfa and other crops that grow best on nearly neutral soils. The levels of available phosphorus and potassium are naturally low in most of these soils. Lowell soils, however, have a moderate content of phosphorus. Additions of lime and fertilizer should be based on the results of soil tests, the needs of the crop, and the expected level of yields. The Cooperative Extension Service can help to determine the kind and amount of fertilizer and lime needed and the proper method of application.

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

Some of the soils in the survey area that are used for crops have a surface layer of silt loam that is light in color and low in organic matter content. Generally, the structure of such soils is weak. A surface crust forms during periods of 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 crusting. Fall plowing is generally not a good practice on soils that have a light colored silt loam surface layer because a crust forms in 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 they were plowed. More than 90 percent of the cropland in the survey area consists of sloping soils that are subject to erosion if they are plowed in the fall.

Severely eroded, clayey soils, such as some Beasley and Lowell soils, become cloddy if they are plowed outside a narrow range in optimum moisture content. Fall plowing on such soils generally results in better tilth in the spring. A gravelly surface layer impairs the tilth of some soils in the survey area, but these soils are only in small, isolated areas along river bottoms and terraces. The content and size of the pebbles affect the use of tillage implements.

Managing Pasture and Hayland

In 1987, there were more than 40,000 beef and dairy cattle in Henry and Trimble Counties *(11)*. Most of the hayland and pasture in the two counties supports a mixture of grasses and legumes. Much of the hay is grown in rotation with pasture. Most of the harvested hay is rolled into large, round bales or is used as grass silage.

Because about half of the total farm income in the survey area is derived from the sale of livestock, a good forage program is important. A successful livestock enterprise depends on a forage program that provides large quantities of good-quality feed. Such a program can provide as much as 78 percent of the feed for beef cattle and 66 percent of the feed for dairy cattle *(9)*. On much of the hayland and pasture in Henry and Trimble Counties, renovation, brush control, and measures that prevent overgrazing are needed.

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

The nearly level and gently sloping, deep and very deep, well drained soils should be planted to the highest producing crops, such as corn silage, alfalfa, or a mixture of alfalfa and orchardgrass or of alfalfa and timothy. Sod-forming grasses, such as tall fescue and bluegrass, minimize erosion in the steeper areas. Alfalfa should be seeded with cool-season grasses in areas where the soils are at least 2 feet deep and are well drained. The more poorly drained soils and the soils that are less than 2 feet deep are suited to clover-grass mixtures or to pure stands of clover or grasses. Legumes can be established through renovation in areas that support sod-forming grasses.

The forage species selected for planting should be those that are suited not only to the soil but also to the intended use. They should be those that provide the maximum quality and versatility in the forage program. Legumes generally produce higher quality feed than grasses. As a result, they should be grown to the maximum extent possible. The taller legumes, such as alfalfa and red clover, are more versatile than legumes that are used primarily for grazing, such as white clover. Orchardgrass, timothy, and tall fescue are best suited to use as hay and silage.

Tall fescue is an important cool-season grass that is suited to a wide range of soil conditions. It is grown for both pasture and hay. The growth that occurs in the period August through November is commonly permitted to accumulate in the field and is "stockpiled" for grazing late in fall and in winter. For maximum production, nitrogen fertilizer should be applied during the stockpiling period. The rate of application should be based on the desired production level.

Warm-season grasses planted from early April to late May help to alleviate the "summer slump" of cool-season grasses, such as tall fescue and Kentucky bluegrass. They grow well during warm periods. Their greatest growth occurs from mid-June to September, which is the period when growth of cool-season grasses is slow. Examples of warm-season grasses are switchgrass, big bluestem, indiangrass, and Caucasian bluestem.

Renovation can increase forage yields in areas that have a good stand of grass. Renovation involves partial destruction of the sod, applications of lime and fertilizer, and seeding of the desirable forage species *(10)*. Adding legumes to these grass stands provides high-quality feed. Legumes increase summer production. They also take nitrogen from the air. Under growing conditions in Kentucky, alfalfa can fix 200 to 300 pounds of nitrogen per acre per 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 per year *(10)*.

Additional information about managing pasture and hayland can be obtained from local offices of the Soil Conservation Service and the Kentucky Cooperative Extension Service.

Yields Per Acre

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

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

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

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

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

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major, and generally expensive, landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit *(20)*. Only class and subclass are used in this survey.

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

Class I soils have few limitations that restrict their use.

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

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

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

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

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

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

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

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

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

The acreage of soils in each capability class and subclass is shown in table 6. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in table 5.

Woodland Management and Productivity

Charles A. Foster, forester, Soil Conservation Service, assisted in writing this section.

Commercial forest land makes up about 25 percent of the land area in Henry County *(13).* The central mixed hardwoods forest type makes up about 30 percent of the forest land; oak-hickory, 25 percent; redcedar-hardwoods, 24 percent; elm-ash-cottonwood, 13 percent; and southern pine, 3 percent. The remaining 5 percent includes the oak-pine, white oak, and maple-beech forest types.

Commercial forest land makes up about 45 percent of the land area in Trimble County *(13).* The central mixed hardwoods forest type makes up about 31 percent of the forest land; redcedar-hardwoods, 23 percent; oak-hickory, 19 percent; elm-ash-cottonwood, 19 percent; and southern pine, 5 percent. The remaining 3 percent consists of the oak-pine, white oak, and maple-beech forest types.

Nearly all of the tracts of woodland in the survey area are privately owned. Much of the woodland is in scattered small farm woodlots that are poorly stocked and commonly are grazed by livestock. On the average, forest stands produce only about 33 cubic feet of wood per acre per year. About 75 percent of the commercial forest land can produce 50 cubic feet or more per acre per year. Much of the forest land is not properly managed because about 30 percent of it is part of a larger farm or tract. Most stands are sold after less than 10 years. Many are not well stocked with desirable, high-quality trees.

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

The survey area has one commercial sawmill, three mills that are used for custom sawing, and one wood veneer plant. Rough lumber, wood veneer, and posts are the main wood products. Several mills in the adjacent counties buy logs and standing timber from landowners in the survey area.

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

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

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

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

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

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

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

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The estimates of the productivity of the soils in this survey area are based on published data *(6, 7, 16, 17)*.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year calculated at the age of culmination of mean annual increment.

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

Recreation

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

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

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

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

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

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

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

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

Wildlife Habitat

William H. Casey, biologist, Soil Conservation Service, assisted in writing this section.

The wildlife population in Henry and Trimble Counties consists of about 37 species of mammals, 43 species of reptiles and amphibians, and 107 species of birds that are either summer or year-round residents. Many of the more than 200 other kinds of birds in Kentucky frequent these counties sometime during the year.

Game species in the survey area offer opportunities for hunting. Furbearers are important to a small number of commercial trappers. The species sought by birdwatchers and wildlife photographers are becoming more popular. Also of importance, especially to scientists, are the species that are thought to be in danger of extinction.

The species most often hunted are cottontail rabbit, gray and fox squirrels, white-tailed deer, raccoon, red fox, bobwhite quail, and mourning dove. Those most commonly trapped are muskrat, raccoon, opossum, red fox, gray fox, mink, skunk, coyote, and weasel. The species that are particularly important to birdwatchers and wildlife photographers are those that visit the survey area only occasionally and those that are extremely shy and are seldom seen. These include golden eagle, sandhill crane, and bobcat.

Six species in the survey area have been declared by the U.S. Fish and Wildlife Service to be either threatened or endangered. They are Indiana bat, gray bat, eastern cougar, bald eagle, American peregrine falcon, and Arctic peregrine falcon.

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

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife *(44)*. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

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

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

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

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

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

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

Coniferous plants furnish browse 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, eastern white pine, and eastern 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, 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 should be considered in planning, in site selection, and in design.

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

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

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

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

Building Site Development

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

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

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. Depth to a high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 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, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost-action potential, and depth to a high water table affect the traffic-supporting capacity.

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

Sanitary Facilities

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

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

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

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

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

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

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

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

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

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

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

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

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

Construction Materials

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

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

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

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

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and 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. They are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

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

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

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

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

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

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel 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, stones, or soluble salts; have slopes of more than 15 percent; or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant nutrients as it decomposes.

Water Management

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

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

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

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

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

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

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

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, 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 *(21)*. 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 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

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

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

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

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as 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.

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 generally are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

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

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability 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 *(18)*.

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

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

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

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

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

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

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

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and Water Features

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

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

The four hydrologic soil groups are:

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

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

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

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

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

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

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

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

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

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils.

The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent*; and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

The two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "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 specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

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

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

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

Physical and Chemical Analyses of Selected Soils

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

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 *(22)*.

Sand—(0.05-2.0 mm fraction) weight percentages of materials less than 2 mm (3A1).
Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all materials less than 2 mm (3A1).
Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of materials less than 2 mm (3A1).
Organic carbon—dichromate, ferric sulfate titration (6A1a).
Extractable cations—ammonium acetate pH 7.0, uncorrected; calcium (6N2), magnesium (602), sodium (6P2), potassium (6Q2).
Extractable acidity—barium chloride-triethanolamine I (6H1a).
Cation-exchange capacity—ammonium acetate, pH 7.0 (5A1a).
Cation-exchange capacity—sum of cations (5A3a).
Base saturation—ammonium acetate, pH 7.0 (5C1).
Base saturation—sum of cations, TEA, pH 8.2 (5C3).
Reaction (pH)—1:1 water dilution (8C1a).
Reaction (pH)—potassium chloride (8C1c).
Reaction (pH)—SMP buffer (8D7, Kentucky Agricultural Experiment Station).
Hydrogen + Aluminum—(6G1x, Kentucky Agricultural Experiment Station).
Iron—dithionate-citrate extract (6C2b).
Available phosphorus—(656, Kentucky Agricultural Experiment Station).
Field sampling—site selection (1A1).
Field sampling—soil sampling (1A2).
Laboratory preparation—standard (air-dry) material (1B1).
Particles—less than 2 mm (2A1).

Data sheet symbols—(2B).
Exchangeable acidity (H+Al)—Yuan procedure 67-3.52, part 2, methods of analysis, ASA, 1965.
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 several typical pedons are given in tables 19 and 20. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were analyzed by the Soil Conservation Service, Soil Survey Investigations Staff, Lincoln, Nebraska.

The determinations in table 19 were made by the optical count method on the coarse silt in the Cincinnati, Lawrence, Rossmoyne, and Ryker soils. The determinations in table 20 were made on clay particles. Except for the Beasley soil, all of the soils that were sampled have mixed mineralogy. The Beasley soil has montmorillonitic mineralogy and thus is considered to be a taxadjunct to the Beasley series in this survey area.

The methods used in obtaining the data and their respective codes, which are in parentheses and refer to published methods *(26)*, are Optical analysis (7B1), Potassium (6Q3a), Iron (6C7a), X-ray diffraction (7A2i), Differential thermal analysis (7A3), and Total analysis of clay (7C3).

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 typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by the Soil Mechanics Laboratory, Fort Worth, Texas.

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

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 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 *(23)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 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 Alfisol.

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

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

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

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. 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, mixed, mesic Typic Hapludalfs.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum 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" *(19)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(23)*. 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 soils that are moderately slowly permeable. These soils formed in fine textured material weathered from soft limestone and from calcareous siltstone and shale. They are on ridgetops, shoulder slopes, and hillsides. Slopes range from 2 to 40 percent. They are dominantly 6 to 20 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

The Beasley soils in this survey area are taxadjuncts to the series because the mineralogy is montmorillonitic. This difference, however, does not significantly affect the use, management, or behavior of the soils.

Beasley soils are associated on the landscape with Brassfield, Grayford, and Nicholson soils. Brassfield soils are in a fine-loamy family and are less than 40 inches to a paralithic contact. Grayford soils are in a fine-loamy family. Nicholson soils are moderately well drained, have a fragipan, and are in a fine-silty family.

Typical pedon of Beasley silty clay loam, 6 to 12 percent slopes, eroded; in Trimble County; about 3.2 miles south of Bedford, 300 yards east of U.S. Highway 42:

Ap1—0 to 2 inches; brown (10YR 4/3) silt loam; moderate fine and medium granular structure; very friable; many fine roots; common fine pores; moderately acid; abrupt smooth boundary.

Ap2—2 to 6 inches; yellowish brown (10YR 5/4) silty clay loam; common fine faint brown mottles and coatings; moderate medium subangular blocky structure; friable; common fine roots; common fine pores; moderately acid; abrupt smooth boundary.

Bt1—6 to 12 inches; yellowish brown (10YR 5/6) silty clay; moderate fine and medium angular blocky structure; firm; few fine roots; few fine pores; common distinct clay films on faces of peds; common brown silt coatings; slightly acid; clear wavy boundary.

Bt2—12 to 20 inches; yellowish brown (10YR 5/6) silty clay; few fine faint brown mottles; moderate coarse subangular blocky structure parting to weak fine angular blocky; very firm; few fine roots; few fine pores; common distinct clay films on faces of peds; few small black concretions; neutral; gradual smooth boundary.

Bt3—20 to 28 inches; yellowish brown (10YR 5/8) clay; few fine faint brown mottles; moderate coarse subangular blocky structure parting to weak fine angular blocky; very firm; few fine roots; few fine pores; common distinct clay films on faces of peds; few small black concretions; moderately alkaline; clear smooth boundary.

C—28 to 41 inches; mottled light olive brown (2.5Y 5/4), light gray (10YR 7/1), and yellowish brown (10YR 5/6) silty clay loam; massive; very firm; few fine roots; few fine pores; strongly alkaline; weak effervescence; abrupt smooth boundary.

Cr—41 to 56 inches; light olive gray shale; thinly bedded with white and yellow coatings on partings; few fine roots in widely spaced cracks in the upper 6 inches; strongly alkaline.

The thickness of the solum ranges from 20 to more than 40 inches, and the depth to a paralithic contact is 40 inches or more. The content of limestone, shale, or siltstone fragments ranges from 0 to 10 percent in the solum and from 0 to 35 percent in the C horizon. Reaction ranges from very strongly acid to neutral in the upper part of the solum and from neutral to strongly alkaline in the lower part.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The texture 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. In some pedons it has common mottles in shades of brown, yellow, or olive. The texture is silty clay or clay.

The C horizon has hue of 10YR, 7.5YR, or 2.5Y, value of 4 to 6, and chroma of 1 to 8. In some pedons it does not have a dominant color and is mottled in shades of yellow, olive, gray, or brown. The texture is clay, silty clay, or silty clay loam.

Boonesboro Series

The Boonesboro series consists of moderately deep, well drained soils that are rapidly permeable in the subsoil. These soils have a mollic epipedon. They formed in alluvial material washed from upland soils derived from limestone, siltstone, and shale. They are on flood plains in the narrow valleys along the smaller streams. Slopes range from 0 to 2 percent. The soils are fine-loamy, mixed, mesic Fluventic Hapludolls.

Boonesboro soils are associated on the landscape with the Elk, Newark, Nolin, and Woolper soils. All of the associated soils are deep over bedrock. Elk soils are on stream terraces, have an argillic horizon, and are in a fine-silty family. Newark soils are somewhat poorly drained. Newark and Nolin soils have an ochric epipedon. They are in a fine-silty family. Woolper soils are in a fine textured family and have an argillic horizon. They are on foot slopes.

Typical pedon of Boonesboro silt loam, frequently flooded; in Henry County; about 4 miles east of New Castle, 100 yards north of Flat Bottom Road, and 50 yards west of Drennon Creek:

Ap—0 to 10 inches; dark brown (10YR 3/3) silt loam; moderate medium subangular blocky structure parting to weak fine granular; very friable; many fine roots; about 1 percent thin, flat limestone fragments

6 to 15 inches long; slightly acid; gradual smooth boundary.

A—10 to 21 inches; dark brown (10YR 3/3) silt loam; weak medium subangular blocky structure parting to moderate medium granular; very friable; common fine roots; about 4 percent thin, flat limestone fragments 6 to 15 inches long; neutral; clear smooth boundary.

Bw—21 to 28 inches; brown (10YR 4/3) very flaggy silty clay loam; weak medium subangular blocky structure; friable; few fine roots; about 40 percent thin, flat limestone fragments 6 to 15 inches long; about 5 percent weathered siltstone fragments 4 to 10 inches long; about 3 percent small, rounded pebbles ⅛ to ¼ inch in diameter; mildly alkaline; gradual wavy boundary.

C—28 to 33 inches; dark yellowish brown (10YR 4/4) very flaggy silty clay loam; massive; friable; about 45 percent thin, flat limestone fragments 6 to 15 inches long; about 10 percent thin weathered siltstone fragments 4 to 10 inches long; about 5 percent small, rounded pebbles ⅛ to ¼ inch in diameter; mildly alkaline; abrupt smooth boundary.

R—33 inches; hard limestone bedrock.

The thickness of the solum and the depth to limestone bedrock range from 20 to 40 inches. The content of coarse fragments ranges from 0 to 20 percent in the A horizon and from 15 to 75 percent in the Bw and C horizons. Reaction ranges from slightly acid to mildly alkaline throughout the profile.

The Ap and A horizons have hue of 10YR or 7.5YR, value of 3, and chroma of 2 or 3. The Bw horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 2 to 4. In the fine-earth fraction, it is silt loam or silty clay loam. The C horizon has colors and textures similar to those of the Bw horizon.

Brassfield Series

The Brassfield series consists of moderately deep, well drained soils that are moderately permeable. These soils formed in loamy material weathered from interbedded, greenish gray limestone, calcareous siltstone, and calcareous sandstone. They are on steep or very steep hillsides. Slopes range from 20 to 40 percent. The soils are fine-loamy, carbonatic, mesic Rendollic Eutrochrepts.

Brassfield soils are associated on the landscape with Beasley and Fairmount soils. Beasley soils are in a fine textured family and are more than 40 inches to a paralithic contact. Fairmount soils are less than 20 inches to a lithic contact, have a mollic epipedon, and have a clayey cambic horizon.

Typical pedon of Brassfield silt loam, in an area of Brassfield-Beasley complex, 20 to 40 percent slopes, eroded; in Trimble County; about 3 miles south of Milton, 0.5 mile south of the junction of Joyce Ridge Road and U.S. Highway 421, about 1,000 feet north of Corn Creek:

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam; weak fine and medium granular structure; very friable; common fine roots; mildly alkaline; clear smooth boundary.

Bw—5 to 15 inches; light yellowish brown (10YR 6/4) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; friable; few fine roots; about 10 percent soft siltstone fragments; mildly alkaline; slight effervescence; gradual smooth boundary.

C—15 to 26 inches; mottled light yellowish brown (2.5Y 6/4) and olive gray (5Y 5/2), soft, weathered siltstone that breaks down to silt loam; relict platy structure; firm; few fine roots along cracks; about 20 percent hard siltstone fragments; moderately alkaline; strong effervescence; clear smooth boundary.

Cr—26 inches; light yellowish brown (2.5Y 6/4) and olive gray (5Y 5/2), interbedded, calcareous siltstone and shale.

The thickness of the solum ranges from 10 to 30 inches. The depth to a paralithic contact ranges from 20 to 40 inches. The content of coarse fragments ranges from 8 to 30 percent. Reaction is neutral or mildly alkaline in the Ap horizon and mildly alkaline or moderately alkaline in the Bw and C horizons.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. The Bw horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 to 6. Low-chroma colors, if they occur, are considered to be inherited from the parent material. This horizon is silt loam, loam, clay loam, or silty clay loam. The C horizon has a matrix and mottles with hue of 2.5Y or 5Y, value of 5 or 6, and chroma of 1 to 4. It is silt loam, loam, clay loam, or silty clay loam.

Chenault Series

The Chenault series consists of deep and very deep, well drained soils that are moderately permeable. These soils formed in old alluvium over limestone or material weathered from limestone. They are on ridgetops, on shoulder slopes, and in karst areas. Slopes range from 2 to 12 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Chenault soils are associated on the landscape with

Fairmount and Faywood soils. The associated soils are underlain by hard limestone bedrock interbedded with thin layers of calcareous shale and siltstone. Fairmount soils are less than 20 inches to a lithic contact, have a mollic epipedon, and have a clayey cambic horizon. Faywood soils are less than 40 inches to a lithic contact and are in a fine textured family.

Typical pedon of Chenault silt loam, 6 to 12 percent slopes; in Henry County; about 0.7 mile northeast of the Orville post office, 0.6 mile northwest of the confluence of Stevens Creek with the Kentucky River, 565 yards south of Kentucky Highway 561:

Ap—0 to 6 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; common very fine roots; about 5 percent pebbles and chert fragments; neutral; abrupt smooth boundary.

Bt1—6 to 18 inches; brown (7.5YR 4/4) silty clay loam; moderate medium and fine subangular blocky structure; friable; few fine roots; few fine tubular pores; common distinct clay films on faces of peds; few small dark nodules; about 10 percent pebbles and subrounded chert fragments; moderately acid; gradual wavy boundary.

Bt2—18 to 32 inches; brown (7.5YR 4/4) silty clay loam; weak coarse prismatic structure parting to moderate fine angular blocky; firm; few fine roots; common distinct clay films on faces of peds; about 12 percent pebbles and subrounded chert fragments; moderately acid; gradual wavy boundary.

Bt3—32 to 46 inches; brown (7.5YR 4/4) gravelly clay loam; moderate fine angular blocky structure; firm; common distinct clay films on faces of peds; about 30 percent pebbles and subrounded chert fragments; slightly acid; gradual wavy boundary.

2C—46 to 60 inches; brown (7.5YR 5/4) clay; massive; plastic and sticky; few limestone flagstones 6 to 10 inches across; neutral; abrupt smooth boundary.

2R—60 inches; hard limestone bedrock.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock ranges from 40 to 80 inches. Reaction ranges from strongly acid to neutral in the Ap horizon, from strongly acid to slightly acid in the Bt horizon, and from moderately acid to neutral in the 2C horizon. The content of pebbles and chert fragments ranges from 5 to 30 percent in the Ap horizon, from 10 to 30 percent in the Bt horizon, and from 5 to 30 percent in the 2C horizon.

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. It is silty clay loam, clay loam, loam, or the gravelly analogs of those textures. The 2C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. In some pedons it is mottled in shades of brown or gray. It is silty clay, clay, or the gravelly analogs of those textures. Some pedons have a 2BC horizon, which has colors and textures similar to those of the 2C horizon.

Cincinnati Series

The Cincinnati series consists of very deep, well drained soils that have a slowly permeable fragipan. These soils formed in a mantle of loess and in the underlying glacial till. They are on ridgetops and shoulder slopes in the north-central part of Trimble County. Slopes range from 2 to 12 percent. The soils are fine-silty, mixed, mesic Typic Fragiudalfs.

Cincinnati soils are associated on the landscape with Grayford, Rossmoyne, and Ryker soils. Grayford and Ryker soils do not have a fragipan. Grayford soils are in a fine-loamy family and are deep. Rossmoyne soils have low-chroma mottles in the upper part of the argillic horizon.

Typical pedon of Cincinnati silt loam, 2 to 6 percent slopes; in Trimble County; about 2.2 miles southeast of Milton, 50 feet south of U.S. Highway 421, about 50 feet northwest of a private lane:

Ap—0 to 10 inches; brown (10YR 4/3) silt loam; moderate medium granular structure; very friable; common fine roots; common fine pores; nearly continuous dark brown coatings; mildly alkaline; abrupt smooth boundary.

BA—10 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; very friable; common fine roots; common fine pores; few root channels and cavities filled with brown material like that in the Ap horizon; mildly alkaline; clear smooth boundary.

Bt—14 to 27 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium and coarse subangular blocky structure parting to moderate fine angular blocky; friable; few fine roots; common fine pores; common distinct clay films on faces of peds; few pale brown silt coatings in the lower 3 inches; neutral; clear wavy boundary.

2Btx1—27 to 42 inches; yellowish brown (10YR 5/4) silt loam; common fine faint grayish brown mottles; moderate very coarse prismatic structure parting to weak fine angular blocky; very firm; brittle; few fine roots, 2 millimeters to 1 centimeter thick, between prisms; common black coatings and few distinct clay films on prisms; few pebbles; very strongly acid; gradual wavy boundary.

2Btx2—42 to 55 inches; strong brown (7.5YR 5/6) silt loam; common fine distinct grayish brown (10YR

5/2) mottles; moderate very coarse prismatic structure parting to moderate fine angular blocky; very firm; brittle; common distinct grayish brown (10YR 5/2) clay films, 2 millimeters to 1 centimeter thick, between prisms; common distinct clay films and black coatings on prisms; few small black concretions; few pebbles; very strongly acid; gradual wavy boundary.

2Bt1—55 to 69 inches; yellowish red (5YR 5/6) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure parting to moderate fine and medium subangular blocky; firm; common distinct reddish gray clay films, 2 millimeters to 1 centimeter thick, on faces of large peds; common distinct clay films on faces of small peds; few pebbles; very strongly acid; gradual wavy boundary.

2Bt2—69 to 81 inches; yellowish red (5YR 5/6) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure parting to moderate fine and medium subangular blocky; firm; common distinct reddish gray (5YR 5/2) clay films, 2 millimeters to 1 centimeter thick, on faces of peds; few pebbles; very strongly acid; abrupt smooth boundary.

2Bt3—81 to 93 inches; dark red (2.5YR 3/6) silty clay loam; moderate coarse subangular blocky structure parting to moderate fine angular blocky; firm; common distinct brown (10YR 5/3) clay films, 2 millimeters thick, on faces of large peds; some strong brown (7.5YR 5/6) clay loam between adjacent peds; common distinct dark red (2.5YR 3/6) clay films and common black coatings on faces of small peds; common small black concretions and soft nodules; few pebbles; strongly acid.

The thickness of the solum ranges from 48 to more than 100 inches. The depth to bedrock is more than 6 feet. In unlimed areas reaction is strongly acid or very strongly acid above and in the fragipan and ranges from very strongly acid to neutral below the fragipan. The content of coarse fragments ranges from 2 to 10 percent in and below the fragipan.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The BA and Bt horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. They are silt loam or silty clay loam. The 2Btx and 2Bt horizons have hue of 10YR, 7.5YR, 5YR, or 2.5YR, value of 3 to 6, and chroma of 4 to 6. They are silt loam, silty clay loam, clay loam, or loam.

Eden Series

The Eden series consists of moderately deep, well drained soils that are slowly permeable. These soils formed in fine textured material weathered from soft, calcareous shale interbedded with thin layers of limestone and siltstone. They are on hillsides, shoulder slopes, and narrow ridgetops, mainly in the eastern part of Henry County. Slopes range from 6 to 35 percent. They are dominantly 20 to 35 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Eden soils are associated on the landscape with Faywood, Fairmount, Lowell, and Nicholson soils. The associated soils are underlain by hard limestone bedrock interbedded with thin layers of calcareous shale and siltstone. Fairmount soils are less than 20 inches to a lithic contact and have a mollic epipedon. Faywood soils are less than 40 inches to a lithic contact, and Lowell soils are more than 40 inches to a lithic contact. Nicholson soils are moderately well drained, have a fragipan, and are in a fine-silty family.

Typical pedon of Eden silty clay loam, 20 to 35 percent slopes, eroded; in Henry County; about 3.7 miles east of Defoe, 1.1 miles northeast of the U.S. Highway 421 bridge across Six Mile Creek, 200 yards southwest of Kyle Road:

Ap—0 to 4 inches; dark grayish brown (2.5Y 4/2) silty clay loam; moderate fine angular blocky and weak fine granular structure; friable; many fine roots; about 2 percent limestone flagstones 6 to 18 inches across; neutral; clear smooth boundary.

Bt—4 to 22 inches; light olive brown (2.5Y 5/4) silty clay; common medium distinct yellowish brown (10YR 5/6) mottles; strong fine and medium subangular and angular blocky structure; firm; common fine and few medium roots; common fine tubular pores; common distinct clay films on faces of peds; about 10 percent shale and siltstone fragments 0.5 inch to 3.0 inches across; slightly acid; gradual smooth boundary.

BC—22 to 29 inches; light olive brown (2.5Y 5/4) flaggy silty clay; few medium distinct strong brown (7.5YR 5/6) and few fine distinct olive gray (5Y 5/2) mottles; moderate medium angular blocky structure parting to moderate medium and fine subangular blocky; firm; few fine roots; few small tubular pores; about 25 percent limestone flagstones 6 to 15 inches across and 5 percent weathered shale and siltstone fragments 0.5 inch to 3.0 inches across; moderately alkaline; clear smooth boundary.

Cr—29 to 50 inches; soft, weathered, calcareous shale and siltstone interbedded with layers of hard limestone.

The thickness of the solum ranges from 14 to 40 inches. The depth to a paralithic contact ranges from 20 to 40 inches. The content of limestone, siltstone, and shale fragments ranges from 0 to 25 percent in the A horizon and from 10 to 35 percent in the B horizon. Reaction ranges from strongly acid to moderately alkaline.

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 or 2.5Y, value of 4 or 5, and chroma of 3 to 6. In some pedons it is mottled in shades of olive. It is silty clay, clay, or the flaggy analogs of those textures. The BC horizon has colors and textures similar to those of the Bt horizon. Some pedons have mottles with chroma of 2 in the lower part of the argillic horizon. The gray color is considered to be inherited from the parent material.

Some pedons have a C horizon. This horizon has hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 1 to 4. It is commonly mottled in shades of gray, olive, or brown. It is flaggy or very flaggy silty clay or clay. The content of limestone, siltstone, and shale fragments ranges from 25 to 75 percent. Reaction ranges from mildly alkaline to strongly alkaline.

Elk Series

The Elk series consists of very deep, well drained soils that are moderately permeable. These soils formed in mixed alluvium on stream terraces. Slopes range from 0 to 40 percent. They are dominantly 0 to 12 percent. The soils are fine-silty, mixed, mesic Ultic Hapludalfs.

Elk soils are associated on the landscape with Lawrence, Newark, Nolin, Otwell, and Woolper soils. Lawrence and Otwell soils have a fragipan. Lawrence soils are somewhat poorly drained, and Otwell soils are moderately well drained. Newark soils are somewhat poorly drained. Newark and Nolin soils are on flood plains and do not have an argillic horizon. Woolper soils are on foot slopes and benches, have a mollic epipedon, and are in a fine textured family.

Typical pedon of Elk silt loam, rarely flooded, 2 to 6 percent slopes; in Trimble County; about 2.7 miles southeast of Bedford, 1.2 miles east of the junction of U.S. Highway 421 and Kentucky Highway 316, approximately 325 yards south of the Little Kentucky River:

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

BA—10 to 16 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; very friable; common very fine roots; common fine pores; moderately acid; gradual smooth boundary.

Bt1—16 to 30 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; common distinct clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt2—30 to 44 inches; yellowish brown (10YR 5/6) silty clay loam; few medium distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

C—44 to 64 inches; dark yellowish brown (10YR 4/4) silty clay loam; common medium distinct pale brown (10YR 6/3) mottles; massive; few small black concretions; strongly acid.

The thickness of the solum ranges from 40 to 60 inches, and the depth to bedrock ranges from 5 to more than 20 feet. The content of coarse fragments ranges from 0 to 5 percent in the solum and from 0 to 30 percent in the C horizon. In unlimed areas reaction ranges from slightly acid to very strongly acid throughout the profile.

The Ap horizon has hue of 10YR or 7.5YR, value of 4, 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. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. Some pedons have few or common gray mottles below the upper 10 inches of the argillic horizon. This horizon is silt loam or silty clay loam. The C horizon has colors similar to those of the Bt horizon. It is mostly silty clay loam or silt loam, but some pedons have thin strata of loam, clay loam, or silty clay.

Fairmount Series

The Fairmount series consists of shallow, well drained soils that are moderately slowly or slowly permeable. These soils formed in clayey material weathered from limestone interbedded with calcareous shale. They are on hillsides and bluffs, mainly along the larger streams. Slopes range from 12 to 65 percent. The soils are clayey, mixed, mesic Lithic Hapludolls.

Fairmount soils are associated on the landscape with Brassfield, Chenault, Eden, Faywood, and Woolper soils. Brassfield, Chenault, Eden, and Faywood soils have an ochric epipedon. Brassfield soils are in a fine-loamy family and are less than 40 inches to a paralithic contact. Chenault soils are on high stream terraces, are in a fine-loamy family, and are deep over bedrock. Eden soils are less than 40 inches to a paralithic contact, and Faywood soils are less than 40 inches to a lithic contact. Woolper soils are deep over bedrock and are on foot slopes and benches.

Typical pedon of Fairmount flaggy silty clay loam, in an area of the Fairmount-Woolper complex, 30 to 65 percent slopes; in Trimble County; about 3.9 miles southeast of Bedford, 0.5 mile east of the U.S. Highway 421 bridge across the Little Kentucky River, 165 yards southeast of Kentucky Highway 316:

Oi—1 inch to 0; decayed forest litter.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) flaggy silty clay loam; moderate fine granular structure; friable; many fine roots; about 30 percent thin, flat limestone fragments 4 to 14 inches across; moderately alkaline; clear smooth boundary.

A2—4 to 11 inches; dark brown (10YR 3/3) flaggy silty clay; strong medium prismatic structure parting to strong medium subangular blocky; firm; few fine roots; few faint clay films on faces of peds; about 30 percent thin, flat limestone fragments 4 to 14 inches across; mildly alkaline; abrupt smooth boundary.

Bw—11 to 17 inches; light olive brown (2.5Y 5/4) channery silty clay; strong medium subangular blocky structure parting to medium fine angular blocky; very firm; few fine roots; common fine irregular pores; about 35 percent small limestone fragments 0.5 inch to 3.0 inches across; moderately alkaline; abrupt smooth boundary.

R—17 inches; hard, gray limestone interbedded with thin layers of calcareous shale.

The thickness of the solum and the depth to bedrock range from 10 to 20 inches. Reaction ranges from neutral to moderately alkaline throughout the profile. The content of limestone fragments ranges from 5 to 35 percent.

The A1 and A2 horizons have hue of 10YR or 2.5Y and value and chroma of 2 or 3. They are flaggy silty clay loam or flaggy silty clay. The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. In some pedons it has few or common mottles in shades of brown, gray, or olive. It is the flaggy or channery analogs of silty clay, clay, or silty clay loam.

Faywood Series

The Faywood series consists of moderately deep, well drained soils that are moderately slowly or slowly permeable. These soils formed in fine textured material weathered from limestone interbedded with calcareous shale and siltstone. They are on ridgetops, on shoulder slopes, on hillsides, and in karst areas. Slopes range from 6 to 20 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Faywood soils are associated on the landscape with Chenault, Eden, Fairmount, Lowell, and Nicholson soils. Chenault soils are on high stream terraces, are in a fine-loamy family, and are deep over bedrock. Eden soils are less than 40 inches to a paralithic contact. Fairmount soils are less than 20 inches to a lithic contact and have a mollic epipedon. Nicholson soils are moderately well drained, have a fragipan, and are in a fine-silty family.

Typical pedon of Faywood silty clay loam, 12 to 20 percent slopes, eroded; in Henry County; about 3 miles southeast of New Castle, 200 yards south of Kentucky Highway 573, and 15 yards west of Russell Branch Road:

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

BA—4 to 7 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; many fine tubular pores; strongly acid; clear smooth boundary.

Bt1—7 to 16 inches; yellowish brown (10YR 5/6) silty clay; moderate medium subangular blocky structure; firm; common fine roots; common distinct clay films on faces of peds; about 3 percent limestone fragments 1 to 3 inches across; few black concretions; slightly acid; gradual wavy boundary.

Bt2—16 to 20 inches; yellowish brown (10YR 5/4) silty clay; common medium distinct olive (5Y 5/3) and few fine faint light olive brown mottles; moderate medium angular and subangular blocky structure; firm, sticky and plastic; few fine roots; common distinct clay films on faces of peds; common dark brown and black concretions; slightly acid; gradual wavy boundary.

Bt3—20 to 26 inches; yellowish brown (10YR 5/4) clay; many medium distinct olive (5Y 5/3) and light olive brown (2.5Y 5/4) mottles; strong and moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; common distinct clay films on faces of peds; about 10 percent limestone and shale fragments as much as 4 inches across; few dark brown concretions; neutral; abrupt smooth boundary.

R—26 inches; limestone interbedded with calcareous shale.

The thickness of the solum and the depth to limestone bedrock range from 20 to 40 inches. The content of limestone and shale fragments ranges from 0 to 15 percent in the solum. Reaction ranges from strongly acid to mildly alkaline throughout the solum.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The BA horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 or 4. The Bt horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 or 5, and chroma of 4 to 8. It commonly has mottles in shades of olive, brown, or gray in the lower part. It is silty clay, clay, or silty clay loam. Some pedons have a BC or C horizon, which has colors and textures similar to those of the lower part of the Bt horizon.

Grayford Series

The Grayford series consists of deep, well drained soils that are moderately permeable. These soils formed in a mantle of loess and glacial till and in the underlying fine textured material weathered from limestone and shale. They are on the upper hillsides in the northern and central parts of Trimble County. Slopes range from 12 to 20 percent. The soils are fine-loamy, mixed, mesic Ultic Hapludalfs.

The Grayford soils in this survey area are taxadjuncts to the series because the base saturation in the 3BC horizon is more than 60 percent, thus making the soils Typic Hapludalfs. Also, the mildly alkaline reaction of the 3BC horizon and the paralithic contact are outside the range of the series.

Grayford soils are associated on the landscape with Beasley, Cincinnati, and Ryker soils. Beasley soils are in a fine textured family and are more than 40 inches to a paralithic contact. Cincinnati soils have a fragipan and are in a fine-silty family. Ryker soils are more than 60 inches deep over bedrock and are in a fine-silty family.

Typical pedon of Grayford silt loam, in an area of Grayford-Beasley complex, 12 to 20 percent slopes, eroded; in Trimble County; about 1 mile southwest of Bedford, 300 yards west of U.S. Highway 42:

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

Bt1—4 to 16 inches; brown (7.5 4/4) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; common distinct clay films on faces of peds; strongly acid; clear wavy boundary.

2Bt2—16 to 26 inches; yellowish brown (10YR 5/8) silty clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; common distinct clay films on faces of peds; common dark brown concretions; about 2 percent chert fragments ¼ to ¾ inch in diameter; strongly acid; clear wavy boundary.

2Bt3—26 to 35 inches; reddish brown (5YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; common dark brown concretions; about 2 percent chert fragments ¼ to ½ inch in diameter; strongly acid; clear wavy boundary.

3BC—35 to 49 inches; strong brown (7.5YR 5/6) clay; common medium distinct light olive brown (2.5Y 5/4) and common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse angular blocky structure; very firm; few dark brown concretions; mildly alkaline; clear smooth boundary.

3Cr—49 to 54 inches; soft, calcareous siltstone.

The thickness of the solum and the depth to bedrock range from 40 to 60 inches. The thickness of the loess ranges from 6 to 24 inches, and the thickness of the glacial till ranges from 14 to 24 inches. In unlimed areas, reaction ranges from strongly acid to slightly acid in the Ap and Bt horizons, from strongly acid or very strongly acid in the 2Bt horizon, and from strongly acid to mildly alkaline in the 3BC horizon. The content of coarse fragments ranges from about 2 to 5 percent in the 2Bt horizon and from 0 to 10 percent in the 3BC horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. It is silt loam or silty clay loam. The 2Bt horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 or 5, and chroma of 4 to 8. It is silty clay loam, silt loam, loam, or clay loam. The 3BC horizon has hue of 7.5YR, 5YR, or 2.5YR, value of 4 or 5, and chroma of 4 to 8. It has common mottles in shades of brown, olive, or yellow in some pedons. It is clay or silty clay. Some pedons have a 3C horizon, which has colors and textures similar to those of the 3BC horizon.

Huntington Series

The Huntington series consists of very deep, well drained soils that are moderately permeable. These soils have a mollic epipedon. They formed in alluvial material that washed from upland soils derived from limestone, siltstone, and shale. They are on flood plains in wide valleys, mainly along the Ohio River in Trimble County. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, mesic Fluventic Hapludolls.

Huntington soils are associated on the landscape with Newark, Otwell, and Wheeling soils. All of the associated soils have an ochric epipedon. Newark soils are somewhat poorly drained. Otwell and Wheeling soils are on stream terraces. Otwell soils are moderately well drained and have a fragipan. Wheeling soils have an argillic horizon and are in a fine-loamy family.

Typical pedon of Huntington silt loam, occasionally flooded; in Trimble County; about 2.4 miles south of Wise's Landing, 0.6 mile below the mouth of Middle Creek, 85 yards east of the Ohio River:

Ap—0 to 11 inches; dark brown (10YR 3/3) silt loam; moderate medium granular structure; very friable; common very fine roots; slightly acid; clear smooth boundary.

BA—11 to 22 inches; dark grayish brown (10YR 4/2) silt loam; weak coarse prismatic structure parting to weak fine and medium subangular blocky; very friable; common very fine roots; many wormholes and wormcasts; neutral; gradual wavy boundary.

Bw—22 to 58 inches; brown (10YR 4/3) silt loam; weak fine and medium subangular blocky structure; friable; neutral; clear smooth boundary.

C—58 to 72 inches; dark yellowish brown (10YR 4/4) silt loam; few medium faint yellowish brown and brown mottles; massive; friable; neutral.

The solum is more than 40 inches thick. The depth to bedrock ranges from about 5 to more than 20 feet. Reaction ranges from moderately acid to mildly alkaline throughout the profile. The content of coarse fragments ranges from 0 to 3 percent in the solum.

The Ap horizon has hue of 10YR or 7.5YR and value and chroma of 2 or 3. The BA horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 or 3. It is silt loam or silty clay loam. The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam or silty clay loam. The C horizon has colors similar to those of the Bw horizon, but in some pedons it has yellowish brown and dark brown mottles. It is commonly silt loam or silty clay loam, but in places it is stratified with thin layers of loam, sandy loam, or sandy clay loam.

Lawrence Series

The Lawrence series consists of very deep, somewhat poorly drained soils that have a slowly permeable fragipan. These soils formed in mixed alluvium on stream terraces. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, mesic Aquic Fragiudalfs.

Lawrence soils are associated on the landscape with Elk, Newark, Nolin, and Otwell soils. Elk soils are well drained. Newark and Nolin soils are on flood plains and do not have a fragipan or an argillic horizon. Nolin soils are well drained. Otwell soils are moderately well drained and do not have low-chroma mottles in the upper part of the argillic horizon.

Typical pedon of Lawrence silt loam, rarely flooded; in Henry County; about 5 miles northwest of Lockport, 0.6 mile north of Kentucky Highway 389, and 0.5 mile south of the Kentucky River, on Marshalls Bottom:

Ap—0 to 8 inches; grayish brown (2.5Y 5/2) silt loam; common medium distinct dark grayish brown (10YR 4/2) and few medium distinct very pale brown (10YR 7/3) mottles; moderate fine and medium granular structure; very friable; many fine roots; common fine pores; few distinct strong brown coatings; slightly acid; abrupt smooth boundary.

Bt1—8 to 19 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct light brownish gray (10YR 6/2) and pale brown (10YR 6/3) mottles; moderate fine and medium subangular blocky structure; friable; common fine roots; few fine pores; common distinct light yellowish brown (10YR 6/4) clay films and silt coatings on faces of peds; very strongly acid; clear smooth boundary.

Bt2—19 to 25 inches; strong brown (7.5YR 5/6) silty clay loam; many medium distinct light brownish gray (10YR 6/2) mottles; moderate coarse subangular blocky structure parting to moderate fine angular blocky; friable; few fine roots; few fine pores; common distinct light brownish gray (10YR 6/2) silt coatings on faces of large peds; common distinct clay films on faces of small peds; very strongly acid; clear wavy boundary.

Btx1—25 to 38 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct light brownish gray (10YR 6/2) mottles; moderate very coarse prismatic structure parting to moderate fine angular blocky; very firm; brittle; few fine roots between prisms; common distinct light brownish gray (10YR 6/2) clay films, 2 to 10 millimeters thick, on faces of prisms; common distinct strong brown (7.5YR 5/6) clay films on faces of blocks; few black coatings on faces of blocks; very strongly acid; gradual wavy boundary.

Btx2—38 to 49 inches; dark yellowish brown (10YR 4/4) silt loam; common fine distinct light brownish gray (10YR 6/2) mottles; common very coarse prismatic structure parting to weak fine subangular blocky; very firm; brittle; few fine roots between prisms; few distinct light brownish gray (10YR 6/2) clay films on faces of prisms; few black coatings on faces of blocks; very strongly acid; gradual wavy boundary.

Btx3—49 to 78 inches; dark yellowish brown (10YR 4/4) silt loam; few fine distinct light gray (2.5Y 7/2) mottles; strong very coarse prismatic structure; extremely firm; brittle; common distinct light gray (10YR 7/1) clay films, 2 to 10 millimeters thick, on faces of prisms; massive interiors with black streaks and stains and a few old channels with black coatings; strongly acid.

The thickness of the solum ranges from 40 to 80 inches. The depth to bedrock ranges from 5 to more than 10 feet. In unlimed areas reaction ranges from slightly acid to very strongly acid in the Ap and Bt horizons. The Btx horizon is strongly acid or very 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 horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 5 or 6, and chroma of 3 to 6. It has few to many mottles with chroma of 2 or less. It is silty clay loam or silt loam. The Btx horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 7, and chroma of 1 to 6. In some pedons it is equally mottled in shades of gray and brown. It is silt loam or silty clay loam. Some pedons have a 2BC or 2C horizon, which has colors similar to those of the Btx horizon and is silty clay loam or silty clay.

Lowell Series

The Lowell series consists of deep and very deep, well drained soils that are moderately slowly permeable. These soils formed in fine textured material weathered from limestone interbedded with calcareous shale and siltstone. They are on ridgetops, on shoulder slopes, and in karst areas. Slopes range from 2 to 12 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Lowell soils are associated on the landscape with Eden, Faywood, Nicholson, and Shelbyville soils. Eden soils are less than 40 inches to a paralithic contact. Faywood soils are less than 40 inches to a lithic contact. Nicholson soils are moderately well drained, have a fragipan, and are in a fine-silty family. Shelbyville soils are in a fine-silty family and have a dark surface layer.

Typical pedon of Lowell silt loam, 2 to 6 percent slopes; in Henry County; about 2.5 miles northeast of New Castle, 0.2 mile north of Kentucky Highway 202:

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine and medium granular structure; very friable; common fine roots; common fine pores; nearly continuous slightly darker coatings; moderately acid; abrupt smooth boundary.

Bt1—8 to 18 inches; yellowish brown (10YR 5/6) silty clay loam; moderate coarse subangular blocky structure parting to moderate fine angular blocky; friable; few fine roots; few fine pores; common distinct brown (10YR 5/3) clay films on faces of peds; few very small black and dark brown soft accumulations; moderately acid; gradual smooth boundary.

Bt2—18 to 26 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate coarse subangular blocky structure parting to moderate fine angular blocky; friable; few fine roots; few fine pores; common distinct dark yellowish brown (10YR 4/6) clay films on faces of peds; few very small black and dark brown soft accumulations; strongly acid; clear smooth boundary.

Bt3—26 to 38 inches; mottled yellowish brown (10YR 5/6) and light yellowish brown (10YR 6/4) clay; moderate coarse subangular blocky structure parting to moderate fine and very fine angular blocky; firm; common distinct clay films on faces of peds; common small soft black accumulations, stains, and coatings; strongly acid; gradual smooth boundary.

Bt4—38 to 51 inches; yellowish brown (10YR 5/6) clay; common medium distinct light yellowish brown (2.5Y 6/4) mottles; moderate coarse angular blocky and prismatic structure; very firm; common distinct light yellowish brown (10YR 6/4) clay films on faces of peds; common small soft black accumulations and stains; few slickensides 4 to 6 inches long and wide; slightly acid; clear smooth boundary.

BC—51 to 60 inches; light olive brown (2.5Y 5/4) channery silty clay; many medium distinct brownish yellow (10YR 6/6) and light brownish gray mottles (10YR 6/2); weak coarse subangular blocky structure; very firm; common distinct clay films or pressure faces; about 25 percent thin, flat limestone fragments 3 to 6 inches long; neutral; abrupt smooth boundary.

C—60 to 74 inches; light olive brown (2.5YR 5/4) channery silty clay loam; many medium distinct brownish yellow (10YR 6/6) and light brownish gray (10YR 6/2) mottles; massive; very firm; about 55 percent thin, flat limestone fragments 3 to 6 inches long; mildly alkaline; weak effervescence; abrupt smooth boundary.

R—74 inches; gray limestone.

The thickness of the solum ranges from 30 to 60 inches, and the depth to bedrock ranges from 40 to more than 80 inches. The content of limestone and siltstone fragments ranges from 0 to 5 percent in the upper part of the solum, from 0 to 15 percent in the lower part, and from 1 to 30 percent in the C horizon. In unlimed areas reaction ranges from slightly acid to very strongly acid in the upper part of the solum. It ranges from strongly acid to mildly alkaline in the lower part of the solum and from moderately acid to mildly alkaline in the C horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. It is silt loam or silty clay loam. Some pedons have a 3- to 6-inch BA horizon. This horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is silty clay loam or silty clay. The Bt horizon has hue of 2.5Y, 10YR, or 7.5YR, value of 4 or 5, and chroma of 4 to 6. In some pedons it has mottles in shades of brown, yellow, olive, or gray in the lower part. It is silty clay loam or silty clay in the upper part and silty clay or clay in the lower part. The BC horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 3 to 6. In some pedons it has mottles in shades of brown, yellow, olive, or gray. It is silty clay or clay. The C horizon has colors similar to those of the BC horizon. It is silty clay loam, silty clay, or clay.

McGary Series

The McGary series consists of very deep, somewhat poorly drained soils that are slowly or very slowly permeable. These soils formed in fine textured slack-water deposits. They are dominantly in a broad upland depression in the southwestern part of Henry County. In a few small areas they are on stream terraces above the major creeks in Henry County. Slopes range from 0 to 2 percent. The soils are fine, mixed, mesic Aeric Ochraqualfs.

McGary soils are associated on the landscape with Nicholson and Lowell soils on uplands and Otwell and Elk soils on stream terraces. Nicholson soils formed in silty loess over fine textured material weathered from limestone and have a fragipan. They are moderately well drained and are in a fine-silty family. Lowell soils formed in fine textured material weathered from limestone and are well drained. Otwell soils are moderately well drained, have a fragipan, and are in a fine-silty family. Elk soils are well drained and are in a fine-silty family.

Typical pedon of McGary silt loam; in Henry County; about 1 mile southeast of Eminence, 300 feet south of Kentucky Highway 22, about 700 feet west of a farm lane:

Ap—0 to 6 inches; grayish brown (10YR 5/2) silt loam; many medium distinct dark yellowish brown (10YR 4/6) mottles; weak fine granular structure; very friable; common fine and medium roots; common medium tubular pores; moderately acid; clear smooth boundary.

BA—6 to 9 inches; grayish brown (10YR 5/2) silt loam; common medium distinct dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine tubular pores; moderately acid; clear wavy boundary.

Btg—9 to 16 inches; grayish brown (2.5Y 5/2) silty clay; many medium distinct dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; few fine roots; strongly acid; gradual wavy boundary.

Bt—16 to 26 inches; yellowish brown (10YR 5/4) silty clay; many medium distinct light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; common distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

BCg—26 to 38 inches; gray (10YR 5/1) silty clay; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak coarse subangular blocky structure; firm; few fine roots; moderately acid; gradual wavy boundary.

Cg1—38 to 64 inches; gray (10YR 5/1) silty clay; common medium distinct yellowish brown (10YR 5/6) and few medium distinct dark yellowish brown (10YR 4/4) mottles; massive; firm, sticky and plastic; moderately alkaline; strong effervescence; clear wavy boundary.

Cg2—64 to 85 inches; mottled gray (10YR 5/1), yellowish brown (10YR 5/6), and dark yellowish brown (10YR 4/4) silty clay loam stratified with silty clay, silt loam, and loam; massive; firm, sticky and plastic; moderately alkaline; strong effervescence.

The thickness of the solum ranges from 24 to 40 inches. The depth to bedrock ranges from 5 to more than 10 feet. The depth to carbonates ranges from 20 to 40 inches. Reaction ranges from strongly acid to neutral in the upper part of the solum and from moderately acid to mildly alkaline in the lower part.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. The BA horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is silt loam or silty clay loam. In some pedons a horizon between the Ap horizon and a depth of 30 inches has a dominant matrix chroma of 3 or 4. The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. It is commonly mottled in shades of brown, yellow, olive, or gray. It is silty clay loam or silty clay. The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6. It is stratified clay, silty clay, or silty clay loam and in places has thin layers of silt loam or loam.

Newark Series

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

Newark soils are associated on the landscape with Boonesboro, Elk, Huntington, Lawrence, and Nolin soils. Boonesboro and Huntington soils are well drained and have a mollic epipedon. Boonesboro soils are less than 40 inches to a lithic contact, are well drained, and are in a fine-loamy family. Elk soils are on stream terraces, have an argillic horizon, and are well drained. Lawrence soils are on stream terraces and have a fragipan. Nolin soils are well drained.

Typical pedon of Newark silt loam, frequently flooded; in Trimble County; about 3.2 miles east of Bedford, 0.4 mile southeast of the confluence of Hardy Creek and the Little Kentucky River, 200 yards south of Bunker Hill:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; few fine distinct grayish brown (2.5Y 5/2) mottles; weak medium granular and weak fine subangular blocky structure; very friable; few fine roots; neutral; abrupt smooth boundary.

Bw—7 to 16 inches; brown (10YR 5/3) silt loam; common medium distinct grayish brown (2.5Y 5/2) and few fine faint dark yellowish brown mottles; weak fine subangular blocky structure; very friable; neutral; clear smooth boundary.

Bg—16 to 36 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium distinct dark grayish brown (10YR 4/2) mottles; weak fine subangular blocky structure; friable; few small oxide nodules; neutral; gradual smooth boundary.

Cg1—36 to 53 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium distinct brown (7.5YR 4/4) and dark grayish brown (10YR 4/2) mottles; massive; friable; many dark brown coatings; many small dark concretions; neutral; gradual wavy boundary.

Cg2—53 to 80 inches; gray (10YR 6/1) silty clay loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; massive; firm; neutral.

The thickness of the solum ranges from 22 to 44 inches. The depth to bedrock ranges from about 5 feet to more than 10 feet. The content of coarse fragments ranges from 0 to 5 percent in the solum and is as much as 15 percent in the Cg horizon. Reaction ranges from moderately acid to mildly alkaline throughout the profile.

The Ap and Bw horizons have hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The Bg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 4 to 7 and chroma of 0 to 2. The Bw and Bg horizons have few to many mottles in shades of gray or brown. They are silt loam or silty clay loam. The Cg horizon has colors and textures similar to those of the Bg horizon, but in some pedons it is equally mottled in shades of gray and brown. Also, some pedons are stratified with thin layers of loam, fine sandy loam, or silty clay.

Nicholson Series

The Nicholson series consists of very deep, moderately well drained soils that have a slowly permeable fragipan. These soils formed in a mantle of silty loess and in the underlying fine textured material weathered from limestone, siltstone, and shale. They are on ridgetops and shoulder slopes. Slopes range from 2 to 12 percent. They are dominantly 2 to 6 percent. The soils are fine-silty, mixed, mesic Typic Fragiudalfs.

Nicholson soils are associated on the landscape with Beasley, Eden, Shelbyville, and Lowell soils. Beasley, Eden, and Lowell soils are in a fine textured family, are well drained, and do not have a fragipan. Eden soils are less than 40 inches to a paralithic contact. Shelbyville soils are well drained, have a dark surface layer, and do not have a fragipan.

Typical pedon of Nicholson silt loam, 2 to 6 percent slopes; in Henry County; about 1 mile west of Eminence, 75 yards south of Kentucky Highway 22:

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine and very fine roots; moderately acid; clear smooth boundary.

Bt1—8 to 19 inches; brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; many fine roots; few distinct clay films on faces of peds; few small black concretions; slightly acid; clear smooth boundary.

Bt2—19 to 24 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; common distinct clay films on faces of peds; few small black concretions; strongly acid; clear wavy boundary.

Btx—24 to 43 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct light brownish gray (2.5Y 6/2) mottles; moderate very coarse prismatic structure parting to moderate medium subangular blocky; firm; compact and brittle; few fine roots between prisms; common distinct clay films and silt coatings on faces of prisms; common dark brown and black concretions; strongly acid; gradual wavy boundary.

2BC—43 to 48 inches; yellowish brown (10YR 5/6) silty clay; common medium distinct light olive gray (5Y 6/2) mottles; moderate medium angular blocky structure; firm, sticky and plastic; common dark brown and black concretions; moderately acid; gradual wavy boundary.

2C—48 to 74 inches; yellowish brown (10YR 5/6) clay; few medium distinct light brownish gray (2.5Y 6/2) mottles; massive; very firm, sticky and plastic; common dark brown and 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 upper part of the profile is generally free of coarse fragments, but the content of these fragments in the 2BC and 2C horizons ranges from 0 to 15 percent. In unlimed areas reaction ranges from very strongly acid to slightly acid above and in the fragipan. It ranges from strongly acid to mildly alkaline below the fragipan.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. In some pedons it has few or common low-chroma mottles in the lower part. It is silt loam or silty clay loam. The Btx horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 or 5, and chroma of 4 to 8. It has few to many mottles with chroma of 2 or less. It is silty clay loam or silt loam. The 2BC horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 or 5, and chroma of 4 to 6. It has few or common mottles with chroma of 2 or less. It is silty clay or clay. The 2C horizon has colors and textures similar to those of the 2BC horizon.

Nolin Series

The Nolin series consists of very deep, well drained soils that are moderately permeable. These soils formed in mixed alluvium on flood plains along the major streams and their tributaries. Slopes range from 0 to 25 percent. They are dominantly 0 to 2 percent. The soils are fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts.

Nolin soils are associated on the landscape with Boonesboro, Elk, Lawrence, Newark, and Otwell soils. Boonesboro soils are less than 40 inches to a lithic contact, have a mollic epipedon, and are in a fine-loamy family. Elk, Lawrence, and Otwell soils are on stream terraces. Elk soils are well drained. Lawrence and Otwell soils have a fragipan. Lawrence and Newark soils are somewhat poorly drained, and Otwell soils are moderately well drained.

Typical pedon of Nolin silt loam, occasionally flooded; in Henry County; about 9 miles northeast of New Castle, 300 yards southeast of the junction of Kentucky Highways 202 and 1360, about 40 feet north of Drennon Creek:

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; weak fine and very fine granular structure; very friable; few very fine roots; mildly alkaline; clear smooth boundary.

Bw1—9 to 21 inches; brown (10YR 4/3) silt loam; weak medium and fine subangular blocky structure; very friable; few very fine roots; common fine tubular pores; few faint clay films in pores; neutral; gradual wavy boundary.

Bw2—21 to 68 inches; brown (10YR 4/3) silt loam; moderate fine subangular blocky structure; friable; few fine tubular pores; few faint clay films in pores; slightly acid; gradual wavy boundary.

C—68 to 78 inches; dark yellowish brown (10YR 4/4) silt loam; massive; friable; slightly acid.

The solum is more than 40 inches thick. The depth to bedrock ranges from about 5 to more than 10 feet. The content of coarse fragments ranges from 0 to 5 percent in the solum. Reaction ranges from moderately acid to moderately alkaline throughout the profile.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. In some pedons it has low-chroma mottles below a depth of 24 inches. It is silt loam or silty clay loam. The C horizon has hue of 2.5Y, 10YR, or 7.5YR, value of 4 or 5, and chroma of 2 to 4. It is commonly silt loam or silty clay loam. In some pedons, however, it occurs as strata of silt loam, silty clay loam, loam, fine sandy loam, or the gravelly analogs of those textures.

Otwell Series

The Otwell series consists of very deep, moderately well drained soils that have a very slowly permeable fragipan. These soils formed in mixed alluvium on stream terraces. Slopes range from 0 to 6 percent. They are dominantly 2 to 6 percent. The soils are fine-silty, mixed, mesic Typic Fragiudalfs.

Otwell soils are associated on the landscape with Elk, Huntington, Lawrence, Nolin, and Wheeling soils. Elk soils are well drained. Huntington and Nolin soils are on flood plains and are well drained. Huntington soils have a mollic epipedon. Lawrence soils are somewhat poorly drained and have low-chroma mottles in the upper part of the argillic horizon. Wheeling soils are well drained and are in a fine-loamy family.

Typical pedon of Otwell silt loam, rarely flooded, 2 to 6 percent slopes; in Henry County; about 5 miles northwest of Lockport, 0.6 mile north of Kentucky Highway 389, about 0.5 mile south of the Kentucky River, 450 yards north of a gravel road, on Marshalls Bottom:

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

Bt1—8 to 19 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; few fine tubular pores; common distinct light yellowish brown (10YR 6/4) clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—19 to 25 inches; yellowish brown (10YR 5/4) silty clay loam; many medium faint mottles; moderate medium subangular blocky structure; friable; few very fine roots; common distinct pale brown (10YR 6/3) clay films on faces of peds; very strongly acid; clear smooth boundary.

2Btx—25 to 53 inches; mottled yellowish brown (10YR 5/6), light brownish gray (10YR 6/2), and strong brown (7.5YR 5/6) silty clay loam; moderate very coarse prismatic structure parting to moderate fine and medium angular blocky; firm; brittle; few very fine roots along faces of prisms; common distinct clay films on faces of peds; about 2 percent soft dark brown accumulations; slight increase in sand content in the lower part; very strongly acid; gradual smooth boundary.

2C—53 to 81 inches; mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/4), and light yellowish brown (10YR 6/4) silty clay loam; firm; massive; common strong brown nodules; strongly acid.

The thickness of the solum ranges from 40 to more than 80 inches. The depth to bedrock ranges from 5 to more than 10 feet. The content of coarse fragments ranges from 0 to 5 percent in the solum and from 0 to 15 percent in the 2C horizon. In unlimed areas reaction ranges from neutral to very strongly acid in the Ap horizon and is very strongly acid or strongly acid in the Bt and 2Btx horizons. It is strongly acid to slightly acid in the C horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. In some pedons it has low-chroma mottles in the lower part. It is silty clay loam or silt loam. The 2Btx horizon has hue of 2.5Y, 10YR, or 7.5YR, value of 4 to 6, and chroma of 2 to 6. In some pedons it is equally mottled in shades of brown, gray, yellow, and olive. It is silty clay loam or silt loam. The 2C horizon has colors similar to those of the 2Btx horizon. It is commonly silty clay loam or silt loam, but in some pedons it occurs as strata of silt loam, silty clay loam, loam, or silty clay.

Rossmoyne Series

The Rossmoyne series consists of very deep, moderately well drained soils that have a moderately slowly or slowly permeable fragipan. These soils formed in a mantle of loess and in the underlying glacial till. They are on broad upland ridges in the northern part of Trimble County. Slopes range from 0 to 6 percent. The soils are fine-silty, mixed, mesic Aquic Fragiudalfs.

Rossmoyne soils are associated on the landscape with Cincinnati, Grayford, and Ryker soils. Cincinnati soils do not have low-chroma mottles in the upper part of the argillic horizon. Grayford and Ryker soils are well drained and do not have a fragipan. Grayford soils are in a fine-loamy family.

Typical pedon of Rossmoyne silt loam, 0 to 2 percent slopes; in Trimble County; about 2 miles southwest of Milton, 0.4 mile north of Kentucky Highway 1255, about 50 feet west of a farm lane:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; few fine faint dark yellowish brown mottles; weak medium granular and moderate fine and medium subangular blocky structure; very friable; many very fine roots; slightly acid; abrupt smooth boundary.

BA—8 to 16 inches; dark yellowish brown (10YR 4/4) silt loam; few fine faint light yellowish brown and yellowish brown mottles; weak medium and fine subangular blocky structure; very friable; common very fine roots; few very fine tubular pores; slightly acid; clear smooth boundary.

Bt1—16 to 23 inches; yellowish brown (10YR 5/4) silt loam; common medium faint yellowish brown (10YR 5/6) and common fine distinct light brownish gray (10YR 6/2) mottles; weak medium and fine subangular blocky structure; friable; common very fine roots; common distinct clay films on faces of peds; very strongly acid; clear wavy boundary.

2Btx1—23 to 35 inches; yellowish brown (10YR 5/6) silty clay loam; many medium distinct light brownish gray (10YR 6/2) and many medium faint yellowish brown (10YR 5/4) mottles and coatings on peds; moderate coarse prismatic structure parting to moderate fine angular and subangular blocky; firm; brittle; few fine roots along prisms; common distinct clay films on faces of prisms; few coarse quartz grains; very strongly acid; clear wavy boundary.

2Btx2—35 to 45 inches; yellowish brown (10YR 5/6) silt loam; many coarse distinct light brownish gray (10YR 6/2) mottles; moderate very coarse prismatic structure; very firm; brittle; common distinct light yellowish brown (10YR 6/4) clay films and coatings on faces of prisms; common coarse quartz grains; very strongly acid; gradual wavy boundary.

2Btx3—45 to 54 inches; yellowish brown (10YR 5/6) silt loam; many coarse distinct light brownish gray (10YR 6/2) mottles; moderate very coarse prismatic structure; very firm; brittle; common distinct light yellowish brown (10YR 6/4) clay films and coatings on faces of prisms; common coarse quartz grains; strongly acid; gradual wavy boundary.

2BC1—54 to 67 inches; yellowish brown (10YR 5/6) silty clay loam; common medium faint light brownish gray (10YR 6/2) and light yellowish brown (10YR 6/4) mottles; moderate medium prismatic structure parting to weak fine angular blocky; firm; many dark brown (10YR 3/3) coatings and few small dark concretions; about 2 percent small pebbles; slightly acid; clear wavy boundary.

2BC2—67 to 82 inches; silty clay that has yellowish brown (10YR 5/6) ped interiors and yellowish brown (10YR 5/4) ped exteriors; weak coarse subangular blocky structure parting to weak fine angular blocky; firm, sticky; common light brownish gray (10YR 6/2) streaks and coatings on faces of peds; many dark oxide concretions and soft accumulations of iron; about 5 percent small pebbles and chert fragments; neutral.

The thickness of the solum ranges from 60 to more than 100 inches. The depth to bedrock is more than 6 feet. The content of coarse fragments ranges from about 2 to 10 percent in the 3BC horizon. In unlimed areas reaction is strongly acid or very strongly acid above and in the fragipan. It is strongly acid to mildly alkaline in the 2BC horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The BA horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam or silty clay loam. The Bt and 2Btx horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The Bt horizon has few to many mottles with chroma of 2 or less. It is silt loam or silty clay loam. The 2Btx horizon has common or many low-chroma mottles. It is silty clay loam, silt loam, loam, or clay loam. The 2BC horizon has hue of 2.5Y, 10YR, or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It has few to many low-chroma mottles. It is silty clay loam, silty clay, clay loam, or loam.

Ryker Series

The Ryker series consists of very deep, well drained soils that are moderately permeable. These soils formed in a mantle of loess and in the underlying glacial till. They are on ridgetops and shoulder slopes in the north-central part of Trimble County. Slopes range from 2 to 12 percent. The soils are fine-silty, mixed, mesic Typic Paleudalfs.

Ryker soils are associated on the landscape with Cincinnati, Grayford, and Rossmoyne soils. Cincinnati and Rossmoyne soils are moderately well drained and have a fragipan. Rossmoyne soils have low-chroma mottles in the upper part of the argillic horizon. Grayford soils are less than 60 inches deep over bedrock and are in a fine-loamy family.

Typical pedon of Ryker silt loam, 2 to 6 percent slopes; in Trimble County; about 2.5 miles south of Milton, 0.9 mile south of the junction of U.S. Highway 421 and Old Bedford Pike, 20 feet west of a farm lane:

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; weak medium granular and subangular blocky structure; very friable; common very fine roots; neutral; abrupt smooth boundary.

Bt1—9 to 17 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common very fine roots; common very fine tubular pores; few distinct dark brown (7.5YR 4/4) clay films and dark coatings on faces of peds; few small dark oxide concretions; neutral; gradual wavy boundary.

Bt2—17 to 26 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common very fine roots; common very fine tubular pores; few distinct dark brown (7.5YR 4/4) clay films and dark coatings on faces of peds; few small dark oxide concretions; neutral; gradual wavy boundary.

Bt3—26 to 37 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few fine roots; common very fine tubular pores; common distinct dark brown (7.5YR 4/4) clay films and few dark coatings on faces of peds; few small dark concretions; neutral; clear wavy boundary.

2Bt4—37 to 50 inches; yellowish red (5YR 5/6) silty clay loam; moderate medium subangular and angular blocky structure; friable; few very fine roots; common distinct clay films and dark coatings on faces of peds; few light brown (7.5YR 6/4) streaks; slightly acid; gradual wavy boundary.

2Bt5—50 to 62 inches; reddish brown (5YR 4/4) silty clay loam; moderate medium subangular and angular blocky structure; firm; common distinct clay films on faces of peds; common dark reddish brown (5YR 3/3) coatings; few strong brown (7.5YR 5/6) streaks; about 2 percent small pebbles and chert fragments; moderately acid; gradual wavy boundary.

2Bt6—62 to 80 inches; yellowish red (5YR 4/6) silty clay loam; moderate coarse subangular blocky structure parting to moderate medium and fine subangular and angular blocky; firm; thick distinct reddish brown (2.5YR 4/4) clay films on faces of peds; many dark reddish brown (5YR 3/3) coatings; about 2 percent coarse fragments, mostly small pebbles and chert; very strongly acid; gradual smooth boundary.

2Bt7—80 to 90 inches; yellowish red (5YR 5/6) loam; moderate medium and fine angular blocky structure; firm; thick distinct red (2.5YR 4/6) clay films on faces of peds; common small dark concretions; about 6 percent coarse fragments consisting of small pebbles, chert fragments, and clean quartz grains; very strongly acid.

The thickness of the solum ranges from 60 to more than 100 inches. The depth to bedrock is more than 6 feet. The content of coarse fragments ranges from about 2 to 15 percent in the 2Bt horizon. 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 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. It is silt loam or silty clay loam. The 2Bt horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. It is silty clay loam, loam, clay loam, or silt loam. Some pedons have a 3Bt horizon, which has colors similar to those of the 2Bt horizon and is silty clay loam, silty clay, or clay.

Shelbyville Series

The Shelbyville series consists of deep and very deep, well drained soils that are moderately permeable in the upper part of the solum and moderately slowly permeable in the lower part. These soils have a dark surface layer. They formed in a mantle of loess and in the underlying fine textured material weathered from limestone interbedded with siltstone and calcareous shale. They are on ridgetops, mainly in the central and south-central parts of Henry County. Slopes range from 2 to 6 percent. The soils are fine-silty, mixed, mesic Mollic Hapludalfs.

Shelbyville soils are associated on the landscape with Lowell and Nicholson soils. Lowell soils are in a fine textured family. Nicholson soils are moderately well drained and have a fragipan.

Typical pedon of Shelbyville silt loam, 2 to 6 percent slopes; in Henry County; about 1.5 miles southwest of Bethlehem, 135 yards west of Kentucky Highway 22, in a cultivated field:

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

Bt1—8 to 14 inches; brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few very fine roots; few wormcasts; common fine tubular pores; common distinct clay films on faces of peds; few dark oxide nodules; slightly acid; clear smooth boundary.

Bt2—14 to 32 inches; brown (7.5YR 5/4) silty clay loam; moderate medium and fine subangular blocky structure; friable; few very fine roots; common distinct clay films on faces of peds; common small dark oxide nodules; neutral; gradual smooth boundary.

2Bt3—32 to 48 inches; brown (7.5YR 5/4) silty clay; many medium distinct strong brown (7.5YR 5/6) and yellowish brown (10YR 5/4) mottles; moderate fine angular and subangular blocky structure; firm; many distinct clay films on faces of peds; many dark coatings and dark oxide nodules; content of concretions increasing to 10 percent in the lower part; neutral; clear smooth boundary.

2Bt4—48 to 68 inches; yellowish brown (10YR 5/4) silty clay; many medium distinct light yellowish brown (2.5Y 6/4) mottles; moderate medium subangular blocky structure; firm, plastic and sticky; many distinct clay films on faces of peds; many soft dark brown accumulations and nodules; neutral; clear smooth boundary.

2BC—68 to 80 inches; mottled light olive brown (2.5Y 5/4), olive (5Y 5/3), and yellowish brown (10YR 5/6) silty clay; weak coarse subangular blocky structure; firm, plastic and sticky; common dark reddish brown coatings; common soft dark brown accumulations and nodules; few small limestone fragments in the lower part; mildly alkaline.

The thickness of the solum and the depth to bedrock are more than 50 inches. The content of coarse fragments ranges from 0 to 15 percent in the 2Bt4 and 2BC horizons. In unlimed areas reaction ranges from strongly acid to neutral in the upper part of the solum and from strongly acid to mildly alkaline in the lower part.

The Ap horizon has hue of 10YR or 7.5YR, value of 3, and chroma of 2 to 4. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silty clay loam. The 2Bt horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 4 to 8. In some pedons it is mottled in shades of gray, brown, or olive. It is silty clay or clay. The 2BC horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 3 to 8. In some pedons it is equally mottled in shades of brown, olive, and gray. It is silty clay or clay.

Wheeling Series

The Wheeling series consists of very deep, well drained soils that are moderately permeable. These soils formed in mixed alluvium on stream terraces, mainly along the Ohio and Kentucky Rivers. Slopes range from 0 to 20 percent. The soils are fine-loamy, mixed, mesic Ultic Hapludalfs.

Wheeling soils are associated on the landscape with Huntington and Otwell soils. Huntington soils are on flood plains, have a mollic epipedon, and are in a fine-silty family. Otwell soils are moderately well drained, have a fragipan, and are in a fine-silty family.

Typical pedon of Wheeling silt loam, 0 to 6 percent slopes; in Trimble County; about 2 miles east of Milton, 0.2 mile south of Kentucky Highway 36, about 300 feet west of the Carroll County line:

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; moderate medium subangular blocky structure parting to weak fine granular; very friable; many fine roots; slightly acid; clear smooth boundary.

Bt1—9 to 21 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate medium subangular blocky structure; very friable; few fine roots; few very fine tubular pores; common distinct clay films on faces of peds; moderately acid; gradual wavy boundary.

Bt2—21 to 35 inches; strong brown (7.5YR 5/6) loam; weak medium subangular blocky structure; friable; few fine tubular pores; common distinct clay films on faces of peds; moderately acid; gradual wavy boundary.

BC—35 to 60 inches; strong brown (7.5YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; few dark iron streaks; strongly acid; gradual smooth boundary.

C—60 to 75 inches; strong brown (7.5YR 5/6), stratified very fine sand, fine sand, and sand; single grain; loose; moderately acid.

The thickness of the solum ranges from 40 to 60 inches, and the depth to bedrock ranges from 5 to more than 20 feet. The content of rock fragments ranges from 0 to 25 percent in the upper 40 inches. In unlimed areas reaction is strongly acid or moderately acid throughout the profile.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is silt loam or loam. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is loam, clay loam, or silty clay loam. The BC horizon has colors similar to those of the Bt horizon. It is very fine sandy loam, fine sandy loam, or the gravelly analogs of those textures. The C horizon is stratified. It ranges from dominantly very fine sand to dominantly gravel.

Woolper Series

The Woolper series consists of very deep, well drained soils that are moderately slowly or slowly permeable. These soils have a mollic epipedon. They formed in fine textured colluvial and alluvial material derived from limestone and shale. They are on foot slopes, alluvial fans, and hillside benches. Slopes range from 2 to 65 percent. The soils are fine, mixed, mesic Typic Argiudolls.

Woolper soils are associated on the landscape with Boonesboro, Elk, and Fairmount soils. Boonesboro soils are on flood plains, are in a fine-loamy family, and are less than 40 inches to a lithic contact. Elk soils are on stream terraces and are in a fine-silty family. Fairmount soils are on hillsides and bluffs and are less than 20 inches to a lithic contact.

Typical pedon of Woolper silty clay loam, in an area of Fairmount-Woolper complex, 30 to 65 percent slopes; in Henry County; about 1.7 miles northeast of Turners Station, 0.4 mile south of the Carroll County line, 200 feet south of a gravel road:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silty clay loam; moderate medium fine granular structure; firm; many fine and medium roots; about 5 percent limestone fragments 3 to 10 inches across; slightly acid; clear smooth boundary.

Bt1—8 to 21 inches; dark brown (10YR 3/3) silty clay; weak coarse prismatic structure parting to weak fine and medium angular and subangular blocky; firm, sticky and plastic; common fine roots; common distinct clay films on faces of peds; about 10 percent limestone fragments 3 to 10 inches across; neutral; gradual wavy boundary.

Bt2—21 to 46 inches; brown (7.5YR 4/4) silty clay; moderate fine and medium angular blocky structure; very firm, sticky and plastic; few medium and coarse roots; common distinct clay films on faces of peds; about 5 percent limestone fragments 3 to 10 inches across; few irregular pores; neutral; clear wavy boundary.

BC—46 to 64 inches; yellowish brown (10YR 5/4) clay; weak coarse angular blocky structure; very firm; few fine roots; about 10 percent limestone fragments 2 to 8 inches across; mildly alkaline.

The thickness of the solum ranges from 40 to more than 60 inches. The depth to bedrock ranges from 60 to more than 100 inches. The content of coarse fragments ranges from 0 to 15 percent throughout the profile. Reaction ranges from slightly acid to mildly alkaline throughout the profile.

The Ap horizon has hue of 10YR or 7.5YR and value and chroma of 2 or 3. The Bt1 horizon has colors similar to those of the Ap horizon. It is silty clay, clay, or silty clay loam. The Bt2 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 has few or common mottles in shades of gray, olive, or brown. It is silty clay or clay. Some pedons have a C horizon. The BC and C horizons have colors and textures similar to those of the Bt2 horizon.

Formation of the Soils

This section relates the factors of soil formation to the soils in the survey area. It also describes the processes of horizon differentiation and the geology and physiography in the survey area.

Factors of Soil Formation

The characteristics of a soil depend on the physical and chemical composition of the parent material and on climate, relief, plant and animal life, and time *(8)*. Soils form through the interaction of these five factors. The relative importance of each factor differs from one soil to another. In some areas one factor may dominate the development of soil characteristics, and in other areas another factor may dominate. The proportionate influence of any one of the factors may change. In Henry and Trimble Counties, climate and plant and animal life are not likely to vary greatly and their influence is relatively constant. There are some differences in relief. The most complex and influential factor in the formation of the soils in these counties is the kind of parent material.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. In the early stages of soil formation, a soil has properties similar to those of the parent material. As weathering takes place, these properties are modified and the soil develops its own characteristics. The nature of the parent material affects the rate of weathering. It also 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, or it can be transported and deposited by water, wind, gravity, or ice. Most of the soils in the survey area formed in material that weathered in place from sedimentary rock of the Silurian and Ordovician periods. Beasley, Lowell, and Faywood soils are examples. Most of the soils that formed in this residual material have a clayey subsoil.

Examples of soils that formed in recent stream alluvium on flood plains are Nolin, Boonesboro, and Newark soils. These soils have a loamy subsoil. Examples of soils that formed in stream alluvium and fluvial deposits on terraces are Elk, Wheeling, Otwell, and Chenault soils. These soils have a loamy subsoil.

Wind-transported material, or loess, has been deposited on some of the broader ridgetops in the survey area. Some soils, such as Shelbyville and Nicholson soils, formed partly in loess and partly in residual material. The surface layer and upper part of the subsoil formed in loess and are loamy. The lower part of the subsoil and the substratum formed in residual material and generally are clayey.

On the broader ridgetops in the northern and central parts of Trimble County, the loess is underlain by glacial till. Ryker, Cincinnati, Rossmoyne, and Grayford formed partly in loess and partly in glacial till. In some areas the lower part of the substratum, below the glacial till, formed in residual material. It generally is clayey. The surface layer and the upper part of the subsoil in these soils formed in loess and are loamy. The lower part of the subsoil formed in glacial till and is loamy.

Some soils formed in colluvium over residual material. An example is Woolper soils on foot slopes at the base of steep hillsides. These soils have a clayey subsoil.

Climate

Climatic factors, mainly temperature and rainfall, affect the physical, chemical, and biological properties of soils. Temperature affects the rate of chemical and physical changes in the soils and thus the rate of soil formation. If the temperature increases 10 degrees C, the rate of chemical reaction doubles. Moisture and temperature affect biochemical reactions. Moisture is essential in soil formation. Climate significantly influences the natural vegetation. Because of its effect on such factors as erosion and deposition, it also influences the relief of an area and the degree of profile development *(8)*.

Changes in climate over long periods affect the soils. Soil formation is affected by the average climatic condition, but extremes in the weather probably have had more influence on particular soil properties than on soil formation. The soils in the survey area formed in a temperate, moist climate that was probably similar to the present climate. Winters are fairly short, and periods of extremely low temperatures also are short. Periods of high temperatures are fairly brief in summer. The average annual temperature in the survey area is about 55 degrees. The average annual precipitation is about 53 inches. The precipitation is fairly evenly distributed throughout the year.

Temperature and rainfall in the survey area have favored almost continuous weathering of rocks and minerals, leaching of soluble material and fine particles, and removal and deposition of material by water. Soluble bases, including calcium and magnesium, and clay minerals have been moved to lower horizons or have been leached out of the soils. As a result, many soils that formed in 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 the survey area was mainly mixed hardwoods. Most of the soils formed under hardwood forests. The soils that remain wooded have a thin, dark surface layer. In soils that have been plowed, such as Lowell and Beasley soils, the dark surface layer is mixed with a light colored layer below it.

Earthworms, insects, and other small animals mix soil material and add organic matter to the soils. 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 soils to the upper part. They also add organic matter, provide a protective cover that retards erosion, and influence soil temperature. Soil material is mixed by root channeling and by the uprooting of trees by the wind. The organic matter added by plants and animals alters the chemical processes in the soils and forms humus. Some micro-organisms directly or symbiotically release nutrients, such as nitrogen, to the soils. The organic matter tends to improve soil structure, and the decay of this matter releases acids that accelerate weathering.

Changes caused by human activities are evident in soils that have been eroded, drained, excavated, or filled. In areas of some soils, erosion has removed most or all of the original surface layer and exposed the subsoil. Examples are the severely eroded Beasley and Lowell soils. Cultivation, drainage systems, irrigation, applications of fertilizer, introduction of new plants, and land shaping influence soil formation by changing the nature and properties of the soils. Except for those caused by land shaping, these changes take place slowly.

Relief

Relief affects soil formation through its influence on drainage, erosion, plant cover, and soil temperature. Because relief varies widely in the survey area, it accounts for many differences among the soils. It tends to modify the effects of climate and vegetation. For example, Newark soils, which formed on nearly level flood plains, had an excessive amount of water during formation. The wetness resulted in a lack of oxidation and the formation of a gray subsoil. In other nearly level and gently sloping soils, a fragipan can form under certain conditions. An example is Lawrence soils.

Gently sloping and sloping soils commonly show most clearly the influence of all five soil-forming factors. Although excess water runs off these soils, erosion is not excessive. Because the surface is relatively stable, an argillic horizon formed in these soils. Lowell and Beasley soils are examples.

Some steep soils are shallow and exhibit only slight evidence of profile development because geologic erosion takes place almost as rapidly as soil formation. Fairmount soils are an example. Some steep soils are deep or very deep because the parent material moves down the slopes slowly and accumulates at the lower end of the slopes. An example is Woolper soils on foot slopes below steep slopes. Other steep soils are moderately deep because weathering of the underlying rock occurs at a faster rate than geologic erosion. Faywood and Eden soils are examples.

In some karst areas, material from the eroded surface layer of the soils on the surrounding karst slopes has been deposited in the basin of the sinks. Generally this recently deposited material has been only slightly weathered. Some of these local alluvial areas are large enough to be mapped separately, but others are so small that they were mapped only as inclusions. Such areas are included with some of the Chenault, Lowell, and Faywood soils in mapping.

The soil temperature and plant cover are somewhat different on cool aspects than on warm ones, but these differences generally are slight.

Time

The time required for a soil to form depends on 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 weathering than others. For example, quartz sand may change very little even if it is exposed for long periods. Other parent material is more porous, and thus more intense weathering can take place. The age of a soil is determined by the relative degree of profile development rather than the number of years that the soil has been subject to the soil-forming processes.

Soils that have weakly expressed horizons have characteristics almost identical to the parent material. In Henry and Trimble Counties, these soils are in areas on flood plains where deposition of new material prevents the development of distinct soil horizons. Nolin and Huntington soils are examples.

Soils that formed over long periods have well developed profiles. Ryker and Lowell soils are examples. These soils are very deep or deep over bedrock and have distinct horizons. Erosion commonly removes sediment from mature soils and from some immature soils and deposits it as new parent material on other soils *(8)*.

Processes of Horizon Differentiation

The formation of a succession of layers, or horizons, in soils is the result of one or more of the soil-forming processes. These processes are the accumulation of organic matter; the leaching of carbonates and other soluble material; the chemical weathering, mainly by hydrolysis, of primary minerals into silicate clay minerals; the translocation of silicate clay and some silt-sized particles from one horizon to another; and the reduction and transfer of iron.

Several of these processes have been active in the formation of most of the soils in the survey area. The interaction of the first four processes is reflected in the strongly expressed horizons in Ryker and Shelbyville soils. All five processes have probably been active in the formation of the moderately well drained Nicholson, Otwell, and Rossmoyne soils.

Some organic matter has accumulated in all of the soils in the area. Most of the soils contain moderate amounts of organic matter in the surface layer. The organic matter content ranges from low in Eden soils to high in Woolper soils.

Most of the soils in the survey area are acid in the upper layers unless the surface has been limed. Although most of the soils formed in material that has a high content of carbonates, some of the carbonates and the more soluble materials have been leached into the lower layers. Beasley and Lowell soils are examples.

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

A fragipan has formed in the B horizon of some of the moderately well drained and somewhat poorly drained soils on uplands and stream terraces. Examples are Rossmoyne, Cincinnati, Nicholson, and Otwell soils. The fragipan is a dense, compact layer that is hard or very hard when dry and is brittle when moist. It is slowly permeable or very slowly permeable and has few to many bleached fracture planes that form polygons. It tends to rupture suddenly rather than break down slowly when lateral pressure is applied.

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

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

Geology and Physiography

Beecher J. Hines, geologist, Soil Conservation Service, helped prepare this section.

The major geologic strata underlying the soils in the survey area are of the Paleozoic era. These strata were deposited in shallow seas 310 to 500 million years ago. The sedimentary rock that formed is of the Ordovician and Silurian periods *(15)*. Many of the broad upland ridgetops are capped with a mantle of silty loess, with loamy and gravelly fluvial deposits, or with glacial till of the Quaternary or Tertiary periods. The valleys consist of alluvial material of the Quaternary period. Table 23 shows the geologic systems, formations, members, their range in thickness, and the dominant soils that formed in the geologic material.

The western and central parts of Henry County and all of Trimble County are in the Outer Bluegrass Physiographic Region *(5)*. This region is underlain by the Drakes, Bull Fork, Grant Lake Limestone, and Calloway Creek Formations of the Ordovician period *(31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43)*. The rock strata consist of limestone, dolomite, and shale. In the westernmost part of Henry County and in the part of Trimble County west of the Little Kentucky River, the ridgetops are capped with Laurel Dolomite, Osgood Shale, and Brassfield Dolomite of the Silurian period. In the northern and central parts of Trimble County, the ridgetops are capped with Louisville Limestone and

Waldron Shale of the Silurian period. As these formations weathered, they formed broad, rolling ridgetops that have short to long side slopes. Elevation ranges from about 420 feet above sea level in the valleys to about 980 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 or very deep. Most of the soils have a strongly acid to mildly alkaline, clayey subsoil. Fairmount, Faywood, and Lowell are the dominant soils that formed mainly in material weathered from limestone and dolomite, and Beasley soils are the dominant ones that formed mainly in material weathered from shale.

In some areas the ridgetops are capped with a mantle of loess. The upper part of the soils on these ridgetops formed in silty material, and the lower part formed in clayey material weathered from limestone or dolomite. Most of these soils are nearly level to sloping and have a strongly acid to mildly alkaline subsoil. Shelbyville and Nicholson are the dominant soils in these areas.

On the broader tops of the ridges in the northern and central parts of Trimble County, a mantle of loess is underlain by glacial till of the Quaternary period. The thickness of the silty loess combined with that of the loamy glacial till ranges from 3 to more than 6 feet. Most of the soils on these ridgetops are nearly level to moderately steep and have a very strongly acid to mildly alkaline subsoil. Ryker, Cincinnati, Rossmoyne, and Grayford are the dominant soils in these areas.

Where Brassfield Dolomite is exposed, it weathers to a soft, loamy, calcareous rock. This rock, commonly called "marl," is used locally as a source of agricultural lime. Brassfield soils formed mainly in the loamy material weathered from this soft dolomite.

The eastern part of Henry County is in the Hills of the Bluegrass Physiographic Region *(5)*. This area is commonly called "Eden Hills." It is underlain by the Kope and Clays Ferry Formations of the Ordovician period *(31, 33, 38, 40)*. The rock strata consist of shale interbedded with thin layers of limestone and calcareous siltstone. As this formation weathered, it formed small hills with narrow ridgetops. Elevation ranges from about 450 feet above sea level in the valleys to about 850 feet on the higher ridgetops. The soils in this region are sloping to steep. They are shallow to deep and have a strongly acid to moderately alkaline, clayey subsoil. Eden and Lowell are the dominant soils that formed in material weathered from the Clays Ferry Formation.

Young terrace deposits of Tertiary and Quaternary age and alluvial deposits of Quaternary age are in scattered areas throughout Henry and Trimble Counties. The largest areas of these deposits are along the Ohio River and the Little Kentucky River in Trimble County and along the Kentucky River, Six Mile Creek, and Drennon Creek in Henry County. The soils in these areas are nearly level to sloping. They are generally deep and have a strongly acid to moderately alkaline, loamy subsoil. Wheeling, Elk, and Otwell soils are dominant on the low stream terraces, and Nolin, Huntington, Newark, and Boonesboro soils are dominant on the flood plains. Chenault soils are on the older, higher terraces along the Kentucky River in Henry County.

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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. Warm aspects are slopes of more than 15 percent that face an azimuth of 135 to 315 degrees. Cool aspects are slopes of more than 15 percent that face an azimuth of 315 to 135 degrees.

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

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

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

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

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

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

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 fragment.

Chert. An impure, very fine grained, siliceous rock frequently associated with limestone or dolomite.

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.

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

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

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

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

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

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

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

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

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

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

Cemented.—Hard; little affected by moistening.

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

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

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 grazingland for a prescribed period.

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

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

Dolomite. A sedimentary rock that is made up mainly of calcium and magnesium carbonate.

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.

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

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

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, or clay.

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

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

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

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

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

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

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

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. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

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

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

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

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

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

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

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

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

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

Infiltration 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 in which streamflow is 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.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landform. Any physical, recognizable form or feature on the Earth's surface that has a characteristic shape and has formed through natural causes. It includes major features such as plains, hills, and valleys.

Landscape (geology). The distinct association of landforms, especially as modified by geologic forces, that can be seen in a single view.

Large stones (in tables). Rock fragments that are 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Limestone. A sedimentary rock that is more than 50 percent calcium carbonate, primarily in the form of calcite. Limestone usually forms through a combination of organic and inorganic processes and includes soluble and insoluble constituents. Some limestone is 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.

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

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

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

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

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

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

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

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

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

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

Ordovician period. 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.

Paleozoic era. The geologic era between the Precambrian and Mesozoic eras. It began about 600 million years ago and ended about 230 million years ago.

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 through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

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

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

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

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

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

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

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

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 period. 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 the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 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). There is a shallow root zone. The soil is shallow over a layer that greatly restricts roots.

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

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

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

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

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

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 period. 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 (in tables). The soil mass is susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. The slope classes in this survey area are:

Nearly level	0 to 2 percent
Gently sloping	2 to 6 percent
Sloping	6 to 12 percent
Moderately steep	12 to 20 percent
Steep	20 to 30 percent
Very steep	30 to 65 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 depth. The depth of the soil over bedrock. The soil depth classes in this survey are:

Very shallow	less than 10 inches deep over bedrock
Shallow	10 to 20 inches deep over bedrock
Moderately deep	20 to 40 inches deep over bedrock
Deep	40 to 60 inches deep over bedrock
Very deep	more than 60 inches deep over bedrock

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 substratum. 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.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind 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 grain* (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.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Tertiary period. The first period of the Cenozoic era of geologic time. It followed the Mesozoic era and preceded the Quarternary period (approximately from 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). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topography. The configuration of a surface, including its relief and the position of its natural and manmade features.

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 by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. This contrasts with poorly graded soil.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-81 at Shelbyville, Kentucky)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	40.0	20.9	30.5	68	-9	19	3.34	1.56	4.86	7	5.7
February----	44.5	23.3	33.9	69	-6	21	3.15	1.38	4.65	7	3.1
March-------	54.1	32.1	43.1	80	11	62	4.63	2.32	6.63	9	2.6
April-------	66.3	42.7	54.5	85	24	176	4.16	2.16	5.89	8	.0
May---------	75.1	51.6	63.4	90	32	422	4.43	2.89	5.83	8	.0
June--------	82.8	60.2	71.5	94	44	645	3.80	2.31	5.12	7	.0
July--------	86.6	64.1	75.4	97	51	787	4.70	2.40	6.71	8	.0
August------	85.7	62.8	74.3	96	49	753	3.74	1.99	5.27	6	.0
September---	80.2	55.9	68.1	95	37	543	3.39	1.55	4.96	5	.0
October-----	68.8	43.4	56.1	88	24	234	2.71	1.31	3.91	5	.0
November----	55.1	33.9	44.5	80	11	24	3.47	1.73	4.98	7	.8
December----	44.3	25.7	35.0	69	1	12	3.39	1.54	4.97	7	1.6
Yearly:											
Average---	65.3	43.1	54.2	---	---	---	---	---	---	---	---
Extreme---	---	---	---	100	-11	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,698	44.91	37.55	50.82	84	13.8

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-81 at Shelbyville, 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. 9	Apr. 24	May 2
2 years in 10 later than--	Apr. 4	Apr. 19	Apr. 27
5 years in 10 later than--	Mar. 26	Apr. 10	Apr. 18
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 29	Oct. 15	Oct. 4
2 years in 10 earlier than--	Nov. 2	Oct. 20	Oct. 9
5 years in 10 earlier than--	Nov. 10	Oct. 29	Oct. 19

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-81 at Shelbyville, 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	213	183	162
8 years in 10	219	189	169
5 years in 10	229	202	183
2 years in 10	239	214	197
1 year in 10	244	220	205

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Henry County	Trimble County	Total-- Area	Extent
		Acres	Acres	Acres	Pct
BaB	Beasley silt loam, 2 to 6 percent slopes	951	73	1,024	0.4
BeC2	Beasley silty clay loam, 6 to 12 percent slopes, eroded	5,626	4,379	10,005	3.5
BeD2	Beasley silty clay loam, 12 to 20 percent slopes, eroded	721	2,034	2,755	1.0
BfC3	Beasley silty clay, 6 to 12 percent slopes, severely eroded	427	66	493	0.2
BfD3	Beasley silty clay, 12 to 20 percent slopes, severely eroded	3,470	1,420	4,890	1.7
Bo	Boonesboro silt loam, frequently flooded	1,924	3,184	5,108	1.8
BsE2	Brassfield-Beasley complex, 20 to 40 percent slopes, eroded	7	16,664	16,671	5.8
CaB	Chenault silt loam, 2 to 6 percent slopes	220	0	220	0.1
CaC	Chenault silt loam, 6 to 12 percent slopes	1,015	0	1,015	0.4
CcB	Cincinnati silt loam, 2 to 6 percent slopes	0	4,330	4,330	1.5
CcC	Cincinnati silt loam, 6 to 12 percent slopes	0	3,942	3,942	1.4
EdC2	Eden silty clay loam, 6 to 20 percent slopes, eroded	3,842	17	3,859	1.3
EdE2	Eden silty clay loam, 20 to 35 percent slopes, eroded	37,405	58	37,463	13.1
EkA	Elk silt loam, occasionally flooded, 0 to 2 percent slopes	325	142	467	0.2
EkB	Elk silt loam, rarely flooded, 2 to 6 percent slopes	520	257	777	0.3
EkC	Elk silt loam, occasionally flooded, 6 to 12 percent slopes	144	81	225	0.1
En	Elk and Nolin silt loams, frequently flooded	715	3	718	0.2
FaE	Fairmount flaggy silty clay loam, 12 to 30 percent slopes, very rocky	8,325	7,118	15,443	5.4
FwF	Fairmount-Woolper complex, 30 to 65 percent slopes	5,643	22,335	27,978	9.8
FyC2	Faywood silty clay loam, 6 to 12 percent slopes, eroded	4,294	210	4,504	1.6
FyD2	Faywood silty clay loam, 12 to 20 percent slopes, eroded	23,431	3,688	27,119	9.5
GbD2	Grayford-Beasley complex, 12 to 20 percent slopes, eroded	0	5,204	5,204	1.8
Hu	Huntington silt loam, occasionally flooded	27	1,428	1,455	0.5
Lc	Lawrence silt loam, rarely flooded	1,557	36	1,593	0.6
LoB	Lowell silt loam, 2 to 6 percent slopes	10,179	156	10,335	3.6
LoC	Lowell silt loam, 6 to 12 percent slopes	43,584	3,160	46,744	16.3
LsC3	Lowell silty clay loam, 6 to 12 percent slopes, severely eroded	554	50	604	0.2
Mc	McGary silt loam	116	11	127	*
Ne	Newark silt loam, frequently flooded	447	287	734	0.2
NhB	Nicholson silt loam, 2 to 6 percent slopes	14,705	476	15,181	5.3
NhC	Nicholson silt loam, 6 to 12 percent slopes	521	675	1,196	0.4
No	Nolin silt loam, occasionally flooded	3,993	763	4,756	1.7
OtA	Otwell silt loam, occasionally flooded, 0 to 2 percent slopes	146	40	186	*
OtB	Otwell silt loam, rarely flooded, 2 to 6 percent slopes	1,918	295	2,213	0.8
Pt	Pits, quarries	40	0	40	*
RoA	Rossmoyne silt loam, 0 to 2 percent slopes	0	281	281	0.1
RoB	Rossmoyne silt loam, 2 to 6 percent slopes	0	1,390	1,390	0.5
RyB	Ryker silt loam, 2 to 6 percent slopes	0	4,050	4,050	1.4
RyC	Ryker silt loam, 6 to 12 percent slopes	0	3,148	3,148	1.1
ShB	Shelbyville silt loam, 2 to 6 percent slopes	6,573	23	6,596	2.3
WeD	Wheeling loam, 6 to 20 percent slopes	1,280	503	1,783	0.6
WhB	Wheeling silt loam, 0 to 6 percent slopes	214	1,343	1,557	0.5
WoB	Woolper silty clay loam, 2 to 6 percent slopes	319	725	1,044	0.4
WoC	Woolper silty clay loam, 6 to 12 percent slopes	524	573	1,097	0.4
WoD	Woolper silty clay loam, 12 to 20 percent slopes	86	288	374	0.1
	Water areas less than 40 acres in size	343	89	432	0.1
	Water areas more than 40 acres in size	141	5,056	5,197	1.8
	Total	186,272	100,051	286,323	100.0

* Less than 0.1 percent.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Tobacco	Wheat	Soybeans	Alfalfa hay	Grass-legume hay	Pasture
		Bu	Lb	Bu	Bu	Ton	Ton	AUM*
BaB: Beasley	IIe	100	2,800	40	35	4.5	3.0	7.5
BeC2: Beasley	IIIe	90	2,400	35	30	4.0	3.0	7.0
BeD2: Beasley	IVe	70	2,100	30	---	3.0	2.0	5.0
BfC3: Beasley	IVe	65	2,000	25	20	3.0	2.0	5.0
BfD3: Beasley	VIe	---	---	---	---	---	1.5	4.0
Bo: Boonesboro	IIw	100	2,800	40	35	4.5	3.5	8.0
BsE2: Brassfield-Beasley	VIe	---	---	---	---	---	---	4.5
CaB: Chenault	IIe	115	3,000	40	35	4.0	3.5	7.0
CaC: Chenault	IIIe	100	2,650	35	35	4.0	3.0	7.0
CcB: Cincinnati	IIe	115	3,000	40	40	4.0	3.5	8.0
CcC: Cincinnati	IIIe	100	2,700	35	35	4.0	3.0	7.0
EdC2: Eden	IVe	75	1,950	20	20	3.0	2.5	5.0
EdE2: Eden	VIe	---	---	---	---	---	---	3.5
EkA: Elk	IIw	135	3,200	50	45	5.0	4.0	9.0
EkB: Elk	IIe	135	3,200	50	45	5.0	4.0	9.0
EkC: Elk	IIIe	115	2,900	40	35	4.5	3.0	7.5
En: Elk-Nolin	VIe	---	---	---	---	---	---	---
FaE: Fairmount	VIIs	---	---	---	---	---	---	3.0
FwF: Fairmount-Woolper	VIIe	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Tobacco	Wheat	Soybeans	Alfalfa hay	Grass-legume hay	Pasture
		Bu	Lb	Bu	Bu	Ton	Ton	AUM*
FyC2------------ Faywood	IIIe	85	2,000	25	20	3.0	2.0	5.5
FyD2------------ Faywood	IVe	70	1,800	20	---	2.5	1.5	4.5
GbD2------------ Grayford-Beasley	IVe	80	1,900	20	---	2.5	2.0	5.0
Hu-------------- Huntington	IIw	135	3,200	50	45	5.0	4.0	9.0
Lc-------------- Lawrence	IIIw	80	1,900	30	35	---	30	6.0
LoB------------- Lowell	IIe	115	2,900	40	35	4.5	3.0	7.5
LoC------------- Lowell	IIIe	100	2,600	35	30	4.0	3.0	7.5
LsC3------------ Lowell	IVe	75	2,150	30	25	3.5	2.0	5.5
Mc-------------- McGary	IIIw	75	---	30	35	---	3.0	6.0
Ne-------------- Newark	IIw	110	2,500	40	40	---	3.5	8.5
NhB------------- Nicholson	IIe	115	2,900	40	40	4.0	3.0	7.5
NhC------------- Nicholson	IIIe	100	2,700	35	35	3.5	3.0	7.0
No-------------- Nolin	IIw	135	3,200	45	50	5.0	4.0	9.0
OtA------------- Otwell	IIw	105	2,800	40	40	4.0	3.0	7.5
OtB------------- Otwell	IIe	110	3,000	40	40	4.0	3.0	7.5
Pt**------------ Pits, quarries	VIIIs	---	---	---	---	---	---	---
RoA------------- Rossmoyne	IIw	110	2,800	40	40	4.0	3.5	8.0
RoB------------- Rossmoyne	IIe	110	2,800	40	40	4.0	3.5	8.0
RyB------------- Ryker	IIe	130	3,200	45	50	5.0	4.0	9.0
RyC------------- Ryker	IIIe	110	2,800	40	45	5.0	3.5	8.0

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Tobacco	Wheat	Soybeans	Alfalfa hay	Grass-legume hay	Pasture
		Bu	Lb	Bu	Bu	Ton	Ton	AUM*
ShB------------- Shelbyville	IIe	130	3,200	45	50	5.0	4.0	9.0
WeD------------- Wheeling	IVe	100	2,700	35	30	4.0	2.5	5.5
WhB------------- Wheeling	IIe	125	3,200	45	40	4.5	4.0	9.0
WoB------------- Woolper	IIe	115	2,900	45	40	4.0	3.0	7.5
WoC------------- Woolper	IIIe	105	2,600	40	35	4.0	3.0	7.0
WoD------------- Woolper	IVe	85	2,300	35	30	4.0	2.5	5.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas are excluded. Dashes indicate no acreage)

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I:				
Henry County	---	---	---	---
Trimble County	---	---	---	---
II:				
Henry County	42,461	35,599	6,862	---
Trimble County	19,243	13,118	6,125	---
III:				
Henry County	57,381	55,708	1,673	---
Trimble County	16,215	16,168	47	---
IV:				
Henry County	30,341	30,341	---	---
Trimble County	11,850	11,850	---	---
V:				
Henry County	---	---	---	---
Trimble County	---	---	---	---
VI:				
Henry County	41,597	41,597	---	---
Trimble County	18,145	18,145	---	---
VII:				
Henry County	13,968	5,643	---	8,325
Trimble County	29,453	22,335	---	7,118
VIII:				
Henry County	40	---	---	40
Trimble County	---	---	---	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Management concerns: Erosion hazard	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, BeC2: Beasley	Moderate	Moderate	Slight	Severe	White oak	65	47	White oak, Virginia pine, white ash.
					Scarlet oak	---	---	
					Eastern redcedar	41	44	
					Hickory	---	---	
					White ash	63	---	
					Yellow poplar	80	71	
BeD2: Beasley	Severe	Moderate	Slight	Severe	White oak	65	47	White oak, Virginia pine, white ash.
					Scarlet oak	---	---	
					Eastern redcedar	41	44	
					Hickory	---	---	
					White ash	63	---	
					Yellow poplar	80	71	
BfC3: Beasley	Moderate	Moderate	Moderate	Moderate	White oak	50	34	Virginia pine, white oak, white ash.
					Scarlet oak	---	---	
					Eastern redcedar	---	---	
					Hickory	---	---	
					White ash	---	---	
BfD3: Beasley	Severe	Moderate	Moderate	Moderate	White oak	50	34	Virginia pine, white oak, white ash.
					Scarlet oak	---	---	
					Eastern redcedar	---	---	
					Hickory	---	---	
					White ash	---	---	
Bo: Boonesboro	Slight	Slight	Moderate	Severe	Yellow poplar	90	90	Eastern cottonwood, sweetgum, yellow poplar, white ash.
					White ash	---	---	
					Sweetgum	---	---	
					American elm	---	---	
					Hackberry	---	---	
					American sycamore	---	---	
BsE2**:								
Brassfield	Severe	Moderate	Slight	Slight	Scarlet oak	60	43	Virginia pine, white ash.
					Eastern redcedar	40	43	
					Chinkapin oak	---	---	
					White ash	---	---	
					Black locust	---	---	
					Eastern redbud	---	---	
Beasley	Severe	Moderate	Slight	Severe	White oak	65	47	White oak, Virginia pine, white ash.
					Scarlet oak	---	---	
					Eastern redcedar	41	44	
					Hickory	---	---	
					White ash	63	---	
					Yellow poplar	80	71	
CaB, CaC: Chenault	Slight	Slight	Slight	Severe	Yellow poplar	90	90	Yellow poplar, black walnut, white oak, northern red oak, eastern white pine.
					White oak	---	---	
					Black oak	---	---	
					Sugar maple	---	---	
					American sycamore	---	---	
					Hickory	---	---	
					Black walnut	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
CcB, CcC----------- Cincinnati	Slight	Slight	Slight	Severe	Northern red oak----	80	62	Eastern white pine, yellow poplar, northern red oak, white oak.
					White oak-----------	---	---	
					Hickory-------------	---	---	
EdC2------------ Eden	Moderate	Moderate	Moderate	Moderate	Eastern redcedar----	41	44	White oak, white ash, eastern white pine, green ash.
					Black oak-----------	69	51	
					White oak-----------	---	---	
					White ash-----------	61	---	
					Scarlet ash---------	70	52	
					Chinkapin oak-------	78	60	
EdE2------------ Eden	Severe	Moderate	Moderate	Moderate	Eastern redcedar----	41	44	White oak, white ash, eastern white pine, green ash.
					Black oak-----------	69	51	
					White oak-----------	---	---	
					White ash-----------	61	---	
					Scarlet oak---------	70	52	
					Chinkapin oak-------	78	60	
EkA, EkB, EkC--- Elk	Slight	Slight	Slight	Severe	Yellow poplar-------	91	92	Eastern white pine, yellow poplar, black walnut, white oak, northern red oak.
					Pin oak-------------	96	93	
					Hackberry-----------	---	---	
					Red maple-----------	---	---	
					American sycamore---	---	---	
					Black walnut--------	---	---	
En**:								
Elk------------	Severe	Moderate	Slight	Severe	Yellow poplar-------	91	92	Eastern white pine, yellow poplar, black walnut, white oak, northern red oak.
					Pin oak-------------	96	93	
					Hackberry-----------	---	---	
					Red maple-----------	---	---	
					American sycamore---	---	---	
					Black walnut--------	---	---	
Nolin----------	Moderate	Moderate	Moderate	Severe	Yellow poplar-------	107	119	Yellow poplar, eastern cottonwood, green ash, sweetgum.
					Sweetgum------------	92	112	
					Eastern cottonwood--	---	---	
					River birch---------	---	---	
					American sycamore---	---	---	
FaE------------- Fairmount	Moderate	Moderate	Severe	Moderate	Black oak-----------	65	47	Virginia pine, white oak, white ash.
					Eastern redcedar----	41	44	
					Scarlet oak---------	60	43	
					Chinkapin oak-------	---	---	
					White ash-----------	---	---	
					Black locust--------	---	---	
					Black walnut--------	---	---	
FwF**:								
Fairmount------	Severe	Severe	Moderate	Moderate	Black oak-----------	65	47	Virginia pine, white oak, white ash.
					Eastern redcedar----	41	44	
					Scarlet oak---------	60	43	
					Chinkapin oak-------	---	---	
					White ash-----------	---	---	
					Black locust--------	---	---	
					Black walnut--------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
FwF**:								
Woolper	Severe	Severe	Moderate	Severe	Black oak	75	57	Yellow poplar, white ash, white oak, northern red oak, eastern white pine.
					Chinkapin oak	71	53	
					White ash	---	---	
					Hickory	---	---	
					Yellow buckeye	---	---	
					Black walnut	---	---	
FyC2 Faywood	Slight	Moderate	Slight	Moderate	Northern red oak	70	52	White oak, eastern white pine, northern red oak.
					Scarlet oak	72	54	
					White oak	60	43	
					Chinkapin oak	---	---	
					Sugar maple	---	---	
					Southern red oak	---	---	
FyD2 Faywood	Moderate	Moderate	Slight	Moderate	Northern red oak	70	52	White oak, eastern white pine, northern red oak.
					Scarlet oak	72	54	
					White oak	60	43	
					Chinkapin oak	---	---	
					Sugar maple	---	---	
					Southern red oak	---	---	
GbD2**:								
Grayford	Moderate	Moderate	Slight	Severe	White oak	90	72	Eastern white pine, black walnut, yellow poplar, white ash, northern red oak.
					Yellow poplar	98	104	
					Sweetgum	76	70	
Beasley	Severe	Moderate	Slight	Severe	White oak	65	47	White oak, Virginia pine, white ash.
					Scarlet oak	---	---	
					Eastern redcedar	41	44	
					Hickory	---	---	
					White ash	63	---	
					Yellow poplar	80	71	
Hu Huntington	Slight	Slight	Slight	Severe	Yellow poplar	95	98	Yellow poplar, black walnut, eastern white pine, white ash, northern red oak.
					Northern red oak	85	66	
					White oak	---	---	
					Black walnut	---	---	
Lc Lawrence	Slight	Moderate	Moderate	Severe	Yellow poplar	85	81	Yellow poplar, American sycamore, white oak, sweetgum, eastern white pine, green ash.
					Sweetgum	89	103	
					White oak	74	56	
					Black oak	78	60	
					Red maple	---	---	
					Pin oak	---	---	
					Hackberry	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
LoB, LoC: 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	74	---	
					Sugar maple	---	---	
					Northern red oak	---	---	
					Chinkapin oak	81	63	
LsC3: Lowell	Slight	Moderate	Moderate	Moderate	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	---	---	
Mc: McGary	Slight	Moderate	Slight	Severe	Pin oak	80	74	Eastern white pine, white ash, American sycamore, green ash, pin oak.
					White oak	64	47	
					Sweetgum	---	---	
					Black oak	67	47	
					Red maple	---	---	
					Hackberry	---	---	
					Green ash	---	---	
					Hickory	---	---	
Ne: Newark	Slight	Moderate	Slight	Severe	Pin oak	100	98	Eastern cottonwood, sweetgum, American sycamore, green ash.
					Eastern cottonwood	94	113	
					Sweetgum	85	93	
					Green ash	---	---	
NhB, NhC: 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	110	
					Northern red oak	79	61	
No: Nolin	Slight	Slight	Moderate	Severe	Yellow poplar	107	119	Yellow poplar, eastern white pine, eastern cottonwood, sweetgum, black walnut.
					Sweetgum	92	112	
					Eastern cottonwood	---	---	
					American sycamore	---	---	
OtA, OtB: Otwell	Slight	Slight	Slight	Severe	Yellow poplar	95	98	Eastern white pine, yellow poplar, white oak.
					White oak	69	51	
					Sugar maple	---	---	
					Black oak	---	---	
RoA, RoB: Rossmoyne	Slight	Slight	Slight	Severe	White oak	61	44	White ash, yellow poplar, eastern white pine.
					White ash	---	---	
					Northern red oak	80	62	
					Sugar maple	---	---	
					American beech	---	---	
					American sycamore	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
RyB, RyC-------- Ryker	Slight	Slight	Slight	Severe	White oak-----------	90	---	Eastern white pine, black walnut, yellow poplar, white ash, northern red oak, white oak.
					Yellow poplar-------	98	---	
					Sweetgum------------	76	---	
					White ash-----------	---	---	
ShB------------- Shelbyville	Slight	Slight	Slight	Severe	Northern red oak----	80	62	Eastern white pine, yellow poplar, black walnut, white ash, white oak, northern red oak.
					White oak-----------	75	57	
					Black oak-----------	80	62	
					Southern red oak----	80	62	
					Hickory-------------	---	---	
					American beech------	---	---	
					American elm--------	---	---	
					Black walnut--------	---	---	
WeD------------- Wheeling	Moderate	Slight	Slight	Severe	Northern red oak----	80	62	Eastern white pine, yellow poplar, black walnut, northern red oak, white oak.
					Yellow poplar-------	90	90	
WhB------------- Wheeling	Slight	Slight	Slight	Severe	Northern red oak----	80	62	Eastern white pine, yellow poplar, black walnut, northern red oak, white oak.
					Yellow poplar-------	90	90	
WoB, WoC-------- Woolper	Slight	Moderate	Moderate	Severe	Black oak-----------	75	57	Yellow poplar, white ash, white oak, northern red oak, eastern white pine.
					Chinkapin oak-------	71	53	
					White ash-----------	---	---	
					Hickory-------------	---	---	
					Yellow buckeye------	---	---	
					Black walnut--------	---	---	
WoD------------- Woolper	Moderate	Moderate	Moderate	Severe	Black oak-----------	75	57	Yellow poplar, white ash, white oak, northern red oak, eastern white pine.
					Chinkapin oak-------	71	53	
					White ash-----------	---	---	
					Hickory-------------	---	---	
					Yellow buckeye------	---	---	
					Black walnut--------	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BaB: Beasley	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly, slope.	Slight	Slight.
BeC2: Beasley	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
BeD2: Beasley	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
BfC3: Beasley	Severe: too clayey.	Severe: too clayey.	Severe: slope, too clayey.	Severe: too clayey.	Severe: too clayey.
BfD3: Beasley	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: too clayey.	Severe: slope, too clayey.
Bo: Boonesboro	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
BsE2*:					
Brassfield	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope, erodes easily.	Severe: slope.
Beasley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CaB: Chenault	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
CaC: Chenault	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
CcB: Cincinnati	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly.	Slight	Slight.
CcC: Cincinnati	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
EdC2: Eden	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: large stones, slope.
EdE2: Eden	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
EkA: Elk	Severe: flooding.	Slight	Moderate: flooding.	Severe: erodes easily.	Moderate: flooding.
EkB: Elk	Severe: flooding.	Slight	Moderate: slope.	Severe: erodes easily.	Slight.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
EkC------------------- Elk	Severe: flooding.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: flooding, slope.
En*:					
Elk------------------	Severe: flooding, slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Nolin----------------	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
FaE------------------- Fairmount	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: large stones, slope, small stones.	Severe: erodes easily.	Severe: large stones, slope, thin layer.
FwF*:					
Fairmount------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: large stones, slope, small stones.	Severe: erodes easily, slope.	Severe: large stones, slope, thin layer.
Woolper--------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
FyC2------------------ Faywood	Moderate: percs slowly, slope.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
FyD2------------------ Faywood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
GbD2*:					
Grayford-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Beasley--------------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Hu-------------------- Huntington	Severe: flooding.	Slight----------	Moderate: flooding.	Slight----------	Moderate: flooding.
Lc-------------------- Lawrence	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Severe: erodes easily.	Moderate: wetness.
LoB------------------- Lowell	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight----------	Slight.
LoC, LsC3------------- Lowell	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Mc-------------------- McGary	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ne Newark	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, erodes easily.	Severe: wetness, flooding.
NhB Nicholson	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness.
NhC Nicholson	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
No Nolin	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
OtA Otwell	Severe: flooding, percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight	Moderate: flooding.
OtB Otwell	Severe: flooding, percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight	Slight.
Pt*. Pits, quarries					
RoA Rossmoyne	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
RoB Rossmoyne	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
RyB Ryker	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
RyC Ryker	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
ShB Shelbyville	Slight	Slight	Moderate: slope.	Slight	Slight.
WeD Wheeling	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
WhB Wheeling	Slight	Slight	Moderate: slope.	Slight	Slight.
WoB Woolper	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly, slope.	Severe: erodes easily.	Slight.
WoC Woolper	Moderate: percs slowly, slope.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
WoD-------------------- Woolper	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
BaB Beasley	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BeC2 Beasley	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BeD2 Beasley	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BfC3 Beasley	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BfD3 Beasley	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Bo Boonesboro	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BsE2*:										
Brassfield	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Beasley	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CaB Chenault	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CaC Chenault	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CcB Cincinnati	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CcC Cincinnati	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EdC2 Eden	Fair	Good	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
EdE2 Eden	Very poor.	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
EkA, EkB Elk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EkC Elk	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
En*:										
Elk	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Nolin	Very poor.	Poor	Fair	Good	Good	Poor	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

TABLE 9.--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
FaE: Fairmount	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
FwF*:										
Fairmount	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Woolper	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FyC2: Faywood	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FyD2: Faywood	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GbD2*:										
Grayford	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Beasley	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Hu: Huntington	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Lc: Lawrence	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
LoB: Lowell	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LoC, LsC3: Lowell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Mc: McGary	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Ne: Newark	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
NhB: Nicholson	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NhC: Nicholson	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
No: Nolin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
OtA, OtB: Otwell	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Pt*. Pits, quarries										
RoA: Rossmoyne	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
RoB: Rossmoyne	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
RyB: Ryker	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
RyC: Ryker	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ShB: Shelbyville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WeD: Wheeling	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WhB: Wheeling	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WoB: Woolper	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WoC: Woolper	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WoD: Woolper	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BaB: Beasley	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
BeC2: Beasley	Moderate: slope, too clayey.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
BeD2: Beasley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
BfC3: Beasley	Moderate: slope, too clayey.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Severe: too clayey.
BfD3: Beasley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope, too clayey.
Bo: Boonesboro	Severe: depth to rock.	Severe: flooding.	Severe: flooding, depth to rock.	Severe: flooding.	Severe: flooding.	Severe: flooding.
BsE2*:						
Brassfield	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Beasley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
CaB: Chenault	Moderate: depth to rock, too clayey.	Slight	Moderate: depth to rock.	Moderate: slope.	Moderate: low strength.	Moderate: small stones.
CaC: Chenault	Moderate: depth to rock, too clayey, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: small stones, slope.
CcB: Cincinnati	Moderate: dense layer, wetness.	Slight	Moderate: wetness.	Moderate: slope.	Severe: low strength.	Slight.
CcC: Cincinnati	Moderate: dense layer, wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
EdC2: 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.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
EdE2: Eden	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: low strength, slope, slippage.	Severe: slope.
EkA: Elk	Moderate: too clayey, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
EkB: Elk	Moderate: too clayey.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Slight.
EkC: Elk	Moderate: too clayey, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Severe: low strength, flooding.	Moderate: flooding, slope.
En*:						
Elk	Severe: slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: low strength, slope, flooding.	Severe: slope.
Nolin	Moderate: wetness, flooding, slope.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Severe: low strength, flooding.	Severe: flooding.
FaE: Fairmount	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: large stones, slope, thin layer.
FwF*:						
Fairmount	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: large stones, slope, thin layer.
Woolper	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
FyC2: 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.
FyD2: Faywood	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
GbD2*:						
Grayford	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Beasley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Hu: Huntington	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Lc---------------- Lawrence	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength.	Moderate: wetness.
LoB--------------- Lowell	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
LoC, LsC3--------- 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.
Mc---------------- McGary	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
Ne---------------- Newark	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
NhB--------------- Nicholson	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.	Moderate: wetness.
NhC--------------- Nicholson	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: wetness, slope.
No---------------- Nolin	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
OtA--------------- Otwell	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
OtB--------------- Otwell	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength.	Slight.
Pt*. Pits, quarries						
RoA--------------- Rossmoyne	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
RoB--------------- Rossmoyne	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Moderate: wetness.
RyB--------------- Ryker	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
RyC: Ryker	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
ShB: Shelbyville	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
WeD: Wheeling	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
WhB: Wheeling	Slight	Slight	Slight	Slight	Moderate: low strength.	Slight.
WoB: Woolper	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
WoC: Woolper	Moderate: too clayey, slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
WoD: Woolper	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
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.
BeC2---------------- Beasley	Severe: percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, depth to rock.	Poor: too clayey, hard to pack.
BeD2---------------- Beasley	Severe: slope, percs slowly.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope.	Poor: slope, too clayey, hard to pack.
BfC3---------------- Beasley	Severe: percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, depth to rock.	Poor: too clayey, hard to pack.
BfD3---------------- Beasley	Severe: slope, percs slowly.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope.	Poor: slope, too clayey, hard to pack.
Bo------------------ Boonesboro	Severe: flooding, depth to rock, poor filter.	Severe: seepage, depth to rock, flooding.	Severe: flooding, depth to rock, seepage.	Severe: flooding, depth to rock, seepage.	Poor: depth to rock.
BsE2*:					
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.
Beasley-------------	Severe: slope, percs slowly.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope.	Poor: slope, too clayey, hard to pack.
CaB----------------- Chenault	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Severe: seepage.	Fair: area reclaim, too clayey.
CaC----------------- Chenault	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Severe: seepage.	Fair: area reclaim, too clayey, slope.
CcB----------------- Cincinnati	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
CcC----------------- Cincinnati	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope, too clayey.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
EdC2----------------- 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.
EdE2----------------- 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.
EkA------------------ Elk	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey, thin layer.
EkB------------------ Elk	Moderate: flooding, percs slowly.	Moderate: seepage, slope.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey, thin layer.
EkC------------------ Elk	Severe: flooding.	Severe: flooding, slope.	Severe: flooding.	Severe: flooding.	Fair: too clayey, slope, thin layer.
En*:					
Elk-----------------	Severe: flooding, slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: flooding, slope.	Poor: slope.
Nolin---------------	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
FaE------------------ Fairmount	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, slope.
FwF*:					
Fairmount-----------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, slope.
Woolper-------------	Severe: slope, percs slowly.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, too clayey, hard to pack.
FyC2----------------- 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.
FyD2----------------- 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.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
GbD2*:					
Grayford	Severe: slope.	Severe: slope.	Severe: depth to rock, seepage, slope.	Severe: slope.	Poor: slope.
Beasley	Severe: slope, percs slowly.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope.	Poor: slope, too clayey, hard to pack.
Hu: Huntington	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
Lc: Lawrence	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
LoB: 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.
LoC, LsC3: Lowell	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
Mc: McGary	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Ne: Newark	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
NhB: Nicholson	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
NhC: Nicholson	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
No: Nolin	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
OtA: Otwell	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey, wetness.
OtB: Otwell	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: flooding, wetness.	Moderate: flooding, wetness.	Fair: too clayey, wetness.
Pt*. Pits, quarries					

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
RoA: Rossmoyne	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
RoB: Rossmoyne	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
RyB: Ryker	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
RyC: Ryker	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
ShB: Shelbyville	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
WeD: Wheeling	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Moderate: slope.	Fair: slope, thin layer.
WhB: Wheeling	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Slight	Fair: thin layer.
WoB: Woolper	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
WoC: Woolper	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
WoD: Woolper	Severe: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope, too clayey, hard to pack.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," 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, BeC2: Beasley	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
BeD2: Beasley	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
BfC3: Beasley	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
BfD3: Beasley	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
Bo: Boonesboro	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
BsE2*:				
Brassfield	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, slope.
Beasley	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
CaB, CaC: Chenault	Fair: area reclaim, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CcB: Cincinnati	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
CcC: Cincinnati	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey, slope.
EdC2: Eden	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey.
EdE2: Eden	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey.
EkA, EkB: Elk	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
EkC: Elk	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
En*:				
Elk	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Nolin	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
FaE: Fairmount	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, too clayey, large stones.
FwF*:				
Fairmount	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, too clayey, large stones.
Woolper	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
FyC2: Faywood	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
FyD2: Faywood	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
GbD2*:				
Grayford	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Beasley	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Hu: Huntington	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Lc: Lawrence	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
LoB, LoC, LsC3: Lowell	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Mc: McGary	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Ne: Newark	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
NhB: Nicholson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
NhC: Nicholson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
No: Nolin	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, area reclaim.
OtA, OtB: Otwell	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Pt*. Pits, quarries				
RoA, RoB: Rossmoyne	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
RyB: Ryker	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
RyC: Ryker	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
ShB: Shelbyville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
WeD: Wheeling	Fair: low strength.	Probable	Probable	Fair: small stones, slope.
WhB: Wheeling	Fair: low strength.	Probable	Probable	Fair: small stones.
WoB, WoC: Woolper	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
WoD: Woolper	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "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--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
BaB: Beasley	Moderate: depth to rock.	Moderate: thin layer.	Deep to water	Erodes easily	Erodes easily.
BeC2, BeD2, BfC3, BfD3: Beasley	Moderate: depth to rock.	Moderate: thin layer.	Deep to water	Slope	Slope.
Bo: Boonesboro	Severe: seepage.	Severe: thin layer, piping.	Deep to water	Depth to rock, erodes easily.	Depth to rock, erodes easily.
BsE2*:					
Brassfield	Severe: slope.	Severe: piping.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Beasley	Severe: slope.	Moderate: thin layer.	Deep to water	Slope	Slope.
CaB: Chenault	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Favorable	Favorable.
CaC: Chenault	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Slope	Slope.
CcB: Cincinnati	Moderate: seepage.	Moderate: piping.	Percs slowly, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
CcC: Cincinnati	Moderate: seepage.	Moderate: seepage.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
EdC2: Eden	Moderate: depth to rock.	Severe: hard to pack, large stones, thin layer.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
EdE2: Eden	Severe: slope.	Severe: hard to pack, large stones, thin layer.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
EkA: Elk	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
EkB: Elk	Moderate: seepage, slope.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
EkC: Elk	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
En*:					
Elk	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Nolin	Severe: seepage, slope.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
FaE Fairmount	Severe: depth to rock, slope.	Severe: thin layer, large stones.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, erodes easily.
FwF*:					
Fairmount	Severe: depth to rock, slope.	Severe: thin layer, large stones.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, erodes easily.
Woolper	Severe: slope.	Severe: hard to pack.	Deep to water	Erodes easily, percs slowly, slope.	Slope, erodes easily, percs slowly.
FyC2, FyD2 Faywood	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock, percs slowly.	Slope, depth to rock, percs slowly.
GbD2*:					
Grayford	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Beasley	Slight	Moderate: thin layer.	Deep to water	Slope	Slope.
Hu Huntington	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Favorable.
Lc Lawrence	Slight	Severe: piping.	Percs slowly	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
LoB Lowell	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Erodes easily	Erodes easily.
LoC, LsC3 Lowell	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Mc McGary	Slight	Severe: wetness.	Percs slowly	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Ne Newark	Moderate: seepage.	Severe: piping, wetness.	Flooding	Erodes easily, wetness.	Wetness, erodes easily.
NhB Nicholson	Moderate: seepage, slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
NhC: Nicholson	Severe: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Slope, erodes easily, wetness, rooting depth.	Slope, erodes easily, rooting depth.
No: Nolin	Severe: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
OtA: Otwell	Slight	Moderate: wetness.	Percs slowly, flooding.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth.
OtB: Otwell	Moderate: slope.	Moderate: wetness.	Percs slowly, slope.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth.
Pt*. Pits, quarries					
RoA: Rossmoyne	Moderate: seepage.	Moderate: piping, wetness.	Percs slowly	Wetness, rooting depth, percs slowly.	Erodes easily, rooting depth, percs slowly.
RoB: Rossmoyne	Moderate: seepage, slope.	Moderate: piping, wetness.	Percs slowly, slope.	Wetness, rooting depth, percs slowly.	Erodes easily, rooting depth, percs slowly.
RyB: Ryker	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Erodes easily	Erodes easily.
RyC: Ryker	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
ShB: Shelbyville	Moderate: seepage.	Slight	Deep to water	Favorable	Favorable.
WeD: Wheeling	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope.
WhB: Wheeling	Moderate: seepage, slope.	Severe: piping.	Deep to water	Favorable	Favorable.
WoB: Woolper	Slight	Severe: hard to pack.	Deep to water	Erodes easily, percs slowly.	Erodes easily, percs slowly.
WoC, WoD: Woolper	Slight	Severe: hard to pack.	Deep to water	Erodes easily, percs slowly, slope.	Slope, erodes easily, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments >3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
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
	6-24	Silty clay, clay	CH, CL	A-7	0-5	90-100	85-100	85-100	75-100	45-70	20-40
	24-45	Silty clay, clay, silty clay loam.	CL, CH	A-7	0-5	85-100	85-100	80-100	65-100	40-65	15-35
	45-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
BeC2, BeD2------- Beasley	0-6	Silty clay loam	CL	A-6, A-7	0-5	90-100	85-100	80-100	75-100	34-42	15-22
	6-20	Silty clay, clay	CH, CL	A-7	0-5	90-100	85-100	85-100	75-100	45-70	20-40
	20-41	Silty clay, clay, silty clay loam.	CL, CH	A-7	0-5	85-100	85-100	80-100	65-100	40-65	15-35
	41-56	Weathered bedrock	---	---	---	---	---	---	---	---	---
BfC3, BfD3------- Beasley	0-6	Silty clay-------	CL	A-6, A-7	0-5	90-100	85-100	80-100	75-100	34-42	15-22
	6-20	Silty clay, clay	CH, CL	A-7	0-5	90-100	85-100	85-100	75-100	45-70	20-40
	20-41	Silty clay, clay, silty clay loam.	CL, CH	A-7	0-5	85-100	85-100	80-100	65-100	40-65	15-35
	41-52	Weathered bedrock	---	---	---	---	---	---	---	---	---
Bo--------------- Boonesboro	0-21	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-5	90-100	85-100	80-100	70-95	25-35	3-11
	21-33	Gravelly silt loam, very flaggy silty clay loam, very gravelly silty clay loam.	GM, GC, CL, CL-ML	A-2, A-4, A-6, A-7	0-20	50-75	40-70	35-65	25-60	25-42	3-20
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
BsE2*:											
Brassfield------	0-5	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-10	85-95	70-90	70-90	55-85	<35	NP-15
	5-26	Silt loam, 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
	26	Weathered bedrock	---	---	---	---	---	---	---	---	---
Beasley---------	0-6	Silty clay loam	CL	A-6, A-7	0-5	90-100	85-100	80-100	75-100	34-42	15-22
	6-20	Silty clay, clay	CH, CL	A-7	0-5	90-100	85-100	85-100	75-100	45-70	20-40
	20-41	Silty clay, clay, silty clay loam.	CL, CH	A-7	0-5	85-100	85-100	80-100	65-100	40-65	15-35
	41-56	Weathered bedrock	---	---	---	---	---	---	---	---	---
CaB, CaC--------- Chenault	0-6	Silt loam--------	ML, CL-ML	A-4	0-5	65-90	60-90	55-85	55-85	<35	NP-10
	6-46	Gravelly 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
	46-60	Gravelly clay, clay, silty clay.	CL, CH	A-7	0	65-90	60-90	60-90	60-90	45-75	20-45
	60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments >3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CcB-------------- Cincinnati	0-10	Silt loam--------	ML, CL	A-4, A-6	0	100	95-100	90-100	80-100	25-40	3-16
	10-27	Silty clay loam, loam, silt loam.	CL	A-6, A-4	0	95-100	90-100	85-100	70-100	25-40	8-15
	27-55	Clay loam, silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	85-100	75-95	70-90	55-80	25-40	5-20
	55-81	Clay loam, loam	CL, ML, CL-ML	A-6, A-4	0	85-100	75-95	70-90	55-80	25-40	5-20
	81-93	Clay loam, silty clay loam, loam.	CL, CL-ML	A-6, A-4	0	90-100	80-95	70-90	55-80	25-40	5-20
CcC-------------- Cincinnati	0-9	Silt loam--------	ML, CL	A-4, A-6	0	100	95-100	90-100	80-100	25-40	3-16
	9-27	Silty clay loam, loam, silt loam.	CL	A-6, A-4	0	95-100	90-100	85-100	70-100	25-40	8-15
	27-55	Clay loam, silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	85-100	75-95	70-90	55-80	25-40	5-20
	55-81	Clay loam, loam	CL, ML, CL-ML	A-6, A-4	0	85-100	75-95	70-90	55-80	25-40	5-20
	81-93	Clay loam, silty clay loam, loam.	CL, CL-ML	A-6, A-4	0	90-100	80-95	70-90	55-80	25-40	5-20
EdC2, EdE2------- 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
	4-29	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
	29-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
EkA, EkB, EkC---- Elk	0-10	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	70-95	25-35	3-10
	10-44	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
	44-64	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
En*:											
Elk-------------	0-10	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	70-95	25-35	3-10
	10-44	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
	44-64	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
Nolin-----------	0-9	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	9-68	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
	68-78	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
FaE-------------- Fairmount	0-4	Flaggy silty clay loam.	CL	A-6, A-7	8-50	80-100	70-100	65-100	60-95	35-45	15-22
	4-17	Flaggy silty clay loam, flaggy clay, flaggy silty clay.	CH, CL	A-7	8-50	80-100	70-100	65-100	60-100	40-70	20-40
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
FwF*:											
Fairmount	0-4	Flaggy silty clay loam.	CL	A-6, A-7	8-50	80-100	70-100	65-100	60-95	35-45	15-22
	4-17	Flaggy silty clay loam, flaggy clay, flaggy silty clay.	CH, CL	A-7	8-50	80-100	70-100	65-100	60-100	40-70	20-40
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Woolper	0-8	Silty clay loam	CL	A-6, A-7	0-10	95-100	90-100	85-100	75-100	34-42	15-22
	8-21	Silty clay, silty clay loam, clay.	CL, CH	A-7, A-6	0-10	95-100	90-100	85-100	75-100	35-65	15-40
	21-64	Clay, silty clay	CH, CL	A-7	0-10	95-100	90-100	85-100	75-100	45-75	20-45
FyC2, FyD2 Faywood	0-7	Silty clay loam	CL	A-6, A-7	0-15	100	95-100	90-100	85-100	34-42	15-22
	7-26	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-15	90-100	90-100	85-100	75-100	42-70	20-45
	26	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GbD2*:											
Grayford	0-4	Silt loam	CL-ML, CL	A-4	0	100	100	90-100	70-90	18-30	4-10
	4-16	Silty clay loam, silt loam.	CL	A-6, A-4	0	100	95-100	95-100	80-95	25-35	8-13
	16-35	Clay loam, silty clay loam, loam.	CL	A-6, A-4	0-5	95-100	85-100	75-100	60-95	25-40	8-15
	35-49	Clay, silty clay	CH, CL	A-7	0-10	95-100	65-95	60-90	50-85	45-55	20-30
	49	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Beasley	0-6	Silty clay loam	CL	A-6, A-7	0-5	90-100	85-100	80-100	75-100	34-42	15-22
	6-20	Silty clay, clay	CH, CL	A-7	0-5	90-100	85-100	85-100	75-100	45-70	20-40
	20-41	Silty clay, clay, silty clay loam.	CL, CH	A-7	0-10	70-100	55-100	50-100	50-95	40-65	15-35
	41-56	Weathered bedrock	---	---	---	---	---	---	---	---	---
Hu Huntington	0-11	Silt loam	ML, CL, CL-ML	A-4, A-6	0	95-100	95-100	85-100	60-95	25-40	5-15
	11-58	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	95-100	85-100	60-95	25-40	5-15
	58-72	Stratified fine sand to silty clay loam.	SM, SC, ML, CL	A-2, A-4	0-10	95-100	60-100	50-90	30-75	<30	NP-10
Lc Lawrence	0-8	Silt loam	ML	A-4	0	100	95-100	90-100	80-100	25-35	2-10
	8-25	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
	25-49	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
	49-78	Silty clay, silty clay loam, silt loam.	ML, CL, MH, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	75-100	25-60	5-25
LoB, LoC Lowell	0-8	Silt loam	ML, CL, CL-ML	A-4	0	100	95-100	90-100	85-100	22-32	3-10
	8-38	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
	38-74	Clay, silty clay	CH, MH, CL	A-7	0-10	95-100	90-100	85-100	75-100	45-75	20-40

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
LsC3------------- Lowell	0-4	Silty clay loam	CL	A-6, A-7	0	100	95-100	90-100	85-100	34-42	15-22
	4-43	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
	43-53	Clay, silty clay	CH, MH, CL	A-7	0-10	95-100	90-100	85-100	75-100	45-75	20-40
	53	Unweathered bedrock.	---	---	---	---	---	---	---	---	
Mc--------------- McGary	0-9	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-95	25-40	5-15
	9-38	Silty clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	90-100	45-60	25-35
	38-85	Stratified silty clay loam to clay.	CL, CH	A-6, A-7	0	95-100	95-100	95-100	85-100	35-55	20-35
Ne--------------- Newark	0-7	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	90-100	80-100	55-95	<32	NP-10
	7-36	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
	36-80	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
NhB, NhC--------- Nicholson	0-8	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	80-95	25-35	5-10
	8-24	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
	24-43	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
	43-74	Silty clay, 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	0-9	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	9-68	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
	68-78	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
OtA, OtB--------- Otwell	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-95	25-35	5-15
	8-25	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-95	25-40	5-20
	25-53	Silty clay loam, loam, silt loam.	CL	A-6, A-7	0	95-100	95-100	85-100	65-90	35-50	15-30
	53-81	Stratified loam to silty clay.	CL	A-6, A-7	0	95-100	75-100	75-100	65-95	35-50	15-30
Pt*. Pits, quarries											
RoA, RoB--------- Rossmoyne	0-8	Silt loam--------	ML	A-4	0	100	100	95-100	90-100	30-40	4-10
	8-23	Silty clay loam, silt loam, clay loam.	CL, ML	A-6, A-7, A-4	0	100	95-100	85-100	80-95	30-48	8-20
	23-67	Clay loam, loam, silty clay loam.	CL	A-6, A-4	0	90-100	85-95	80-90	70-85	25-40	9-19
	67-82	Clay loam, loam, silty clay.	CL	A-6, A-7, A-4	0	80-95	70-90	65-85	60-80	25-42	8-20
RyB, RyC--------- Ryker	0-9	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	90-100	80-95	20-30	5-15
	9-50	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	75-95	25-40	10-20
	50-90	Silt loam, silty clay loam, clay loam.	CL	A-6, A-7	0	85-100	80-100	75-95	60-85	25-45	10-20

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
ShB-------------- Shelbyville	0-8	Silt loam--------	ML, CL	A-4, A-6	0	100	95-100	90-100	85-100	25-40	3-15
	8-32	Silty clay loam, silt loam.	CL	A-6, A-4, A-7	0	100	95-100	90-100	85-100	30-45	10-25
	32-80	Silty clay, clay	CH, CL, MH	A-7	0-10	80-100	80-100	70-100	65-100	45-75	20-45
WeD-------------- Wheeling	0-9	Loam-------------	ML, CL, SM, SC	A-4	0	90-100	90-100	85-100	45-90	15-35	NP-10
	9-35	Silty clay loam, loam, gravelly sandy loam.	ML, CL, SM, SC	A-4, A-6	0-5	90-100	70-100	65-100	45-80	20-40	2-20
	35-75	Stratified very fine sand to very gravelly sand.	GM, SM, GP, GW	A-1, A-2, A-3, A-4	10-20	35-90	20-75	10-65	4-45	<20	NP-10
WhB-------------- Wheeling	0-9	Silt loam--------	ML, CL, SM, SC	A-4	0	90-100	90-100	85-100	45-90	15-35	NP-10
	9-35	Silty clay loam, loam, gravelly sandy loam.	ML, CL, SM, SC	A-4, A-6	0-5	90-100	70-100	65-100	45-80	20-40	2-20
	35-75	Stratified very fine sand to very gravelly sand.	GM, SM, GP, GW	A-1, A-2, A-3, A-4	10-20	35-90	20-75	10-65	4-45	<20	NP-10
WoB, WoC, WoD---- Woolper	0-8	Silty clay loam	CL	A-6, A-7	0-10	95-100	90-100	85-100	75-100	34-42	15-22
	8-21	Silty clay, silty clay loam, clay.	CL, CH	A-7, A-6	0-10	95-100	90-100	85-100	75-100	35-65	15-40
	21-64	Clay, silty clay	CH, CL	A-7	0-10	95-100	90-100	85-100	75-100	45-75	20-45

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. 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	2-4
	6-24	40-60	1.30-1.55	0.2-0.6	0.12-0.18	4.5-7.3	Moderate	0.28		
	24-45	35-60	1.50-1.70	0.2-0.6	0.09-0.15	6.6-9.0	Moderate	0.28		
	45-60	---	---	---	---	---	---	----		
BeC2, BeD2: Beasley	0-6	27-40	1.20-1.40	0.6-2.0	0.14-0.23	4.5-7.3	Low	0.32	3	.5-2
	6-20	40-60	1.30-1.55	0.2-0.6	0.12-0.18	4.5-7.3	Moderate	0.28		
	20-41	35-60	1.50-1.70	0.2-0.6	0.09-0.15	6.6-9.0	Moderate	0.28		
	41-56	---	---	---	---	---	---	----		
BfC3, BfD3: Beasley	0-6	40-60	1.20-1.40	0.6-2.0	0.14-0.23	4.5-7.3	Low	0.32	3	.5-2
	6-20	40-60	1.30-1.55	0.2-0.6	0.12-0.18	4.5-7.3	Moderate	0.28		
	20-41	35-60	1.50-1.70	0.2-0.6	0.09-0.15	6.6-9.0	Moderate	0.28		
	41-52	---	---	---	---	---	---	----		
Bo: Boonesboro	0-21	15-27	1.20-1.40	0.6-2.0	0.18-0.23	6.1-8.4	Low	0.37	3	3-5
	21-33	18-35	1.20-1.40	6.0-20	0.06-0.12	6.1-8.4	Low	0.17		
	33	---	---	---	---	---	---	----		
BsE2*:										
Brassfield	0-5	12-27	1.20-1.40	0.6-2.0	0.14-0.20	6.6-7.8	Low	0.43	2	2
	5-26	18-35	1.20-1.45	0.6-2.0	0.10-0.18	7.4-8.4	Low	0.28		
	26	---	---	---	---	---	---	----		
Beasley	0-6	27-55	1.20-1.40	0.6-2.0	0.14-0.23	4.5-7.3	Low	0.32	3	.5-2
	6-20	40-60	1.30-1.55	0.2-0.6	0.12-0.18	4.5-7.3	Moderate	0.28		
	20-41	35-60	1.50-1.70	0.2-0.6	0.09-0.15	6.6-9.0	Moderate	0.28		
	41-56	---	---	---	---	---	---	----		
CaB, CaC: Chenault	0-6	12-27	1.20-1.40	2.0-6.0	0.16-0.22	5.1-7.3	Low	0.28	4	2-4
	6-46	18-35	1.20-1.50	0.6-2.0	0.10-0.20	5.1-6.5	Low	0.28		
	46-60	40-55	1.30-1.60	0.6-2.0	0.07-0.16	5.6-7.3	Moderate	0.28		
	60	---	---	---	---	---	---	----		
CcB: Cincinnati	0-10	15-25	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low	0.43	4	1-3
	10-27	22-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-5.5	Low	0.37		
	27-55	22-35	1.60-1.85	0.06-0.6	0.08-0.12	4.5-6.5	Moderate	0.37		
	55-81	25-40	1.55-1.75	0.06-0.6	0.08-0.12	4.5-6.5	Moderate	0.37		
	81-93	25-40	1.55-1.75	0.06-0.6	0.08-0.12	5.1-7.3	Moderate	0.37		
CcC: Cincinnati	0-9	15-25	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low	0.43	4	2-3
	9-27	22-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-5.5	Low	0.37		
	27-55	22-35	1.60-1.85	0.06-0.6	0.08-0.12	4.5-6.5	Moderate	0.37		
	55-81	25-40	1.55-1.75	0.06-0.6	0.08-0.12	4.5-6.5	Moderate	0.37		
	81-93	25-40	1.55-1.75	0.06-0.6	0.08-0.12	5.1-7.3	Moderate	0.37		
EdC2, EdE2: Eden	0-4	27-40	1.35-1.55	0.06-0.6	0.12-0.18	5.1-8.4	Moderate	0.43	3	.5-2
	4-29	40-60	1.45-1.65	0.06-0.2	0.08-0.13	5.1-8.4	Moderate	0.28		
	29-50	---	---	---	---	---	---	0.17		
EkA, EkB, EkC: 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	2-3
	10-44	18-34	1.20-1.50	0.6-2.0	0.18-0.22	4.5-6.5	Low	0.28		
	44-64	15-50	1.20-1.50	0.6-2.0	0.14-0.20	4.5-6.5	Low	0.28		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
En*:										
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	2-3
	10-44	18-34	1.20-1.50	0.6-2.0	0.18-0.22	4.5-6.5	Low	0.28		
	44-64	15-50	1.20-1.50	0.6-2.0	0.14-0.20	4.5-6.5	Low	0.28		
Nolin	0-9	12-27	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low	0.43	5	2-4
	9-68	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low	0.43		
	68-78	10-30	1.30-1.55	0.6-2.0	0.10-0.23	5.6-8.4	Low	0.43		
FaE Fairmount	0-4	27-40	1.20-1.40	0.06-0.6	0.12-0.20	6.6-8.4	Moderate	0.37	2	4-7
	4-17	35-60	1.40-1.60	0.06-0.6	0.10-0.18	6.6-8.4	Moderate	0.37		
	17	---	---	---	---	---	-------------	----		
FwF*:										
Fairmount	0-4	27-40	1.20-1.40	0.06-0.6	0.12-0.20	6.6-8.4	Moderate	0.37	2	3-7
	4-17	35-60	1.40-1.60	0.06-0.6	0.10-0.18	6.6-8.4	Moderate	0.37		
	17	---	---	---	---	---	-------------	----		
Woolper	0-8	27-35	1.30-1.50	0.6-2.0	0.18-0.22	6.1-7.8	Low	0.37	3	4-6
	8-21	36-50	1.30-1.55	0.06-0.6	0.13-0.19	6.1-7.8	Moderate	0.28		
	21-64	40-60	1.45-1.65	0.06-0.6	0.12-0.17	6.1-7.8	Moderate	0.28		
FyC2, FyD2 Faywood	0-7	27-40	1.30-1.40	0.6-2.0	0.18-0.22	5.1-7.8	Low	0.37	3	2-4
	7-26	35-60	1.35-1.45	0.06-0.6	0.12-0.17	5.1-7.8	Moderate	0.28		
	26	---	---	---	---	---	-------------	----		
GbD2*:										
Grayford	0-4	12-25	1.25-1.40	0.6-2.0	0.20-0.24	5.1-6.5	Low	0.37	5	.5-2
	4-16	20-30	1.35-1.50	0.6-2.0	0.18-0.20	4.5-6.5	Moderate	0.37		
	16-35	20-35	1.40-1.60	0.6-2.0	0.16-0.20	4.5-5.5	Moderate	0.37		
	35-49	42-50	1.40-1.60	0.6-2.0	0.09-0.11	5.1-7.8	High	0.37		
	49	---	---	---	---	---	-------------	----		
Beasley	0-6	27-55	1.20-1.40	0.6-2.0	0.14-0.23	4.5-7.3	Low	0.32	3	.5-2
	6-20	40-60	1.30-1.55	0.2-0.6	0.12-0.18	4.5-7.3	Moderate	0.28		
	20-41	40-60	1.50-1.70	0.2-0.6	0.09-0.15	6.6-9.0	Moderate	0.28		
	41-56	---	---	---	---	---	-------------	----		
Hu Huntington	0-11	18-27	1.10-1.30	0.6-2.0	0.18-0.24	5.6-7.8	Low	0.28	5	4-6
	11-58	18-27	1.30-1.50	0.6-2.0	0.16-0.22	5.6-7.8	Low	0.32		
	58-72	15-30	1.30-1.50	0.6-2.0	0.10-0.16	5.6-7.8	Low	0.28		
Lc Lawrence	0-8	12-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-6.5	Low	0.43	3	2-4
	8-25	18-35	1.40-1.60	0.6-2.0	0.18-0.22	4.5-6.5	Low	0.37		
	25-49	18-35	1.50-1.70	0.06-0.2	0.08-0.12	4.5-5.5	Low	0.43		
	49-78	18-60	1.50-1.70	0.06-0.2	0.08-0.12	4.5-5.5	Low	0.37		
LoB, LoC Lowell	0-8	12-27	1.20-1.40	0.6-2.0	0.18-0.23	4.5-6.5	Low	0.37	3	2-4
	8-38	35-60	1.30-1.60	0.2-0.6	0.13-0.19	4.5-6.5	Moderate	0.28		
	38-74	40-60	1.50-1.60	0.2-0.6	0.12-0.17	5.1-7.8	Moderate	0.28		
LsC3 Lowell	0-4	27-40	1.20-1.40	0.6-2.0	0.18-0.23	4.5-6.5	Low	0.37	3	.5-2
	4-43	35-60	1.30-1.60	0.2-0.6	0.13-0.19	4.5-6.5	Moderate	0.28		
	43-53	40-60	1.50-1.60	0.2-0.6	0.12-0.17	5.1-7.8	Moderate	0.28		
	53	---	---	---	---	---	-------------	----		
Mc McGary	0-9	22-30	1.35-1.50	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.43	3	2-4
	9-38	35-50	1.60-1.70	0.06-0.2	0.11-0.13	5.6-7.8	High	0.32		
	38-85	35-50	1.55-1.65	<0.2	0.14-0.16	7.9-8.4	High	0.32		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Ne---------------- Newark	0-7	12-27	1.20-1.40	0.6-2.0	0.15-0.23	5.6-7.8	Low----------	0.43	5	2-4
	7-36	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43		
	36-80	12-40	1.30-1.50	0.6-2.0	0.15-0.22	5.6-7.8	Low----------	0.43		
NhB, NhC--------- Nicholson	0-8	12-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-6.5	Low----------	0.43	3	2-4
	8-24	18-35	1.40-1.60	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.43		
	24-43	18-35	1.50-1.70	0.06-0.2	0.07-0.12	4.5-6.5	Low----------	0.43		
	43-74	35-60	1.40-1.60	0.06-0.6	0.07-0.12	5.1-7.8	Moderate-----	0.37		
No---------------- Nolin	0-9	12-27	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43	5	2-4
	9-68	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43		
	68-78	10-30	1.30-1.55	0.6-2.0	0.10-0.23	5.6-8.4	Low----------	0.43		
OtA, OtB--------- Otwell	0-8	18-27	1.25-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.43	4	.5-2
	8-25	22-30	1.30-1.50	0.2-0.6	0.18-0.22	4.5-5.5	Moderate-----	0.43		
	25-53	18-30	1.60-1.80	<0.06	0.06-0.08	4.5-5.5	Moderate-----	0.43		
	53-81	20-40	1.50-1.65	0.06-0.2	0.06-0.08	5.1-6.5	Moderate-----	0.43		
Pt*. Pits, quarries										
RoA, RoB--------- Rossmoyne	0-8	13-27	1.35-1.50	0.6-2.0	0.20-0.24	4.5-7.3	Low----------	0.43	4-3	2-3
	8-23	22-35	1.40-1.60	0.6-2.0	0.14-0.19	4.5-5.5	Moderate-----	0.43		
	23-67	24-35	1.70-1.90	0.06-0.6	0.06-0.10	4.5-5.5	Moderate-----	0.43		
	67-82	18-45	1.60-1.75	0.06-0.6	0.06-0.10	5.1-7.8	Moderate-----	0.43		
RyB, RyC--------- Ryker	0-9	15-27	1.35-1.50	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5-4	2-4
	9-50	20-35	1.40-1.60	0.6-2.0	0.18-0.22	4.5-7.3	Moderate-----	0.37		
	50-90	20-40	1.45-1.65	0.6-2.0	0.15-0.20	4.5-6.0	Moderate-----	0.37		
ShB-------------- Shelbyville	0-8	12-27	1.30-1.40	0.6-2.0	0.19-0.23	5.1-7.3	Low----------	0.32	4	2-4
	8-32	18-35	1.30-1.45	0.6-2.0	0.18-0.22	5.1-7.3	Low----------	0.37		
	32-80	40-60	1.35-1.50	0.2-0.6	0.12-0.18	5.1-7.8	Moderate-----	0.28		
WeD, WhB--------- Wheeling	0-9	12-20	1.20-1.40	0.6-6.0	0.12-0.18	5.1-6.5	Low----------	0.37	4	2-3
	9-35	18-30	1.30-1.50	0.6-2.0	0.08-0.16	5.1-6.0	Low----------	0.32		
	35-75	8-15	1.30-1.50	6.0-2.0	0.04-0.08	5.1-6.0	Low----------	0.20		
WoB, WoC, WoD---- Woolper	0-8	27-35	1.30-1.50	0.6-2.0	0.18-0.22	6.1-7.8	Low----------	0.37	3	4-6
	8-21	36-50	1.30-1.55	0.06-0.6	0.13-0.19	6.1-7.8	Moderate-----	0.28		
	21-64	40-60	1.45-1.65	0.06-0.6	0.12-0.17	6.1-7.8	Moderate-----	0.28		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

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, BeC2, BeD2, BfC3, BfD3 Beasley	C	None	---	---	>6.0	---	---	40-60	Soft	Moderate	Moderate.
Bo Boonesboro	B	Frequent	Brief	Jan-Apr	>6.0	---	---	20-40	Hard	Low	Low.
BsE2*:											
Brassfield	B	None	---	---	>6.0	---	---	20-40	Soft	Low	Low.
Beasley	C	None	---	---	>6.0	---	---	40-60	Soft	Moderate	Moderate.
CaB, CaC Chenault	B	None	---	---	>6.0	---	---	40-80	Hard	Low	Moderate.
CcB, CcC Cincinnati	C	None	---	---	2.0-4.0	Perched	Jan-Apr	>60	---	Moderate	High.
EdC2, EdE2 Eden	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Low.
EkA Elk	B	Occasional	Brief	Jan-Jun	>6.0	---	---	>60	---	Moderate	Moderate.
EkB Elk	B	Rare	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
EkC Elk	B	Occasional	Brief	Jan-Jun	>6.0	---	---	>60	---	Moderate	Moderate.
En*:											
Elk	B	Frequent	Brief	Jan-Jun	>6.0	---	---	>60	---	Moderate	Moderate.
Nolin	B	Frequent	Brief to long.	Dec-Jul	3.0-6.0	Apparent	Feb-Mar	>60	---	Low	Moderate.
FaE Fairmount	D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low.
FwF*:											
Fairmount	D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low.
Woolper	C	None	---	---	>6.0	---	---	>60	---	Moderate	Low.
FyC2, FyD2 Faywood	C	None	---	---	>6.0	---	---	20-40	Hard	High	Moderate.
GbD2*:											
Grayford	B	None	---	---	>6.0	---	---	40-60	Hard	High	Moderate.
Beasley	C	None	---	---	>6.0	---	---	40-60	Soft	Moderate	Moderate.
Hu Huntington	B	Occasional	Brief	Dec-May	>6.0	---	---	>60	---	Low	Moderate.

See footnote at end of table.

TABLE 16.--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			
Lc----------------- Lawrence	C	Rare---------	---	---	1.0-2.0	Perched	Dec-Apr	>60	---	High------	High.
LoB, LoC, LsC3----- Lowell	C	None---------	---	---	>6.0	---	---	>40	Hard	High------	Moderate.
Mc----------------- McGary	C	None---------	---	---	1.0-3.0	Apparent	Jan-Apr	>60	---	High------	Low.
Ne----------------- Newark	C	Frequent----	Brief to long.	Jan-Apr	0.5-1.5	Apparent	Dec-May	>60	---	High------	Low.
NhB, NhC----------- Nicholson	C	None---------	---	---	1.5-2.5	Perched	Jan-Apr	>60	---	High------	Moderate.
No----------------- Nolin	B	Occasional	Brief to long.	Feb-May	3.0-6.0	Apparent	Feb-Mar	>60	---	Low-------	Moderate.
OtA---------------- Otwell	C	Occasional	Brief------	Jan-May	2.0-3.5	Perched	Jan-Apr	>60	---	Moderate	High.
OtB---------------- Otwell	C	Rare---------	---	---	2.0-3.5	Perched	Jan-Apr	>60	---	Moderate	High.
Pt*. Pits, quarries											
RoA, RoB----------- Rossmoyne	C	None---------	---	---	1.5-3.0	Perched	Jan-Apr	>60	---	High------	High.
RyB, RyC----------- Ryker	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
ShB---------------- Shelbyville	B	None---------	---	---	>6.0	---	---	>50	---	Moderate	Moderate.
WeD, WhB----------- Wheeling	B	None---------	---	---	>6.0	---	---	>60	---	Low-------	Moderate.
WoB, WoC, WoD------ Woolper	C	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--PHYSICAL ANALYSIS OF SELECTED SOILS

(TR means trace. The pedons are typical of their respective 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			Size class and particle diameter (mm)							Textural class*
				Sand							
	Sand (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	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 sand (2-0.1)	Very fine sand plus silt (0.1-0.002)	
	Pct <2mm										
Beasley silty clay loam: (80KY-223-29)											
Ap1--- 0 to 2	1.4	71.8	26.8	0.1	0.2	0.2	0.4	0.5	0.9	72.3	Sil
Ap2--- 2 to 6	2.1	68.1	29.8	0.3	0.3	0.3	0.6	0.6	1.5	68.7	Sicl
Bt1--- 6 to 12	2.0	50.1	47.9	0.1	0.2	0.3	0.7	0.7	1.3	50.8	Sic
Bt2---12 to 20	4.0	40.3	55.7	0.5	0.6	0.6	1.2	1.1	2.9	41.4	Sic
Bt3---20 to 28	3.1	39.9	57.0	0.2	0.6	0.5	1.0	0.8	2.3	40.7	C
C-----28 to 41	3.1	67.4	29.5	0.3	0.9	0.6	0.7	0.6	2.5	68.0	Sicl
Cr----41 to 56	2.4	60.2	37.4	0.2	0.3	0.2	0.5	1.2	1.2	61.4	Sicl
Cincinnati silt loam: (80KY-223-25)											
Ap---- 0 to 10	4.1	77.3	18.6	0.1	0.6	0.9	1.4	1.1	3.0	78.4	Sil
BA----10 to 14	2.7	71.2	26.1	TR	0.5	0.7	0.9	0.6	2.1	71.8	Sil
Bt----14 to 27	3.2	64.8	32.0	0.1	0.4	0.7	1.1	0.9	2.3	65.7	Sicl
2Btx1-27 to 42	16.2	64.9	18.9	1.2	3.8	3.3	5.1	2.8	13.4	67.7	Sil
2Btx2-42 to 55	14.8	59.8	25.4	1.0	2.4	2.9	5.3	3.2	11.6	63.0	Sil
2Bt1--55 to 69	21.6	47.3	31.1	1.2	2.7	4.2	8.1	5.4	16.2	52.7	Cl
2Bt2--69 to 81	22.3	44.8	32.9	1.1	2.8	4.5	8.5	5.4	16.9	50.2	Cl
2Bt3--81 to 93	13.0	50.9	36.1	4.2	3.6	1.5	2.0	1.7	11.3	52.6	Sicl
Lawrence silt loam: (80KY-103-31)											
Ap---- 0 to 8	15.0	66.6	18.4	0.7	1.5	1.5	4.9	6.4	8.6	73.0	Sil
Bt1--- 8 to 19	10.7	58.3	31.0	0.2	0.7	0.9	3.6	5.4	5.3	63.7	Sicl
Bt2---19 to 25	13.7	55.9	30.4	0.1	0.4	1.0	4.7	7.6	6.1	63.3	Sicl
Btx1--25 to 38	20.0	53.0	27.0	TR	0.3	1.7	8.3	9.7	10.3	62.7	Sicl
Btx2--38 to 49	17.2	59.8	23.0	0.1	0.1	0.6	4.8	11.6	5.6	71.4	Sil
Btx3--49 to 78	10.7	63.9	25.4	TR	0.1	0.6	3.0	7.0	3.7	70.9	Sil

See footnote at end of table.

TABLE 17.--PHYSICAL ANALYSIS OF SELECTED SOILS--Continued

Soil name, report number, horizon, and depth in inches	Total			Size class and particle diameter (mm)							
				Sand							
	Sand (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	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 sand (2-0.1)	Very fine sand plus silt (0.1-0.002)	Textural class*
	Pct <2mm										
Lowell silt loam: (80KY-103-30)											
Ap---- 0 to 8	3.9	73.1	23.0	0.2	0.9	1.0	1.1	0.7	3.2	73.8	Sil
Bt1--- 8 to 18	4.8	57.0	38.2	0.2	1.0	1.2	1.5	0.9	3.9	57.9	Sicl
Bt2---18 to 26	7.7	53.1	39.2	0.4	1.7	1.9	2.3	1.4	6.3	54.5	Sicl
Bt3---26 to 38	13.8	36.8	49.4	0.9	2.6	2.6	4.4	3.3	10.5	40.1	C
Bt4---38 to 51	2.6	36.7	60.7	0.1	0.1	0.2	1.2	1.0	1.6	37.7	C
BC----51 to 60	4.5	41.1	54.4	0.5	0.6	0.6	1.7	1.1	3.4	42.2	Sic
C-----60 to 74	18.3	49.5	32.2	5.7	4.6	2.5	3.3	2.2	16.1	51.7	Sicl
Rossmoyne silt loam: (80KY-223-28)											
Ap---- 0 to 8	4.0	81.9	14.1	0.4	1.0	0.6	0.7	1.3	2.7	83.2	Sil
BA---- 8 to 16	3.2	77.7	19.1	0.3	0.7	0.5	0.6	1.1	2.1	78.8	Sil
Bt1---16 to 23	2.9	71.7	25.4	0.2	0.6	0.5	0.5	1.1	1.8	72.8	Sil
2Btx1-23 to 35	3.3	65.3	31.4	---	0.3	0.5	1.0	1.5	1.8	66.8	Sicl
2Btx2-35 to 45	6.9	67.2	25.9	0.1	0.7	1.4	2.6	2.1	4.8	69.3	Sil
2Btx3-45 to 54	11.8	63.2	25.0	0.3	1.5	2.4	4.6	3.0	8.8	66.2	Sil
2BC1--54 to 67	15.2	55.8	29.0	0.9	1.9	3.1	5.7	3.6	11.6	59.4	Sicl
2BC2--67 to 82	11.7	46.0	42.3	0.6	1.5	2.3	4.4	2.9	8.8	48.9	Sic
Ryker silt loam: (80KY-223-26)											
Ap---- 0 to 9	3.6	76.4	20.0	0.2	0.6	0.6	1.1	1.1	2.5	77.5	Sil
Bt1--- 9 to 17	2.1	68.8	29.1	---	0.3	0.5	0.7	0.6	1.5	69.4	Sicl
Bt2---17 to 26	5.1	69.0	25.9	0.4	0.9	1.1	1.7	1.0	4.1	70.0	Sil
Bt3---26 to 37	10.7	64.5	24.8	1.1	2.1	2.1	3.5	1.9	8.8	66.4	Sil
2Bt4--37 to 50	10.9	57.9	31.2	1.0	1.9	2.2	3.8	2.0	8.9	59.9	Sicl
2Bt5--50 to 62	12.5	56.6	30.9	0.6	1.9	2.7	4.7	2.6	9.9	59.2	Sicl
2Bt6--62 to 80	18.5	49.7	31.8	0.8	2.3	3.9	7.3	4.2	14.3	53.9	Sicl
2Bt7--80 to 90	28.6	44.7	26.7	1.9	4.0	5.7	10.7	6.3	22.3	51.0	L

* L means loam; sil, silt loam; cl, clay loam; sicl, silty clay loam; sic, silty clay; and c, clay.

TABLE 18.--CHEMICAL ANALYSIS OF SELECTED SOILS

(TR indicates trace amounts of the element. The pedons are typical of their respective series in the survey area. For the location of the pedons, see the section "Soil Series and Their Morphology")

Soil name, report number, horizon, and depth in inches	pH H_2O 1:1	pH KCl 1N 1:1	Extractable cations Ca	Extractable cations Mg	Extractable cations K	Extractable cations Na	Extractable cations Total (TEC)	Cation-exchange capacity Ammonium acetate	Cation-exchange capacity Sum of cations	Extractable acidity	Hydrogen plus aluminum	Base saturation Ammonium acetate	Base saturation Sum of cations	Organic matter	Calcium carbonate equivalent	Phosphorus	Potassium
			---------Milliequivalents per 100 grams of soil----------									Pct	Pct	Pct	Pct	Ppm	Ppm
Beasley silty clay loam: (80KY-223-29)																	
Ap1--- 0 to 2	5.8	5.1	8.1	7.5	0.3	0.3	16.2	30.6	31.0	14.7	0.2	53	52	9.5	0.5	14.5	99
Ap2--- 2 to 6	5.8	4.5	4.9	5.9	0.3	0.2	11.3	22.9	22.4	11.1	2.4	49	50	2.3	0.4	5	102
Bt1--- 6 to 12	6.4	5.2	6.3	12.1	0.3	0.4	19.1	35.0	26.8	7.7	0.1	55	71	0.6	0.3	2	180
Bt2---12 to 20	7.4	6.0	6.4	17.5	0.3	0.6	24.8	39.3	30.3	5.5	TR	63	82	0.4	0.4	1	137
Bt3---20 to 28	7.9	6.8	6.7	23.0	0.3	1.0	31.0	37.6	33.7	2.7	TR	82	92	0.5	0.6	1.5	114
C-----28 to 41	8.4	7.5	11.0	10.4	0.1	0.7	22.2	16.3	25.8	3.6	0.4	136	86	0.2	15.8	1	68
Cr----41 to 56	8.4	7.6	11.2	10.1	0.2	0.9	22.4	16.1	24.3	1.9	0.4	139	92	0.1	18.1	2	105
Cincinnati silt loam: (80KY-223-25)																	
Ap---- 0 to 10	7.6	6.9	6.8	3.0	0.1	0.1	10.0	15.3	16.1	6.1	TR	65	62	2.1	1.0	14	50
BA----10 to 14	7.5	6.5	5.6	2.7	0.1	0.2	8.6	15.3	14.5	5.8	TR	56	59	0.6	0.4	3	74
Bt----14 to 27	7.2	6.3	7.6	3.8	0.2	0.3	11.9	21.0	18.7	6.8	TR	57	64	0.5	0.1	2.5	99
2Btx1-27 to 42	5.0	3.6	1.4	1.3	0.1	0.1	2.9	14.3	19.9	16.9	0.2	20	15	0.2	0.1	1	53
2Btx2-42 to 55	4.9	3.5	0.8	1.4	0.1	0.2	2.5	15.0	14.6	12.1	0.4	17	17	0.2	0.1	1	43
2Bt1--55 to 69	4.9	3.6	1.8	2.7	0.1	0.2	4.8	19.6	20.3	15.5	0.1	24	24	0.2	0.1	1	46
2Bt2--69 to 81	4.9	3.5	3.0	4.1	0.1	0.4	7.6	22.1	22.6	15.0	1.9	34	34	0.2	0.1	1	55
2Bt3--81 to 93	5.2	3.9	3.3	4.3	0.1	0.5	8.2	20.2	19.7	11.5	0.3	41	42	0.2	0.1	1	52
Lawrence silt loam: (80KY-103-31)																	
Ap---- 0 to 8	6.1	5.0	5.2	1.5	0.1	0.1	6.9	14.8	13.9	7.0	0.1	47	50	1.6	0.4	15	37
Bt1--- 8 to 19	4.6	3.5	1.8	1.4	0.2	0.2	3.6	21.5	20.0	16.3	1.5	17	18	0.4	0.3	4	79
Bt2---19 to 25	4.8	3.3	0.8	1.6	0.2	0.2	2.8	22.4	24.4	18.9	1.2	12	11	0.3	0.4	4	96
Btx1--25 to 38	5.0	3.3	0.3	1.8	0.2	0.3	2.6	23.2	20.4	17.8	1.7	11	13	0.2	0.3	7	92
Btx2--38 to 49	5.0	3.2	1.2	2.7	0.2	0.4	4.5	15.0	17.4	13.0	0.8	30	26	0.2	0.3	14	84
Btx3--49 to 78	5.1	3.3	2.8	5.1	0.2	0.6	8.7	21.1	19.3	10.6	0.7	41	45	0.3	0.3	17	86

TABLE 18.--CHEMICAL ANALYSIS OF SELECTED SOILS--Continued

Soil name, report number, horizon, and depth in inches	pH H_2O 1:1	pH KCl 1N 1:1	Extractable cations Ca	Extractable cations Mg	Extractable cations K	Extractable cations Na	Extractable cations Total (TEC)	Cation-exchange capacity Ammonium acetate	Cation-exchange capacity Sum of cations	Extractable acidity	Hydrogen plus aluminum	Base saturation Ammonium acetate	Base saturation Sum of cations	Organic matter	Calcium carbonate equivalent	Phosphorus	Potassium
			--Milliequivalents per 100 grams of soil--									Pct	Pct	Pct	Pct	Ppm	Ppm
Lowell silt loam: (80KY-103-30)																	
Ap---- 0 to 8	5.7	5.1	9.8	1.0	0.2	0.3	11.3	20.0	22.4	11.1	0.1	57	50	3.1	0.3	63	68
Bt1--- 8 to 18	5.7	4.3	11.0	1.1	0.2	0.4	12.7	25.9	26.8	14.1	TR	49	47	0.5	0.3	103	94
Bt2---18 to 26	5.4	3.8	10.6	1.1	0.2	0.4	12.3	32.2	30.8	18.5	2.1	38	40	0.3	0.4	175	94
Bt3---26 to 38	5.4	3.6	10.1	2.1	0.3	0.5	13.0	45.8	34.0	21.1	1.8	28	38	0.2	0.2	135	121
Bt4---38 to 51	6.5	5.4	28.9	2.8	0.2	0.5	32.4	41.7	40.7	8.3	TR	78	80	0.3	0.4	15	110
BC----51 to 60	7.3	6.5	30.8	2.3	0.2	0.4	33.7	40.3	40.0	6.3	0.1	84	84	0.2	2.2	14	93
C-----60 to 74	7.8	7.0	20.8	0.8	0.1	0.4	22.1	18.1	27.2	5.1	0.1	122	81	0.2	14.7	3	73
Rossmoyne silt loam: (80KY-223-28)																	
Ap---- 0 to 8	6.4	5.7	5.4	1.5	0.1	0.1	7.1	12.2	17.4	10.3	TR	58	41	2.6	0.2	4	46
BA---- 8 to 16	6.4	5.0	3.4	0.9	0.1	0.1	4.5	10.2	10.6	6.1	TR	44	42	0.7	0.1	2	41
Bt1---16 to 23	5.0	3.8	2.2	1.3	0.1	0.3	3.9	16.3	17.2	13.3	0.8	24	23	0.5	0.2	1	70
2Btx1-23 to 35	4.8	3.6	2.3	4.7	0.2	0.4	7.6	25.4	24.1	16.6	5.1	30	32	0.3	0.1	1	134
2Btx2-35 to 45	4.7	3.5	2.4	5.3	0.2	0.5	8.4	21.2	22.6	14.1	0.4	40	37	0.2	0.3	1	92
2Btx3-45 to 54	5.1	3.7	3.1	6.6	0.2	0.6	10.5	19.1	18.3	7.8	0.5	55	57	0.2	0.1	1	83
2BC1--54 to 67	6.5	5.1	3.4	8.0	0.1	0.7	12.2	19.5	16.9	4.7	TR	63	72	0.3	0.4	1	72
2BC2--67 to 82	6.9	5.8	7.2	11.5	0.1	0.8	19.6	28.0	24.1	4.5	0.1	70	81	0.1	0.2	1	72
Ryker silt loam: (80KY-223-26)																	
Ap---- 0 to 9	7.0	6.5	9.0	1.9	0.5	0.1	11.5	17.2	18.2	6.7	TR	67	63	2.3	1.8	37.5	206
Bt1--- 9 to 17	7.1	6.1	7.9	2.5	0.4	0.1	10.9	20.1	18.6	7.8	TR	54	58	0.5	0.3	3	168
Bt2---17 to 26	7.0	5.9	7.0	2.2	0.3	0.1	9.6	18.1	20.9	11.3	TR	53	46	0.5	0.2	2	113
Bt3---26 to 37	6.8	5.7	6.0	1.6	0.2	0.1	7.9	15.4	15.3	7.4	TR	51	52	0.3	0.3	3	91
2Bt4--37 to 50	6.5	5.4	4.8	2.7	0.3	0.1	7.9	16.5	18.2	10.3	TR	48	43	0.3	0.3	3.5	117
2Bt5--50 to 62	5.7	4.6	3.7	2.9	0.4	0.1	7.1	15.7	17.4	10.3	0.1	45	41	0.3	0.3	2.5	161
2Bt6--62 to 80	4.9	3.8	2.5	2.5	0.4	0.1	5.5	15.8	17.6	12.1	0.4	35	31	0.2	0.4	1.5	167
2Bt7--80 to 90	5.1	3.9	2.1	1.9	0.4	0.1	4.5	13.1	13.4	8.9	1.2	34	34	0.2	0.3	1.5	148

TABLE 19.--SAND MINERALOGY OF SELECTED SOILS

(Dashes indicate that the mineral was not detected. TR indicates trace amounts of the mineral. The pedons are typical of their respective 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				Percent weatherable minerals										
	Quartz	Opaques*	Resistant aggregates	Total resistant minerals	Hornblende	Tourmaline	Biotite	Zircon	Chlorite	Muscovite	Plagioclase feldspar	Potassium feldspar	Plant opal	Epidote	Weatherable aggregates
Cincinnati silt loam: (80KY-223-25)															
Bt-----14 to 27	80	1	---	81	TR	TR	1	TR	---	1	---	17	---	TR	---
2Btx2--42 to 55	87	1	---	88	TR	TR	TR	---	---	TR	---	11	TR	TR	---
2Bt2---69 to 81	92	1	---	93	---	TR	2	---	---	TR	---	3	---	1	---
Lawrence silt loam: (80KY-103-31)															
Bt1---- 8 to 19	80	3	---	83	TR	TR	1	TR	---	1	---	14	TR	1	---
Rossmoyne silt loam: (80KY-223-28)															
Bt1----16 to 23	82	2	---	84	TR	---	1	---	---	TR	---	14	1	TR	---
Ryker silt loam: (80KY-223-26)															
Bt2----17 to 26	79	3	---	82	---	TR	1	TR	---	1	---	16	---	TR	---

* Includes plant opal, tourmaline, and zircon.

TABLE 20.--CLAY MINERALOGY OF SELECTED SOILS

Soil name, report number, horizon, and depth in inches	Potassium	Iron	Relative amounts of clay minerals*					Kaolinite
			Montmorillinite	Mica	Kaolinite	Chlorite	Vermiculite	
	Pct	Pct						Pct
Beasley silty clay loam: (80KY-223-29)								
Bt2----12 to 20	2.4	6.0	4	2	2	3	---	32
Lowell silt loam: (80KY-103-30)								
Bt2----18 to 26	2.2	7.0	2	2	2	---	3	23

* Relative amounts: 5 means dominant; 4, abundant; 3, moderate; 2, small; and 1, trace.

TABLE 21.--ENGINEERING INDEX TEST DATA

(The pedons are typical of their respective series in the survey area. For the location of the pedons, see the section "Soil Series and Their Morphology")

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution											Liquid limit	Plasticity index	Moisture density		Specific gravity
			Percentage passing sieve--								Percentage smaller than--					Maximum dry density	Optimum moisture	
	AASHTO	Unified	3 in.	2 in.	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm	Pct		Lb/cu ft	Pct	
Beasley silty clay loam: (80 KY-223-29)																		
Bt2----12 to 20	A-7-6	CH	100	100	100	100	100	100	100	96	86	65	46	60	33	99	21	2.71
C------28 to 41	A-6	CL	100	100	100	100	100	100	100	92	67	43	31	39	17	113	17	2.80
Cincinnati silt loam: (80KY-223-25)																		
Bt-----14 to 27	A-7-5	CL	100	100	100	100	100	100	100	100	75	43	25	41	17	107	19	2.71
2Btx1--27 to 42	A-4	CL	100	100	100	100	100	100	100	83	62	30	18	27	9	112	15	2.68
2Bt1---55 to 69	A-6	CL	100	100	100	100	100	100	100	77	62	39	28	37	16	106	19	2.72
2Bt3---81 to 93	A-7-5	CL	100	100	100	100	100	100	100	83	64	43	31	43	21	111	18	2.81
Lawrence silt loam: (80KY-103-31)																		
Bt1---- 8 to 19	A-6	CL	100	100	100	100	100	100	100	100	68	42	26	37	15	104	19	2.70
Btx1---25 to 38	A-6	CL	100	100	100	100	100	100	100	94	65	39	29	35	14	108	17	2.70
Btx3---49 to 78	A-6	CL	100	100	100	100	100	100	100	94	68	36	19	32	12	108	16	2.72
Lowell silt loam: (80KY-103-30)																		
Bt1---- 8 to 18	A-6	CL	100	100	100	100	100	100	100	100	81	49	33	38	17	104	19	2.72
Bt4----38 to 51	A-7-6	CH	100	100	100	100	100	100	100	100	87	74	53	58	32	100	23	2.74
Rossmoyne silt loam: (80KY-223-28)																		
Bt1----16 to 23	A-6	ML	100	100	100	100	100	100	100	96	62	36	21	37	12	106	17	2.70
2Btx2,																		
2Btx3--35 to 54	A-6	CL	100	100	100	100	100	100	100	90	64	30	18	33	12	112	18	2.64
2BC1---54 to 67	A-6	CL	100	100	100	100	100	100	100	83	62	30	18	34	16	115	15	2.71

TABLE 21.--ENGINEERING INDEX TEST DATA--Continued

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution											Liquid limit	Plasticity index	Moisture density		Specific gravity
			Percentage passing sieve--								Percentage smaller than--					Maximum dry density	Optimum moisture	
	AASHTO	Unified	3 in.	2 in.	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm					
														Pct		Lb/cu ft	Pct	
Ryker silt loam: (80KY-223-26)																		
Bt1---- 9 to 17	A-6	CL	100	100	100	100	100	100	100	96	82	62	38	40	17	105	18	2.71
2Bt4---37 to 50	A-6	CL	100	100	100	100	100	100	100	90	67	36	28	37	16	107	18	2.71
2Bt6---62 to 80	A-6	CL	100	100	100	100	100	100	100	83	69	39	25	38	17	107	17	2.72

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
Boonesboro	Fine-loamy, mixed, mesic Fluventic Hapludolls
Brassfield	Fine-loamy, carbonatic, mesic Rendollic Eutrochrepts
Chenault	Fine-loamy, mixed, mesic Typic Hapludalfs
Cincinnati	Fine-silty, mixed, mesic Typic Fragiudalfs
Eden	Fine, mixed, mesic Typic Hapludalfs
Elk	Fine-silty, mixed, mesic Ultic Hapludalfs
Fairmount	Clayey, mixed, mesic Lithic Hapludolls
Faywood	Fine, mixed, mesic Typic Hapludalfs
*Grayford	Fine-loamy, mixed, mesic Ultic Hapludalfs
Huntington	Fine-silty, mixed, mesic Fluventic Hapludolls
Lawrence	Fine-silty, mixed, mesic Aquic Fragiudalfs
Lowell	Fine, mixed, mesic Typic Hapludalfs
McGary	Fine, mixed, mesic Aeric Ochraqualfs
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
Rossmoyne	Fine-silty, mixed, mesic Aquic Fragiudalfs
Ryker	Fine-silty, mixed, mesic Typic Paleudalfs
Shelbyville	Fine-silty, mixed, mesic Mollic Hapludalfs
Wheeling	Fine-loamy, mixed, mesic Ultic Hapludalfs
Woolper	Fine, mixed, mesic Typic Argiudolls

TABLE 23.--GEOLOGIC SYSTEMS, FORMATIONS, AND MEMBERS

System	Formation, member, and bed	Range in thickness	Dominant soils
		Ft	
Quaternary	Alluvium	0-80	Huntington, Nolin, Newark.
	Loess	0-10	Shelbyville, Nicholson.
	Lacustrine deposits	0-30	Wheeling,
	Loamy deposits	0-100	Elk, Otwell.
	Glacial till	0-30	Ryker, Cincinnati, Rossmoyne, Grayford.
	High-level fluvial deposits	0-30	Chenault.
Silurian	Louisville Limestone and Waldron Shale	20-40	Nicholson, Ryker, Cincinnati.
	Laurel Dolomite	45-55	Nicholson, Shelbyville, Cincinnati, Rossmoyne, Grayford.
	Osgood Formation	10-25	Brassfield,
	Brassfield Formation	0-5	Beasley, Grayford.
Ordovician	Drakes Formation:		
	Saluda Dolomite	45-75	Beasley,
	Bardstown Member	20-60	Nicholson.
	Rowland Member	0-60	
	Bull Fork	50-225	Lowell, Faywood, Fairmount.
	Grant Lake	30-110	Lowell,
	Calloway Creek	150-240	Faywood, Shelbyville, Nicholson, Fairmount.
	Kope and Clays Ferry	150-265	Eden, Lowell.
	Lexington Limestone:		
	Tanglewood	0-25	Fairmount,
	Millersburg	40-55	Faywood.
	Grier	100+	

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