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 Allen County, Kentucky

How To Use This Soil Survey

General Soil Map

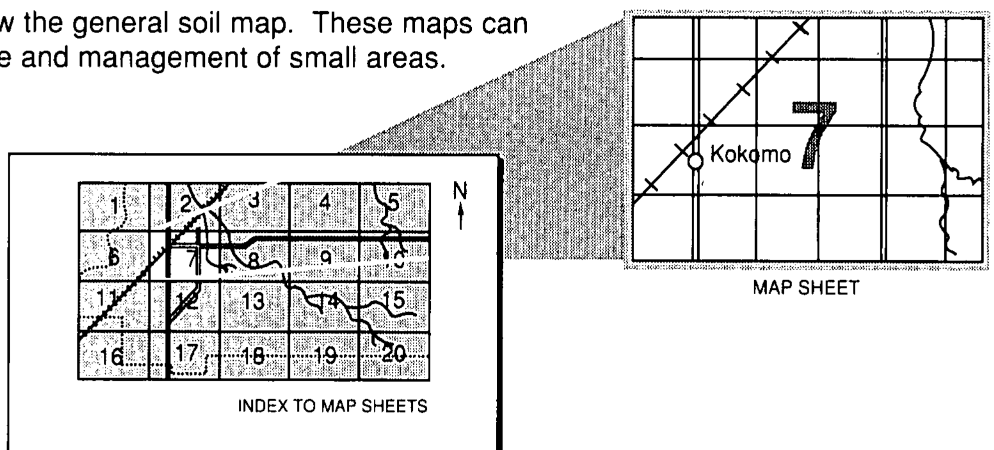
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

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

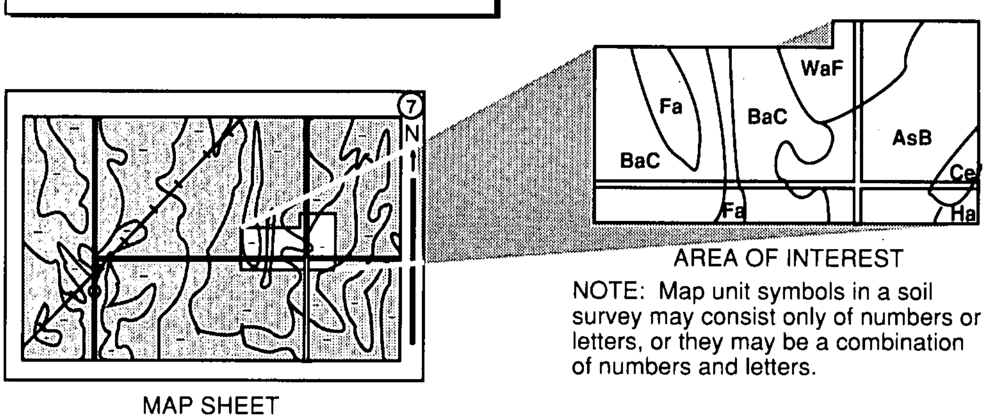
Detailed Soil Maps

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

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.



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.



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

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

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

Major fieldwork for this soil survey was completed in 1984. Soil names and descriptions were approved in 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1984. 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 Allen 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: In Allen County, Christian gravelly silt loam, 2 to 6 percent slopes, eroded, is well suited to pasture and cropland.

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Issued September 1989

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Foreword

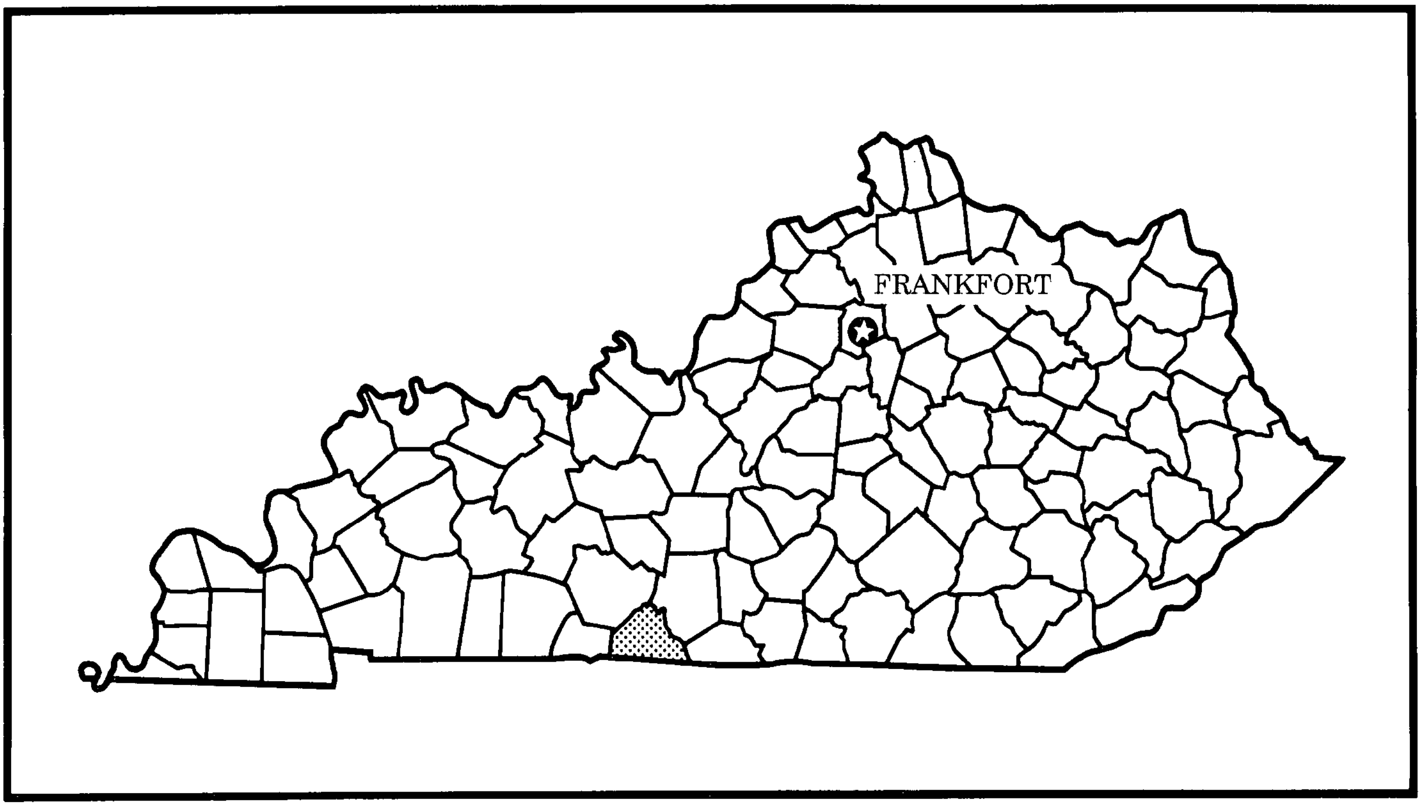
This soil survey contains information that can be used in land-planning programs in Allen County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of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

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

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

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

Randall W. Giessler
State Conservationist
Soil Conservation Service



Location of Allen County in Kentucky.

Soil Survey of
Allen County, Kentucky

By Arlin J. Barton, Soil Conservation Service

Soils surveyed by Arlin J. Barton, Edward B. Campbell, Harry S. Evans, and Stephen J. Chapin, Soil Conservation Service, and Mark Davis, Kentucky Natural Resources and Environmental Protection Cabinet

Maps compiled by Karen K. Simpson and Patricia L. Black, 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

ALLEN COUNTY is in the south-central part of Kentucky. The total area is 224,660 acres, or 351 square miles. Scottsville, the county seat, is near the center of the county. In 1985, the county had a population of 14,623 *(15)*.

The soils in Allen County have a wide range of textures, natural drainage, and other characteristics.

General Nature of the Survey Area

Allen County was formed in 1815 from parts of Warren and Barren Counties *(40)*. The county was named for Colonel John Allen, who was killed in the Battle of the River Raisin in Michigan in 1813. The county was settled before the Revolutionary War by pioneers from Virginia and North Carolina. Daniel Boone was one of those pioneers. In 1770, a party of hunters from Virginia came to the area. After they returned home and reported on the rich, fertile land, the clear flowing streams, and the abundant fish and wildlife, pioneers began to enter the area. The increase in population was very slow until the close of the Revolutionary War. Land grants were given to the Revolutionary soldiers for their services.

Farming has been important since Allen County was first settled; however, up to the time of the Revolution, the agricultural resources in the area were relatively undeveloped. Farming has since become the major industry in the county.

Oil, limestone, sand, and gravel are the nonagricultural economic products of Allen County. Oil production is the most important product but is declining at this time.

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 Scottsville, Kentucky, for the period 1951 to 1980. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 36 degrees F, and the average daily minimum temperature is 29 degrees. The lowest temperature on record, which occurred at Scottsville on January 24, 1963, is -20 degrees. In summer the average temperature is 76 degrees, and the average daily maximum temperature is 87 degrees. The highest recorded temperature, which occurred at Scottsville on July 27, 1952, is 108 degrees.

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

The total annual precipitation is 52 inches. Of this, 26 inches, or 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 9.68 inches at Scottsville on June 23, 1969. Thunderstorms occur on about 47 days each year, and most occur in summer.

The average snowfall is 15 inches. The greatest snow depth at any one time during the period of record was 10 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, 12 miles per hour, early in spring.

Physiography, Drainage, Topography, and Geology

Allen County lies in the Eastern Pennyroyal physiographic region of the Mississippi Plateau *(19)*. The region is characterized as a rolling upland plain.

The drainage pattern throughout the county is that of stream-cut topography. The south-central and eastern parts of the county are dissected by the Barren River, Pinchgut Creek, and Long Creek. These streams flow northward into Barren River Lake. The Barren River forms most of the eastern and northern boundaries of Allen County. The central and northern parts of the county are drained by Difficult Creek, Little Difficult Creek, and Bays Fork. These streams flow northward into the Barren River. The southwestern and western parts of Allen County are drained by Trammel Creek, Middle Fork, and Sulphur Creek. These streams flow northwest into Warren County.

The elevation ranges from about 450 feet at the junction of Bays Fork and the Barren River to about 937 feet at Mt. Union Church in the south-central part of the county. The northern part of the county is underlain by soluble limestone and has numerous sinkholes.

The soils are influenced by the weathering or decomposition of rocks and minerals of the Fort Payne Formation and the St. Louis, Salem, and Warsaw Limestones of the Mississippian System; the Chattanooga Shale of the Devonian System; the Laurel Dolomite and Louisville Limestone of the Silurian System; and the Cumberland Formation of the Ordovician System *(20, 39)*.

The St. Louis, Salem, and Warsaw Limestones underlie about 45 percent of Allen County. These limestones are mostly in the western and north-central parts of the county. The Fort Payne Formation underlies the southern and eastern parts of the county. The Chattanooga Shale, the Cumberland Formation, and the Louisville Limestone and Laurel Dolomite Formations are in the southeastern part of the county along the Barren River and its tributaries.

Farming

Farm products are the main source of income in Allen County. In 1982, the U.S. Census of Agriculture reported 1,290 farms *(38)*. The average farm size was 124 acres. Average farm income from crops was 7,272 dollars, and income from livestock was 7,795 dollars. Sales of 5,000 dollars or more were reported from 729 farms. Of those, 74 percent were operated by full owners, 19 percent were operated by part-time owners, and 7 percent were operated by tenants. According to the National Resource Inventory Estimates of 1982, about 48,900 acres was used as cropland, about 71,400 acres was used as pastureland, and about 78,200 acres was used as woodland *(13, 21)*.

Tobacco, corn, soybeans, wheat, and hay were the crops harvested. Tobacco is the most important cash crop grown in Allen County. Clover, lespedeza, and alfalfa are the most important forage crops.

Beef cattle, hogs, and dairy cattle are the most important livestock in Allen County. In the 1982 U.S. Census of Agriculture, the number of cattle, including beef cattle and dairy cattle, was 35,056, and the number of hogs was 19,453.

How This Survey Was Made

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

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

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

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, soil 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.

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

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

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

Map Unit Composition

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

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

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

General Soil Map Units

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

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

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

1. Christian-Mountview-Bedford

Deep, gently sloping to moderately steep, well drained and moderately well drained soils that have a clayey subsoil or a loamy and clayey subsoil and that formed in residuum or old alluvium from limestone, sandstone, siltstone, and shale or in loess over residuum from limestone; on upland ridgetops and side slopes

This map unit is made up of relatively broad ridgetops, side slopes, and valleys dissected by small streams and waterways (fig. 1). Much of the landscape is karst topography. Slopes range from 2 to 20 percent.

This map unit makes up about 48 percent of the survey area. It is about 50 percent Christian soils, 11 percent Mountview soils, 6 percent Bedford soils, and 33 percent minor soils.

Christian soils are well drained and are on ridgetops and side slopes. These soils formed in residuum or old alluvium from limestone, sandstone, siltstone, and shale. Typically, the surface layer is dark brown gravelly silt loam or gravelly silty clay loam. The upper part of the subsoil is yellowish red gravelly silty clay and red and dark red gravelly clay. The lower part is dark red, mottled clay.

Mountview soils are well drained and are on ridgetops and side slopes. These soils formed in a silty mantle over residuum from limestone. Typically, the surface layer is yellowish brown silt loam. The upper part of the subsoil is strong brown silty clay loam, and the lower part is red silty clay and dark red gravelly silty clay.

Bedford soils are moderately well drained and are on ridgetops. These soils formed in a silty mantle over residuum from limestone. Typically, the surface layer is dark brown silt loam. The upper part of the subsoil is yellowish brown and light yellowish brown silt loam. A firm, compact, and brittle fragipan is in the middle part. It is brown, mottled silt loam. The lower part of the subsoil is red silty clay.

The minor soils are Crider, Caneyville, and Trimble soils on ridgetops and side slopes; Elk soils on foot slopes and stream terraces; Taft soils on upland flats and stream terraces; and Skidmore, Nolin, and Newark soils on flood plains and in upland drainageways and depressions. Rock outcrop is on side slopes.

Most of the soils of this map unit are used for cultivated crops, pasture, hay, or timber. The gently sloping and sloping soils are used for cultivated crops.

The gently sloping and sloping soils are well suited to row crops, and the severely eroded, sloping and moderately steep soils are poorly suited. The main limitations are steepness of slope, the hazard of erosion, and wetness. If row crops are grown, erosion control practices are needed.

The soils of this map unit are suited to pasture and hay. If these soils are properly managed, high yields can be produced.

These soils are well suited to woodland. The main concerns in management are the erosion hazard, plant competition, and use of equipment on the steeper slopes.

These soils are suited to most recreational uses. The main limitations are steepness of slope, wetness, slow

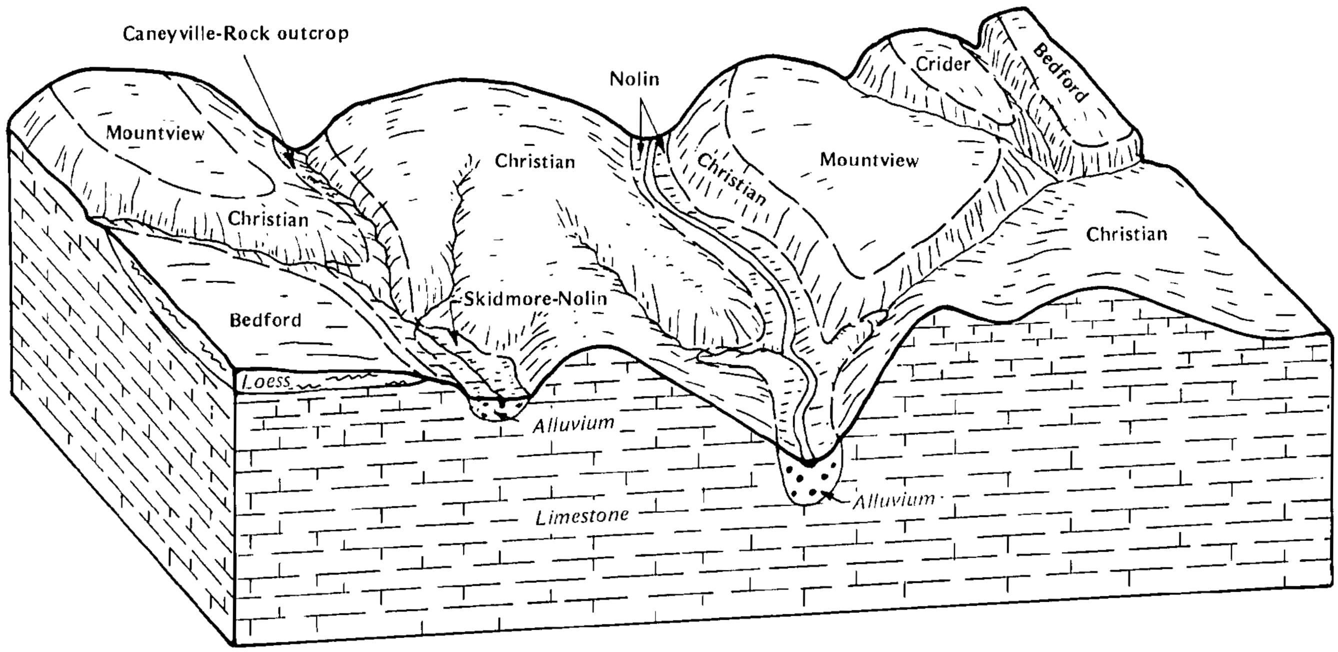


Figure 1.—Relationship of soils to topography and underlying material in the Christian-Mountview-Bedford general soil map unit.

permeability, and small stones on the surface.

These soils have good potential as habitat for openland and woodland wildlife.

The gently sloping and sloping soils are suited to most urban uses, and the moderately steep soils are poorly suited. Steepness of slope, clayey texture of the subsoil, and shrink-swell potential are the main limitations. The low strength of some of the soils is a limitation affecting local roads and streets.

2. Trimble-Bedford-Mountview

Deep, gently sloping to very steep, well drained and moderately well drained soils that have a loamy subsoil or a loamy and clayey subsoil and that formed in residuum from limestone or in loess over residuum from limestone; on upland ridgetops and side slopes

This map unit is made up of relatively broad ridgetops, side slopes, and valleys dissected by small streams and drainageways (fig. 2). Much of the landscape is karst topography. Slopes range from 2 to 50 percent.

This map unit makes up about 52 percent of the survey area. It is about 64 percent Trimble soils, 12 percent Bedford soils, 5 percent Mountview soils, and 19 percent minor soils.

Trimble soils are well drained and are on ridgetops and side slopes. These soils formed in residuum from limestone. Typically, the surface layer is dark brown gravelly silt loam. The upper part of the subsoil is yellowish brown gravelly silt loam, and the lower part is brownish yellow, strong brown, and yellowish brown gravelly clay loam and silty clay loam.

Bedford soils are moderately well drained and are on ridgetops. These soils formed in a silty mantle over residuum from limestone. Typically, the surface layer is dark brown silt loam. The upper part of the subsoil is yellowish brown and light yellowish brown silt loam. A firm, compact, and brittle fragipan is in the middle part. It is brown, mottled silt loam. The lower part of the subsoil is red silty clay.

Mountview soils are well drained and are on ridgetops. These soils formed in a silty mantle over material weathered from limestone. Typically, the surface layer is yellowish brown silt loam. The upper part of the subsoil is strong brown silty clay loam, and the lower part is red silty clay and dark red gravelly silty clay.

The minor soils are Crider, Caneyville, and Christian soils on ridgetops and side slopes; Sulphura soils on side slopes; Elk soils on stream terraces; Taft soils on upland flats and stream terraces; Newark and Nolin

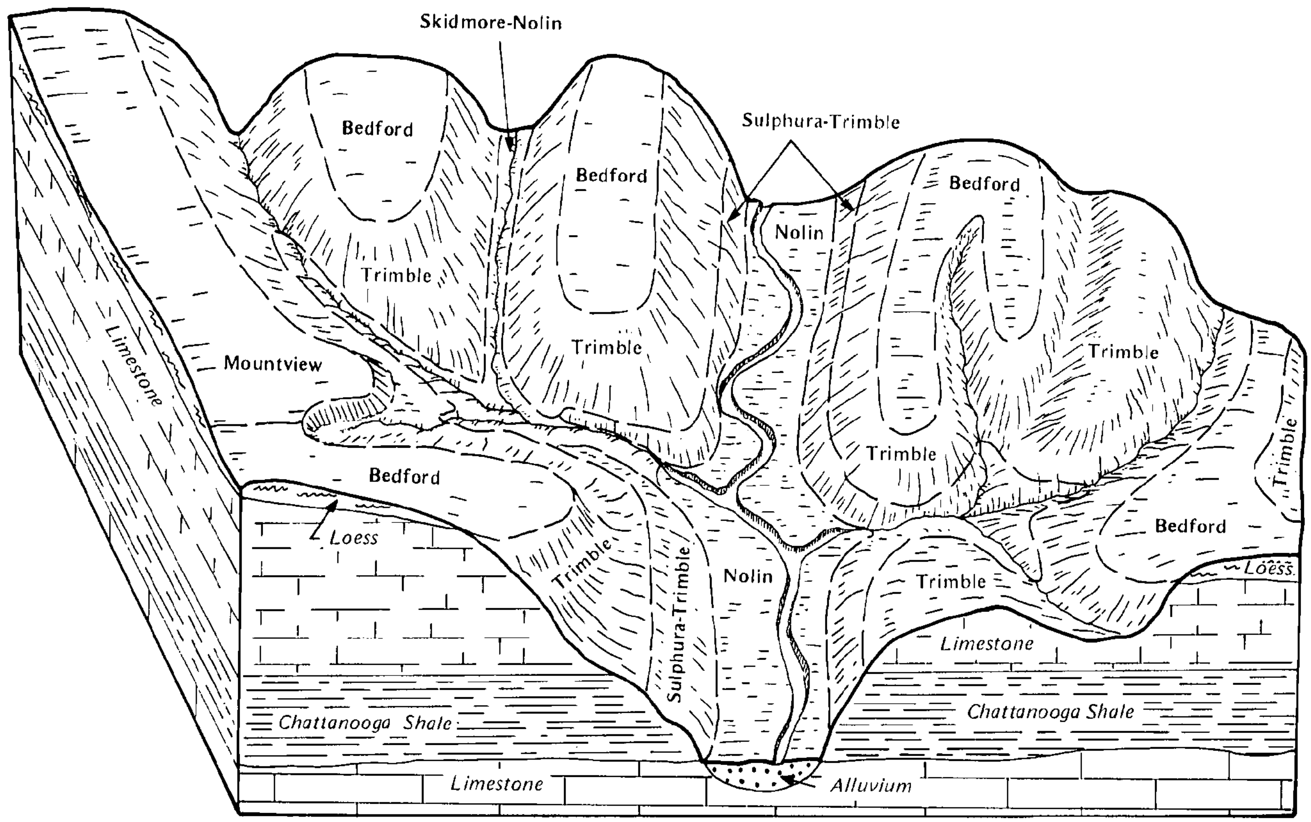


Figure 2.—Relationship of soils to topography and underlying material in the Trimble-Bedford-Mountview general soil map unit.

soils on flood plains and in upland drainageways and depressions; and Skidmore soils on narrow flood plains.

Most of the soils of this map unit are used for cultivated crops, pasture, hay, or timber. The gently sloping and sloping soils are used for row crops, hay, or pasture.

The gently sloping and sloping soils are well suited to row crops. Erosion is a hazard, and erosion control practices are needed.

The gently sloping to moderately steep soils are suited to pasture and hay. The soils on steep slopes are limited for use as pasture because of the steepness of slope and the hazard of erosion.

The soils of this map unit are well suited to woodland. The main concerns in management are the erosion hazard, plant competition, and use of equipment on the steeper slopes.

These soils are suited to most recreational uses. The main limitations are steepness of slope, wetness, slow permeability, and small stones on the surface.

These soils have good potential for use as habitat for openland and woodland wildlife.

The gently sloping and sloping soils are suited to most urban uses, and the moderately steep soils are poorly suited. Steepness of slope, wetness, and slow permeability are the main limitations.

Detailed Soil Map Units

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Mountview silt loam, 2 to 6 percent slopes, is one of two phases in the Mountview series.

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

A *soil complex* consists of two or more soils 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. Sulphura-Trimble complex, 20 to 50 percent slopes, is an example.

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

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. The Rock outcrop member of the Caneyville-Rock outcrop complex, 12 to 20 percent slopes, eroded, 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. Soil boundary lines do not completely join with those in adjoining counties because of differences in map unit design and changes in concepts of some soils.

BeB—Bedford silt loam, 2 to 6 percent slopes. This deep, gently sloping, moderately well drained soil is on ridgetops on uplands. The areas of this soil are irregular in shape and are about 3 to 30 acres.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil extends to a depth of 72 inches or more. The upper part to a depth of 27 inches is yellowish brown and light yellowish brown silt loam. A firm, compact, and brittle fragipan is at a depth of 27 to 56 inches. It is brown silt loam that has pale brown mottles and light brownish gray and yellowish brown streaks. The lower part of the subsoil is red silty clay.

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. The

Figure 3.—Bedford silt loam, 2 to 6 percent slopes, is suited to many uses, including hay and pasture.

available water capacity is moderate. The root zone is moderately deep and is restricted by the fragipan. This soil has good tilth. A seasonal high water table is at a depth of 1.5 to 3.5 feet. The shrink-swell potential is moderate. Depth to bedrock is more than 60 inches.

Included with this Bedford soil in mapping are small areas of Crider, Mountview, and Taft soils. Also included are a few areas of eroded Bedford and Christian soils. The included soils make up about 10 percent of this map unit.

This Bedford soil is used mainly for row crops, small grains, hay, or pasture.

This soil is well suited to row crops; however, wetness, moderate depth of the root zone, and moderate available water capacity are limitations. Erosion is a moderate hazard if conventional tillage is used. Conservation tillage, crop residue use, stripcropping, and contour farming help to control erosion and increase infiltration.

This soil is suited to most pasture and hay crops (fig. 3). Wetness, moderate depth of the root zone, and moderate available water capacity are limitations. Alfalfa does not grow well on this soil. Proper plant species and seeding rates are needed for adequate forage and ground cover. Periodic pasture renovation helps to maintain the desired plants. Lime and fertilizer, proper stocking, rotation grazing, and weed control are also needed.

This soil is suited to woodland but is not used extensively for timber production. Preferred trees for planting are eastern white pine, yellow poplar, white ash, sweetgum, and loblolly pine. Plant competition is the main concern in management. (See table 7 for specific information relating to potential productivity.)

This soil is suited to some urban uses. Wetness and the very slow permeability in the fragipan are limitations affecting building site development and sanitary facilities. Proper engineering techniques can help to overcome some of these limitations.

This Bedford soil is in capability subclass IIe.

CaD2—Caneyville-Rock outcrop complex, 12 to 20 percent slopes, eroded. This complex consists of moderately deep, moderately steep, well drained Caneyville soil and Rock outcrop that are on upland side slopes. Caneyville soil and Rock outcrop are too intricately mixed to be mapped separately at the selected scale. Caneyville soil is in narrow bands separated by discontinuous areas of Rock outcrop. The areas of this soil and Rock outcrop are about 25 to 100 acres. Erosion has removed about 25 to 75 percent of the original surface layer of the Caneyville soil.

Caneyville soil and similar soils make up about 45 percent of the complex and Rock outcrop about 30 percent. The included soils make up the rest.

Typically, the Caneyville soil has a dark brown silt loam surface layer about 6 inches thick. The subsoil extends to a depth of about 36 inches. The upper part to a depth of about 22 inches is yellowish red silty clay loam. The lower part is yellowish red and olive yellow clay that has strong brown and yellowish brown mottles. Limestone bedrock is at a depth of 36 inches.

Caneyville soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and the available water capacity is moderate. This soil has good tilth. The root zone is moderately deep. Bedrock is at a depth of 20 to 40 inches. The shrink-swell potential is moderate.

Rock outcrop is in the form of ledges, boulders, and cliffs. In some areas, irregularly shaped boulders, 1 to 25 feet in diameter, have broken loose from the cliffs and have accumulated downslope. Very dark gray or black clayey material up to 3 inches thick covers the limestone in some areas.

Included with this complex in mapping are small areas of Christian and Trimble soils. The included soils make up about 25 percent of this complex.

The Caneyville soil in this complex is used mainly as pastureland or woodland (fig. 4).

This complex is not suited to cultivated crops and hay because of Rock outcrop and steepness of slope.

This complex is poorly suited to pasture because of Rock outcrop and steepness of slope. Maintenance of the desired grasses and legumes is severely restricted. Plants selected should not require frequent renovation and should provide adequate ground cover. Stocking rates need to be adjusted to prevent overgrazing.

This Caneyville soil is suited to woodland. Preferred trees for planting include white oak, yellow poplar, white ash, eastern white pine, and loblolly pine on cool aspects and Virginia pine, eastern redcedar, and loblolly pine on warm aspects. The erosion hazard, plant competition, seedling mortality, and equipment use limitation are concerns in management. (See table 7 for specific information relating to potential productivity.)

This complex is poorly suited to most urban uses. Depth to bedrock, Rock outcrop, shrink-swell potential, and steepness of slope are the main limitations affecting urban uses. These limitations are difficult to overcome. Low strength is a limitation affecting local roads and streets.

Caneyville soil is in capability subclass VIe. Rock outcrop is in capability subclass VIIIs.

CaE2—Caneyville-Rock outcrop complex, 20 to 50 percent slopes, eroded. This complex consists of moderately deep, steep and very steep, well drained Caneyville soil and Rock outcrop that are on upland side slopes. Caneyville soil and Rock outcrop are too intricately mixed to be mapped separately at the selected scale. Caneyville soil is in narrow bands separated by discontinuous areas of Rock outcrop. The areas of this soil and Rock outcrop are about 15 to 75 acres. Erosion has removed about 25 to 75 percent of the original surface layer of the Caneyville soil.

Caneyville soil and similar soils make up about 45 percent of the complex and Rock outcrop makes up about 30 percent. The included soils make up the rest.

Typically, the Caneyville soil has a brown silt loam surface layer about 6 inches thick. The subsoil extends to a depth of about 36 inches. The upper part to a depth of about 22 inches is yellowish red silty clay loam. The lower part is yellowish red and olive yellow clay that has strong brown and yellowish brown mottles. Limestone bedrock is at a depth of 36 inches.

Caneyville soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and the available water capacity is moderate. The root zone is moderately deep. Bedrock is at a depth of 20 to 40 inches. The shrink-swell potential is moderate.

Rock outcrop is in the form of ledges and cliffs. In some areas, irregularly shaped boulders, 1 to 25 feet in diameter, have broken loose from the cliffs and have accumulated downslope. Very dark gray or black clayey material up to 3 inches thick covers the limestone in some areas.

Included with this complex in mapping are small areas of Christian and Trimble soils. The included soils make up about 25 percent of this complex.

The Caneyville soil in this complex is used mainly as pastureland or woodland.

Figure 4.—Caneyville-Rock outcrop complex, 12 to 20 percent slopes, eroded, can be used as pastureland, but rock outcrop and steepness of slope are limitations.

This soil is not suited to cultivated crops and hay because of Rock outcrop and steepness of slope.

This soil is poorly suited to pasture because of Rock outcrop and steepness of slope. Pastures generally are on the lower slopes where Rock outcrop and boulders are less prominent. Maintenance of the desired grasses and legumes is severely restricted. Plants selected should not require frequent renovation and should provide adequate ground cover.

This Caneyville soil is suited to woodland. Preferred trees for planting are yellow poplar, white oak, white ash, eastern white pine, and loblolly pine on cool aspects and eastern redcedar, Virginia pine, and loblolly pine on warm aspects. The erosion hazard, equipment use limitation, and plant competition are concerns in managing timber on this soil. (See table 7 for specific information relating to potential productivity.)

This soil is poorly suited to urban uses because of depth to bedrock, Rock outcrop, and steepness of slope. These limitations are difficult to overcome.

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

CdB—Captina silt loam, 2 to 6 percent slopes. This deep, gently sloping, moderately well drained soil is on stream terraces and foot slopes. The areas of this soil range from 3 to 10 acres.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part to a depth of about 28 inches is yellowish brown silt loam. A firm, compact, and brittle fragipan is at a depth of about 28 to 42 inches. It is yellowish brown silt loam that has gray, light brownish gray, and strong brown mottles. The lower part of the subsoil is strong brown silty clay loam that has pale brown and yellowish brown mottles.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate above the fragipan and slow in the fragipan. The available water capacity is moderate. This soil has good tilth. The root zone is moderately deep and is restricted by the fragipan. A seasonal high water table is at a depth of 2 to 3 feet.

Included with this Captina soil in mapping are a few areas of Elk and Taft soils. A moderately well drained soil is included that has more coarse fragments in the subsoil than Captina soil and does not have a fragipan. Also included are a few areas of soils that have slopes of 6 to 15 percent and some areas of severely eroded soils. The included soils make up about 10 percent of this map unit.

This Captina soil is used mainly for row crops, small grains, hay, or pasture.

This soil is well suited to row crops; however, wetness, moderate depth of the root zone, and moderate available water capacity are limitations. Erosion is a moderate hazard if conventional tillage is used. Good tilth is maintained by returning the crop residue to the soil. Conservation tillage, crop residue use, stripcropping, and contour farming help to control erosion and increase infiltration.

This soil is suited to most pasture and hay crops. Wetness, moderate depth of the root zone, and moderate available water capacity are limitations. Alfalfa does not grow well on this soil. Plants selected should provide adequate forage and ground cover. Frequent pasture renovation helps to maintain the desired plants. Lime and fertilizer, proper stocking, rotation grazing, and weed control are needed.

This Captina soil is well suited to woodland but is not used extensively for timber production. Preferred trees for planting are shortleaf pine, northern red oak, white oak, loblolly pine, and eastern white pine. Plant competition is a concern in management. (See table 7 for specific information relating to potential productivity.)

This soil is suited to some urban uses. Wetness and slow permeability are limitations affecting building site development and sanitary facilities. Proper engineering techniques can help to overcome some of these limitations.

This Captina soil is in capability subclass IIe.

ChB2—Christian gravelly silt loam, 2 to 6 percent slopes, eroded. This deep, gently sloping, well drained soil is on broad, convex ridgetops on uplands. Some areas are karst. The areas of this soil are about 3 to 30 acres. Erosion has removed about 25 to 75 percent of the original surface layer.

Typically, the surface layer is dark brown gravelly silt loam about 6 inches thick. The subsoil extends to a depth of 72 inches or more. The upper part to a depth of about 15 inches is yellowish red gravelly silty clay. The middle part to a depth of about 50 inches is red and dark red gravelly clay that has strong brown, yellowish red, and reddish yellow mottles. The lower part is dark red or mottled dark red, strong brown, and pale yellow clay.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. The root zone is deep and easily penetrated by plant roots. Soil tilth is good and can be maintained by returning crop residue to the soil. This soil can be worked throughout a wide range of moisture content. The shrink-swell potential is moderate.

Included with this Christian soil in mapping are a few areas of Bedford, Crider, and Mountview soils. Also included are some small areas of severely eroded Christian soils and some areas of soils that have less than 15 percent chert fragments in the surface layer. The included soils make up about 5 to 15 percent of this map unit.

This Christian soil is used mainly for row crops (fig. 5). In some areas, it is used as pastureland or woodland. This soil is well suited to row crops. Erosion is a moderate hazard if conventional tillage is used. Conservation tillage, crop residue use, stripcropping, and contour farming help to control erosion and increase infiltration.

This soil is well suited to pasture and hay crops commonly grown in the area and if properly managed, produces high yields. Pasture renovation can increase the yields and maintain the desired plants. Lime and fertilizer, proper stocking, rotation grazing, and weed control are also needed.

This soil is well suited to woodland. Preferred trees for planting are eastern white pine, yellow poplar, shortleaf pine, loblolly pine, northern red oak, and white oak. Plant competition is a concern in woodland management. (See table 7 for specific information relating to potential productivity.)

This soil is suited to most urban uses. The clayey subsoil, moderate shrink-swell potential, and low strength are the main limitations. Proper engineering techniques can help to overcome some of these limitations.

Figure 5.—Christian gravelly silt loam, 2 to 6 percent slopes, eroded, is well suited to row crops, such as Burley tobacco.

This Christian soil is in capability subclass IIe.

ChC2—Christian gravelly silt loam, 6 to 12 percent slopes, eroded. This deep, sloping, well drained soil is on convex ridgetops and side slopes on uplands. Some areas are karst. The areas of this soil are about 3 to 30 acres. Erosion has removed about 25 to 75 percent of the original surface layer.

Typically, the surface layer is dark brown gravelly silt loam about 6 inches thick. The subsoil extends to a depth of 72 inches or more. The upper part to a depth of about 15 inches is yellowish red gravelly silty clay. The middle part to a depth of about 50 inches is red and dark red gravelly clay that has strong brown, yellowish red, and reddish yellow mottles. The lower part is dark red or mottled dark red, strong brown, and pale yellow clay.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. This soil has good tilth and can be worked throughout a wide range of moisture content. The root zone is deep and easily penetrated by plant roots. The shrink-swell potential is moderate.

Included with this Christian soil in mapping are a few small areas of Bedford, Crider, and Mountview soils. Also included are a few areas of a soil similar to the Christian soil except it is free of chert to a depth of 24 to 30 inches. Some small areas of severely eroded Christian soils are included. The included soils make up about 5 to 15 percent of this map unit.

This Christian soil is used mainly for pasture or row crops. In some areas, it is used as woodland.

This soil is suited to cultivated crops. Erosion is a severe hazard if conventional tillage is used. Conservation tillage, crop residue use, stripcropping, and contour farming help to control erosion and increase infiltration.

This soil is well suited to pasture and hay crops commonly grown in the area and if properly managed, produces high yields. Frequent pasture renovation helps to maintain the desired plants. Lime and fertilizer, proper stocking, rotation grazing, and weed control are also needed.

This soil is well suited to woodland. Preferred trees for planting are eastern white pine, yellow poplar, shortleaf pine, loblolly pine, northern red oak, and white oak. Plant competition is a concern in management. (See table 7 for specific information relating to potential productivity.)

This soil is suited to most urban uses. The clayey subsoil, low strength, and steepness of slope are the main limitations. Proper engineering techniques can help to overcome some of these limitations.

This Christian soil is in capability subclass IIIe.

ChD2—Christian gravelly silt loam, 12 to 20 percent slopes, eroded. This deep, moderately steep, well drained soil is on convex ridgetops and side slopes on uplands. Some areas are karst. The areas of this soil are about 3 to 50 acres. Erosion has removed about 25 to 75 percent of the original surface layer.

Typically, the surface layer is dark brown gravelly silt loam about 6 inches thick. The subsoil extends to a depth of 72 inches or more. The upper part to a depth of about 15 inches is yellowish red gravelly silty clay. The middle part to a depth of about 50 inches is red and dark red gravelly clay that has strong brown, yellowish red, and reddish yellow mottles. The lower part is dark red or mottled dark red, strong brown, and pale yellow clay.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. This soil has good tilth except in spots where erosion has exposed the subsoil material. The root zone is deep and easily penetrated by plant roots. The shrink-swell potential is moderate.

Included with this Christian soil in mapping are a few small areas of Caneyville soil and Rock outcrop. Also included are a few spots of severely eroded Christian soils and gullies. The included soils make up about 5 to 15 percent of this map unit.

This Christian soil is used mainly as woodland or pastureland. In some areas, it is used for cultivated crops.

Although this soil is suited to occasional cultivation, it is better suited to pasture and hay crops. If this soil is cultivated, the erosion hazard is very severe unless erosion control measures are used. Conservation tillage, return of crop residue to the soil, use of cover crops, and inclusion of grasses and legumes in the cropping sequence help to control further erosion and to maintain productivity.

This soil is suited to pasture and hay crops commonly grown in the area and if properly managed, produces high yields. Frequent pasture renovation helps to maintain the desired plants. Lime and fertilizer, proper stocking, rotation grazing, and weed control are also needed.

This soil is well suited to woodland. Preferred trees for planting are yellow poplar, shortleaf pine, eastern white pine, loblolly pine, northern red oak, and white oak. The erosion hazard, equipment use limitation, and plant competition are the major concerns in management. (See table 7 for specific information relating to potential productivity.)

This soil is poorly suited to most urban uses. Steepness of slope is the major limitation affecting most sanitary facilities and building site development. Low strength is a limitation affecting local roads and streets and use as roadfill material.

This Christian soil is in capability subclass IVe.

CmC3—Christian gravelly silty clay loam, 6 to 12 percent slopes, severely eroded. This deep, sloping, well drained soil is on convex ridgetops and side slopes on uplands. Some areas are karst. The areas of this soil are about 3 to 30 acres. Erosion has removed most of the original surface layer and in places some of the subsoil. Some areas have rills and shallow gullies.

Typically, the surface layer is strong brown gravelly silty clay loam about 3 inches thick. The subsoil extends to a depth of 65 inches or more. The upper part to a depth of about 11 inches is yellowish red gravelly silty clay. The middle part to a depth of 43 inches is red and dark red gravelly clay that has strong brown, yellowish red, and reddish yellow mottles. The lower part is dark red or mottled dark red, strong brown, and pale yellow clay.

This soil is low in natural fertility and low in organic matter content. Permeability is moderate, and the available water capacity is high. This soil has poor tilth and is somewhat difficult to till because the surface layer consists mostly of subsoil material. The shrink-swell potential is moderate.

Included with this Christian soil in mapping are a few small areas of Caneyville soil and Rock outcrop. Also included are a few areas of Christian soils that are not eroded. The included soils make up about 5 to 10 percent of this map unit.

This Christian soil is used mainly as woodland or pastureland. In a few areas, it is used for cultivated crops. Other areas are idle and are revegetating naturally.

Although this soil is suited to occasional cultivation, it is better suited to pasture and hay crops. Response of crops to lime and fertilizer is fair. If this soil is cultivated, the hazard of erosion is very severe unless erosion control measures are used. Conservation tillage, return of crop residue to the soil, use of cover crops, and inclusion of grasses and legumes in the cropping sequence help to control further erosion and to maintain productivity.

This soil is suited to hay and pasture, and moderate yields can be obtained by using good management practices. Vegetation is somewhat difficult to establish since most of the original surface layer has been removed by erosion. Pasture renovation helps to maintain yields and the desired plants. Lime and fertilizer, proper stocking, rotation grazing, and weed control are also needed.

This soil is suited to woodland. Preferred trees for planting are Virginia pine, white oak, eastern redcedar, and loblolly pine. The equipment use limitation, seedling mortality, and plant competition are concerns in management. (See table 7 for specific information relating to potential productivity.)

This soil is suited to some urban uses. Steepness of slope, the clayey subsoil, and low strength are the main limitations. Proper engineering techniques can help overcome some of these limitations.

This Christian soil is in capability subclass IVe.

CmD3—Christian gravelly silty clay loam, 12 to 20 percent slopes, severely eroded. This deep, moderately steep, well drained soil is on convex ridgetops and side slopes on uplands. Some areas are karst. The areas of this soil are about 3 to 50 acres. Erosion has removed most of the original surface layer and in places some of the subsoil. Some areas have rills and shallow gullies.

Typically, the surface layer is strong brown gravelly silty clay loam about 3 inches thick. The subsoil extends to a depth of 65 inches or more. The upper part to a depth of about 11 inches is yellowish red gravelly silty clay. The middle part to a depth of about 43 inches is red and dark red gravelly clay that has strong brown, yellowish red, and reddish yellow mottles. The lower part is dark red or mottled dark red, strong brown, and pale yellow clay.

This soil is low in natural fertility and low in organic matter content. Permeability is moderate, and the available water capacity is high. This soil has poor tilth because the surface layer consists mostly of subsoil material.

Included with this Christian soil in mapping are a few small areas of Caneyville soil and Rock outcrop. Also included are a few areas of soils that are not eroded. The included soils make up about 5 to 10 percent of this map unit.

This Christian soil is used mainly as woodland or pastureland. Some areas are idle and are revegetating naturally.

This soil is poorly suited to cultivated crops because of past erosion, steepness of slope, and the very severe hazard of erosion.

This soil is suited to pasture and hay crops but requires good management to prevent further erosion. Plants selected should provide adequate ground cover. Pasture renovation helps to maintain the desired plants. Lime and fertilizer, proper stocking, rotation grazing, and weed control are also needed.

This soil is suited to woodland. Preferred trees for planting are Virginia pine, white oak, eastern redcedar, and loblolly pine. The erosion hazard, equipment use limitation, seedling mortality, and plant competition are concerns in management. (See table 7 for specific information relating to potential productivity.)

This soil is poorly suited to most urban uses. Steepness of slope, clayey texture, and low strength are the main limitations. Proper engineering techniques can help overcome some of these limitations.

This Christian soil is in capability subclass VIe.

CrB—Crider silt loam, 2 to 6 percent slopes. This deep, gently sloping, well drained soil is on broad ridgetops on uplands. Slopes are smooth and convex. The areas of this soil are about 3 to 25 acres.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The subsoil extends to a depth of 63 inches or more. The upper part to a depth of 36 inches is dark yellowish brown, yellowish brown, and yellowish red silt loam. The lower part is dark red silty clay loam and red silty clay.

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. This soil has good tilth and can be worked throughout a wide range of moisture content. The root zone is deep and easily penetrated by plant roots. The lower part of the subsoil has moderate shrink-swell potential.

Included with this Crider soil in mapping are a few small areas of Bedford, Christian, and Mountview soils. Also included are small areas of Crider soils that are eroded and have a dark yellowish brown surface layer. The included soils make up about 5 to 10 percent of this map unit.

This Crider soil is used mainly for row crops. In some areas, it is used as woodland or pastureland.

This soil is well suited to row crops. Crops respond well to lime and fertilizer. If this soil is cultivated, the hazard of erosion is moderate unless erosion control measures are used. Conservation tillage, return of crop residue to the soil, use of cover crops, and inclusion of grasses and legumes in the cropping sequence help to control erosion and to maintain productivity.

This soil is well suited to pasture and hay crops commonly grown in the area and if properly managed, produces high yields. Pasture renovation can increase the yields and helps to maintain the desired plants. Lime and fertilizer, proper stocking, rotation grazing, and weed control are also needed.

This soil is well suited to woodland. Preferred trees for planting are northern red oak, yellow poplar, eastern white pine, black walnut, white ash, white oak, loblolly pine, and shortleaf pine. Plant competition is a concern in management. (See table 7 for specific information relating to potential productivity.)

This soil is well suited to most urban uses; however, low strength is a limitation affecting local roads and streets and use as roadfill material.

This Crider soil is in capability subclass IIe.

CrC3—Crider silt loam, 6 to 12 percent slopes, severely eroded. This deep, sloping, well drained soil is on ridgetops and side slopes on uplands. Slopes are smooth and convex. The areas of this soil are about 3 to 25 acres. Erosion has removed most of the original surface layer and some of the subsoil in places. Some areas have rills and shallow gullies.

Typically, the surface layer is dark yellowish brown silt loam about 5 inches thick. The subsoil extends to a depth of 57 inches or more. The upper part to a depth of 29 inches is dark yellowish brown, yellowish brown, and yellowish red silt loam. The lower part is dark red silty clay loam and red silty clay.

This soil is medium in natural fertility and low in organic matter content. Permeability is moderate, and the available water capacity is high. This soil has only fair tilth because the surface layer consists mostly of subsoil material. The root zone is deep. The lower part of the subsoil has moderate shrink-swell potential.

Included with this Crider soil in mapping are a few small areas of Bedford and Christian soils. Also included are areas of Crider soils that are less eroded and have a brown silt loam surface layer. The included soils make up about 5 to 10 percent of this map unit.

This Crider soil is used mainly for pasture and hay. In some areas, it is used as cropland or woodland.

Although this soil is suited to occasional cultivation, it is better suited to pasture and hay crops. Response of crops to lime and fertilizer is fair. If this soil is cultivated, the hazard of erosion is very severe unless erosion control measures are used. Conservation tillage, return of crop residue to the soil, use of cover crops, and inclusion of grasses and legumes in the cropping sequence help to control further erosion and to maintain productivity.

This soil is suited to hay and pasture, and moderate yields can be obtained by using good management practices. Vegetation is somewhat difficult to establish since most of the original surface layer has been removed by erosion. Pasture renovation helps to maintain yields and the desired plants. Lime and fertilizer, proper stocking, rotation grazing, and weed control are also needed.

This soil is well suited to woodland. Preferred trees for planting are northern red oak, yellow poplar, eastern white pine, black walnut, loblolly pine, white ash, white oak, and shortleaf pine. Plant competition is a concern in management. (See table 7 for specific information relating to potential productivity.)

This soil is suited to most urban uses. Steepness of slope is a limitation affecting most sanitary facilities and building site development. Low strength is a limitation affecting local roads and streets and use as roadfill material.

This Crider soil is in capability subclass IVe.

EkB—Elk silt loam, 2 to 6 percent slopes, occasionally flooded. This deep, gently sloping, well drained soil is on low stream terraces. The areas of this soil are about 3 to 20 acres.

Typically, the surface layer is dark yellowish brown silt loam about 9 inches thick. The subsoil extends to a depth of 62 inches or more. The upper part to a depth of about 45 inches is strong brown silt loam and silty clay loam. The lower part is yellowish red silty clay loam that has light gray and pale brown mottles.

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. The root zone is deep. This soil has good tilth and can be worked throughout a wide range of moisture content. This soil is subject to brief periods of occasional flooding generally late in winter and early in spring.

Included with this Elk soil in mapping are small areas of Captina soils. Also included on flood plains are a few areas of Newark and Nolin soils. Some Elk soils that are below the Barren River Dam are subject to rare flooding or do not flood. The included soils make up less than 15 percent of the map unit. Individual areas of these soils generally are less than 5 acres.

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

This soil is well suited to row crops commonly grown in the area and produces high yields if properly managed. Crops respond well to lime and fertilizer. If this soil is cultivated, the hazard of erosion is moderate unless erosion control measures are used. Conservation tillage, return of crop residue to the soil, use of cover crops, and inclusion of grasses and legumes in the cropping sequence help to control erosion and maintain productivity.

This soil is suited to pasture and hay crops commonly grown in the area although some hay crops may be damaged by flooding. Frequent pasture renovation helps to maintain the desired plants. Lime and fertilizer, proper stocking, rotation grazing, and weed control are also needed.

This soil is well suited to woodland. Preferred trees for planting are eastern white pine, yellow poplar, black walnut, loblolly pine, white oak, northern red oak, cherrybark oak, white ash, and shortleaf pine. Plant competition is a concern in management. (See table 7 for specific information relating to potential productivity.)

This soil is poorly suited to most urban uses because of flooding and low strength.

This Elk soil is in capability subclass IIe.

Me—Melvin silt loam, frequently flooded. This deep, nearly level, poorly drained soil is on flood plains and in upland drainageways and depressions. The areas of this soil are about 3 to 75 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer is grayish brown silt loam about 8 inches thick. It has brown and grayish brown mottles. The subsurface layer to a depth of about 18 inches is light brownish gray silt loam that has yellowish brown, light olive brown, and dark brown mottles. The subsoil extends to a depth of 38 inches. It is grayish brown silt loam that has yellowish brown and very dark grayish brown mottles. The substratum to a depth of 65 inches or more is light brownish gray silt loam that has dark yellowish brown and dark brown mottles.

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. This soil has good tilth. The root zone is deep. A seasonal high water table is near the surface to a depth of 1 foot for long periods in winter and early in spring. This soil is subject to frequent flooding in winter and spring.

Included with this Melvin soil in mapping are a few small areas of Newark and Nolin soils. Also included are small areas of Taft soils on low stream terraces. Some Melvin soils that are below the Barren River Dam are subject to rare or occasional flooding. The included soils make up about 10 to 15 percent of this map unit.

This Melvin soil is used mainly for row crops, hay, or pasture. A few small tracts are woodland.

If this soil is adequately drained, it is suited to most row crops grown in the area. A seasonal high water table is the major limitation. Planting and harvesting are sometimes delayed by wetness. Conservation tillage, return of crop residue to the soil, and use of cover crops help to maintain desirable soil structure and organic matter content. Small grain crops are sometimes damaged by winter flooding.

This soil is well suited to pasture and hay crops that tolerate wetness although some hay crops may be damaged by flooding. Frequent pasture renovation helps to maintain the desired plants and yields. Fertilizer, adequate drainage, proper stocking, rotation grazing, and weed control are also needed.

This soil is well suited to woodland. Preferred trees for planting are pin oak, American sycamore, sweetgum, loblolly pine, willow oak, and green ash. The equipment use limitation, seedling mortality, and plant competition are concerns in management. (See table 7 for specific information relating to potential productivity.)

This soil is poorly suited to urban uses. Wetness, the hazard of flooding, and low strength are the main limitations. These limitations are difficult to overcome.

This Melvin soil is in capability subclass IIIw.

MoB—Mountview silt loam, 2 to 6 percent slopes. This deep, gently sloping, well drained soil is on convex ridgetops on uplands. The areas of this soil are about 3 to 30 acres.

Typically, the surface layer is yellowish brown silt loam about 7 inches thick. The subsoil extends to a depth of 69 inches or more. The upper part to a depth of about 22 inches is strong brown silty clay loam. The lower part is red silty clay and dark red gravelly silty clay with strong brown and yellowish red mottles.

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

Figure 6.—Mountview silt loam, 2 to 6 percent slopes, is well suited to pasture.

deep. This soil has good tilth and can be worked throughout a wide range of moisture content. The shrink-swell potential is moderate in the lower part of the subsoil.

Included with this Mountview soil in mapping are small areas of Bedford, Christian, and Trimble soils. Also included are small areas of Mountview soils that are eroded and have a redder surface layer. The included soils make up about 5 to 10 percent of this map unit.

This Mountview soil is used mainly for row crops. In some areas, it is used as woodland or pastureland.

This soil is well suited to cultivated crops commonly grown in the area and produces high yields if properly managed. Crops respond well to lime and fertilizer. If this soil is cultivated, the hazard of erosion is moderate unless erosion control measures are used. Conservation tillage, return of crop residue to the soil, use of cover crops, and inclusion of grasses and legumes in the cropping sequence help to control erosion and to maintain productivity.

This soil is well suited to pasture and hay crops commonly grown in the area and, if properly managed, produces high yields (fig. 6). Pasture renovation can increase yields and helps to maintain the desired plants. Lime and fertilizer, proper stocking, rotation grazing, and weed control are also needed.

This soil is well suited to woodland. Preferred trees for planting are shortleaf pine, loblolly pine, yellow poplar, northern red oak, eastern white pine, white oak, black walnut, and white ash. Plant competition is a concern in management. (See table 7 for specific information relating to potential productivity.)

This soil is suited to most urban uses. Low strength is a limitation affecting local roads and streets and use as roadfill material.

This Mountview soil is in capability subclass IIe.

MoC2—Mountview silt loam, 6 to 12 percent slopes, eroded. This deep, sloping, well drained soil is on convex ridgetops and side slopes on uplands. The areas of this soil are about 3 to 30 acres. Erosion has removed about 25 to 75 percent of the original surface layer.

Typically, the surface layer is yellowish brown silt loam about 5 inches thick. The subsoil extends to a depth of 65 inches or more. The upper part to a depth of about 18 inches is strong brown silty clay loam. The lower part is red silty clay and dark red gravelly silty clay. Mottles in the lower part are strong brown and yellowish brown.

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. The root zone is deep. This soil has good tilth except in spots where erosion has exposed the subsoil material. The shrink-swell potential is moderate in the lower part of the subsoil.

Included with this Mountview soil in mapping are small areas of Bedford, Christian, and Trimble soils. A few areas of severely eroded Mountview soils are also included. The included soils make up about 5 to 10 percent of this map unit.

This Mountview soil is used mainly for row crops. In some areas, it is used as woodland or for hay.

This soil is well suited to cultivated crops commonly grown in the area and produces high yields if properly managed. Crops respond well to lime and fertilizer. If this soil is cultivated, the hazard of erosion is severe unless erosion control measures are used. Conservation tillage, return of crop residue to the soil, use of cover crops, and inclusion of grasses and legumes in the cropping sequence help to control erosion.

This soil is well suited to pasture and hay crops commonly grown in the area and if properly managed, produces high yields. Frequent pasture renovation helps to maintain the desired plants. Lime and fertilizer, proper stocking, rotation grazing, and weed control are also needed.

This soil is well suited to woodland. Preferred trees for planting are shortleaf pine, loblolly pine, yellow poplar, northern red oak, eastern white pine, white oak, black walnut, and white ash. Plant competition is a concern in management. (See table 7 for specific information relating to potential productivity.)

This soil is suited to most urban uses. Steepness of slope is a limitation affecting most sanitary facilities and building site development. Low strength is a limitation affecting local roads and streets and use as roadfill material.

This Mountview soil is in capability subclass IIIe.

Ne—Newark silt loam, frequently flooded. This deep, nearly level, somewhat poorly drained soil is on flood plains and in upland drainageways and depressions. The areas of this soil are about 3 to 50 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The subsoil extends to a depth of about 36 inches. The upper part to a depth of about 15 inches is brown silt loam that has pale brown mottles. The lower part is light brownish gray and grayish brown silt loam that has yellowish brown mottles. The substratum to a depth of 60 inches is grayish brown silt loam that has light brownish gray and brown mottles.

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. This soil has good tilth. The root zone is deep. A seasonal high water table is at a depth of 0.5 to 1.5 feet in winter and early in spring. This soil is subject to frequent flooding in winter and early in spring.

Included with this Newark soil in mapping are a few areas of Melvin and Nolin soils in similar positions on the landscape and a few areas of Taft soils on stream terraces. A soil similar to Newark soil except it has more sand in the subsoil is also included. Some Newark soils that are below the Barren River Dam are subject to rare or occasional flooding. The included soils make up about 5 to 15 percent of this map unit.

This Newark soil is used mainly for row crops or pasture. A few small tracts are woodland.

If adequately drained, this soil is well suited to most row crops commonly grown in the area. A seasonal high water table is the major limitation. Planting and harvesting are sometimes delayed by wetness. Tile drainage systems generally are used to correct the wetness of this soil. Drained areas are well suited to corn and soybeans and can be cropped intensively. Conservation tillage, return of crop residue to the soil, and use of cover crops help to maintain desirable soil structure and organic matter content. Small grain crops are sometimes damaged by winter flooding.

This soil is well suited to pasture and hay crops that tolerate some wetness. Some hay crops may be damaged by flooding. Frequent pasture renovation helps to maintain the desired plants and yields. Fertilizer, adequate drainage, proper stocking, rotation grazing, and weed control are also needed.

This soil is well suited to woodland. Preferred trees for planting are eastern cottonwood, sweetgum, American sycamore, and green ash. Plant competition, the equipment use limitation, and seedling mortality are concerns in management. (See table 7 for specific information relating to potential productivity.)

This soil is poorly suited to most urban uses because of flooding, wetness, and low strength.

This Newark soil is in capability subclass IIw.

No—Nolin silt loam, occasionally flooded. This deep, nearly level, well drained soil is on flood plains and in upland drainageways and depressions. The areas of this soil are about 5 to 150 acres or more. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil to a depth of 65 inches or more is dark yellowish brown silt loam.

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. The root zone is deep. This soil has good tilth and can be worked throughout a wide range of moisture content. A seasonal high water table is at a depth of 3 to 6 feet or more in winter and early in spring. This soil is subject to occasional flooding late in winter and early in spring.

Included with this Nolin soil in mapping are areas of Newark and Skidmore soils in similar positions on the landscape and small areas of Elk and Taft soils on stream terraces. Some Nolin soils that are below the Barren River Dam are subject to rare flooding. The included soils make up about 5 to 10 percent of this map unit.

This Nolin soil is used mainly for cultivated crops. In some areas, it is used as woodland or pastureland.

This soil is well suited to most row crops commonly grown in the area. If properly managed, this soil is productive and can be cropped intensively. Small grain crops are sometimes damaged by winter flooding. Conservation tillage, return of crop residue to the soil, and use of cover crops help to maintain desirable soil structure and organic matter content.

This soil is well suited to pasture and hay crops commonly grown in the area. Some hay crops may be damaged by flooding. Pasture renovation helps to maintain the desired plants. Weed control, proper stocking, and fertilizer are also needed.

This soil is well suited to woodland. Preferred trees for planting are yellow poplar, eastern white pine, eastern cottonwood, white ash, cherrybark oak, sweetgum, and black walnut. Plant competition and seedling mortality are concerns in management. (See table 7 for specific information relating to potential productivity.)

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

This soil is poorly suited to intensive recreation facilities because of flooding; however, some selected recreation facilities can be developed by using good designs for structures and careful installation procedures. A selected area for camping and picnic facilities is below the dam on Barren River (fig. 7).

This Nolin soil is in capability subclass IIw.

Sn—Skidmore-Nolin complex, frequently flooded. This complex consists of deep, nearly level, well drained soils on flood plains. The Skidmore and Nolin soils are too intricately mixed to be mapped separately at the selected scale. The areas of these soils are about 3 to 30 acres. Slopes range from 0 to 2 percent.

Skidmore soil makes up about 70 percent of the complex and Nolin soil about 20 percent. The included soils make up the rest.

Typically, the Skidmore soil has a dark brown gravelly loam surface layer about 6 inches thick. The subsoil to a depth of about 38 inches is dark brown gravelly and very gravelly loam. The substratum to a depth of about 56 inches is dark brown very gravelly clay loam.

This Skidmore soil is medium in natural fertility and low in organic matter content. Permeability is moderately rapid, and the available water capacity is low. The root zone is deep. This soil has poor tilth because of the coarse fragments in the surface layer. A seasonal high water table is at a depth of 3 to 4 feet or more in winter and early in spring. This soil is subject to frequent flooding in winter and early in spring.

Typically, the Nolin soil has a dark brown silt loam surface layer about 9 inches thick. The subsoil to a depth of 65 inches or more is dark yellowish brown silt loam.

This Nolin soil is high in natural fertility and moderate in organic matter content. Permeability is moderate, and the available water capacity is high. The root zone is deep. This soil has good tilth and can be worked throughout a wide range of moisture content. A seasonal high water table is at a depth of 3 to 6 feet or more in winter and early in spring. This soil is subject to frequent flooding late in winter and early in spring.

Included with this complex in mapping are small areas of Newark and Melvin soils. The included soils make up about 10 percent of this complex.

The Skidmore and Nolin soils are used mainly as pastureland or woodland. In some areas, they are used for cultivated crops.

These soils are suited to most cultivated crops commonly grown in the area. Small grain crops can be damaged by winter flooding. Conservation tillage, return of crop residue to the soil, and use of cover crops help

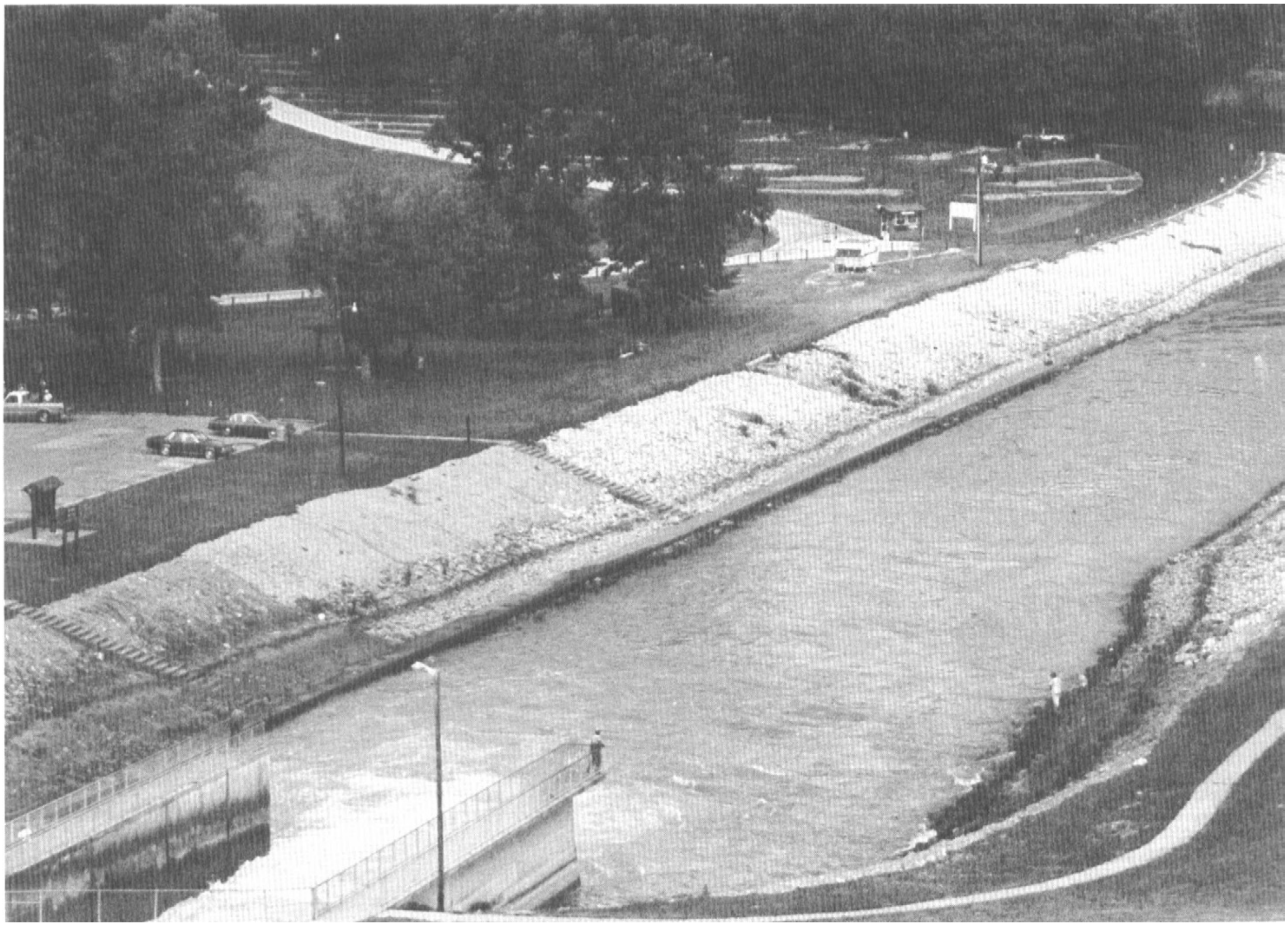


Figure 7.—Camping and picnic facilities are below the dam of Barren River Lake in an area of Nolin silt loam, occasionally flooded.

to maintain desirable soil structure and organic matter content. Coarse fragments in the surface layer of the Skidmore soil are a hindrance to tillage operations.

These soils are suited to pasture and hay; however, grasses and legumes that withstand flooding for short periods are the most suitable pasture plants. Some hay crops can be damaged by flooding. Establishing a seedbed in the Skidmore soil is difficult because of the coarse fragments in the surface layer. The Nolin soil is well suited to annual supplemental pasture or hay crops, and high yields can be obtained in most years. Renovation, weed control, proper stocking, and applications of fertilizer help to maintain the desired species.

These soils are suited to woodland. Preferred trees for planting on the Skidmore soil are yellow poplar, white ash, eastern white pine, American sycamore, white oak, cherrybark oak, and sweetgum. Preferred trees on the Nolin soil are eastern cottonwood, green ash, cherrybark oak, sweetgum, black walnut, and yellow poplar. Plant competition, the equipment use limitation, and seedling mortality are concerns in management. (See table 7 for specific information relating to potential productivity.)

These soils are well suited to habitat for openland and woodland wildlife.

These soils are poorly suited to urban uses because of flooding.

The Skidmore and Nolin soils are in capability subclass IIw.

StE—Sulphura-Trimble complex, 20 to 50 percent slopes. This complex consists of moderately deep and deep, steep and very steep, somewhat excessively drained and well drained soils on side slopes on uplands. The Sulphura and Trimble soils are too intricately mixed to be mapped separately at the selected scale. They are in horizontal bands perpendicular to the slope. The areas of these soils are about 10 to 250 acres.

Sulphura soil makes up about 60 percent of the complex and Trimble soil about 20 percent. The included soils make up the rest.

Typically, the Sulphura soil has a dark yellowish brown channery silt loam surface layer about 4 inches thick. The subsoil extends to a depth of 26 inches. It is dark yellowish brown channery silt loam. Hard, dark colored shale is at a depth of 26 inches.

This Sulphura soil is low in natural fertility and organic matter. Permeability is moderate, and the available water capacity is low. The root zone is moderately deep.

Typically, the Trimble soil has a dark brown gravelly silt loam surface layer about 6 inches thick. The subsoil extends to a depth of 62 inches or more. The upper part to a depth of about 40 inches is yellowish brown gravelly silt loam and brownish yellow gravelly clay loam. The middle part to a depth of about 53 inches is mottled strong brown, light yellowish brown, and yellowish brown gravelly clay loam. The lower part of the subsoil is strong brown silty clay loam that has reddish yellow and light yellowish brown mottles.

This Trimble soil is medium in natural fertility and low in organic matter content. Permeability is moderate, and the available water capacity is high. The root zone is deep.

Included with this complex in mapping are small areas of Caneyville soils and areas of shallow, loamy soils that have a dark surface layer. The included soils make up about 20 percent of this map unit.

The Sulphura and Trimble soils are used mainly as woodland. In some less sloping areas, they are used for pasture. Steepness of slope and the hazard of erosion are the main limitations affecting pasture use.

These soils are poorly sutied to row crops because of the steepness of slope.

These soils are suited to limited pasture use, but good management practices are needed to control erosion. They are better suited to woodland. If these soils are used for pasture, plants selected should provide adequate ground cover and should not require frequent renovation. Forage production during midsummer is low, and stocking rates should be adjusted to prevent overgrazing. Lime and fertilizer, brush control, and rotation grazing are needed. Steepness of slope limits the use of farm machinery.

The Sulphura soil is suited to woodland, and the Trimble soil is well suited. Preferred trees for planting on Sulphura soil are shortleaf pine, Virginia pine, loblolly pine, and eastern redcedar. Preferred trees for planting on Trimble soil are eastern white pine, black walnut, shortleaf pine, white oak, and northern red oak. The equipment use limitation, seedling mortality, and plant competition are concerns in managing the Sulphura soil for timber production, and plant competition, the erosion hazard, and equipment use limitation are concerns in managing the Trimble soil. (See table 7 for specific information relating to potential productivity.)

These soils are poorly suited to urban uses because of the steepness of slope.

The Sulphura and Trimble soils are in capability subclass VIIe.

Ta—Taft silt loam. This deep, nearly level, somewhat poorly drained soil is on upland flats and stream terraces. The areas of this soil are about 3 to 30 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The subsoil extends to a depth of 65 inches or more. The upper part to a depth of 25 inches is light yellowish brown silt loam that has light brownish gray and yellowish brown mottles. A compact and brittle fragipan is at a depth of 25 to 55 inches. It is light brownish gray and dark yellowish brown silt loam that has yellowish brown and grayish brown mottles. The lower part of the subsoil is mottled yellowish brown, strong brown, and gray silt loam.

This soil is medium in natural fertility and low in organic matter content. Permeability is moderate above the fragipan and slow in the fragipan. The available water capacity is moderate. This soil has good tilth. The root zone is moderately deep. A seasonal high water table is at a depth of 1 to 2 feet late in winter and early in spring.

Included with this Taft soil in mapping are small areas of Bedford soils on upland flats and Newark and Melvin soils on flood plains. Also included are some Taft soils that are subject to ponding and flooding. The included soils make up about 5 to 10 percent of this map unit.

This Taft soil is used mainly for pasture, hay, or row crops.

If adequately drained, this soil is suited to row crops. The seasonal high water table and fragipan are the major limitations. Planting and harvesting are sometimes delayed by wetness. If surface drainage systems are used, the wetness problem is reduced. Conservation tillage, return of crop residue to the soil, and use of cover crops help to maintain desirable soil structure and organic matter content.

This soil is suited to pasture and hay crops that tolerate some wetness. The fragipan restricts its use for deep-rooted legumes. Frequent pasture renovation helps to maintain the desired plants. Lime and fertilizer, adequate drainage, proper stocking, and weed control are also needed.

This soil is well suited to woodland. Preferred trees for planting are yellow poplar, white oak, sweetgum, eastern white pine, and loblolly pine. The equipment use limitation and plant competition are concerns in management. (See table 7 for specific information relating to potential productivity.)

This soil is well suited to habitat for openland and woodland wildlife.

This soil is poorly suited to most urban uses. Wetness and slow permeability in the fragipan are limitations affecting most sanitary facilities. Wetness is a limitation affecting most building site development. Low strength is a limitation affecting local roads and streets and use as roadfill material.

This Taft soil is in capability subclass IIIw.

TrB2—Trimble gravelly silt loam, 2 to 6 percent slopes, eroded. This deep, gently sloping, well drained soil is on narrow ridgetops and side slopes on uplands. The areas of this soil are about 3 to 30 acres. Erosion has removed about 25 to 75 percent of the original surface layer.

Typically, the surface layer is dark brown gravelly silt loam about 4 inches thick. The subsoil extends to a depth of 63 inches or more. The upper part to a depth of about 40 inches is yellowish brown gravelly silt loam and brownish yellow gravelly clay loam. The middle part to a depth of about 52 inches is mottled strong brown, light yellowish brown, and yellowish brown gravelly clay loam. The lower part of the subsoil is strong brown silty clay loam that has reddish yellow and light yellowish brown mottles.

This soil is medium in natural fertility and low in organic matter content. Permeability is moderate, and the available water capacity is high. This soil has good tilth. The root zone is deep. Depth to bedrock is more than 60 inches.

Included with this Trimble soil in mapping are small areas of Mountview and Bedford soils. Also included are small areas of a soil similar to Trimble soil except it has bedrock at a depth of less than 40 inches. The included soils make up about 5 to 10 percent of this map unit.

This Trimble soil is used mainly for pasture or row crops (fig. 8).

This soil is well suited to row crops and produces high yields if properly managed. Crops respond well to lime and fertilizer. If this soil is cultivated, the hazard of erosion is moderate unless erosion control measures are used. Conservation tillage, return of crop residue to the soil, use of cover crops, and inclusion of grasses and legumes in the cropping sequence help to control erosion and to maintain high yields.

This soil is well suited to pasture and hay crops and if properly managed, produces high yields. Pasture renovation can increase yields and helps to maintain the desired plants. Lime and fertilizer, proper stocking, rotation grazing, and weed control are also needed.

This soil is well suited to woodland. Preferred trees for planting are eastern white pine, black walnut, white oak, northern red oak, and shortleaf pine. Plant competition is a concern in management. (See table 7 for specific information relating to potential productivity.)

This soil is suited to most urban uses. Low strength is a limitation affecting local roads and streets and use as roadfill material.

This Trimble soil is in capability subclass IIe.

TrC2—Trimble gravelly silt loam, 6 to 12 percent slopes, eroded. This deep, sloping, well drained soil is on ridgetops and side slopes on uplands. The areas of this soil are about 3 to 60 acres. Erosion has removed about 25 to 75 percent of the original surface layer.

Typically, the surface layer is dark brown gravelly silt loam about 4 inches thick. The subsoil extends to a depth of 63 inches or more. The upper part to a depth of about 40 inches is yellowish brown gravelly silt loam and brownish yellow gravelly clay loam. The middle part to a depth of about 52 inches is mottled strong brown, light yellowish brown, and yellowish brown gravelly clay loam. The lower part of the subsoil is strong brown silty clay loam that has reddish yellow and light yellowish brown mottles.

This soil is medium in natural fertility and low in organic matter content. Permeability is moderate, and the available water capacity is high. This soil has good tilth. The root zone is deep. Depth to bedrock is more than 60 inches.

Included with this Trimble soil in mapping are small areas of Mountview and Bedford soils and a few areas of a soil similar to Trimble soil except it has bedrock at a depth of less than 40 inches. Also included are a few

Figure 8.—Trimble gravelly silt loam, 2 to 6 percent slopes, eroded, is used for pasture. Oil production also takes place in this area.

areas of severely eroded Trimble soils. The included soils make up about 5 to 10 percent of this map unit.

This Trimble soil is used mainly for pasture, hay, or row crops. In some areas, it is used as woodland.

This soil is suited to cultivated crops and produces high yields if properly managed. Crops respond well to lime and fertilizer. If this soil is cultivated, the hazard of erosion is severe unless erosion control measures are used. Conservation tillage, return of crop residue to the soil, use of cover crops, and inclusion of grasses and legumes in the cropping sequence help to control erosion and to maintain high yields.

This soil is well suited to hay and pasture crops and if properly managed, produces high yields. Frequent pasture renovation helps to maintain the desired plants. Lime and fertilizer, proper stocking, rotation grazing, and weed control are also needed.

This soil is well suited to woodland (fig. 9). Preferred trees for planting are eastern white pine, white oak, black walnut, shortleaf pine, and northern red oak. Plant competition is a concern in management. (See table 7 for specific information relating to potential productivity.)

This soil is suited to most urban uses. Steepness of slope and small stones are the most significant limitations. These limitations generally can be overcome by proper design of structures and by careful installation procedures.

This Trimble soil is in capability subclass IIIe.

TrD2—Trimble gravelly silt loam, 12 to 20 percent slopes, eroded. This deep, moderately steep, well

Figure 9.—Hardwood trees are common in woodland areas of Trimble gravelly silt loam, 6 to 12 percent slopes, eroded.

drained soil is on narrow ridgetops and side slopes on uplands. The areas of this soil are about 3 to 60 acres. Erosion has removed about 25 to 75 percent of the original surface layer.

Typically, the surface layer is dark brown gravelly silt loam about 4 inches thick. The subsoil extends to a depth of 63 inches or more. The upper part to a depth of about 40 inches is yellowish brown gravelly silt loam and brownish yellow gravelly clay loam. The middle part to a depth of about 52 inches is mottled strong brown, light yellowish brown, and yellowish brown gravelly clay loam. The lower part of the subsoil is strong brown silty clay loam that has reddish yellow and light yellowish brown mottles.

This soil is medium in natural fertility and low in organic matter content. Permeability is moderate, and the available water capacity is high. This soil has good tilth. The root zone is deep. Depth to bedrock is more than 60 inches.

Included with this Trimble soil in mapping are small areas of Caneyville and Christian soils. Also included are a few areas of severely eroded Trimble soils and soils similar to Trimble soil except they have bedrock at a depth of less than 40 inches. The included soils make up about 5 to 10 percent of this map unit.

This Trimble soil is used mainly as pastureland or woodland.

Although this soil is suited to occasional cultivation, it is better suited to pasture and hay crops. If this soil is cultivated, the hazard of erosion is very severe unless erosion control measures are used. Conservation tillage, return of crop residue to the soil, use of cover crops, and inclusion of grasses and legumes in the cropping sequence help to control further erosion and to maintain good tilth.

The soil is well suited to hay and pasture crops and if properly managed, produces high yields. Frequent pasture renovation helps to maintain the desired plants. Fertilizer and lime, proper stocking, rotation grazing, and weed control are also needed.

This soil is well suited to woodland. Preferred trees for planting are eastern white pine, black walnut, shortleaf pine, white oak, and northern red oak. The erosion hazard, plant competition, and equipment use limitation are concerns in management. (See table 7 for specific information relating to potential productivity.)

This soil is poorly suited to most urban uses. Steepness of slope is the major limitation affecting most sanitary facilities and building site developments. Low strength is a limitation affecting local roads and streets and use as roadfill material.

This Trimble soil is in capability subclass IVe.

TrE—Trimble gravelly silt loam, 20 to 50 percent slopes. This deep, steep and very steep, well drained soil is on long and narrow side slopes on uplands. The areas of this soil are about 10 to 60 acres.

Typically, the surface layer is dark brown gravelly silt loam about 4 inches thick. The subsoil extends to a depth of 63 inches or more. The upper part to a depth of 43 inches is yellowish brown gravelly silt loam and brownish yellow gravelly clay loam. The middle part to a depth of about 52 inches is mottled strong brown, light yellowish brown, and yellowish brown gravelly clay loam. The lower part of the subsoil is strong brown silty clay loam that has reddish yellow and light yellowish brown mottles.

This soil is medium in natural fertility and low in organic matter content. Permeability is moderate, and the available water capacity is high. The root zone is deep. Depth to bedrock is more than 60 inches.

Included with this Trimble soil in mapping are small areas of Caneyville soils. Also included are a few areas of severely eroded Trimble soils and soils similar to Trimble soil except they have bedrock at a depth of less than 40 inches. The included soils make up about 10 to 15 percent of this map unit.

This Trimble soil is used mainly as woodland. In a few areas, it is used for pasture.

This soil is poorly suited to row crops. Steepness of slope is the main limitation.

This soil is suited to pasture but requires good management to control erosion. It is better suited to woodland. If this soil is used for pasture, plants that provide adequate ground cover and do not require frequent renovation are needed. Forage production during midsummer is low, and stocking rates should be adjusted to prevent overgrazing. Lime and fertilizer, brush control, and rotation grazing are needed. Steepness of slope limits the use of farm machinery.

This soil is well suited to woodland. Preferred trees for planting are eastern white pine, black walnut, shortleaf pine, white oak, and northern red oak. The erosion hazard, plant competition, and equipment use limitation are concerns in management. (See table 7 for specific information relating to potential productivity.)

This soil is poorly suited to urban uses mainly because of the steepness of slope.

This Trimble soil is in capability subclass VIIe.

WaC2—Waynesboro silt loam, 6 to 12 percent slopes, eroded. This deep, sloping, well drained soil is on side slopes and ridgetops and around the rim of depressions in karst areas on uplands. In karst areas, depressions are common and steepness of slope varies within a short distance. The areas of this soil are about 3 to 40 acres. Erosion has removed about 25 to 75 percent of the original surface layer.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsoil extends to a depth of 66 inches or more. The upper part to a depth of about 25 inches is yellowish red silty clay loam and red clay loam. The lower part is dark red clay loam. Strong brown and grayish brown mottles are at a depth of more than 59 inches.

This soil is medium in natural fertility and low in organic matter content. Permeability is moderate, and the available water capacity is high. The root zone is deep and easily penetrated by plant roots. This soil has good tilth. The shrink-swell potential is moderate.

Included with this Waynesboro soil in mapping are small areas of Christian and Crider soils. Also included are areas of soils similar to this Waynesboro soil except they have a loam surface layer or have slopes of 2 to 6 percent. A few areas of severely eroded Waynesboro soil are included. The included soils make up about 5 to 10 percent of this map unit.

This Waynesboro soil is used mainly for pasture, hay, or row crops.

This soil is suited to row crops and produces high yields if properly managed. Crops respond well to lime and fertilizer. If the soil is cultivated, the hazard of erosion is severe unless erosion control measures are used. Conservation tillage, return of crop residue to the soil, use of cover crops, and inclusions of grasses and legumes in the cropping sequence help to control erosion and to maintain high yields.

This soil is well suited to pasture and hay crops and if properly managed, produces high yields. Frequent pasture renovation helps to maintain the desired plants. Lime and fertilizer, proper stocking, rotation grazing, and weed control are also needed.

This soil is well suited to woodland. Preferred trees for planting are yellow poplar, black walnut, white oak, loblolly pine, and shortleaf pine. Plant competition is a concern in management. (See table 7 for specific information relating to potential productivity.)

This soil is suited to most urban uses. Steepness of slope is the major limitation affecting most sanitary facilities and building site development. Low strength is a limitation affecting local roads and streets and use as roadfill material. These limitations generally can be overcome by proper design of structures and by careful installation procedures.

This Waynesboro soil is in capability subclass IIIe.

WnD2—Waynesboro loam, 12 to 20 percent slopes, eroded. This deep, moderately steep, well drained soil is on side slopes and ridgetops and around the rim of depressions in karst areas on uplands. In karst areas, depressions are common and steepness of slope varies within a short distance. The areas of this soil are about 3 to 35 acres. Erosion has removed about 25 to 75 percent of the original surface layer.

Typically, the surface layer is brown loam about 5 inches thick. The subsoil extends to a depth of 66 inches or more. The upper part to a depth of about 25 inches is yellowish red silty clay loam and red clay loam. The lower part is dark red clay loam. Strong brown and grayish brown mottles are at a depth of more than 59 inches.

This soil is medium in natural fertility and low in organic matter content. Permeability is moderate, and the available water capacity is high. The root zone is deep and easily penetrated by plant roots. This soil has good tilth. The shrink-swell potential is moderate.

Included with this Waynesboro soil in mapping are small areas of Christian and Crider soils. Also included are areas of Waynesboro soils that have a silt loam surface layer and small areas of severely eroded Waynesboro soils that have a silty clay loam surface layer. The included soils make up about 10 to 15 percent of this map unit.

This Waynesboro soil is used mainly as pastureland or woodland. In a few areas, it is used for row crops.

Although this soil is suited to occasional cultivation, it is best suited to pasture and hay crops. If this soil is cultivated, the hazard of erosion is very severe unless erosion control measures are used. Conservation tillage, return of crop residue to the soil, use of cover crops, and inclusion of grasses and legumes in the cropping sequence help to control further erosion and to maintain good tilth.

This soil is suited to pasture and hay crops and if properly managed, produces high yields. Frequent pasture renovation helps to maintain the desired plants. Lime and fertilizer, proper stocking, rotation grazing, and weed control are also needed.

This soil is well suited to woodland. Preferred trees for planting are yellow poplar, white oak, loblolly pine, and shortleaf pine. Plant competition, the erosion hazard, and equipment use limitation are concerns in management. (See table 7 for specific information relating to potential productivity.)

This soil is suited to most urban uses. Steepness of slope is the major limitation affecting most sanitary facilities and building site development. Low strength is a limitation affecting local roads and streets and use as roadfill material.

This Waynesboro soil is in capability subclass IVe.

Prime Farmland

In this section, prime farmland is defined and discussed, and the prime farmland soils in Allen County are listed.

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

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

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

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

The following map units, or soils, make up prime farmland in Allen County. This list does not constitute a recommendation for a particular land use. 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."

Soils that have limitations or hazards, such as a high water table or flooding, may qualify as prime farmland if these limitations or hazards are overcome by such measures as drainage or flood control. The needs for these measures if any are indicated after the map unit name. Onsite evaluation is necessary to determine if the limitations have been overcome by the corrective measures.

BeB	Bedford silt loam, 2 to 6 percent slopes
CdB	Captina silt loam, 2 to 6 percent slopes
ChB2	Christian gravelly silt loam, 2 to 6 percent slopes, eroded
CrB	Crider silt loam, 2 to 6 percent slopes
EkB	Elk silt loam, 2 to 6 percent slopes, occasionally flooded
MoB	Mountview silt loam, 2 to 6 percent slopes
Ne	Newark silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
No	Nolin silt loam, occasionally flooded
Ta	Taft silt loam (where drained)
TrB2	Trimble gravelly silt loam, 2 to 6 percent slopes, eroded

Use and Management of the Soils

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

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

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the 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 *(26)*.

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

Jonathan Hawes, district conservationist, and Henry Amos, conservation agronomist, Soil Conservation Service, helped to prepare 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 Allen County, the soils on nearly level flood plains have high natural fertility and those on very steep uplands have low or medium natural fertility. Most farms in the county are suited to crop and livestock production.

According to the National Resource Inventory Estimates of 1982, about 48,900 acres in Allen County was used as cropland. The crops included two types of tobacco, soybeans, corn, wheat, and a small acreage of specialty crops, such as orchards and vegetables. Some of the cropland was in rotation with hay crops. About 71,400 acres of pastureland and 78,200 acres of woodland were also in the county.

Most of the soils in Allen County have management problems in varying degrees of severity. In the Christian and Trimble soils, cherty limestone fragments that are four inches or smaller in diameter are in the surface layer and subsoil. These chert fragments cause excessive wear on farm equipment during cultivation.

More than 4,000 acres in Allen County is mapped as Skidmore-Nolin complex, frequently flooded. This complex is along small streams. Most of the streams occasionally or frequently flood.

Nearly 8,000 acres is mapped as Nolin silt loam, occasionally flooded. This soil produces excellent yields of row crops and hay.

Flooding can cause serious erosion on fields that are cropped. It can leave deposits of gravel and other debris on pastureland and cropland that interfere with tillage implements and hay harvesting. Flooding causes problems in maintaining fences in pastures.

About 47,000 acres is mapped as Caneyville-Rock outcrop complex, 20 to 50 percent slopes, eroded; Sulphura-Trimble complex, 20 to 50 percent slopes; and Trimble gravelly silt loam, 20 to 50 percent slopes. These soils are better suited to woodland or habitat for woodland wildlife; however, the soils in the less sloping areas are suited to pasture.

Water erosion is the main hazard on the soils in Allen County. The hazard of erosion varies from slight to very severe. Soils vary widely in permeability, slope, depth, and texture, all of which affect the hazard of erosion.

The soils in Allen County that have been damaged by erosion mostly have poor tilth, low available water capacity, and low content of organic matter. These soils generally are more difficult and expensive to cultivate and can be expected to produce lower yields, especially in dry years. Most of the commercial fertilizer, herbicide, and soil amendments are in the plow layer, which is the first layer to be damaged by erosion.

A number of soil management systems are used in Allen County to control erosion. Effective practices used in these systems include terraces with underground outlets, conservation tillage, crop residue, diversions, grassed waterways, contour stripcropping, rotation of crops, cover crops, and contour farming.

Natural soil fertility ranges from high to low in most of the soils. Most crops respond to additions of lime and fertilizer. Fertilizer and lime should be applied according to soil test needs for the planned land use.

About 25,000 acres of soils in Allen County are moderately well drained to poorly drained. These soils have a seasonal high water table from near the surface to a depth of 3.5 feet. Melvin and Newark soils are examples of soils that have a seasonal high water table.

The seasonal high water table causes management problems for most field crops. The excess water causes soils to warm up later in the season, thus delaying planting. Winter crops tend to freeze out in undrained areas of Melvin and Newark soils. Surface and subsurface drainage systems are feasible for improving agricultural production on most of the soils that have a seasonal high water table.

Captina, Bedford, and Taft soils have a fragipan or a restricted root zone. The fragipan restricts downward movement of water in the soil and the amount and depth of root penetration.

A successful livestock program is dependent on a forage program that supplies large quantities of home-grown feeds of adequate quality. Such a program can furnish up to 78 percent of the feed for beef cattle and 66 percent for dairy cattle.

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

The nearly level to gently sloping, deep, and well drained soils are better suited to the highest producing crops, such as corn silage, alfalfa, or a mixture of alfalfa and orchardgrass or alfalfa and timothy. To minimize soil erosion, the steeper soils should be maintained in sod-forming grasses, such as tall fescue or bluegrass. Cool-season grasses where the soils are at least 2 feet deep to bedrock and are well drained are better suited to alfalfa. On soils that are less than 2 feet deep to bedrock or that have drainage problems, a mixture of clover and grass or a pure stand of grass can be used. Legumes can be established through renovation in sods that are dominantly grass.

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

Tall fescue is a cool-season grass that is suited to a wide range of soil conditions. It is used for hay and pasture. The growth made by tall fescue from August to November is commonly permitted to accumulate in the field and is "stockpiled" for deferred grazing late in fall and in winter. Nitrogen fertilizer is important for maximum production during this period, and applications should be based on the desired level of production.

Warm-season grasses planted from early in April to late in May produce well in warm weather, while production of cool-season grasses, such as tall fescue and Kentucky bluegrass, tapers off. Warm-season grasses include switchgrass, big bluestem, indiangrass, and Caucasian bluestem.

Renovation can increase yields of pasture and hay fields that have a good stand of grass. In renovation, the sod is partly destroyed and the soil is limed, fertilized, and seeded to reestablish desirable forage plants. Adding legumes to these fields provides high feed values and increases production of feed in summer. Legumes also add nitrogen to the soil. In Kentucky, alfalfa is the most efficient nitrogen-fixing legume. Other legumes that have nitrogen-fixing ability are red clover, Ladino clover, Korean lespedeza, and vetch.

The local office of the Soil Conservation Service or the Kentucky Cooperative Extension Service can provide additional information on pasture and hay management.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 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 engineering purposes *(31)*.

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

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

Class I soils have few limitations that restrict their use. There are no class I soils in Allen County.

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

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

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

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use. There are no class V soils in Allen County.

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

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

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

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w* or *s*, to the class numeral, for example, IIe. The letter *e* shows that the main hazard is 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); and *s* shows that the soil is limited mainly because it is shallow, droughty, or stony.

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

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

Woodland Management and Productivity

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

Allen County is in the Western Mesophytic Forest region of Kentucky, a transitional area in which oaks are dominant. Commercial forest land covers about 78,200 acres, or 35 percent of the land area *(21)*. The dominant forest types include the oak-hickory on about 74 percent of the forest land, the elm-ash-red maple on 11 percent, the maple-beech-birch on 5 percent, the oak-pine on 5 percent, the loblolly-shortleaf pine on 4 percent, and the oak-gum on 1 percent *(16)*.

Woodland tracts in the county are small private holdings of about 24 acres and are essentially unmanaged. Most of the forest land is capable of producing 50 cubic feet or more of wood per acre per year, but actual production is 33 cubic feet. An obstacle in managing private forest lands is that 30 percent of the landowners have woodland simply because it happens to be a part of the farm or tract. Also, many stands are not well stocked with desirable, high quality trees, and many tracts are owned less than 10 years.

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

The three commercial sawmills and one custom sawmill in Allen County produce pallet stock, dimension stock, kiln-dried lumber, rough lumber, cross ties, and chips. Several mills in adjacent counties buy logs or standing trees from Allen County.

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

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

The first tree listed for each soil under the column "Common trees" is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

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

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

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

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

The potential productivity of *common trees* on a soil is expressed as a *site index*. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate.

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

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands *(4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 17, 18, 22, 24, 25, 27, 29, 32, 35, 36)*.

The *volume* represents an expected volume produced by the most important trees, expressed in cubic feet per acre per year.

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

Recreation

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

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

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

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

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

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

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

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

Wildlife Habitat

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

The wildlife population of Allen County consists of about 39 species of mammals, 47 species of terrestrial reptiles and amphibians, and 97 species of birds that are either summer or year-round residents. More than 200 other species of birds visit Kentucky during migration each year, and many of them are in the county at other times during the year.

Wildlife is an important natural resource in the county, especially species that furnish opportunities for sport hunting, commercial trapping, or aesthetic enjoyment.

The gray squirrel, bobwhite quail, cottontail rabbit, mourning dove, raccoon, and white-tailed deer are the main game species. Trappers concentrate on mink, muskrat, and foxes. Photographers and birdwatchers are especially interested in rare or unusual species that are seldom seen or that are difficult to approach.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Engineering

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

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

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

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

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

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

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

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

Building Site Development

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

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

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

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

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

Sanitary Facilities

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

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

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

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

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

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

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

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

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

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

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

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

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

Construction Materials

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Water Management

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

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

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

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

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

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

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; and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone. Availability of drainage outlets is not considered in the ratings.

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

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

Soil Properties

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

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 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 *(33)*. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

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

Engineering Index Properties

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

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

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

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

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

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 21.

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

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

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

Physical and Chemical Properties

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

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

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They influence the soil's adsorption of cations, moisture retention, shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 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 *(28)*.

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

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

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

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

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

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

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

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

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

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

Soil and Water Features

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

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

The four hydrologic soil groups are:

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

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

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

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

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

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

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

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

Also considered 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 "High water table—Depth" column indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that the water table exists for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

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

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

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

Physical and Chemical Analyses and Mineralogy 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 results of clay mineralogy determinations are given in table 19 and sand mineralogy determinations are given in table 20. 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 National Soil Survey Laboratory and the Kentucky Agricultural Experiment Station.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an oven-dry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(37)*.

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

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

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

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

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

Extractable acidity—barium chloride-triethanolamine I (6H1a).
Cation-exchange capacity—ammonium acetate, pH 7.0 (5A1a).
Cation-exchange capacity—sum of cations (5A3a).
Base saturation—ammonium acetate, pH 7.0 (5C1).
Base saturation—sum of cations, TEA, pH 8.2 (5C3).
Reaction (pH)—1:1 water dilution (8C1a).
Reaction (pH)—potassium chloride (8C1c).
Reaction (pH)—SMD buffer (Kentucky Agricultural Experiment Station).
Available phosphorus—Procedure (656) Kentucky Agricultural Experiment Station.
Particles greater than 2 millimeters—field or laboratory weighing (3B1a).
Extractable bases (5B1a).
Exchangeable acidity (H + A1)—Yuan Procedure 67-3.52, Part 2, methods of analysis, ASA, 1965.
Calcium carbonate equivalent—Procedure (236b) USDA Handbook 60, USDA Salinity Laboratory 1954 (6N7).
X-Ray diffraction (7A2).
Differential thermal analysis (7A3).
Optical analysis, grain mounts, epoxy (7B1a).
Field sampling—site selection (1A1).
Field sampling—pedon sampling (1A2).
Laboratory preparation—standard (air-dry) material (1B1).
Data sheet symbols (2B).

Engineering Index Test Data

Table 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 U.S. Department of Agriculture, Soil Conservation Service, Soil Mechanics Laboratory, Fort Worth, Texas.

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

The tests and methods are: AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); Moisture density, Method A—T 99 (AASHTO); and Specific gravity (particle index)—T 100 (AASHTO), D 653 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(34)*. 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. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

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

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

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

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is not much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is clayey, mixed, mesic Typic Hapludults.

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

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 (30)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (34)*. Unless otherwise stated, matrix colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

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

Bedford Series

The Bedford series consists of deep, moderately well drained soils that have a very slowly permeable fragipan. These soils formed in a loess mantle over residuum from limestone. They are on ridgetops on uplands. A seasonal high water table is at a depth of 1.5 to 3.5 feet late in winter and early in spring. Slopes range from 2 to 6 percent. Bedford soils are fine-silty, mixed, mesic Typic Fragiudults.

Bedford soils are on the same landforms with Christian, Crider, Mountview, and Trimble soils, which are well drained and do not have a fragipan. Christian soils are in a clayey family. Trimble soils are in a fine-loamy family. Christian and Trimble soils are gravelly in the solum.

Typical pedon of Bedford silt loam, 2 to 6 percent slopes; about 10.6 miles west of Scottsville, 2 miles north of the junction of Kentucky Highway 100 and Clare-New Roe Road, 50 yards west of the road, in a pasture.

Ap—0 to 6 inches; dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure parting to weak fine granular; friable; common fine roots; strongly acid; abrupt wavy boundary.

Bt1—6 to 13 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; common fine roots; dark brown (10YR 4/3) organic stains on faces of peds; medium acid; clear smooth boundary.

Bt2—13 to 22 inches; yellowish brown (10YR 5/6) silt loam; weak medium and coarse subangular blocky structure; friable; common fine roots; thin patchy dark brown (7.5YR 4/4) coatings on faces of peds; medium acid; clear wavy boundary.

E—22 to 27 inches; light yellowish brown (10YR 6/4) silt loam; weak medium subangular blocky structure; friable; few fine roots; many dark iron and manganese concretions; common silt coatings on faces of peds; very strongly acid; clear wavy boundary.

Btx1—27 to 41 inches; brown (10YR 5/3) silt loam; common medium faint pale brown (10YR 6/3) mottles; thick light brownish gray (10YR 6/2) and yellowish brown (10YR 5/8) streaks along vertical faces of peds; weak coarse prismatic structure parting to weak medium platy; firm, brittle; few fine roots between prisms; thin patchy brown (7.5YR 5/4) clay films on faces of peds; very strongly acid; gradual smooth boundary.

Btx2—41 to 56 inches; brown (10YR 5/3) silt loam; common medium faint pale brown (10YR 6/3) mottles; thick light brownish gray (10YR 6/2) and yellowish brown (10YR 5/8) streaks along vertical faces of peds; moderate very coarse prismatic structure; firm, brittle; few fine roots between prisms; thin patchy dark brown (7.5YR 4/4) clay films on faces of peds; very strongly acid; abrupt irregular boundary.

2Bt—56 to 72 inches; red (2.5YR 4/6) silty clay; strong fine angular blocky structure; very firm; thick continuous dark brown (7.5YR 4/4) clay films on vertical faces of peds; 10 percent chert fragments; very strongly acid.

The solum thickness and depth to bedrock are more than 60 inches. Depth to the fragipan is about 25 to 30 inches. Reaction is extremely acid to slightly acid in the Ap horizon unless lime has been added to the soil. It is extremely acid to medium acid in the B horizon. The solum is free of rock fragments in the upper part, but ranges from none to 15 percent chert fragments in the lower part.

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. The texture is silt loam or silty clay loam.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 5. The texture is silt loam or silty clay loam.

The Btx horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. Mottles and streaks are in shades of gray, yellow, or brown. The texture is silt loam, silty clay loam, or gravelly silty clay loam.

The 2Bt horizon has hue of 7.5YR to 2.5YR, value of 4 to 6, and chroma of 4 to 6. The texture is silty clay, clay, or gravelly clay.

Caneyville Series

The Caneyville series consists of moderately deep, well drained soils that have moderately slow permeability. These soils formed in residuum from limestone. They are on ridgetops and side slopes on uplands. Slopes range from 12 to 50 percent. Caneyville soils are fine, mixed, mesic Typic Hapludalfs.

Caneyville soils are on the same landforms with Bedford, Christian, and Mountview soils, which have bedrock at a depth of 60 inches or more. Bedford and Mountview soils are in a fine-silty family. Bedford soils are moderately well drained and have a fragipan. Christian soils are in a clayey family.

Typical pedon of Caneyville silt loam, in an area of Caneyville-Rock outcrop complex, 12 to 20 percent slopes, eroded; about 1.4 miles northeast of Gainesville, 0.4 mile west of Gainesville-Post Oliver Road, 535 yards east of Difficult Creek, in a pasture.

Ap—0 to 6 inches; dark brown (7.5YR 4/4) silt loam; weak fine granular structure; friable; many fine roots; neutral; clear smooth boundary.

Bt1—6 to 11 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; firm; many fine roots; few thin clay films on faces of peds; neutral; gradual smooth boundary.

Bt2—11 to 22 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; common clay films on faces of peds; medium acid; gradual smooth boundary.

Bt3—22 to 31 inches; yellowish red (5YR 4/6) clay; common distinct strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) mottles; strong medium angular blocky structure; firm; common clay films on faces of peds; few black and brown concretions; slightly acid; gradual smooth boundary.

BC—31 to 36 inches; olive yellow (2.5Y 6/6) clay; common medium prominent yellowish red (5YR 5/6) and strong brown (7.5YR 5/8) mottles; strong coarse angular blocky structure; very firm; many distinct clay films on faces of peds; common black and brown concretions; many black stains on soil peds; mildly alkaline; abrupt smooth boundary.

R—36 inches; limestone bedrock.

The solum thickness and depth to bedrock range from 20 to 40 inches. Reaction is very strongly acid to neutral in the upper part of the solum and medium acid to mildly alkaline in the lower part. Fragments of limestone, chert, or sandstone range from none to 10 percent in the upper part of the solum and none to 35 percent in the lower part.

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

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

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

The BC horizon has hue of 5YR to 2.5Y, value of 4 to 8, and chroma of 4 to 8. The texture is silty clay or clay. Mottles are in shades of red, brown, or gray.

Captina Series

The Captina series consists of deep, moderately well drained soils that have a slowly permeable fragipan. These soils formed in old alluvium on stream terraces and foot slopes. A seasonal high water table is at a depth of 2 to 3 feet. Slopes range from 2 to 6 percent. Captina soils are fine-silty, siliceous, mesic Typic Fragiudults.

The Captina soils in Allen County are a taxadjunct to the Captina series because they typically have a thinner fragipan, fewer chert fragments, and grayer colors in the lower part of the solum. These differences do not alter use and management.

Captina soils are on the same landscape with Nolin, Elk, and Skidmore soils, which are well drained, have higher base saturation, and do not have a fragipan. Nolin and Skidmore soils are on flood plains. Skidmore soils are in a loamy-skeletal family.

Typical pedon of Captina silt loam, 2 to 6 percent slopes; about 2.7 miles north of Meador, 1.7 miles northeast of the junction of Kentucky Highway 101 and Hall Anderson Road, 300 yards southeast of Barren River, in a corn field.

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

BE—8 to 15 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; many fine roots; few black concretions; strongly acid; gradual smooth boundary.

Bt—15 to 28 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; firm; few fine roots; common black concretions; few thin clay films; strongly acid; clear smooth boundary.

Btx—28 to 42 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct gray (10YR 6/1), light brownish gray (10YR 6/2), and strong brown (7.5YR 5/8) mottles; moderate medium coarse prismatic structure parting to moderate medium subangular blocky; common thin clay films; firm, brittle, and compact; strongly acid; clear smooth boundary.

B t—42 to 60 inches; strong brown (7.5YR 5/6) silty clay loam; common medium distinct pale brown (10YR 6/3) and yellowish brown (10YR 5/6) mottles; strong medium subangular blocky structure; firm; few thin clay films; few chert fragments; strongly acid.

The solum thickness and depth to bedrock are more than 60 inches. Depth to the fragipan ranges from 16 to 30 inches. Reaction is very strongly acid to slightly acid in the Ap horizon and extremely acid to medium acid in the B horizon.

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

The BE horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 or 6.

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

The Btx horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 8. Mottles are in shades of gray and yellowish red. The texture is silt loam or silty clay loam.

The B't horizon has hue of 10YR, 7.5YR, or 5YR, value of 5 or 6, and chroma of 1 to 8. The texture is silt loam or silty clay loam. Chert fragments range from none to 10 percent.

Christian Series

The Christian series consists of deep, well drained, moderately permeable soils that formed in residuum or old alluvium weathered from interbedded sandstone, siltstone, shale, and limestone. These soils are on broad ridgetops and side slopes on uplands. Some areas are karst. Slopes range from 2 to 20 percent. Christian soils are clayey, mixed, mesic Typic Hapludults.

Christian soils are on the same landforms with Bedford, Crider, and Mountview soils, which are in a fine-silty family. Bedford soils are moderately well drained and have a fragipan. Crider and Mountview soils do not have chert fragments in the upper part of the solum. Crider soils have higher base saturation.

Typical pedon of Christian gravelly silt loam, 6 to 12 percent slopes, eroded; about 8 miles northwest of Scottsville, 1.3 miles northwest of the junction of Kentucky Highway 1332 and the Antioch-Trammel Road, 0.6 mile north-northeast of Beechgrove Church, 0.2 mile north-northwest of a small cemetery, and 115 yards northeast of a farm road.

Ap—0 to 6 inches; dark brown (10YR 4/3) gravelly silt loam; moderate medium granular structure; very friable; many very fine roots; 20 percent angular chert fragments; medium acid; clear smooth boundary.

Bt1—6 to 15 inches; yellowish red (5YR 5/8) gravelly silty clay; moderate medium subangular blocky structure; firm, plastic and slightly sticky; few very fine roots; distinct nearly continuous clay films on faces of peds; 20 percent angular chert fragments; neutral; gradual smooth boundary.

Bt2—15 to 26 inches; red (2.5YR 4/6) gravelly clay; common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium and fine subangular blocky structure; firm, sticky and plastic; few very fine roots; distinct continuous clay films on faces of peds; 20 percent chert fragments; slightly acid; clear smooth boundary.

Bt3—26 to 38 inches; mottled red (2.5YR 4/6), yellowish red (5YR 4/6), and reddish yellow (7.5YR 7/8) gravelly clay; moderate medium and fine subangular and angular blocky structure; very firm; distinct continuous clay films on faces of peds; 25 percent chert fragments; very strongly acid; gradual smooth boundary.

Bt4—38 to 50 inches; dark red (10R 3/6) gravelly clay; common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium angular blocky structure; very firm; distinct continuous clay films on faces of peds; 26 percent chert fragments; very strongly acid; gradual wavy boundary.

Bt5—50 to 63 inches; dark red (10R 3/6) clay; common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium and fine angular blocky structure; very firm; distinct continuous clay films on faces of peds; 10 percent chert fragments; very strongly acid; gradual wavy boundary.

Bt6—63 to 72 inches; mottled dark red (10R 3/6), strong brown (7.5YR 5/8), and pale yellow (2.5Y 7/4) clay; weak medium and coarse subangular and angular blocky structure with some medium platy structure in lower part; very firm; distinct nearly continuous clay films on faces of peds; 10 percent chert fragments; few remnants of decomposed siltstone that crushes to loamy material; extremely acid.

The solum is 40 to 60 inches or more thick. Depth to bedrock is more than 60 inches. Chert, sandstone fragments, or pebbles range from 15 to 35 percent in the Ap horizon and from none to 35 percent in the Bt horizon. Reaction ranges from neutral to extremely acid.

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

The Bt horizon has hue of 5YR, 2.5YR, or 10R, value of 3 to 5, and chroma of 4 to 8. Mottles are in shades of brown or yellow. The texture is clay loam, silty clay loam, silty clay, or clay, or the gravelly analogs.

Some pedons have a BC or C horizon that has color and texture ranges similar to those of the Bt horizon.

Crider Series

The Crider series consists of deep, well drained, moderately permeable soils that formed in a loess mantle over residuum weathered from limestone. These soils are on broad ridgetops and side slopes on uplands. Slopes range from 2 to 12 percent but are dominantly 2 to 6 percent. Crider soils are fine-silty, mixed, mesic Typic Paleudalfs.

Crider soils are on the same landforms with Bedford, Christian, and Mountview soils. Bedford soils have a fragipan and are moderately well drained. Christian soils are in a clayey family and are gravelly in the solum. Mountview soils have base saturation of less than 35 percent.

Typical pedon of Crider silt loam, 2 to 6 percent slopes; about 7.5 miles south of Scottsville, 1 mile southwest of Mt. Union Church, 0.5 mile west of the junction of Kentucky Highway 1421 and Barnes Road, and 250 feet south of Barnes Road.

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

BA—7 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular and weak fine subangular blocky structure; friable; common fine and medium roots; neutral; clear smooth boundary.

Bt1—14 to 26 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common thin patchy clay films; few fine roots; few small dark brown concretions; strongly acid; gradual smooth boundary.

Bt2—26 to 36 inches; yellowish red (5YR 4/6) silt loam; moderate medium subangular blocky structure; firm; continuous clay films; small black concretions; 2 percent small chert fragments; strongly acid; clear smooth boundary.

2Bt1—36 to 50 inches; dark red (2.5YR 3/6) silty clay loam; moderate medium angular blocky structure; firm; continuous clay films; common light gray (10YR 7/2) silt coatings; few small black concretions; 2 percent chert fragments; very strongly acid; gradual smooth boundary.

2Bt2—50 to 63 inches; red (2.5YR 4/6) silty clay; moderate medium angular blocky structure; firm; continuous clay films; common light gray (10YR 7/2) and brownish yellow (10YR 6/6) silt coatings; few small black concretions; 2 percent chert fragments; very strongly acid.

The solum is more than 60 inches thick. Depth to bedrock ranges from 60 to 100 inches or more. Reaction is neutral to strongly acid in the upper part of the solum and slightly acid to very strongly acid in the lower part.

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

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

The upper part of the Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. The lower part has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. The texture of the Bt horizon is silt loam or silty clay loam.

The 2Bt horizon has hue of 5YR to 10R, value of 3 to 5, and chroma of 4 to 8. Some pedons have few to common mottles in shades of red, brown, yellow, or gray. The texture is silty clay loam, silty clay, or clay.

Elk Series

The Elk series consists of deep, well drained soils that have moderate permeability. These soils formed in mixed alluvium from limestone, sandstone, shale, and loess. They are on low stream terraces and are subject to occasional flooding. Slopes range from 2 to 6 percent. Elk soils are fine-silty, mixed, mesic Ultic Hapludalfs.

The Elk soils in Allen County are a taxadjunct to the Elk series because the amount of clay typically does not decrease by 20 percent or more of its maximum within a depth of about 60 inches. This difference does not alter use and management.

Elk soils are on the same landscape with Nolin and Newark soils on flood plains and Captina and Taft soils on stream terraces. Nolin and Newark soils do not have an argillic horizon. Newark soils are somewhat poorly drained. Captina soils are moderately well drained and have a fragipan. Taft soils are somewhat poorly drained and have a fragipan.

Typical pedon of Elk silt loam, 2 to 6 percent slopes, occasionally flooded; about 1.2 miles north of Mount Aerial, 0.3 mile northwest of Horseshoe Road, 300 feet south of the Middle Fork of Drakes Creek, in a field.

Ap—0 to 9 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable;

many fine roots; slightly acid; clear smooth boundary.

BA—9 to 19 inches; strong brown (7.5YR 5/6) silt loam; weak medium subangular blocky structure; friable; common fine roots; slightly acid; gradual smooth boundary.

Bt1—19 to 34 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few small dark brown concretions; thin patchy clay films; common fine roots; slightly acid; gradual smooth boundary.

Bt2—34 to 45 inches; strong brown (7.5YR 5/6) silty clay loam; common fine faint yellowish red (5YR 5/8) mottles and common fine distinct light gray (10YR 7/1) mottles; common black concretions; continuous clay films; moderate medium subangular blocky structure; firm; strongly acid; clear smooth boundary.

Bt3—45 to 62 inches; yellowish red (5YR 4/6) silty clay loam; common fine and medium light gray (10YR 7/2), strong brown (7.5YR 5/6), and pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; firm; few clay films; 5 percent gravel; strongly acid.

The solum is 40 to 60 inches or more thick. Depth to bedrock is more than 60 inches. Reaction is slightly acid to very strongly acid except where lime has been added to the soil. Gravel ranges up to 5 percent in the solum.

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

The BA, Bt1, and Bt2 horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The texture is silt loam or silty clay loam.

The Bt3 horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 to 7, and chroma of 2 to 6. Mottles are in shades of brown and gray. The texture is silty clay loam, silty clay, or silt loam.

Some pedons have a C horizon that has hue of 5YR, 7.5YR, or 10YR, value of 4 to 7, and chroma of 2 to 6. The texture is silt loam, silty clay loam, or silty clay.

Melvin Series

The Melvin series consists of deep, poorly drained soils that have moderate permeability. These soils formed in alluvium from limestone, shale, and sandstone. They are on flood plains and in upland drainageways and depressions. These soils are subject to frequent flooding. A seasonal high water table is at the surface or within 1 foot in winter and early in spring. Slopes range from 0 to 2 percent. Melvin soils are fine-silty, mixed, nonacid, mesic Typic Fluvaquents.

Melvin soils are on the same landscape with Newark, Nolin, and Taft soils. Newark soils are somewhat poorly drained. Nolin soils are well drained. Taft soils are on adjacent stream terraces, are somewhat poorly drained, and have a fragipan.

Typical pedon of Melvin silt loam, frequently flooded; about 0.5 mile northeast of Gainesville, 300 feet south of the junction of Bridge Hollow and Gainesville-Port Oliver Roads, 50 feet east of Difficult Creek, in a cultivated field.

Ap—0 to 8 inches; grayish brown (10YR 5/2) silt loam; common fine faint brown mottles; weak fine granular structure; friable; many fine roots; slightly acid; gradual smooth boundary.

AB—8 to 18 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/8), light olive brown (2.5Y 5/4), and dark brown (10YR 3/3) mottles; weak fine granular and subangular blocky structure; friable; common fine roots; slightly acid; gradual smooth boundary.

Bg—18 to 38 inches; grayish brown (2.5Y 5/2) silt loam; common medium distinct yellowish brown (10YR 5/6) and very dark grayish brown (2.5Y 3/2) mottles; moderate medium subangular blocky structure; firm; few fine roots in upper part; slightly acid; gradual smooth boundary.

Cg—38 to 65 inches; light brownish gray (2.5Y 6/2) silt loam; common medium distinct dark yellowish brown (10YR 3/4) and dark brown (7.5YR 4/4) mottles; strong medium subangular blocky structure; firm; few small gravel; few black and brown concretions; medium acid.

The solum is 20 to 40 inches thick, and depth to bedrock is more than 60 inches. Reaction ranges from medium acid to mildly alkaline.

The Ap horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 to 3. Mottles are in shades of yellow, brown, or gray.

The AB horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 3. The texture is silt loam or silty clay loam.

The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2, or it is neutral and has value of 4 to 6. The texture is silt loam or silty clay loam.

The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral and has value of 4 to 7. Mottles are in shades of brown or red.

In some pedons, this horizon is equally mottled in shades of gray, brown, and red. The texture is silt loam, silty clay loam, or loam. Some pedons have thin stratified layers of loam, silty clay, or sand and gravel.

Mountview Series

The Mountview series consists of deep, well drained soils that have moderate permeability. These soils formed in a loess mantle over residuum from cherty limestone. They are on broad ridgetops and side slopes on uplands. Slopes range from 2 to 12 percent. Mountview soils are fine-silty, siliceous, thermic Typic Paleudults.

Mountview soils are on the same landforms with Bedford, Christian, and Trimble soils. Bedford soils are moderately well drained and have a fragipan. Christian soils are in a clayey family. Trimble soils are in a fine-loamy family. Christian and Trimble soils have more gravel in the upper part of the solum than Mountview soils.

Typical pedon of Mountview silt loam, 2 to 6 percent slopes; about 10.9 miles west of Scottsville, 2 miles north-northwest of the junction of Kentucky Highway 100 and Clare-New Roe Road, about 650 yards west of the road, in a pasture.

Ap—0 to 7 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; friable; many very fine roots; very strongly acid; abrupt smooth boundary.

Bt1—7 to 22 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; common very fine roots; thin discontinuous clay films on faces of peds; few dark brown concretions; few chert fragments; very strongly acid; clear irregular boundary.

2Bt2—22 to 37 inches; red (2.5YR 4/6) silty clay; few vertical streak-like strong brown mottles; firm; moderate medium subangular blocky structure; few very fine roots; thick continuous clay films on faces of peds; few dark brown concretions; 8 percent chert fragments, 0.25 to 2 inches in diameter; very strongly acid; gradual wavy boundary.

2Bt3—37 to 48 inches; dark red (2.5YR 3/6) gravelly silty clay; few medium distinct strong brown (7.5YR 5/6) mottles; few yellowish red (5YR 4/6) streaks; moderate medium and fine subangular blocky and angular blocky structure; firm; few very fine roots; continuous clay films on faces of peds; 30 percent chert fragments, 0.25 to 3 inches in diameter; very strongly acid; gradual smooth boundary.

2Bt4—48 to 69 inches; dark red (2.5YR 3/6) silty clay; common strong brown (7.5YR 5/6) vertical streaks; moderate medium and fine subangular blocky and angular blocky structure; firm; continuous clay films on faces of peds; few black concretions; 5 percent chert fragments, 0.25 to 3 inches in diameter; very strongly acid.

The solum thickness and depth to bedrock are more than 60 inches. Rock fragments, mostly chert, range up to about 5 percent to a depth of 30 inches and from about 5 to 35 percent below that depth. Reaction is strongly acid or very strongly acid except where lime has been added to the soil.

The Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. The texture is silt loam or silty clay loam.

The 2Bt horizon has hue of 5YR or 2.5YR, value of 3 to 5, and chroma of 6 to 8. The texture is silty clay loam, silty clay, clay, clay loam, or the gravelly analogs.

Newark Series

The Newark series consists of deep, somewhat poorly drained soils that have moderate permeability. These soils formed in alluvium from limestone, shale, and sandstone. They are on flood plains and in upland drainageways and depressions. These soils are subject to frequent flooding. A seasonal high water table is at a depth of 0.5 to 1.5 feet in winter and early in spring. Slopes range from 0 to 2 percent. These soils are fine-silty, mixed, nonacid, mesic Aeric Fluvaquents.

Newark soils are on the same landscape with Melvin, Nolin, Skidmore, and Taft soils. Melvin soils are poorly drained. Nolin and Skidmore soils are well drained. Skidmore soils are in a loamy-skeletal family. Taft soils are on adjacent stream terraces and have a fragipan.

Typical pedon of Newark silt loam, frequently flooded; about 5.8 miles northwest of Scottsville, 2.1 miles west-northwest of the junction of Kentucky Highway 1332 and U.S. Highway 231, about 1 mile northeast of Beech Grove Church, 165 yards west of Trammel Fork, in a pasture.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine roots; slightly acid; gradual smooth boundary.

Bw—7 to 15 inches; brown (10YR 5/3) silt loam; few fine faint pale brown mottles; weak fine granular structure; very friable; common fine roots; medium acid; gradual smooth boundary.

Bg1—15 to 24 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; slightly acid; clear smooth boundary.

Bg2—24 to 36 inches; grayish brown (2.5Y 5/2) silt loam; many medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; common black and brown concretions; slightly acid; clear smooth boundary.

Cg—36 to 60 inches; grayish brown (10YR 5/2) silt loam; many medium distinct light brownish gray (10YR 6/2) and brown (10YR 5/3) mottles; weak coarse subangular blocky structure; firm; few black concretions; slightly acid.

The solum is 22 to 44 inches thick. Depth to bedrock is more than 60 inches. Rock fragments, mostly limestone and siltstone gravel, range up to 5 percent to a depth of 30 inches and up to 15 percent in the underlying material. Reaction ranges from medium acid to mildly alkaline.

The Ap horizon has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 3 or 4.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 or 4. Mottles are in shades of gray or brown. The texture is silt loam or silty clay loam.

The Bg horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 7, and chroma of 1 or 2. Mottles are in shades of gray and brown. Texture is silt loam or silty clay loam.

The Cg horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 7, and chroma of 1 or 2. Mottles are in shades of gray and brown. The texture is silt loam or silty clay loam. Some pedons have thin stratified layers of loam, fine sandy loam, silty clay loam, or silty clay.

Nolin Series

The Nolin series consists of deep, well drained soils that have moderate permeability. These soils formed in alluvium from limestone, siltstone, shale, and loess. They are on flood plains and in upland drainageways and depressions. These soils are subject to occasional or frequent flooding. A seasonal high water table is at a depth of 3 to 6 feet or more in winter and early in spring. Slopes range from 0 to 2 percent. Nolin soils are fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts.

Nolin soils are on the same landscape with Elk, Melvin, Newark, and Taft soils. Elk soils are on adjacent stream terraces and have an argillic horizon. Melvin soils are poorly drained, and Newark soils are somewhat poorly drained. Taft soils are on adjacent stream terraces, are somewhat poorly drained, and have a fragipan.

Typical pedon of Nolin silt loam, occasionally flooded; about 6 miles northwest of Scottsville, 2 miles west of the junction of U.S. Highway 231 and Kentucky Highway 1332, about 165 yards northeast of the Kentucky Highway 1332 bridge over Trammel Creek, in a pasture.

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine roots; medium acid; gradual smooth boundary.

Bw1—9 to 18 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; friable; common fine roots; medium acid; gradual smooth boundary.

Bw2—18 to 65 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; friable; few black concretions; medium acid.

The solum is 40 inches or more thick. Depth to bedrock is more than 60 inches. Reaction is medium acid to moderately alkaline. Rock fragments, mostly limestone and siltstone gravel, range up to 5 percent in the A and B horizons and up to 35 percent in the C horizon.

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

The Bw horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 or 5, and chroma of 3 or 4. Some pedons have mottles in shades of brown below a depth of 24 inches and in shades of gray below a depth of 30 inches. The texture is silt loam or silty clay loam.

Some pedons have a C horizon that has hue of 7.5YR, 10YR, or 2.5Y, value of 4 or 5, and chroma of 2 to 4. Texture is silt loam or silty clay loam. Some pedons have thin stratified layers of loam, fine sandy loam, or sandy loam.

Skidmore Series

The Skidmore series consists of deep, well drained soils that have moderately rapid permeability. These soils formed in alluvium from siltstone, sandstone, and shale. They are on narrow flood plains and are subject to frequent flooding. A seasonal high water table is at a depth of 3 to 4 feet in winter and early in spring. Slopes range from 0 to 2 percent. Skidmore soils are loamy-skeletal, mixed, mesic Dystric Fluventic Eutrochrepts.

Skidmore soils are on the same landforms with Nolin and Newark soils, which are in a fine-silty family. Newark soils are somewhat poorly drained.

Typical pedon of Skidmore gravelly loam, in an area of Skidmore-Nolin complex, frequently flooded; about 5.3 miles southeast of Holland, 1.5 miles east-southeast of the junction of Kentucky Highway 1333 and Red Hill-Akersville Road, 0.3 mile southeast of Roark Cemetery, 50 feet north of road near a bridge.

Ap—0 to 6 inches; dark brown (10YR 4/3) gravelly loam; moderate medium and fine granular structure; very friable; common fine and very fine roots; 20 percent gravel; neutral; clear smooth boundary.

Bw1—6 to 18 inches; dark brown (10YR 3/3) gravelly loam; weak fine subangular blocky structure; friable; common fine roots; 20 percent gravel; slightly acid; clear smooth boundary.

Bw2—18 to 38 inches; dark brown (10YR 4/3) very gravelly loam; weak fine subangular blocky structure; friable; few firm roots; 35 percent gravel; slightly acid; clear smooth boundary.

C—38 to 56 inches; dark brown (10YR 3/3) very gravelly clay loam; massive; firm; 50 percent gravel; 35 percent thin shaly fragments; mildly alkaline; abrupt smooth boundary.

R—56 inches; gray limestone bedrock.

The solum is 20 to 40 inches thick. Depth to bedrock is 40 inches or more. Rock fragments, mostly siltstone gravel, range from 20 to 50 percent in the Ap and Bw horizons and from 35 to 90 percent in the C horizon, but average more than 35 percent in the control section. Reaction ranges from medium acid to mildly alkaline.

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

The Bw horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. The texture is loam, clay loam, fine sandy loam, sandy loam, and the gravelly, very gravelly, channery, or very channery analogs. Some pedons have a 1- to 2-inch layer of loamy sand, or they are dominantly loamy sand below a depth of 30 inches. Some pedons also have mottles in shades of gray below a depth of 24 inches.

The C horizon has hue of 10YR or 7.5YR, value of 3 to 6, and chroma of 3 to 6. The texture is loam, clay loam, fine sandy loam, sandy loam, and the very gravelly, extremely gravelly, very channery, or extremely channery analogs.

Sulphura Series

The Sulphura series consist of moderately deep, somewhat excessively drained soils that have moderate permeability. These soils formed in residuum from shaly limestone and shale. They are on upland side slopes. Slopes range from 20 to 50 percent. Sulphura soils are loamy-skeletal, siliceous, thermic Ruptic-Alfic Dystrochrepts.

The Sulphura soils are a taxadjunct to the Sulphura series because they have less than 35 percent coarse fragments in the control section, and reaction ranges to extremely acid. These differences do not alter use and management.

Sulphura soils are on the same landforms with Trimble and Caneyville soils. Trimble soils are more than 60 inches deep to bedrock and are in a fine-loamy family. Caneyville soils are 20 to 40 inches to bedrock and are in a fine family.

Typical pedon of Sulphura channery silt loam, in an area of Sulphura-Trimble complex, 20 to 50 percent slopes; about 2.8 miles east-northeast of Holland, 0.2 mile southeast of the end of Walnut Hill Road, 100 feet north of Barren River, on a bluff overlooking Jewsharp Bend.

A—0 to 4 inches; dark yellowish brown (10YR 4/4) channery silt loam; weak fine granular structure; friable; few roots; 25 percent shale fragments; strongly acid; clear smooth boundary.

Bw1—4 to 16 inches; dark yellowish brown (10YR 4/4) channery silt loam; moderate medium subangular blocky structure; firm; few roots; 25 percent shale fragments; strongly acid; clear smooth boundary.

Bw2—16 to 26 inches; dark yellowish brown (10YR 4/4) channery silt loam; common distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few roots; 25 percent shale fragments; strongly acid; abrupt smooth boundary.

Cr—26 inches; dark colored shale.

The solum thickness and depth to bedrock are 20 to 40 inches. Reaction is strongly acid to extremely acid in the A and Bw1 horizons and slightly acid to extremely acid in the Bw2 horizon. Shale fragments from 0.25 to 3 inches in diameter range from 15 to 30 percent, by volume, in the control section.

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

The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 8. The texture is silt loam, loam, silty clay loam, and the channery analogs.

The Cr horizon can range up to 12 inches thick and consists of unweathered shale that has soil material in shades of brown. The soil material fills some of the cracks and coats the shale fragments.

Taft Series

The Taft series consists of deep, somewhat poorly drained soils that have a slowly permeable fragipan. These soils formed in a loess mantle and underlying old alluvium or residuum from limestone and shale. They are on upland flats and stream terraces. A seasonal high water table is at a depth of 1 to 2 feet late in winter and early in spring. Slopes range from 0 to 2 percent. Taft soils are fine-silty, siliceous, thermic Glossaquic Fragiudults.

Taft soils are on the same landscape with Mountview, Crider, Bedford, Newark, and Melvin soils. Mountview and Crider soils are well drained. Bedford soils are moderately well drained and do not have gray mottles in the upper 10 inches of the Bt horizon. Newark and Melvin soils are on flood plains. Melvin soils are poorly drained.

Typical pedon of Taft silt loam; about 4.2 miles east of Scottsville, 0.25 mile southeast of the junction of Maysville Road and Doss Canedy Road, and 200 feet west of Doss Canedy Road.

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

Bw—7 to 25 inches; light yellowish brown (2.5Y 6/4) silt loam; few fine distinct light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; strongly acid; clear smooth boundary.

Bx1—25 to 46 inches; light brownish gray (2.5Y 6/2) silt loam; common medium distinct dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to medium subangular blocky; firm, compact, and brittle; prominent nearly vertical veins of gray coatings up to 5 millimeters in diameter; few small black and brown concretions; strongly acid; gradual smooth boundary.

Bx2—46 to 55 inches; dark yellowish brown (10YR 4/6) silt loam; common medium distinct light brownish gray (2.5Y 6/2) and grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm, compact, and brittle; prominent nearly vertical veins of gray coatings up to 5 millimeters in diameter; strongly acid; gradual smooth boundary.

Bt—55 to 65 inches; mottled yellowish brown (10YR 5/4), brown (7.5YR 5/4), and gray (10YR 5/1) silt loam; moderate medium subangular blocky structure; firm; prominent nearly vertical veins of gray coatings up to 5 millimeters in diameter; common black concretions; few limestone chert fragments; strongly acid.

The solum is 50 to 60 inches or more thick. Depth to the fragipan ranges from 20 to 36 inches. Depth to bedrock is more than 60 inches. Reaction is strongly acid or very strongly acid except where lime has been added to the soil.

The Ap horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4.

The Bw horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4. Mottles are in shades of gray. The texture is silt loam or silty clay loam.

The Bx horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 6. The texture is silt loam or silty clay loam.

The Bt horizon has hue of 10YR to 2.5YR, value of 4 or 5, and chroma of 4 to 6. Mottles are in shades of gray, brown, and yellow. The texture is silt loam or silty clay loam.

Trimble Series

The Trimble series consists of deep, well drained soils that have moderate permeability. These soils formed in residuum from cherty limestone. They are on ridgetops and side slopes on uplands. Slopes range from 2 to 50 percent. Trimble soils are fine-loamy, siliceous, mesic Typic Paleudults.

Trimble soils in Allen County are a taxadjunct to the Trimble series because base saturation is more than 35 percent, reaction ranges to medium acid, and some horizons have less than 15 percent coarse fragments. These differences do not alter use and management.

Trimble soils are on the same landforms with Bedford, Christian, Caneyville, and Mountview soils. Bedford soils are moderately well drained, have a fragipan, and are in a fine-silty family. Christian soils are in a clayey family. Caneyville soils are in a clayey family and are 2 to 40 inches to bedrock. Mountview soils are in a fine-silty family.

Typical pedon of Trimble gravelly silt loam, 20 to 50 percent slopes; about 4 miles south of Scottsville, 0.2 mile northeast of the Scottsville-Trammel Fork Bridge across Rough Creek, 150 feet west of Scottsville-Trammel Fork Road, in a wooded area.

O1—2 to 0 inches; partly decomposed leaf litter.

Ap—0 to 4 inches; dark brown (10YR 4/3) gravelly silt loam; weak fine granular structure; very friable; many fine and medium and a few coarse roots; 15 percent chert fragments; strongly acid; clear smooth boundary.

BA—4 to 9 inches; yellowish brown (10YR 5/4) gravelly silt loam; weak medium subangular structure parting to moderate medium granular; friable; many very fine, common medium, and a few coarse roots; 15 percent chert fragments; medium acid; clear smooth boundary.

Bt1—9 to 19 inches; yellowish brown (10YR 5/8) gravelly silt loam; moderate medium subangular blocky structure; friable; common very fine and a few medium and coarse roots; patchy thin clay films on surfaces of peds; 15 percent chert fragments; strongly acid; gradual smooth boundary.

Bt2—19 to 30 inches; yellowish brown (10YR 5/6) gravelly silt loam; moderate medium subangular blocky structure; firm; few fine and common coarse roots; common thin patchy strong brown (7.5YR 5/6) clay films on surfaces of peds; 30 percent angular and subrounded chert fragments; strongly acid; gradual smooth boundary.

Bt3—30 to 40 inches; brownish yellow (10YR 6/8) gravelly clay loam; moderate medium subangular blocky structure; firm; few fine roots; common fine faint light yellowish brown silt coatings; common thin strong brown (7.5YR 5/6) clay films on surfaces of peds; 30 percent angular and subrounded chert fragments; strongly acid; clear smooth boundary.

Bt4—40 to 52 inches; mottled strong brown (7.5YR 5/6) light yellowish brown (10YR 6/4), and yellowish brown (10YR 5/6) gravelly clay loam; moderate medium subangular blocky structure; firm; few fine roots; many fine prominent black stains on surfaces of peds; common thin strong brown (7.5YR 4/6) clay films on surfaces of peds; 30 percent angular and subangular chert fragments; strongly acid; gradual smooth boundary.

Bt5—52 to 63 inches; strong brown (7.5YR 5/6) silty clay loam; common medium faint reddish yellow (7.5YR 6/6) and common fine distinct light yellowish brown (10YR 6/4) mottles; moderate coarse and medium subangular blocky structure; firm; few very fine roots; common thin strong brown (7.5YR 4/6) clay films on surfaces of peds; 10 percent angular and subangular chert fragments; strongly acid.

The solum is 60 to 70 inches or more thick. Depth to bedrock ranges from 60 to 100 inches or more.

Reaction is strongly acid to extremely acid except where lime has been added to the soil. Chert fragments range from 10 to 35 percent throughout. The fragments are predominantly chert, but in some pedons up to 25 percent of the fragments are sandstone or siltstone.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4.

The BA horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. The texture is gravelly silt loam or gravelly silty clay loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. Mottles are in shades of gray, brown, or red in some subhorizons. The texture is gravelly silt loam, gravelly silty clay loam, gravelly clay loam, or silty clay loam.

Waynesboro Series

The Waynesboro series consists of deep, well drained soils that have moderate permeability. These soils formed in old alluvium or unconsolidated material of sandstone, shale, and limestone. They are on narrow ridgetops and side slopes of high stream terraces on uplands. Slopes range from 6 to 20 percent. Waynesboro soils are clayey, kaolinitic, thermic Typic Paleudults.

Waynesboro soils are on the same landforms with Christian, Crider, Mountview, and Trimble soils. Christian soils are gravelly. Trimble soils are gravelly and are in a fine-loamy family. Crider and Mountview soils are in a fine-silty family.

Typical pedon of Waynesboro silt loam, 6 to 12 percent slopes, eroded; about 2.7 miles east of Meador, 1 mile north of the end of Irvin Road, 300 feet west of a farm road, in a field.

Ap—0 to 6 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

Bt1—6 to 12 inches; yellowish red (5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; thin patchy clay films on ped surfaces; few small pebbles; strongly acid; gradual smooth boundary.

Bt2—12 to 25 inches; red (2.5YR 4/6) clay loam; moderate to medium angular blocky structure; firm; few small roots; common continuous clay film on ped surfaces; few small pebbles; strongly acid; gradual smooth boundary.

Bt3—25 to 42 inches; dark red (2.5YR 3/6) clay loam; moderate medium angular blocky structure; firm;

few roots; common continuous clay films on ped surfaces; few small pebbles; very strongly acid, gradual smooth boundary.

Bt4—42 to 59 inches; dark red (2.5YR 3/6) clay loam; moderate medium angular blocky structure; firm; common patchy clay films on ped surfaces; 5 percent pebbles; very strongly acid; gradual smooth boundary.

Bt5—59 to 66 inches; dark red (2.5YR 3/6) clay loam; common medium distinct strong brown (7.5YR 5/6) and grayish brown (10YR 5/2) mottles; moderate medium angular blocky structure; firm; common patchy clay films on ped surfaces; few pebbles and small angular gravel; common brown concretions; few peds with veins of sand; very strongly acid.

The solum thickness and depth to bedrock are more than 60 inches. Reaction is strongly acid or very strongly acid except where lime has been added to the soil. Coarse angular chert and quartzite gravel range up to 10 percent throughout the profile.

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

The Bt horizon has hue of 2.5YR to 10YR, value of 3 to 6, and chroma of 4 to 8. The texture is loam, clay loam, silty clay loam, sandy clay, or clay.

Formation of the Soils

This section describes the factors of soil formation, relates them to soils in the survey area, and explains the processes of soil formation.

Factors of Soil Formation

The characteristic of a soil at any given place depends on the physical and chemical composition of parent material and on climate, relief, plant and animal life, and time. Soils form by the interaction of these five factors. The relative importance of each factor differs from one soil to another. In some areas one factor can dominate the formation of soil characteristics, and in other areas another factor can dominate.

In Allen County, climate and plant and animal life are not likely to vary greatly, but there are differences in relief and parent material.

Because the interrelationships among these five factors are so complex, the effect of any one factor is difficult to determine.

Parent Material

Parent material is the unconsolidated mass in which soils form. It influences the mineral and chemical composition of the soil and to a large extent the rate at which soil formation takes place. The individual characteristics of different parent materials have shaped to some extent the development of the soils.

In Allen County, the basic types of parent material are sedimentary and transported. Sedimentary parent material developed in place in the underlying layers of rock. Transported parent material has been transported by gravity, water, or wind. Recent investigations indicate that the red clayey parent material is mainly debris derived through erosion from higher-lying, clastic sedimentary rocks that were transported and deposited on pediments cut into lower-lying limestone. The deep, red clayey soils subsequently formed in this weathered pedisediment *(23)*. These soils are underlain by limestone and have a more complex genesis than simple solution.

In some areas of the county, limestone is relatively resistant to weathering. Moderately deep Caneyville soils formed in these areas. The deep Trimble soils formed in residuum from cherty limestone. Chert is highly resistant to weathering; consequently, chert nodules and fragments make up a considerable volume of some individual horizons.

Some soils, such as Bedford soils, formed in a thin mantle of loess underlain by limestone residuum. The upper part of the solum that formed in loess is silty, and the lower part that formed in residuum is clayey.

Captina and Elk soils formed in old alluvium on stream terraces. Melvin, Newark, Nolin, and Skidmore soils formed in more recent alluvium on flood plains. All of these soils have less clay in the B and C horizons than soils that formed in residuum.

Climate

The climate of Allen County is humid temperate. The average precipitation is 46 inches. The soils are never completely dry, and they are subject to leaching during most of the year. The average summer air temperature is 74 degrees F, and the average winter air temperature is 34 degrees F.

In Allen County, the soils that most indicate the influence of climate have a leached, acid (unless limed) Bt horizon that is finer textured than the surface layer. The well drained Mountview soils are an example. The section "General Nature of the Survey Area" gives more detailed information on climate.

Relief

Relief, or the position, shape, and slope of the landscape, influences the formation of soils mainly through its effect on drainage and erosion. Relief also influences the formation of soils through variations in exposure to sun, wind, air, drainage, and plant cover.

On moderately steep or steep soils, such as Caneyville, Christian, Sulphura, and Trimble soils, a considerable amount of water is lost through runoff, and less water is able to enter the soil. As a result, erosion removes the soil more rapidly, and deep soils generally do not develop.

On gently sloping and sloping soils, such as Bedford, Crider, and Mountview soils, enough water moves downward to cause leaching and a pronounced accumulation of clay in the subsoil. These soils are likely to be deep and have a well defined profile.

On nearly level soils, such as Melvin and Newark soils, most of the water drains through the soil and creates a wetness limitation if the soil is positioned on a landscape that does not allow water to drain off easily.

Plant and Animal Life

Plants affect soil formation mostly by adding organic matter to the soil. Earthworms, ants, and burrowing animals mix the soil and add organic matter through their waste and bodies. They also make soils more open and porous, thus affecting soil structure. Bacteria and fungi contribute mainly by helping to decompose organic matter and thus releasing plant nutrients. The organic matter imparts a dark color to the soil material and affects soil structure.

The vegetation that grows on the soil during the period of soil formation influences the type of soil that forms. In Allen County, the native vegetation was mostly hardwood forests. The soils that formed under hardwood forests have a thin, dark surface layer; a leached, lighter colored subsurface layer; and a brighter colored subsoil.

Man greatly altered the surface layer and changed the soil environment where he cleared the forest and plowed the soil. He has mixed the soil layers, moved soil from place to place, added fertilizer and lime, and introduced new plants. In places, accelerated erosion has removed most of the original surface layer and exposed the subsoil.

Time

A long period of time is required for distinct soil profiles to develop. The length of time required depends mainly upon the nature of the parent material and the topography. With the exception of soils formed in recent alluvium, enough time has elapsed for the soils in Allen County to express the interaction of the factors of soil formation.

Soils formed in recent alluvium have weak horizon development. The surface horizon can show a slight increase in the content of organic matter, and the subsoil can have weak structure. Such soils are immature. Nolin and Newark soils are immature soils. After a long time, weathering occurs if additional sediment is not deposited. Some of the finer material then moves into the subsoil, and the structure and color of the subsoil can change. This maturing process took place on Captina and Elk soils. A soil is said to be mature when it has been in place long enough to acquire distinct profile characteristics. Christian and Crider soils are mature soils.

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Glossary

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

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Aspect. The direction that a slope faces.

Warm aspect.—Slopes of more than 15 percent facing an azimuth of 135 to 315 degrees.

Cool aspect.—Slopes of more than 15 percent facing an azimuth of 315 to 135 degrees.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as—

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

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

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

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

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

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

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

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

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

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

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

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

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

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

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

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

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

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

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

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

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

Culmination of mean annual increment (CMAI) (Forestry). The volume for a stand of a particular tree species at the point of highest average annual growth.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Excess lime (in tables). Excess carbonates in the soil restrict the growth of some plants.

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

Fine textured soil. Sandy clay, silty clay, and clay.

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

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

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

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

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

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

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

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

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

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

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

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.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

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

Leaching. The removal of soluble material from soil or other material by percolating water.

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

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

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

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

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

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

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

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

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

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter is expressed as—

Low	less than 2 percent
Moderate	2 to 4 percent
High	more than 4 percent

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

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

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

Percolation. The downward movement of water through the soil.

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

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

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

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

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

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

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

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

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

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

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

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH value are—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

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

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

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

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

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

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

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

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

Shale. Sedimentary rock formed by the hardening of a clay deposit.

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

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

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slope, gradient. Terms used in this survey to describe the range of slopes 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 50 percent

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Unstable fill (in tables). There is a risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors that are assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data recorded in the period 1951-80 at Scottsville, Kentucky]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	44.9	26.7	35.8	72	-7	31	4.68	2.46	6.61	9	4.8
February---	49.7	29.3	39.5	74	1	43	4.19	2.20	5.91	8	4.4
March------	59.1	37.5	48.3	82	14	139	5.50	3.27	7.48	10	2.7
April------	70.8	47.5	59.2	87	28	283	4.55	2.88	6.05	8	.1
May--------	77.8	55.4	66.6	91	34	516	4.73	3.11	6.20	8	.0
June-------	84.9	62.9	73.9	96	47	717	4.75	2.05	7.03	7	.0
July-------	87.9	66.6	77.3	98	53	846	4.38	2.53	6.02	8	.0
August-----	87.5	65.4	76.5	97	52	822	3.57	1.73	5.16	6	.0
September--	82.1	59.4	70.8	95	40	624	3.49	1.65	5.07	5	.0
October----	71.6	47.5	59.6	88	27	310	2.69	1.27	3.90	5	.0
November---	58.3	37.7	48.0	80	14	67	4.37	2.52	6.01	7	1.0
December---	48.9	30.8	39.9	71	3	27	4.84	2.29	7.04	8	2.0
Yearly:											
Average--	68.6	47.2	58.0	---	---	---	---	---	---	---	---
Extreme--	---	---	---	99	-7	---	---	---	---	---	---
Total----	---	---	---	---	---	4,424	51.74	43.89	58.51	89	15.0

* 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

[Data recorded in the period 1951-80 at Scottsville, Kentucky]

Probability	Temperature: 24° F or lower	Temperature: 28° F or lower	Temperature: 32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 2	April 14	May 6
2 years in 10 later than--	March 28	April 10	April 29
5 years in 10 later than--	March 18	April 1	April 16
First freezing temperature in fall:			
1 year in 10 earlier than--	October 28	October 22	October 11
2 years in 10 earlier than--	November 2	October 27	October 16
5 years in 10 earlier than--	November 12	November 5	October 25

TABLE 3.--GROWING SEASON

[Data recorded in the period 1951-80 at Scottsville, Kentucky]

Probability	Daily minimum temperature during growing season: Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	218	196	167
8 years in 10	225	203	175
5 years in 10	238	217	191
2 years in 10	250	230	207
1 year in 10	257	237	215

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
BeB	Bedford silt loam, 2 to 6 percent slopes	21,404	9.5
CaD2	Caneyville-Rock outcrop complex, 12 to 20 percent slopes, eroded	2,594	1.2
CaE2	Caneyville-Rock outcrop complex, 20 to 50 percent slopes, eroded	4,972	2.2
CdB	Captina silt loam, 2 to 6 percent slopes	777	0.3
ChB2	Christian gravelly silt loam, 2 to 6 percent slopes, eroded	4,756	2.1
ChC2	Christian gravelly silt loam, 6 to 12 percent slopes, eroded	27,064	12.0
ChD2	Christian gravelly silt loam, 12 to 20 percent slopes, eroded	22,173	9.9
CmC3	Christian gravelly silty clay loam, 6 to 12 percent slopes, severely eroded	216	0.1
CmD3	Christian gravelly silty clay loam, 12 to 20 percent slopes, severely eroded	432	0.2
CrB	Crider silt loam, 2 to 6 percent slopes	3,459	1.5
CrC3	Crider silt loam, 6 to 12 percent slopes, severely eroded	864	0.4
EkB	Elk silt loam, 2 to 6 percent slopes, occasionally flooded	1,081	0.5
Me	Melvin silt loam, frequently flooded	432	0.2
MoB	Mountview silt loam, 2 to 6 percent slopes	14,586	6.5
MoC2	Mountview silt loam, 6 to 12 percent slopes, eroded	3,243	1.4
Ne	Newark silt loam, frequently flooded	2,162	1.0
No	Nolin silt loam, occasionally flooded	7,999	3.6
Sn	Skidmore-Nolin complex, frequently flooded	4,324	1.9
StE	Sulphura-Trimble complex, 20 to 50 percent slopes	1,513	0.7
Ta	Taft silt loam	648	0.3
TrB2	Trimble gravelly silt loam, 2 to 6 percent slopes, eroded	4,972	2.2
TrC2	Trimble gravelly silt loam, 6 to 12 percent slopes, eroded	27,168	12.1
TrD2	Trimble gravelly silt loam, 12 to 20 percent slopes, eroded	18,193	8.1
TrE	Trimble gravelly silt loam, 20 to 50 percent slopes	40,531	18.0
WaC2	Waynesboro silt loam, 6 to 12 percent slopes, eroded	432	0.2
WnD2	Waynesboro loam, 12 to 20 percent slopes, eroded	216	0.1
	Water	8,449	3.8
	Total	224,660	100.0

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Land capability	Corn	Soybeans	Wheat	Tobacco	Grass-legume hay	Pasture
		Bu	Bu	Bu	Lbs	Ton	AUM*
BeB------------- Bedford	IIe	110	35	35	2,800	3.0	5.5
CaD2:							
Caneyville-----	VIe	---	---	---	---	---	5.0
Rock outcrop---	VIIIs	---	---	---	---	---	---
CaE2:							
Caneyville-----	VIIe	---	---	---	---	---	3.0
Rock outcrop---	VIIIs	---	---	---	---	---	---
CdB------------- Captina	IIe	100	30	30	2,700	3.0	5.5
ChB2------------ Christian	IIe	100	30	35	2,600	4.0	7.5
ChC2------------ Christian	IIIe	90	25	30	2,400	3.5	6.5
ChD2------------ Christian	IVe	75	---	---	2,000	3.0	5.5
CmC3------------ Christian	IVe	65	---	---	2,100	3.0	5.5
CmD3------------ Christian	VIe	---	---	---	---	---	4.0
CrB------------- Crider	IIe	125	45	45	3,200	4.5	9.0
CrC3------------ Crider	IVe	85	30	35	2,400	4.0	8.0
EkB------------- Elk	IIe	125	45	45	3,200	4.5	9.0
Me-------------- Melvin	IIIw	90	35	---	---	3.5	7.0
MoB------------- Mountview	IIe	110	40	40	2,800	4.0	8.0
MoC2------------ Mountview	IIIe	100	30	45	2,400	3.5	7.0
Ne-------------- Newark	IIw	110	35	40	2,400	3.5	7.0
No-------------- Nolin	IIw	120	40	45	3,200	4.0	9.0

See footnote at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Wheat	Tobacco	Grass-legume hay	Pasture
		Bu	Bu	Bu	Lbs	Ton	AUM*
Sn:							
Skidmore-------	IIw	70	30	30	---	3.0	5.5
Nolin----------	IIw	105	35	40	2,400	3.5	7.0
StE:							
Sulphura-------	VIIe	---	---	---	---	---	---
Trimble--------	VIIe	---	---	---	---	---	---
Ta-------------- Taft	IIIw	60	35	30	---	2.5	5.5
TrB2------------ Trimble	IIe	100	35	40	2,800	3.0	6.0
TrC2------------ Trimble	IIIe	95	30	40	2,400	3.0	6.0
TrD2------------ Trimble	IVe	75	25	35	2,200	2.5	5.5
TrE------------- Trimble	VIIe	---	---	---	---	---	---
WaC2------------ Waynesboro	IIIe	90	30	40	2,400	3.0	6.0
WnD2------------ Waynesboro	IVe	75	---	35	2,100	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.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	---	---	---	---
II	65,520	51,035	14,485	---
III	58,987	57,907	1,080	---
IV	41,662	41,662	---	---
V	---	---	---	---
VI	1,988	1,988	---	---
VII	45,027	45,027	---	---
VIII	3,027	---	---	3,027

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
BeB------------- Bedford	Slight	Slight	Slight	Severe	Yellow poplar-------	95	98	Eastern white pine, loblolly pine, yellow poplar, white ash, sweetgum.
					White oak-----------	70	54	
					Sugar maple---------	---	---	
					Sweetgum------------	83	87	
					Red maple-----------	---	---	
					Hickory-------------	---	---	
CaD2, CaE2:								
Caneyville----- (cool aspect)	Severe	Moderate	Slight	Severe	Black oak-----------	71	53	White oak, yellow poplar, white ash, eastern white pine, loblolly pine.
					White oak-----------	64	47	
					Sugar maple---------	---	---	
					Hickory-------------	---	---	
					White ash-----------	75	---	
					Eastern redcedar----	46	54	
					Yellow poplar-------	90	90	
					Chinkapin oak-------	54	38	
Caneyville----- (warm aspect)	Severe	Moderate	Moderate	Severe	Black oak-----------	71	47	Virginia pine, eastern redcedar, loblolly pine.
					White oak-----------	60	43	
					Sugar maple---------	---	---	
					Hickory-------------	---	---	
					Scarlet oak---------	50	34	
					Eastern redcedar----	36	38	
					Chinkapin oak-------	44	29	
Rock outcrop.								
CdB------------- Captina	Slight	Slight	Slight	Severe	Northern red oak----	65	47	Shortleaf pine, northern red oak.
					White oak-----------	60	43	
					Black oak-----------	65	47	
					Eastern redcedar----	40	43	
					Post oak------------	---	---	
ChB2, ChC2------ Christian	Slight	Slight	Slight	Severe	Virginia pine-------	74	114	Yellow poplar, eastern white pine, loblolly pine, shortleaf pine, northern red oak, white oak.
					Black oak-----------	77	59	
					Eastern redcedar----	41	44	
					Yellow poplar-------	87	84	
					White oak-----------	70	52	
					Hickory-------------	---	---	
					Black walnut--------	---	---	
ChD2------------ Christian	Moderate	Moderate	Slight	Severe	Virginia pine-------	74	114	Yellow poplar, eastern white pine, loblolly pine, shortleaf pine, northern red oak, white oak.
					Black oak-----------	77	59	
					Eastern redcedar----	41	44	
					Yellow poplar-------	87	84	
					White oak-----------	70	52	
					Hickory-------------	---	---	
					Black walnut--------	---	---	
CmC3------------ Christian	Slight	Moderate	Moderate	Moderate	Virginia pine-------	65	100	Virginia pine, white oak, eastern redcedar, loblolly pine.
					Eastern redcedar----	31	33	
					Hickory-------------	---	---	
					Blackgum------------	---	---	
					Black oak-----------	67	49	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
CmD3------------ Christian	Moderate	Moderate	Moderate	Moderate	Virginia pine-------	65	100	Virginia pine, white oak, eastern redcedar, loblolly pine.
					Eastern redcedar----	31	33	
					Hickory-------------	---	---	
					Blackgum------------	---	---	
					Black oak-----------	67	49	
CrB, CrC3------- Crider	Slight	Slight	Slight	Severe	Yellow poplar-------	97	102	Eastern white pine, yellow poplar, black walnut, loblolly pine, white ash, northern red oak, white oak, shortleaf pine.
					Sugar maple---------	---	---	
					Black oak-----------	84	66	
					White ash-----------	87	---	
					Black walnut--------	80	---	
					White oak-----------	72	54	
					Hickory-------------	---	---	
					Northern red oak----	84	66	
EkB------------- Elk	Slight	Slight	Slight	Severe	Yellow poplar-------	91	92	Eastern white pine, yellow poplar, black walnut, loblolly pine, white oak, northern red oak, cherrybark oak, white ash, shortleaf pine.
					Cherrybark oak------	95	133	
					Pin oak-------------	96	93	
					Hackberry-----------	---	---	
					Red maple-----------	---	---	
					American sycamore---	---	---	
					Black walnut--------	---	---	
Me-------------- Melvin	Slight	Moderate	Moderate	Severe	Pin oak-------------	100	98	Pin oak, American sycamore, sweetgum, loblolly pine, willow oak, green ash.
					Eastern cottonwood--	101	130	
					Sweetgum------------	92	112	
					Green ash-----------	---	---	
					Hackberry-----------	---	---	
					Hickory-------------	---	---	
					Red maple-----------	---	---	
					American elm--------	---	---	
MoB------------- Mountview	Slight	Slight	Slight	Severe	Southern red oak----	70	52	Loblolly pine, yellow poplar, shortleaf pine, northern red oak, eastern white pine, white oak, black walnut, white ash.
					Yellow poplar-------	90	90	
					Red maple-----------	---	---	
					Black oak-----------	85	67	
MoC2------------ Mountview	Moderate	Slight	Slight	Severe	Southern red oak----	70	52	Loblolly pine, yellow poplar, shortleaf pine, northern red oak, eastern white pine, white oak, black walnut, white ash.
					Yellow poplar-------	90	90	
					Red maple-----------	---	---	
					Black oak-----------	85	67	
Ne-------------- Newark	Slight	Moderate	Moderate	Severe	Pin oak-------------	100	98	Eastern cottonwood, sweetgum, American sycamore, green ash.
					Eastern cottonwood--	94	113	
					Sweetgum------------	85	93	
					Green ash-----------	---	---	
					Cherrybark oak------	---	---	
					Shumard oak---------	---	---	
					Overcup oak---------	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
No------------ Nolin	Slight	Slight	Moderate	Severe	Yellow poplar-------	107	119	Yellow poplar, eastern white pine eastern cottonwood, white ash, cherrybark oak, sweetgum, black walnut.
					Sweetgum-----------	92	112	
					Cherrybark oak------	97	140	
					Eastern cottonwood--	---	---	
					Black walnut--------	---	---	
					American sycamore---	---	---	
					River birch---------	---	---	
Sn: Skidmore-------	Slight	Slight	Moderate	Severe	Yellow poplar-------	103	112	Yellow poplar, white ash, eastern white pine, American sycamore, white oak, cherrybark oak, sweetgum.
					Sweetgum-----------	---	---	
					American sycamore---	---	---	
					Cherrybark oak------	---	---	
					River birch---------	---	---	
					Eastern cottonwood--	---	---	
					Blackgum-----------	---	---	
					White oak-----------	---	---	
					Black oak-----------	---	---	
					Black walnut--------	---	---	
Nolin----------	Slight	Slight	Moderate	Severe	Yellow poplar-------	107	119	Eastern cottonwood, green ash, cherrybark oak, sweetgum, black walnut, yellow poplar.
					Sweetgum-----------	92	112	
					Cherrybark oak------	97	140	
					Eastern cottonwood--	---	---	
					River birch---------	---	---	
					Black willow--------	---	---	
					American sycamore---	---	---	
StE: Sulphura-------	Slight	Moderate	Moderate	Moderate	White oak-----------	55	38	Shortleaf pine, Virginia pine, loblolly pine, eastern redcedar.
					Shortleaf pine------	55	78	
					Virginia pine-------	55	80	
					Loblolly pine-------	65	85	
					Eastern redcedar----	35	37	
Trimble--------	Moderate	Moderate	Slight	Severe	Black oak-----------	68	50	Eastern white pine, black walnut, shortleaf pine, white oak, northern red oak.
					Yellow poplar-------	99	105	
					Red maple-----------	---	---	
					Shagbark hickory----	---	---	
					White oak-----------	59	42	
Ta------------ Taft	Slight	Moderate	Slight	Severe	Yellow poplar-------	98	104	Loblolly pine, sweetgum, eastern white pine, yellow poplar, white oak.
					White oak-----------	60	43	
					Scarlet oak---------	60	43	
					Black oak-----------	57	40	
					Shortleaf pine------	58	84	
TrB2, TrC2------ Trimble	Slight	Slight	Slight	Severe	Black oak-----------	68	50	Eastern white pine, black walnut, shortleaf pine, white oak, northern red oak.
					Yellow poplar-------	99	105	
					Red maple-----------	---	---	
					Shagbark hickory----	---	---	
					White oak-----------	59	42	
					Hickory-------------	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
TrD2, TrE------- Trimble	Moderate	Moderate	Slight	Severe	Black oak-----------	68	50	Eastern white pine black walnut, shortleaf pine, white oak, northern red oak.
					Yellow poplar-------	99	105	
					Red maple-----------	---	---	
					Shagbark hickory----	---	---	
					White oak-----------	59	42	
					Hickory-------------	---	---	
WaC2------------ Waynesboro	Slight	Slight	Slight	Severe	Yellow poplar-------	85	81	Yellow poplar, shortleaf pine, loblolly pine, white oak.
					White oak-----------	75	57	
					Black oak-----------	---	---	
					Virginia pine-------	76	117	
WnD2------------ Waynesboro	Moderate	Moderate	Slight	Severe	Yellow poplar-------	85	81	Yellow poplar, shortleaf pine, loblolly pine, white oak.
					White oak-----------	75	57	
					Black oak-----------	---	---	
					Virginia pine-------	76	117	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 8.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BeB----------------- Bedford	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight----------	Moderate: wetness.
CaD2:					
Caneyville----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Rock outcrop.					
CaE2:					
Caneyville----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Rock outcrop.					
CdB----------------- Captina	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Slight.
ChB2---------------- Christian	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight----------	Severe: small stones.
ChC2---------------- Christian	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight----------	Severe: small stones.
ChD2---------------- Christian	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
CmC3---------------- Christian	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight----------	Severe: small stones.
CmD3---------------- Christian	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
CrB----------------- Crider	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
CrC3---------------- Crider	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
EkB----------------- Elk	Severe: flooding.	Slight----------	Moderate: slope, flooding.	Severe: erodes easily.	Moderate: flooding.
Me------------------ Melvin	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
MoB----------------- Mountview	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
MoC2: Mountview	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Ne: Newark	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
No: Nolin	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
Sn:					
Skidmore	Severe: flooding, small stones.	Severe: small stones.	Severe: small stones, flooding.	Moderate: flooding.	Severe: small stones, flooding.
Nolin	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
StE:					
Sulphura	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Trimble	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Ta: Taft	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
TrB2: Trimble	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
TrC2: Trimble	Moderate: small stones, slope.	Moderate: small stones, slope.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
TrD2: Trimble	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
TrE: Trimble	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
WaC2: Waynesboro	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
WnD2: Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

TABLE 9.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
BeB: Bedford	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CaD2:										
Caneyville	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
CaE2:										
Caneyville	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Rock outcrop.										
CdB: Captina	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ChB2: Christian	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ChC2: Christian	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ChD2: Christian	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CmC3: Christian	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CmD3: Christian	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CrB: Crider	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CrC3: Crider	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EkB: Elk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Me: Melvin	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
MoB: Mountview	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
MoC2: Mountview	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
Ne: Newark	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
No: Nolin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Sn:										
Skidmore	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
Nolin	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Fair	Very poor.
StE:										
Sulphura	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Trimble	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ta Taft	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
TrB2 Trimble	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TrC2 Trimble	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TrD2 Trimble	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
TrE Trimble	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WaC2 Waynesboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WnD2 Waynesboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BeB: Bedford	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Moderate: wetness.
CaD2, CaE2: Caneyville	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Rock outcrop.						
CdB: Captina	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.	Slight.
ChB2: Christian	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Severe: small stones.
ChC2: Christian	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Severe: small stones.
ChD2: Christian	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
CmC3: Christian	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Severe: small stones.
CmD3: Christian	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
CrB: Crider	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
CrC3: Crider	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
EkB: Elk	Moderate: too clayey, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
Me: Melvin	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MoB: Mountview	Moderate: too clayey.	Slight	Moderate: shrink-swell.	Moderate: slope.	Severe: low strength.	Slight.
MoC2: Mountview	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Ne: Newark	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
No: Nolin	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
Sn:						
Skidmore	Moderate: depth to rock, wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: small stones, flooding.
Nolin	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
StE:						
Sulphura	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Trimble	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ta: Taft	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
TrB2: Trimble	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.	Moderate: small stones.
TrC2: Trimble	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: small stones, slope.
TrD2, TrE: Trimble	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WaC2: Waynesboro	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
WnD2: Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BeB: Bedford	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
CaD2, CaE2: Caneyville	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Rock outcrop.					
CdB: Captina	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Poor: small stones.
ChB2: Christian	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Poor: small stones.
ChC2: Christian	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Poor: small stones.
ChD2: Christian	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
CmC3: Christian	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Poor: small stones.
CmD3: Christian	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
CrB: Crider	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
CrC3: Crider	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
EkB: Elk	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey, thin layer.
Me: Melvin	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
MoB: Mountview	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack, small stones.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MoC2: Mountview	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack, small stones.
Ne: Newark	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
No: Nolin	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey.
Sn:					
Skidmore	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, depth to rock, seepage.	Severe: flooding, seepage, wetness.	Poor: seepage, small stones.
Nolin	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey.
StE:					
Sulphura	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Trimble	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Ta: Taft	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
TrB2: Trimble	Slight	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: small stones, too clayey.
TrC2: Trimble	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: small stones, too clayey, slope.
TrD2, TrE: Trimble	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
WaC2: Waynesboro	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
WnD2: Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
BeB------------------- Bedford	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
CaD2:				
Caneyville-----------	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Rock outcrop.				
CaE2:				
Caneyville-----------	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Rock outcrop.				
CdB------------------- Captina	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
ChB2, ChC2------------ Christian	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
ChD2------------------ Christian	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
CmC3------------------ Christian	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
CmD3------------------ Christian	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
CrB------------------- Crider	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
CrC3------------------ Crider	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
EkB------------------- Elk	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Me-------------------- Melvin	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MoB, MoC2------------- Mountview	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
Ne: Newark	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
No: Nolin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Sn:				
Skidmore	Good	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
Nolin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
StE:				
Sulphura	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Trimble	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Ta: Taft	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
TrB2, TrC2: Trimble	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
TrD2: Trimble	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
TrE: Trimble	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
WaC2: Waynesboro	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
WnD2: Waynesboro	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
BeB: Bedford	Moderate: seepage, slope.	Severe: wetness.	Percs slowly, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
CaD2: Caneyville	Severe: slope.	Severe: thin layer, hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
Rock outcrop.					
CaE2: Caneyville	Severe: slope.	Severe: thin layer, hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
Rock outcrop.					
CdB: Captina	Moderate: seepage, slope.	Moderate: piping, wetness.	Percs slowly	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth, percs slowly.
ChB2: Christian	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Favorable	Favorable.
ChC2, ChD2, CmC3, CmD3: Christian	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope.
CrB: Crider	Moderate: seepage, slope.	Severe: piping.	Deep to water	Favorable	Favorable.
CrC3: Crider	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope.
EkB: Elk	Moderate: seepage, slope.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
Me: Melvin	Moderate: seepage.	Severe: piping, wetness.	Flooding	Erodes easily, wetness.	Wetness, erodes easily.
MoB: Mountview	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Erodes easily	Erodes easily.
MoC2: Mountview	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Ne: Newark	Moderate: seepage.	Severe: piping, wetness.	Flooding	Erodes easily, wetness.	Wetness, erodes easily.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
No----------------- Nolin	Severe: seepage.	Severe: piping.	Deep to water----	Erodes easily----	Erodes easily.
Sn: Skidmore---------	Severe: seepage.	Severe: seepage.	Deep to water----	Large stones-----	Large stones, droughty.
Nolin------------	Severe: seepage.	Severe: piping.	Deep to water----	Erodes easily----	Erodes easily.
StE: Sulphura---------	Severe: slope.	Severe: thin layer.	Deep to water----	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Trimble----------	Severe: slope.	Severe: piping.	Deep to water----	Slope------------	Slope.
Ta----------------- Taft	Slight------------	Severe: piping.	Percs slowly-----	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
TrB2-------------- Trimble	Moderate: seepage, slope.	Severe: piping.	Deep to water----	Favorable--------	Favorable.
TrC2, TrD2, TrE--- Trimble	Severe: slope.	Severe: piping.	Deep to water----	Slope------------	Slope.
WaC2-------------- Waynesboro	Severe: slope.	Severe: piping, hard to pack.	Deep to water----	Slope, erodes easily.	Slope, erodes easily.
WnD2-------------- Waynesboro	Severe: slope.	Severe: piping, hard to pack.	Deep to water----	Slope------------	Slope.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications are shown]

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BeB-------------- Bedford	0-6	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	85-95	<25	3-6
	6-27	Silty clay loam, silt loam.	CL	A-6, A-4	0	100	95-100	95-100	85-95	25-40	8-22
	27-56	Silty clay loam, silt loam, gravelly silty clay loam.	CL, SC	A-6, A-4	0	90-100	90-100	80-95	80-95	25-40	7-20
	56-72	Silty clay, clay, gravelly clay.	CL, CH, SC, MH	A-7	0-5	90-100	55-100	55-100	45-100	45-75	20-35
CaD2, CaE2: Caneyville------	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	6-22	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	22-36	Clay, silty clay	CH	A-7	0-15	90-100	85-100	75-100	65-100	50-75	30-45
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
CdB-------------- Captina	0-8	Silt loam--------	ML	A-4	0	95-100	92-100	85-100	75-90	<30	NP-7
	8-28	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	95-100	92-100	85-100	80-95	20-40	5-15
	28-60	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	80-100	85-100	80-100	80-95	20-40	5-20
ChB2, ChC2, ChD2- Christian	0-6	Gravelly silt loam.	ML, CL, GM, GC	A-4, A-6, A-2-4, A-2-6	0-2	55-80	35-85	30-85	25-80	<30	NP-12
	6-15	Clay loam, gravelly silty clay loam, gravelly clay.	ML, CL, SC, GC	A-4, A-6	0-10	70-100	50-100	40-100	36-95	41-70	20-42
	15-72	Clay, clay loam, gravelly clay.	CL, CH, GC, MH	A-7	0-10	70-100	50-100	45-100	40-90	41-70	20-42
CmC3, CmD3------- Christian	0-6	Gravelly silty clay loam.	ML, CL, GM, GC	A-4, A-6, A-2-4, A-2-6	0-2	55-80	35-85	30-85	25-80	41-70	20-42
	6-15	Clay loam, gravelly silty clay loam, gravelly clay.	ML, CL, SC, GC	A-4, A-6	0-10	70-100	50-100	40-100	36-95	41-70	20-42
	15-72	Clay, clay loam, gravelly clay.	CL, CH, GC, MH	A-7	0-10	70-100	50-100	45-100	40-90	41-70	20-42

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CrB, CrC3-------- Crider	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	85-100	25-35	3-12
	7-36	Silt loam, silty clay loam.	CL, ML, CL-ML	A-7, A-6, A-4	0	100	95-100	90-100	85-100	25-42	3-20
	36-63	Silty clay, clay, silty clay loam.	CL, CH	A-7, A-6	0-5	85-100	75-100	70-100	60-100	35-65	15-40
EkB-------------- Elk	0-9	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	70-95	25-35	3-10
	9-45	Silty clay loam, silt loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	75-100	25-40	5-15
	45-62	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
Me--------------- Melvin	0-8	Silt loam--------	CL, CL-ML, ML	A-4	0	95-100	90-100	80-100	80-95	25-35	4-10
	8-38	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	80-98	25-40	5-20
	38-65	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	85-100	80-100	70-100	60-98	25-40	5-20
MoB, MoC2-------- Mountview	0-7	Silt loam--------	ML, CL-ML	A-4	0	100	95-100	95-100	80-96	20-30	2-7
	7-22	Silt loam, silty clay loam.	CL, CH	A-6, A-7	0	95-100	95-100	90-100	80-96	30-43	10-23
	22-69	Silty clay, gravelly silty clay, gravelly silty clay loam.	CL, ML, GC, CH	A-6, A-7	0-20	75-100	65-100	60-98	50-96	35-65	11-32
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
	36-60	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-3	75-100	70-100	65-100	55-95	22-42	3-20
No--------------- Nolin	0-9	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	9-65	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
Sn: Skidmore--------	0-18	Gravelly loam----	GM, SM, ML	A-4, A-2	0-10	60-90	40-85	40-75	25-60	<30	NP-7
	18-56	Gravelly loam, very channery sandy loam, very gravelly loam.	GM, GP-GM	A-2, A-1	5-30	35-60	20-50	15-40	10-35	<30	NP-5
	56	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Nolin-----------	0-9	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	9-65	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

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
StE:											
Sulphura--------	0-4	Channery silt loam.	ML, CL-ML, CL	A-4	0-8	70-90	65-85	60-80	55-75	20-32	2-10
	4-26	Channery silt loam, channery silty clay loam, channery loam.	CL, CL-ML, GM	A-2, A-4, A-6	5-20	55-80	55-80	60-90	60-90	23-32	6-12
	26	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Trimble---------	0-6	Gravelly silt loam.	ML, CL, GM, SC	A-4	0-10	65-100	65-100	55-95	60-90	25-35	3-10
	6-41	Grevelly silty clay loam, gravelly silt loam.	CL, GM-GC, GC, CL-ML	A-4, A-6	0-10	65-100	65-100	55-95	60-90	25-40	5-20
	41-62	Gravelly silt loam, silty clay loam, gravelly clay loam.	GM, GC, ML, CL	A-4, A-6	0-10	65-100	65-100	55-95	60-90	20-40	2-20
Ta--------------- Taft	0-7	Silt loam--------	CL-ML, ML	A-4	0	100	95-100	90-100	75-95	18-30	2-10
	7-25	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	95-100	95-100	85-95	23-38	5-16
	25-65	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6, A-7	0	95-100	90-100	85-100	80-95	23-42	5-20
TrB2, TrC2, TrD2, TrE------------- Trimble	0-9	Gravelly silt loam.	ML, CL, GM, SC	A-4	0-10	65-100	65-100	55-95	60-90	25-35	3-10
	9-52	Gravelly clay loam, gravelly silt loam.	CL, GM-GC, GC, CL-ML	A-4, A-6	0-10	65-100	65-100	55-95	60-90	25-40	5-20
	52-63	Gravelly silt loam, silty clay loam, gravelly clay loam.	GM, GC, ML, CL	A-4, A-6	0-10	65-85	55-80	45-75	35-75	20-40	2-20
WaC2------------- Waynesboro	0-6	Silt loam--------	CL-ML, CL	A-4, A-6	0-5	95-100	95-100	80-98	70-90	22-35	5-15
	6-12	Clay loam, silty clay loam.	CL, ML, SC	A-4, A-6, A-7	0-5	90-100	85-100	75-95	45-75	30-41	9-17
	12-66	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	35-68	9-32
WnD2------------- Waynesboro	0-5	Loam-------------	ML, CL-ML, CL, SM	A-4	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	5-12	Clay loam, loam, silty clay loam.	CL, ML, SC	A-4, A-6, A-7	0-5	90-100	85-100	75-95	45-75	30-41	9-17
	12-66	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	35-68	9-32

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
BeB-------------- Bedford	0-6	10-16	1.30-1.45	0.6-2.0	0.22-0.24	3.6-6.5	Low----------	0.43	4-3	1-2
	6-27	20-32	1.30-1.45	0.6-2.0	0.18-0.20	3.6-6.0	Moderate-----	0.43		
	27-56	22-35	1.50-1.70	<0.06	0.06-0.08	3.6-5.5	Moderate-----	0.43		
	56-72	45-75	1.30-1.50	0.2-0.6	0.06-0.08	3.6-5.5	Moderate-----	0.32		
CaD2, CaE2:										
Caneyville------	0-6	10-25	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low----------	0.43	3	2-4
	6-22	36-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.3	Moderate-----	0.28		
	22-36	40-60	1.35-1.60	0.2-0.6	0.12-0.18	5.6-7.8	Moderate-----	0.28		
	36	---	---	---	---	---	-------------	----		
Rock outcrop.										
CdB-------------- Captina	0-8	8-20	1.50-1.60	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.43	3	1-3
	8-28	20-35	1.40-1.50	0.6-2.0	0.18-0.22	3.6-6.0	Low----------	0.43		
	28-60	20-35	1.45-1.55	0.06-0.2	0.08-0.12	3.6-6.0	Low----------	0.37		
ChB2, ChC2, ChD2, CmC3, CmD3------ Christian	0-6	10-40	1.20-1.50	0.6-6.0	0.10-0.15	3.6-7.3	Low----------	0.20	3	1-3
	6-15	25-60	1.20-1.50	0.6-2.0	0.14-0.22	3.6-7.3	Moderate-----	0.28		
	15-72	35-60	1.30-1.60	0.6-2.0	0.10-0.16	3.6-7.3	Moderate-----	0.28		
CrB, CrC3-------- Crider	0-7	15-27	1.20-1.40	0.6-2.0	0.19-0.23	5.1-7.3	Low----------	0.32	5	2-4
	7-36	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.1-7.3	Low----------	0.28		
	36-63	30-60	1.20-1.55	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-----	0.28		
EkB-------------- Elk	0-9	10-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-6.5	Low----------	0.37	5	.5-3
	9-45	18-34	1.20-1.50	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.28		
	45-62	15-42	1.20-1.50	0.6-2.0	0.14-0.20	5.1-6.5	Low----------	0.28		
Me--------------- Melvin	0-8	12-17	1.20-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43	5	.5-3
	8-38	12-35	1.30-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43		
	38-65	7-35	1.40-1.70	0.6-2.0	0.16-0.23	5.6-7.8	Low----------	0.43		
MoB, MoC2-------- Mountview	0-7	15-25	1.35-1.55	0.6-2.0	0.18-0.22	4.5-5.5	Low----------	0.43	5	1-3
	7-22	20-35	1.40-1.60	0.6-2.0	0.17-0.20	4.5-5.5	Low----------	0.43		
	22-69	35-55	1.30-1.50	0.6-2.0	0.10-0.15	4.5-5.5	Moderate-----	0.32		
Ne--------------- Newark	0-7	7-27	1.20-1.40	0.6-2.0	0.15-0.23	5.6-7.8	Low----------	0.43	5	1-4
	7-36	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43		
	36-60	12-40	1.30-1.50	0.6-2.0	0.15-0.22	5.6-7.8	Low----------	0.43		
No--------------- Nolin	0-9	12-27	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43	5	2-4
	9-65	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43		
Sn:										
Skidmore--------	0-18	7-18	1.20-1.40	2.0-6.0	0.07-0.13	5.6-7.8	Low----------	0.17	5	<2
	18-56	7-30	1.30-1.60	2.0-6.0	0.04-0.10	5.6-7.8	Low----------	0.17		
	56	---	---	---	---	---	-------------	----		
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
	9-65	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43		

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
StE:										
Sulphura	0-4	15-25	1.30-1.50	0.6-2.0	0.12-0.17	3.6-5.5	Low	0.24	2	---
	4-26	18-32	1.35-1.55	0.6-2.0	0.07-0.14	3.6-5.5	Low	0.24		
	26	---	---	---	---	---	-------------	----		
Trimble	0-6	15-25	1.25-1.45	0.6-2.0	0.14-0.19	3.6-6.0	Low	0.28	3	.5-2
	6-41	18-34	1.30-1.55	0.6-2.0	0.14-0.19	3.6-5.5	Low	0.28		
	41-62	18-34	1.45-1.55	0.6-2.0	0.14-0.19	3.6-5.5	Low	0.24		
Ta: Taft	0-7	10-25	1.30-1.40	0.6-2.0	0.20-0.22	4.5-5.5	Low	0.43	3	2-5
	7-25	18-35	1.30-1.50	0.6-2.0	0.18-0.20	4.5-5.5	Low	0.43		
	25-65	15-35	1.50-1.65	0.06-0.2	0.03-0.07	4.5-5.5	Low	0.43		
TrB2, TrC2, TrD2, TrE: Trimble	0-9	15-25	1.25-1.45	0.6-2.0	0.14-0.19	3.6-6.0	Low	0.28	3	.5-2
	9-52	18-34	1.30-1.55	0.6-2.0	0.14-0.19	3.6-5.5	Low	0.28		
	52-63	18-34	1.45-1.55	0.6-2.0	0.14-0.19	3.6-5.5	Low	0.24		
WaC2: Waynesboro	0-6	15-30	1.35-1.50	0.6-2.0	0.15-0.19	4.5-6.0	Low	0.37	5	.5-2
	6-12	23-35	1.40-1.55	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.28		
	12-66	35-50	1.40-1.55	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.28		
WnD2: Waynesboro	0-5	10-30	1.40-1.55	0.6-2.0	0.16-0.20	4.5-6.0	Low	0.28	5	.5-2
	5-12	23-35	1.40-1.55	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.28		
	12-66	35-50	1.40-1.55	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.28		

TABLE 16.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "occasional," "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
BeB---------------- Bedford	C	None-------	---	---	1.5-3.5	Perched	Mar-Apr	>60	---	High-----	High.
CaD2, CaE2: Caneyville-------	C	None-------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
Rock outcrop.											
CdB---------------- Captina	C	None-------	---	---	2.0-3.0	Perched	Dec-Apr	>60	---	Moderate	High.
ChB2, ChC2, ChD2, CmC3, CmD3------- Christian	C	None-------	---	---	>6.0	---	---	>60	---	High-----	High.
CrB, CrC3--------- Crider	B	None-------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
EkB---------------- Elk	B	Occasional	Brief-----	Jan-Jun	>6.0	---	---	>60	---	Moderate	Moderate.
Me----------------- Melvin	D	Frequent---	Brief-----	Dec-May	0-1.0	Apparent	Dec-May	>60	---	High-----	Low.
MoB, MoC2--------- Mountview	B	None-------	---	---	>6.0	---	---	>60	--	Moderate	Moderate.
Ne----------------- Newark	C	Frequent---	Brief-----	Jan-Apr	0.5-1.5	Apparent	Dec-May	>60	---	High-----	Low.
No----------------- Nolin	B	Occasional	Brief-----	Feb-May	3.0-6.0	Apparent	Feb-Mar	>60	---	Low------	Moderate.
Sn: Skidmore---------	B	Frequent---	Very brief	Dec-May	3.0-4.0	Apparent	Dec-Mar	>40	Hard	Low------	Moderate.
Nolin------------	B	Frequent---	Brief-----	Feb-May	3.0-6.0	Apparent	Feb-Mar	>60	---	Low------	Moderate.
StE: Sulphura---------	D	None-------	---	---	>6.0	---	---	20-40	Hard	Low------	Moderate.
Trimble----------	B	None-------	---	---	>6.0	---	---	>60	---	Moderate	High.
Ta----------------- Taft	C	None-------	---	---	1.0-2.0	Perched	Jan-Apr	>60	---	High-----	High.
TrB2, TrC2, TrD2, TrE-------------- Trimble	B	None-------	---	---	>6.0	---	---	>60	---	Moderate	High.
WaC2, WnD2-------- Waynesboro	B	None-------	---	---	>6.0	---	---	>60	---	High-----	High.

TABLE 17.--PHYSICAL ANALYSES OF SELECTED SOILS

[A dash indicates material was not detected. The symbol < means less than; > means more than. TR indicates trace. A zero indicates the analysis was not conducted]

Soil name, sample number, horizon, and depth (in inches)	Total: Sand (2-0.05 mm)	Total: Silt (0.05-0.002 mm)	Total: Clay (< 0.002 mm)	Particle-size distibution, Sand: Very coarse (2-1 mm)	Sand: Coarse (1-0.5 mm)	Sand: Medium (0.5-0.25 mm)	Sand: Fine (0.25-0.1 mm)	Sand: Very fine (0.1-0.05 mm)	Sand coarser than very fine (2-0.1 mm)	Very fine sand plus silt (0.1-0.002 mm)	Textural class	Coarse fragments: >2 mm	Coarse fragments: 2-19 mm	Coarse fragments: 19-76 mm
	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct		Pct	Pct	Pct
Bedford silt loam: 1/ 2/ 6/ (82KY-003-5)														
Ap---------- 0 to 6	4.0	77.7	18.3	0.5	0.7	0.9	1.0	0.9	3.1	78.6	sil	---	---	---
Bt1--------- 6 to 13	3.1	70.4	26.5	0.2	0.5	0.6	1.0	0.8	2.3	71.2	sil	---	---	---
Bt2--------- 13 to 22	4.9	70.4	24.7	0.7	0.8	0.8	1.4	1.2	3.7	50.1	sil	---	---	---
E----------- 22 to 27	8.6	71.8	19.6	2.8	1.5	0.9	1.7	1.7	6.9	73.5	sil	7	7	---
Btx1-------- 27 to 41	8.3	72.8	18.9	2.2	1.1	1.0	2.0	2.0	6.3	74.8	sil	2	2	---
Btx2-------- 41 to 56	8.1	72.5	19.4	1.0	1.0	1.2	2.3	2.6	5.5	75.1	sil	1	1	---
2Bt--------- 56 to 72	4.7	47.4	47.9	0.4	0.4	0.6	1.2	2.1	2.6	49.5	sic	TR	TR	---
Christian silty clay loam: 3/ 4/ 6/ (82KY-003-1)														
Ap---------- 0 to 6	10.6	57.2	32.2	2.5	1.6	1.7	2.5	2.3	8.3	59.5	sicl	7	6	1
Bt1--------- 6 to 11	3.5	26.9	69.6	0.4	0.2	0.5	1.5	0.9	2.6	27.8	c	---	---	---
Bt2--------- 11 to 23	3.7	35.9	60.4	0.2	0.2	0.4	1.3	1.6	2.1	37.5	c	---	---	---
Bt31-------- 23 to 32	2.1	35.8	62.1	---	---	0.2	0.7	1.2	0.9	37.0	c	TR	TR	---
Bt32-------- 32 to 41	9.9	39.0	51.1	1.5	1.0	1.3	2.8	3.3	6.6	42.3	c	5	3	2
Bt41-------- 41 to 52	6.6	39.7	53.7	1.6	0.8	0.6	1.7	1.9	4.7	41.6	c	2	2	---
Bt42-------- 52 to 61	5.6	39.4	55.0	0.7	0.5	0.9	1.4	2.1	3.5	41.5	c	5	3	2
BC---------- 61 to 76	4.9	48.5	46.6	0.2	0.3	0.4	1.1	2.9	2.0	51.4	sic	1	---	1
Christian gravelly silt loam: 1/ 6/ 9/ (82KY-003-2)														
Ap---------- 0 to 6	16.3	63.4	20.3	3.1	1.9	2.9	4.7	3.7	12.6	67.1	grsil	30	13	17
Bt1--------- 6 to 15	6.4	42.9	50.7	1.6	0.7	0.9	1.7	1.5	4.9	44.4	sic	2	2	---
Bt2--------- 15 to 26	8.2	34.2	57.6	1.3	1.4	1.6	2.1	1.8	6.4	36.0	c	6	TR	6
Bt3--------- 26 to 38	4.7	35.3	60.0	0.3	0.6	0.9	1.3	1.6	3.4	36.9	c	1	1	---
Bt4--------- 38 to 50	9.5	34.2	56.3	0.7	1.3	2.4	3.1	2.0	7.5	36.2	grc	28	6	22
Bt5--------- 50 to 63	22.9	33.8	43.3	0.5	2.5	8.8	8.9	2.2	20.7	36.0	c	13	3	10
Bt6--------- 63 to 72	19.8	36.9	43.3	0.2	0.5	3.7	10.6	4.8	15.0	41.7	c	---	TR	---

See footnotes at end of table.

TABLE 17.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name, sample number, horizon, and depth (in inches)	Total: Sand (2-0.05 mm)	Total: Silt (0.05-0.002 mm)	Total: Clay (<0.002 mm)	Particle-size distibution, Sand: Very coarse (2-1 mm)	Sand: Coarse (1-0.5 mm)	Sand: Medium (0.5-0.25 mm)	Sand: Fine (0.25-0.1 mm)	Sand: Very fine (0.1-0.05 mm)	Sand coarser than very fine (2-0.1 mm)	Very fine sand plus silt (0.1-0.002 mm)	Textural class	Coarse fragments: >2 mm	Coarse fragments: 2-19 mm	Coarse fragments: 19-76 mm
	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct		Pct	Pct	Pct
Mountview silt loam:														
1/ 6/														
(82KY-003-6)														
Ap---------- 0 to 7	8.4	76.1	15.5	0.9	0.9	0.8	3.6	2.2	6.2	78.3	sil	1	1	---
Bt1--------- 7 to 22	6.3	62.4	31.3	0.8	0.6	0.9	2.1	1.9	4.4	64.3	sicl	3	3	---
2Bt2-------- 22 to 37	8.5	45.5	46.0	0.7	0.9	1.2	2.8	2.9	5.6	48.4	sic	5	4	1
2Bt3-------- 37 to 48	11.5	40.2	48.3	1.3	1.3	1.7	3.5	3.7	7.8	43.7	sic	14	9	5
2Bt4-------- 48 to 69	6.5	44.7	48.8	0.4	0.5	0.6	2.6	2.4	4.1	47.1	sic	---	---	---
Trimble silt loam:														
1/ 7/ 8/														
(84KY-003-1)														
Ap---------- 0 to 4	11.9	76.2	11.9	2.9	2.7	1.6	2.6	2.1	10.0	78.3	sil	0	0	0
BA---------- 4 to 9	9.2	75.0	15.8	1.9	1.6	1.2	2.3	2.2	7.2	77.2	sil	0	0	0
Bt1--------- 9 to 19	15.1	64.2	20.8	5.0	2.8	1.3	2.5	3.5	11.9	67.7	sil	0	0	0
Bt2--------- 19 to 30	24.4	53.0	22.6	8.6	4.5	1.9	3.8	5.6	19.3	58.6	sil	0	0	0
Bt3--------- 30 to 40	24.2	48.5	27.0	9.5	4.5	1.5	3.0	6.0	20.2	54.5	cl	0	0	0
Bt4--------- 40 to 52	20.3	43.6	36.1	11.0	3.6	1.1	1.8	2.8	17.7	46.4	cl	0	0	0
Bt5--------- 52 to 63	3.7	61.1	35.2	1.4	0.4	0.2	0.5	1.2	2.5	62.3	sicl	0	0	0

See footnotes at end of table.

TABLE 17.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name, sample number, horizon, and depth (in inches)	Total			Particle size distibution								Coarse fragments		
				Sand					Sand coarser than very fine (2-0.1 mm)	Very fine sand plus silt (0.1-0.002 mm)	Textural class			
	Sand (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (< 0.002 mm)	Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)				>2 mm	2-19 mm	19-76 mm
	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct		Pct	Pct	Pct
Trimble silt loam: 5/ (84KY-003-2)														
A----------- 0 to 2	10.5	82.6	6.9	1.7	2.9	1.6	2.4	1.9	8.8	84.5	si	0	0	0
AB---------- 2 to 8	21.6	67.0	11.4	8.1	4.0	2.2	3.7	3.6	16.4	70.6	si	0	0	0
Bt1--------- 8 to 15	15.3	67.6	17.1	5.8	3.0	1.4	2.3	2.8	12.6	70.4	sil	0	0	0
Bt2--------- 15 to 30	19.2	58.7	22.1	5.1	3.3	1.8	4.1	4.9	14.5	63.6	sil	0	0	0
Bt3--------- 30 to 42	24.5	50.0	25.5	9.8	4.3	1.6	3.8	5.0	22.2	55.0	l	0	0	0
Bt4--------- 42 to 54	25.1	34.6	40.3	9.9	4.3	1.6	4.1	5.2	20.4	39.8	c	0	0	0
BC---------- 54 to 59	18.9	29.1	52.0	9.7	3.7	1.1	1.8	2.6	16.6	31.7	c	0	0	0
C----------- 59 to 65	41.7	43.2	15.1	14.5	7.1	2.8	5.9	11.4	30.6	54.6	l	0	0	0

1/ The soil is the typical pedon for the series. For the location of the pedon sampled, see the section "Soil Series and Their Morphology."

2/ Laboratory data show the Bt1 and Bt2 horizons to be slightly less acid than described for the series. These differences are in the range of normal laboratory error, and the soils are not considered taxadjuncts.

3/ The Bt3 and Bt4 horizons were subdivided for sampling.

4/ Location of pedon is about 7.5 miles northwest of Scottsville, 350 yards south of U.S. Highway 231, and 170 yards west of Mt. Union Church.

5/ Location of pedon is about 4.5 miles south of Scottsville, 1.25 miles southeast of the junction of Union Chapel Road and Scottsville-Trammel Fork Road, and 300 yards south of Union Chapel Road. This pedon is considered a taxadjunct to the Trimble series because the base saturation is more than 35 percent.

6/ Analysis by National Soil Survey Laboratory, Lincoln, Nebraska.

7/ Analysis by Kentucky Agricultural Experiment Station.

8/ This pedon is considered a taxadjunct to the Trimble series because the base saturation is more than 35 percent.

9/ Because of the size of laboratory samples, the percentage of coarse fragments in this data may not be accurately measured. (NOTE: Measurement of coarse fragments in engineering index test data is reasonably close to field estimates; this was a larger sample.)

TABLE 18.--CHEMICAL ANALYSES OF SELECTED SOILS

[A dash indicates material was not detected. TR indicates trace. A zero indicates the analysis was not conducted]

Soil name, report number, horizon, and depth (in inches)	Reaction			Extractable cations					Cation-exchange capacity		Ex-tract-able acid-ity	Hydro-gen plus alumi-mum	Base saturation		Organ-ic matter	Calcium car-bonate equiv-alent	Phos-pho-rus	Potas-sium
	$CaCl_2$ (1:2)	H_2O (1:1)	SMP Buffer (1:1)	Ca	Mg	K	Na	Total	Ammonium acetate	Sum of cat-ions			Ammo-nium ace-tate	Sum of cat-ions				
	pH	pH	pH	-----Milliequivalents per 100 grams of soil--------									Pct	Pct	Pct	Pct	Ppm	Ppm
Bedford silt loam: 1/ 2/ 6/ (82KY-003-5)																		
Ap------ 0 to 6	5.1	5.5	0	3.7	0.4	0.2	TR	4.3	7.7	11.2	6.9	0.3	56.0	38.0	1.72	0	0	0
Bt1----- 6 to 13	5.4	5.7	0	5.9	0.8	0.2	0.1	7.0	9.9	10.8	3.8	0	71.0	65.0	0.72	0	0	0
Bt2----- 13 to 22	5.1	5.6	0	5.9	1.4	0.2	0.2	7.7	10.6	12.3	4.6	0	73.0	63.0	0.38	0	0	0
E------- 22 to 27	4.5	4.9	0	2.2	0.9	0.1	TR	3.2	8.2	9.2	6.0	1.4	39.0	35.0	0.19	0	0	0
Btx1---- 27 to 41	4.1	4.8	0	0.9	0.7	0.1	0.1	1.8	6.8	8.6	6.8	2.5	26.0	21.0	0.10	0	0	0
Btx2---- 41 to 56	4.1	4.8	0	0.5	0.7	0.1	0.3	1.6	6.5	7.2	5.6	2.8	25.0	22.0	0.09	0	0	0
2Bt----- 56 to 72	4.2	4.7	0	1.1	1.8	0.1	0.2	3.2	13.0	14.7	11.5	5.5	25.0	22.0	0.12	0	0	0
Christian silty clay loam: 3/ 4/ 6/ (82KY-003-1)																		
Ap------ 0 to 6	6.0	6.4	0	15.6	1.7	0.5	0.2	18.0	18.3	23.6	5.6	---	98.0	76.0	5.23	TR	0	0
Bt1----- 6 to 11	4.3	4.6	0	5.3	2.1	0.3	0.3	8.0	21.0	26.0	18.0	6.1	38.0	31.0	1.20	0	0	0
Bt2----- 11 to 23	4.2	4.6	0	1.9	1.9	0.2	TR	4.0	16.8	20.5	16.5	6.6	24.0	20.0	0.58	0	0	0
Bt31---- 23 to 32	4.1	4.6	0	1.2	2.1	0.2	0.2	3.7	17.0	20.3	16.6	7.6	22.0	18.0	0.36	0	0	0
Bt32---- 32 to 41	4.2	4.5	0	0.7	1.4	0.2	0.2	2.5	14.3	16.9	14.4	7.6	17.0	15.0	0.26	0	0	0
Bt41---- 41 to 52	3.9	4.5	0	0.4	1.4	0.2	0.2	2.2	13.7	17.1	14.9	7.5	16.0	13.0	0.22	0	0	0
Bt42---- 52 to 61	4.1	4.5	0	0.1	1.7	0.2	0.2	2.2	16.4	19.4	17.2	9.3	13.0	11.0	0.12	0	0	0
BC------ 61 to 76	4.0	4.4	0	0.1	1.7	0.2	0.2	2.2	13.8	16.6	14.4	8.1	16.0	13.0	0.12	0	0	0
Christian gravelly silt loam: 1/ 6/ (82KY-003-2)																		
Ap------ 0 to 6	5.6	5.8	0	10.7	1.6	0.5	0.2	13.0	13.1	17.9	4.9	0	99.0	73.0	4.56	0	0	0
Bt1----- 6 to 15	6.3	6.6	0	13.6	1.4	0.5	0.2	15.7	16.9	21.0	5.3	0	93.0	75.0	0.84	0	0	0
Bt2----- 15 to 26	5.9	6.1	0	12.4	2.4	0.3	0.2	15.3	18.7	21.8	6.5	0	82.0	70.0	0.53	0	0	0
Bt3----- 26 to 38	4.4	4.8	0	5.5	2.2	0.3	0.3	8.3	17.9	20.8	12.5	4.0	46.0	40.0	0.36	0	0	0
Bt4----- 38 to 50	4.3	4.6	0	1.9	1.3	0.2	0.2	3.6	14.7	18.6	15.0	5.7	24.0	19.0	0.26	0	0	0
Bt5----- 50 to 63	4.1	4.6	0	0.6	0.7	0.1	0.3	1.7	10.1	13.6	11.9	5.0	17.0	12.0	0.12	0	0	0
Bt6----- 63 to 72	3.9	4.4	0	0.4	0.7	0.2	0.2	1.5	12.3	15.0	13.5	7.2	12.0	10.0	0.12	0	0	0

See footnotes at end of table.

TABLE 18.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name, report number, horizon, and depth (in inches)	Reaction: $CaCl_2$ (1:2)	Reaction: H_2O (1:1)	Reaction: SMP Buffer (1:1)	Extractable cations: Ca	Extractable cations: Mg	Extractable cations: K	Extractable cations: Na	Extractable cations: Total	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
	pH	pH	pH	-----Milliequivalents per 100 grams of soil-----									Pct	Pct	Pct	Pct	Ppm	Ppm
Mountview silt loam: 1/ 6/ (82KY-003-6)																		
Ap------ 0 to 7	4.5	4.9	0	2.4	0.3	0.3	0.2	3.2	6.8	8.6	5.4	0.9	47.0	37.0	1.57	0	0	0
Bt1----- 7 to 22	4.3	4.8	0	3.3	1.4	0.2	0.2	5.1	10.8	13.4	8.3	2.3	47.0	38.0	0.40	0	0	0
2Bt2---- 22 to 37	4.3	4.8	0	2.9	2.1	0.2	0.2	5.4	13.2	15.6	10.2	3.0	41.0	35.0	0.22	0	0	0
2Bt3---- 37 to 48	4.4	4.9	0	2.7	2.0	0.1	0.3	5.1	11.1	13.7	8.6	2.3	46.0	37.0	0.19	0	0	0
2Bt4---- 48 to 69	4.3	4.9	0	2.5	1.8	0.1	0.3	4.7	10.5	12.8	8.1	2.3	45.0	37.0	0.14	0	0	0
Trimble silt loam: 1/ 7/ 8/ (84KY-003-1)																		
Ap------ 0 to 4	0	5.3	6.6	0	0	0	0	0	0	0	0	0	0	0	0	0	86	12
BA------ 4 to 9	0	6.0	6.9	0	0	0	0	0	0	0	0	0	0	0	0	0	191	16
Bt1----- 9 to 19	0	5.2	6.7	0	0	0	0	0	0	0	0	0	0	0	0	0	114	5
Bt2----- 19 to 30	0	5.2	6.7	0	0	0	0	0	0	0	0	0	0	0	0	0	149	4
Bt3----- 30 to 40	0	5.1	6.5	0	0	0	0	0	0	0	0	0	0	0	0	0	160	4
Bt4----- 40 to 52	0	5.1	6.4	0	0	0	0	0	0	0	0	0	0	0	0	0	223	3
Bt5----- 52 to 63	0	5.2	6.0	6.1	3.2	0.8	0.1	10.2	11.4	20.6	10.4	0	89.5	49.5	0.20	0	287	3
Trimble silt loam: 5/ (84KY-003-2)																		
A------- 0 to 2	0	5.8	6.7	0	0	0	0	0	0	0	0	0	0	0	0	0	290	23
AB------ 2 to 8	0	5.4	6.5	0	0	0	0	0	0	0	0	0	0	0	0	0	138	6
Bt1----- 8 to 15	0	5.3	6.8	0	0	0	0	0	0	0	0	0	0	0	0	0	70	3
Bt2----- 15 to 30	0	5.5	7.0	0	0	0	0	0	0	0	0	0	0	0	0	0	130	3
Bt3----- 30 to 42	0	5.0	6.4	0	0	0	0	0	0	0	0	0	0	0	0	0	114	3
Bt4----- 42 to 54	0	4.8	5.4	0	0	0	0	0	0	0	0	0	0	0	0	0	155	3
BC------ 54 to 59	0	4.5	4.7	0	0	0	0	0	0	0	0	0	0	0	0	0	155	2
C------- 59 to 65	0	4.8	6.8	1.6	1.1	0.6	0.1	3.4	0	6.3	2.9	0	0	54.0	0.10	0	72	6

1/ The soil is the typical pedon for the series. For the location of the pedon sampled, see the section "Soil Series and Their Morphology."

2/ Laboratory data show the Bt1 and Bt2 horizons to be slightly less acid than described for the series. These differences are in the range of normal laboratory error, and the soils are not considered taxadjuncts.

3/ The Bt3 and Bt4 horizons were subdivided for sampling.

4/ Location of pedon is about 7.5 miles northwest of Scottsville, 350 yards south of U.S. Highway 231, and 170 yards west of Mt. Union Church.

5/ Location of pedon is about 4.5 miles south of Scottsville, 1.25 miles southeast of the junction of Union Chapel Road and Scottsville-Trammel Fork Road, and 300 yards south of Union Chapel Road. This pedon is considered a taxadjunct to the Trimble series because the base saturation is more than 35 percent.

6/ Analysis by National Soil Survey Laboratory, Lincoln, Nebraska.

7/ Analysis by Kentucky Agricultural Experiment Station.

8/ This pedon is considered a taxadjunct to the Trimble series because the base saturation is more than 35 percent.

TABLE 19.--CLAY MINERALOGY OF SELECTED SOILS

[A dash indicates material was not detected]

Soil name, report number, horizon, and depth (in inches)	Potassium	Iron	Relative amounts of clay minerals 1/				Kaolinite
			Vermiculite	Mica	Kaolinite	Quartz	
	Pct	Pct					Pct
Christian silty clay loam: 2/ 3/ 4/ (82KY-003-1)							
Bt2-------- 11 to 23	2.0	7.9	2	3	3	1	30
Bt4-------- 52 to 61	2.7	7.1	2	4	2	1	19
Christian gravelly silt loam: 4/ 5/ (82KY-003-2)							
Bt1-------- 6 to 15	---	---	---	3	3	1	21
Bt5-------- 50 to 63	---	---	---	2	3	---	31

1/ Relative amounts: 5-dominant, 4-abundant, 3-moderate, 2-small, 1-trace.
2/ The Bt4 horizon was subdivided for sampling.
3/ Location of pedon is about 7.5 miles northwest of Scottsville, 350 yards south of U.S. Highway 231, and 170 yards west of Mt. Union Church.
4/ Analysis by National Soil Survey Laboratory, Lincoln, Nebraska.
5/ The soil is the typical pedon for the series. For the location of the pedon sampled, see the section "Soil Series and Their Morphology."

TABLE 20.--SAND MINERALOGY OF SELECTED SOILS

[A dash indicates material was not detected]

Soil name, report number, horizon, and depth (in inches)	Percent resistant minerals					Percent weatherable minerals									
	Quartz	Opaques	Resistant aggregates	Other resistant minerals 1/	Total resistant minerals	Biotite	Calcite	Chlorite	Coal	Muscovite	Plagioclase feldspar	Potassium feldspar	Sericite	Weatherable aggregates	Fraction analyzed
Bedford silt loam: 2/ 3/ 4/ (82KY-003-5)															
Bt2----- 13 to 22	81	2	1	1	85	1	---	---	---	1	---	13	---	---	COSI
2Bt----- 56 to 72	86	6	---	1	93	3	---	---	---	2	2	---	2	---	COSI
Mountview silt loam: 2/ 4/ (82KY-003-6)															
2Bt1---- 22 to 37	83	4	---	3	90	5	---	---	---	2	---	4	---	---	COSI
Trimble silt loam: 2/ 5/ 6/ (84KY-003-1)															
Bt1, Bt2, Bt3---- 9 to 29 (control section)	92	---	---	---	92	---	---	---	---	3	---	---	---	---	COSI
Trimble silt loam: 5/ 7/ (84KY-003-2)															
Bt1, Bt2 8 to 28 (control section)	92	---	---	---	92	---	---	---	---	3	---	---	---	---	COSI

1/ Includes plant opal, tourmaline, and Zircon.

2/ The soil is the typical pedon for the series. For the location of the pedon sampled, see the section "Soil Series and Their Morphology."

3/ Laboratory data show the Bt1 and Bt2 horizons to be slightly less acid than described for the series. These differences are in the range of normal laboratory error, and the soils are not considered taxadjuncts.

4/ Analysis by National Soil Survey Laboratory, Lincoln, Nebraska.

5/ Analysis by Kentucky Agricultural Experiment Station.

6/ This pedon is considered a taxadjunct to the Trimble series because the base saturation is more than 35 percent.

7/ Location of pedon is about 4.5 miles south of Scottsville, 1.25 miles southeast of the junction of Union Chapel Road and Scottsville-Trammel Fork Road, and 300 yards south of Union Chapel Road. This pedon is considered a taxadjunct to the Trimble series because the base saturation is more than 35 percent.

TABLE 21.--ENGINEERING INDEX TEST DATA

[Tests were performed by the Soil Mechanics Laboratory, South National Technical Center, Fort Worth, Texas]

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--							
	AASHTO	Unified	3 inch	2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.2 mm	.005 mm	.002 mm			Maximum dry density	Optimum moisture	
														Pct		Lb/ft^3	Pct	
Bedford silt loam: 1/ (82KY-003-5)																		
Bt1, Bt2---- 6 to 22	A-6(22)	CL	100	100	100	100	100	100	100	95	69	37	23	40	22	106	19	2.71
Btx1, Btx2-- 27 to 56	A-6(20)	CL	100	100	100	100	100	97	94	90	61	29	16	33	20	111	16	2.73
2Bt--------- 56 to 72	A-7-6(31)	CH	100	100	100	100	100	98	97	95	74	55	42	52	29	98	24	2.94
Christian silty clay loam: 2/ (82KY-003-1)																		
Bt1, Bt2---- 6 to 23	A-7-6(37)	CH	100	99	96	95	94	92	91	87	75	58	46	66	37	95	26	2.77
Bt4--------- 41 to 61	A-7-6(29)	CH	100	96	93	92	91	74	73	70	53	39	32	62	42	99	23	2.75
Christian gravelly silt loam: 1/ (82KY-003-2)																		
Bt1, Bt2---- 6 to 26	A-7-6(30)	CH	100	97	93	93	92	81	80	78	62	51	41	65	36	95	26	2.76
Bt4--------- 38 to 50	A-7-6(25)	MH	100	89	81	79	78	77	76	72	58	50	38	66	33	93	27	2.77
Mountview silt loam: 1/ (82KY-003-6)																		
Bt1--------- 7 to 22	A-6(19)	CH	100	100	99	99	98	87	85	84	60	32	20	41	23	108	18	2.89
2Bt4-------- 48 to 69	A-7-6(31)	CH	100	100	100	100	100	100	100	95	76	53	43	57	27	100	23	2.76

1/ The soil is the typical pedon for the series. For the location of the pedon sampled, see the section "Soil Series and Their Morphology."

2/ Location of pedon is about 7.5 miles northwest of Scottsville, 350 yards south of U.S. Highway 231, and 170 yards west of Mt. Union Church.

TABLE 22.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Bedford	Fine-silty, mixed, mesic Typic Fragiudults
Caneyville	Fine, mixed, mesic Typic Hapludalfs
*Captina	Fine-silty, siliceous, mesic Typic Fragiudults
Christian	Clayey, mixed, mesic Typic Hapludults
Crider	Fine-silty, mixed, mesic Typic Paleudalfs
*Elk	Fine-silty, mixed, mesic Ultic Hapludalfs
Melvin	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Mountview	Fine-silty, siliceous, thermic Typic Paleudults
Newark	Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents
Nolin	Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Skidmore	Loamy-skeletal, mixed, mesic Dystric Fluventic Eutrochrepts
*Sulphura	Loamy-skeletal, siliceous, thermic Ruptic-Alfic Dystrochrepts
Taft	Fine-silty, siliceous, thermic Glossaquic Fragiudults
*Trimble	Fine-loamy, siliceous, mesic Typic Paleudults
Waynesboro	Clayey, kaolinitic, thermic Typic Paleudults

* The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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