Series 1961, No. 11
Issued October, 1964

Soil Survey
CLARK COUNTY
Kentucky

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
KENTUCKY AGRICULTURAL EXPERIMENT STATION

HOW TO USE THE SOIL SURVEY REPORT

THIS SOIL SURVEY of Clark County, Ky., will serve several groups of readers. It will help farmers in planning the kind of management that will protect their soils and provide good yields; assist engineers in selecting sites for roads, buildings, ponds, and other structures; aid foresters in managing woodlands; and add to our knowledge of soil science.

Locating the Soils

Use the index to map sheets at the back of this report to locate areas on the large map. The index is a small map of the county on which numbered rectangles have been drawn to show where each sheet of the large map is located. When the correct sheet of the large map has been found, it will be seen that boundaries of the soils are outlined, and that there is a symbol for each kind of soil. All areas marked with the same symbol are the same kind of soil, wherever they occur on the map. The symbol is inside the area if there is enough room; otherwise, it is outside the area and a pointer shows where the symbol belongs.

Finding information

This report contains sections that will interest different groups of readers, as well as some sections that may be of interest to all.

Farmers and those who work with farmers can learn about the soils in the section "Descriptions of the Soils" and then turn to the section "Use of the Soils for Crops and Pasture." In this way, they first identify the soils on their farm and then learn how these soils can be managed and what yields can be expected. The "Guide to Mapping Units" at the back of the report will simplify use of the map and report. This guide lists each soil and land type mapped in the county, and the page where each is described. It also lists, for each soil and land type, the capability unit, the woodland suitability group, and the wildlife productivity group, and the pages where each of these is described.

Foresters and others interested in woodland can refer to the section "Use of the Soils for Woodland." In that section the soils in the county are grouped according to their suitability for trees, and factors affecting the management of woodland are explained.

Wildlife managers, naturalists, and sportsmen will find, in the section "Use of the Soils for Wildlife," information about the wildlife in the county.

Engineers and builders will want to refer to the section "Use of the Soils for Engineering." Tables in that section show characteristics of the soils that affect engineering.

Scientists and others who are interested will find information about how the soils were formed and how they were classified in the section "Formation, Morphology, and Classification of Soils."

Students, teachers, and other users will find information about soils and their management in various parts of the report, depending on their particular interest.

Newcomers in Clark County will be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the County," which gives additional information about the county.

* * * *

Fieldwork for this survey was completed in 1961. Unless otherwise indicated, all statements in the report refer to conditions in the county at that time. The soil survey of Clark County was made as part of the technical assistance furnished by the Soil Conservation Service to the Clark County Soil Conservation District.

Cover picture: **Cattle grazing on bluegrass pasture. The agriculture of Clark County is based largely on the raising of cattle.**

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402

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SOIL SURVEY OF CLARK COUNTY, KENTUCKY

BY DARWIN G. PRESTON, RAYMOND P. SIMS, A. J. RICHARDSON, R. L. BLEVINS, AND J. L. TAYLOR, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE IN COOPERATION WITH KENTUCKY AGRICULTURAL EXPERIMENT STATION

CLARK COUNTY, which is in the northeastern part of Kentucky (fig. 1), has an area of 259 square miles, or 165,760 acres. The county is bounded on the north by Bourbon County and on the east by Montgomery and

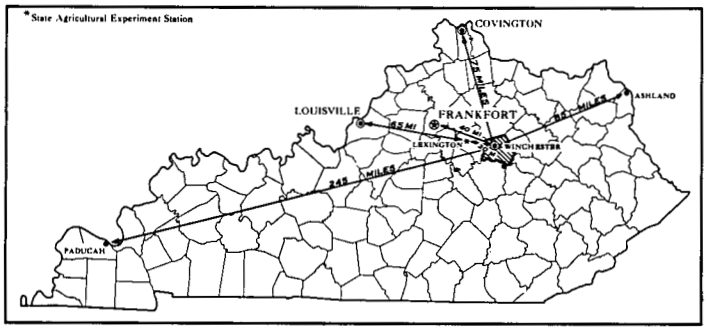

Figure 1.—**Location of Clark County in Kentucky.**

Powell Counties. Fayette County lies to the west, and the southern boundary is formed by the Red and Kentucky Rivers. Winchester is the county seat. It is midway between Louisville and Ashland on U.S. Highway No. 60.

The county lies in four physiographic sections, and the topography ranges from gently undulating to steep. The western part is in the Inner Bluegrass section, which is undulating and gently rolling and has many tree-shaded pastures. Next is the section called Hills of the Bluegrass, where the terrain is hilly and has winding ridges and valleys. An irregular northeast-southwest strip just east of Ruckerville is part of the Outer Bluegrass section; it resembles the Inner Bluegrass section but is more rolling. The southeastern end of the county is in the Knobs section. The Knobs section is gently rolling, except for the conical, flat-topped hills that furnish its name.

Agriculture has been important since the county was first settled. Corn and small grains were the most important crops at one time, but in recent years the trend has been toward grassland agriculture. The climate of the county is temperate and humid, and there are only short periods of excessive heat or cold. Also, rainfall is fairly evenly distributed. As a result, the growing season is favorable for the production of grasses and legumes. It is long enough to permit more than one cutting of perennial hay crops, and there is ample time for the harvesting of corn.

General Soil Map

After study of the soils in a locality and the way they are arranged, it is possible to make a general map that shows several main patterns of soils, called soil associations. Such a map is the colored general soil map in the back of this report. Each association, as a rule, contains a few major soils and several minor soils, in a pattern that is characteristic although not strictly uniform.

The soils within any one association are likely to differ in some or in many properties; for example, slope, depth, stoniness, or natural drainage. Thus, the general soil map shows, not the kind of soil at any particular place, but patterns of soils, in each of which there are several different kinds of soils.

Each soil association is named for the major soil series in it, but, as already noted, soils of other series may also be present. The major soils of one soil association may also be present in another association, but in a different pattern.

The general map is useful to people who want a general idea of the soils, who want to compare different parts of a county, or who want to know the possible location of good-sized areas suitable for a certain kind of farming or other land use.

1. Maury-McAfee-Salvisa Association

Undulating, deep or moderately deep soils of uplands; most of them high in phosphate

This association consists of gently sloping soils on broad ridgetops and of somewhat steeper soils that are adjacent to drainageways and around sinkholes. The areas are in the southwestern part of the county. There the topography is irregular and has many slight depressions. There are also some sharply breaking slopes around sinkholes that lead to subterranean caverns. The difference in elevation between the ridgetops and the bottoms of the drainageways averages about 50 feet. The bottoms are generally only a little wider than is required for the removal of runoff from a normally heavy rainstorm. This association occupies about 7 percent of the county.

The Maury, McAfee, and Salvisa soils are dominant in this association (fig. 2). Maury soils, on broad ridgetops, make up 75 percent of the association. They are

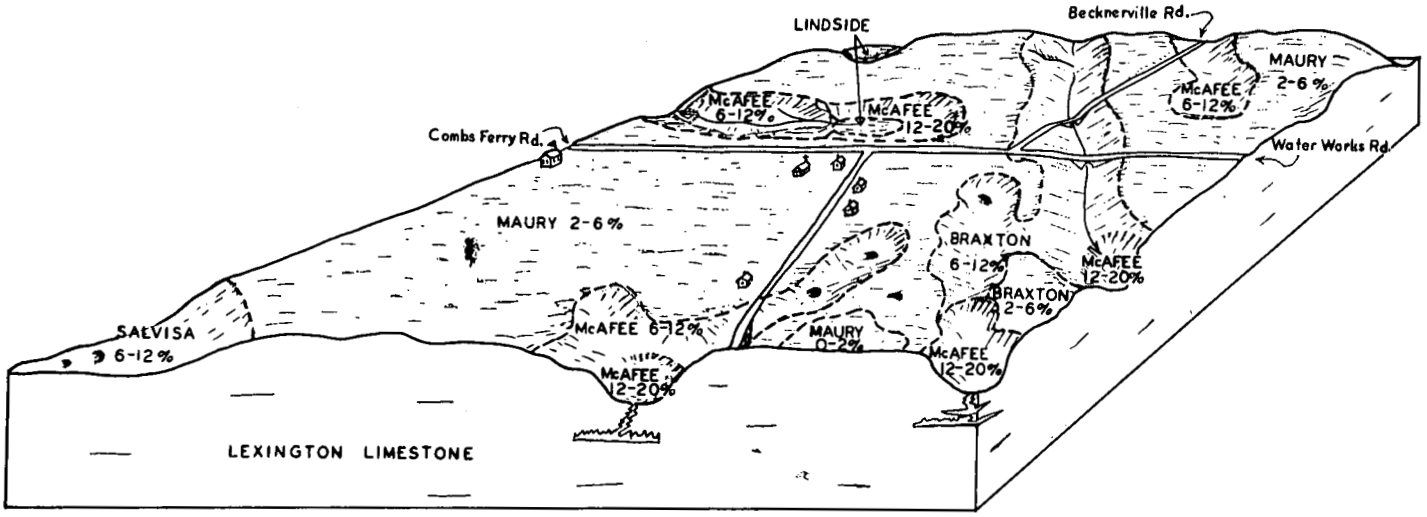

Figure 2.—**Major soil series in soil association 1, their relationship to the landscape, and the parent rocks from which the soils formed.**

gently sloping, deep, and well drained. The McAfee and Salvisa soils, in sloping to sharply breaking areas next to drainageways and around upland depressions, make up about 15 percent of the association. They are moderately deep and well drained. Like the Maury soils, they formed in material from high-grade, phosphatic limestone. The remainder of the association consists of Rock land and well-drained soils on bottom lands.

All of the acreage is in open fields that have a scattering of large, overmature oaks, maples, and hickory trees. The areas are used mainly for bluegrass pasture and hay, but tobacco and corn are grown on some of the acreage.

The farms average about 350 acres in size. They are generally operated by the owner, but some of the farms are worked by tenants for absentee owners. Raising livestock and growing tobacco are the main agricultural enterprises. Much of the burley tobacco in the county is grown by tenants on farms in this association under a share agreement with the owner.

2. McAfee-Salvisa-Ashwood Association

Mostly strongly sloping to steep, shallow to moderately deep, droughty, clayey soils of uplands

This association consists of strongly sloping to steep soils on rolling ridgetops that are deeply dissected by many drains. The areas are in the southwestern part of the county and are underlain by high-grade limestone. The ridgetops are generally narrow, and the slopes break abruptly to steep hillsides. Along the streams the areas are narrow, have little or no alluvial deposit, and are bordered by steep, shallow soils and Rock land. Where there are limestone bluffs, mostly along the Kentucky River and along the lower stretches of tributary streams, differences in elevation of as much as 350 feet occur within a distance of less than three-eighths of a mile. The association occupies about 5 percent of the county.

Dominant in this association are the McAfee, Salvisa, and Ashwood soils (fig. 3). McAfee soils, on the rolling

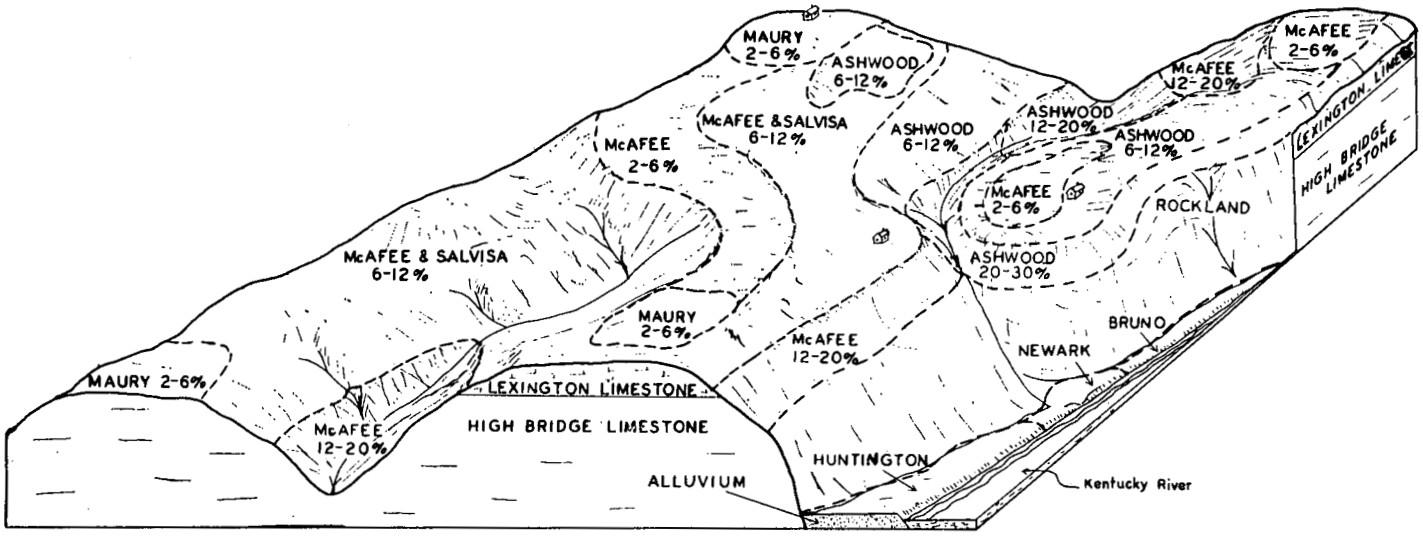

Figure 3.—**Major soil series in soil association 2, their relationship to the landscape, and the parent rocks from which the soils formed.**

ridgetops, make up 65 percent of the association. In other areas McAfee soils are on the upper part of the slopes and are closely associated with the Salvisa soils. The soils of both series are moderately deep, and they make up 15 percent of the acreage. The Ashwood soils are shallow and are generally on steep side slopes in close association with Rock land. The Ashwood soils and Rock land make up another 15 percent of the acreage. The remainder of the association is made up mostly of soils in small plots on bottom lands and of deep Maury soils on broad ridges.

On the steep slopes the soils are mostly wooded. The trees on the rocky bluffs are low-grade, poorly formed hardwoods. Stands of cedar are common on the Ashwood soils, especially in areas that were cleared at one time. The remaining acreage is used mainly for pasture. Some of the grazing areas receive little or no management and are somewhat brushy. Because the soils are droughty, little cultivation is done other than that needed for growing tobacco. A few farms are large, but most of the farms are about 150 acres in size. Raising livestock and growing tobacco are the main farm enterprises.

Predominantly steep slopes and nearness of bedrock to the surface make most soils in this association poorly suited to cultivation. The small acreage suitable for cultivated crops is on the ridgetops. The potential productivity for trees is fair for oaks and good for redcedar.

3. Hampshire-Mercer Association

Undulating, deep or moderately deep, well drained or moderately well drained, medium-textured, fertile soils of uplands

This association is made up of soils on broad ridgetops and in shallow valleys. Most of the areas are in the northwestern part of the county, but a narrow area extends into the southwestern part. The underlying rock is mainly limestone, but in places it is calcareous shale. On the ridgetops the soils are gently sloping, and in most places the drop of the slope to the valley floors is long and even. The difference in elevation between the ridgetops and the valley floors is generally about 50 feet. In most places alluvial material has accumulated along the streams. Along the lower reaches of the major streams, the bottom lands are as much as one-fourth mile wide. This association occupies about 28 percent of the county.

The Hampshire and Mercer soils are dominant in this association (fig. 4). The Hampshire soils are on all the upland slopes and make up 60 percent of the association. They are deep and well drained to moderately well drained. The Mercer and Loradale soils, on the ridgetops, make up 30 percent of the association. The Mercer soils are moderately deep, have a compact zone in the lower part of the subsoil, and are moderately well drained. Loradale soils are deep and well drained. The remainder of the association is made up of soils that have rock outcrops and of soils on the bottom lands and on toe slopes.

This association consists of large expanses of bluegrass pasture interspersed with cultivated fields and hayfields. The farms are large, and a few are more than 1,000 acres in size. Growing tobacco and raising livestock are the major farm enterprises. Most of the corn that is grown is fed to the livestock on the farms. Much of the acreage in pasture is managed for the production of bluegrass seed.

Generally, the larger farms are managed by the owners with the help of hired labor and of tenants who take care of the tobacco crop. Most of the smaller farms are worked by the owner and by tenants who live on the farm.

4. Hampshire-Salvisa Association

Mostly strongly sloping, deep or moderately deep, well-drained soils, with clayey subsoil, of uplands

This association consists of soils on fairly narrow, rolling ridgetops and level bottom lands. The areas are in a narrow belt that extends from the southwest to the northeast just east of Winchester. The ridgetops are about 150 feet above the valley floors, which are seldom more than 150 feet wide. The side slopes range from 12 to 20 percent. This association makes up about 4 percent of the county.

Dominant in this association are the Hampshire and Salvisa soils (fig. 5). These soils formed mainly from limestone but partly from calcareous shale. Hampshire soils are on all the upland slopes, and they make up 60

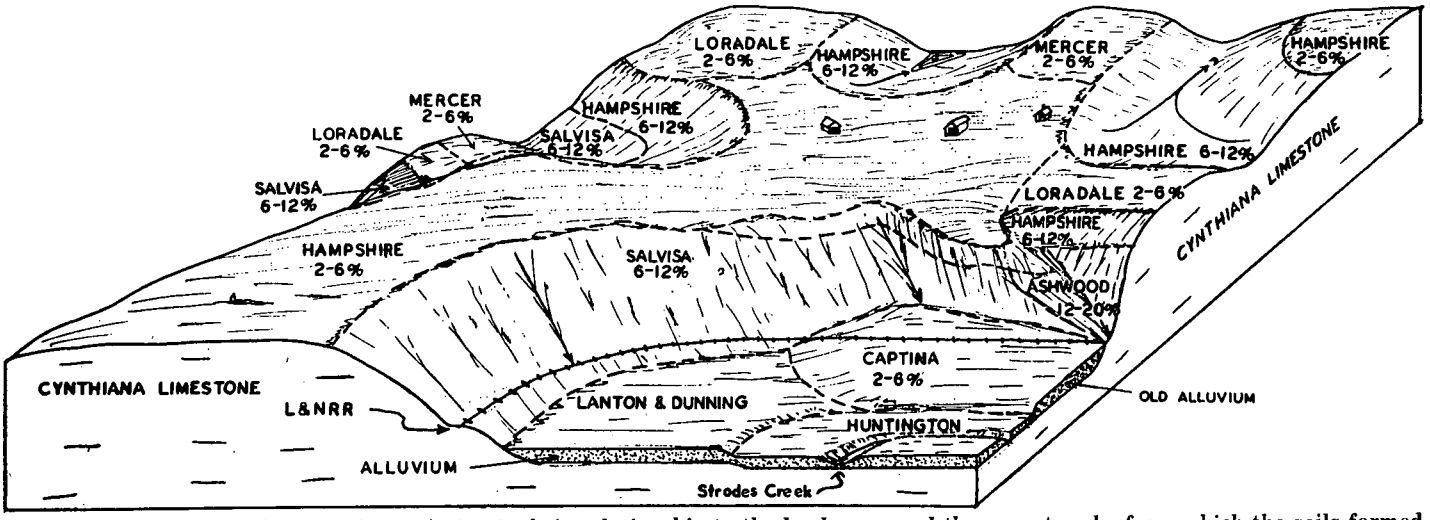

Figure 4.—Major soil series in soil association 3, their relationship to the landscape, and the parent rocks from which the soils formed.

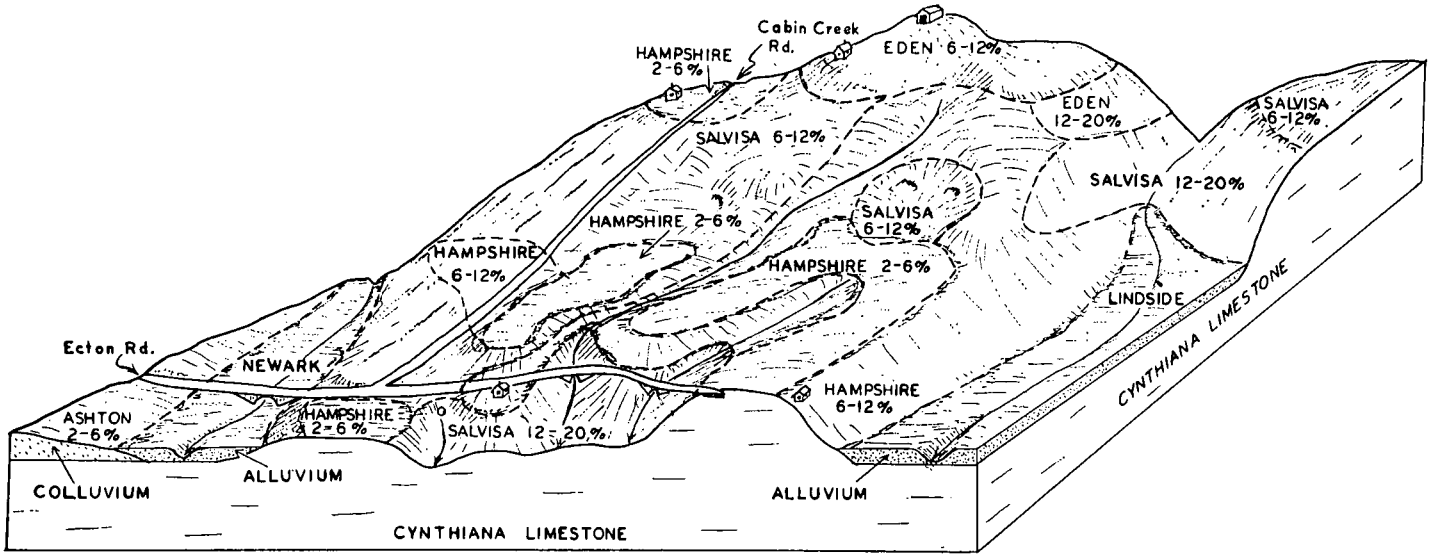

Figure 5.—**Major soil series in soil association 4, their relationship to the landscape, and the parent rocks from which the soils formed.**

percent of the association. They are deep and well drained to moderately well drained. Salvisa soils are steeper than the Hampshire soils and generally are moderately deep and well drained. They make up 25 percent of the association. The remainder of the association is made up of soils on bottom lands that are mostly somewhat poorly drained, of soils on toe slopes, and of scattered soils on ridgetops that formed in material from calcareous shale.

Most of this association is in pasture, but the more productive soils on the ridgetops and toe slopes are in tobacco and corn. Hay crops are generally grown on the more productive soils in the years that the soils are not used for row crops.

The farms are mostly about 150 acres in size and are operated by the owner with the help of neighbors who exchange work. The amount of tobacco grown is small, and the cutting and hanging of the crop can generally be satisfactorily handled with the help of neighbors.

Predominantly strong slopes and outcrops of rock in many places make the soils in this association poorly suited to cultivation. The soils are also somewhat droughty. Consequently, much of the pasture is of low quality. The soils are better suited to Kentucky 31 tall fescue than to other grasses, and many of the improved pastures are planted to that grass.

5. Eden-Culleoka Association

Mostly steep, fertile, somewhat droughty soils of deeply dissected uplands

This soil association consists mainly of steep soils in hilly areas dissected by many drains. The areas are made up of long, narrow ridges that have many offshooting spur ridges. They are along the southern boundary of the county. The difference in elevation between the ridgetops and the valley floors is mostly about 150 feet, but along

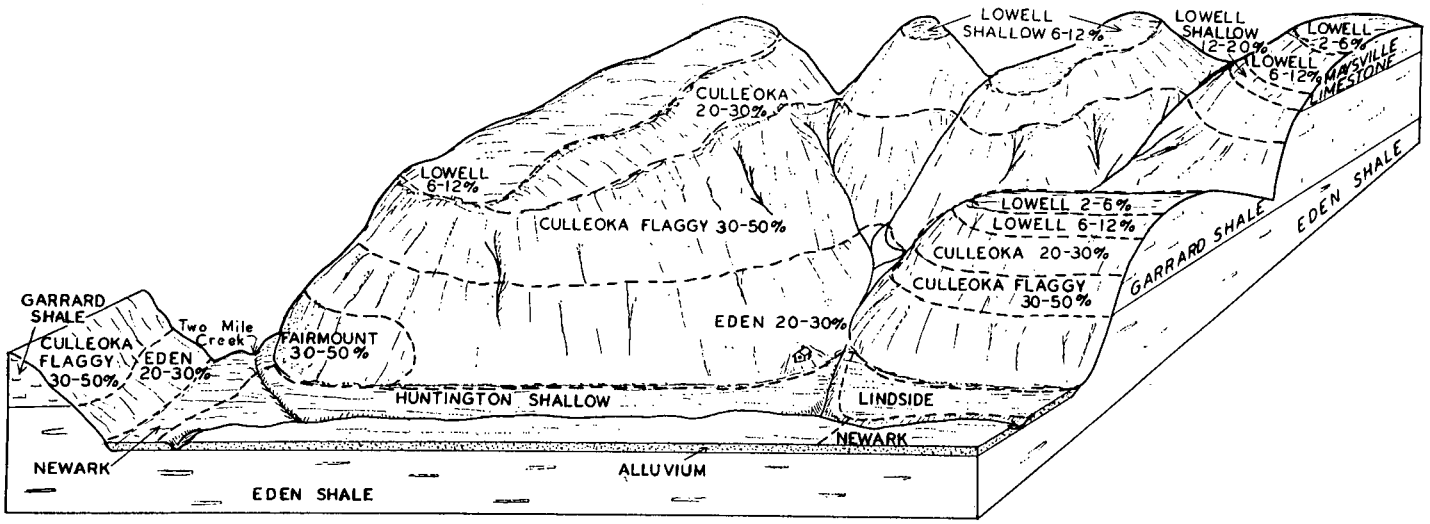

Figure 6.—**Major soil series in soil association 5, their relationship to the landscape, and the parent rocks from which the soils formed.**

the Kentucky River the ridgetops are generally 300 feet above the valley floors. The side slopes range from 20 to 50 percent. This association occupies about 6 percent of the county.

The Eden and Culleoka soils are about evenly distributed throughout this soil association, and they make up 80 percent of the acreage (fig. 6). Eden soils are on the lower slopes. They are clayey and, in some places, rocky. Culleoka soils are on the upper slopes and on some of the ridgetops. They formed in material from soft, calcareous shale and are silty and permeable.

The remainder of the area is made up mostly of soils along the ridges, and these soils were derived from limestone and are somewhat clayey. Also, there are areas of Rock land on steep slopes and soils on narrow bottoms that are mostly wet or are moderately deep to rock.

Much of this association is in pasture of poor quality. About 20 percent is covered by low-grade hardwoods that grow mostly on the steep, rocky soils. Cultivation is mostly on the ridges, but a small acreage on the toe slopes that are above flood level is also cultivated.

Most of the farms are less than 100 acres in size and are of the subsistence type. Sales of tobacco and livestock products provide much of the farm income.

Predominantly steep slopes and nearness of bedrock to the surface make the soils in this association poorly suited to cultivation. The potential production for trees is fair for oak and good for redcedar.

6. Lowell-Shelbyville Association

Undulating, deep or moderately deep, mostly well-drained, medium-textured soils of uplands

This association consists of gently sloping soils on broad ridgetops and of somewhat steep soils that are adjacent to drainageways. There are four disconnected areas in the association, and they are all in the southeastern part of the county. The topography is a rolling plateau surrounded by rough, broken land. The difference in elevation from the ridgetops to the edges of the surrounding rough land is about 100 feet. The side slopes range from 6 to 20 percent, and in most places the slopes break evenly to the narrow drainageways. This association occupies about 9 percent of the county.

The Lowell and Shelbyville soils are dominant in this association (fig. 7). Lowell soils make up 60 percent of the association. They are on all slopes, but most areas are on the somewhat steep slopes. Shelbyville soils make up 20 percent, and they are mostly on the gently sloping ridgetops. The Lowell soils are underlain by limestone and calcareous shale, but the Shelbyville soils are underlain by limestone.

Most of the remaining acreage is made up of moderately well drained Bedford soils, on the flat ridgetops, and of Culleoka and Otway soils, near the breaks of the slopes. The valley floors are narrow, and in those areas the soils are of minor extent.

There are more general farms in this association than in any of the other associations in the county. Pastures are important, but more grain is grown for feed than in other parts of the county. Many fields are in tobacco, corn, small grain, and hay. The cultivated fields are generally on the ridgetops. Small patches of woodland are on a few of the steep slopes.

A few farms in this association are large, but most of them are about 150 acres in size. Most of the farms are operated by the owner. Some of the large farms have a tenant who takes care of the tobacco crop and works on the farm for wages when not busy with the tobacco crop.

7. Eden-Lowell-Culleoka Association

Deeply dissected uplands—deep, well-drained, gently sloping soils, with clayey subsoil, on ridges, and steep, fertile, somewhat droughty soils on side slopes

This association consists of soils on narrow, winding ridgetops and steep hills that are dissected by many drains. The areas are in a generally broad belt that extends across the southeastern half of the county. The ridgetops are about 200 feet above the long, crooked, narrow valley floors. The bottoms are nearly level and are generally no more than 100 feet wide. The side slopes range from 20 to 50 percent. This association occupies about 15 percent of the county.

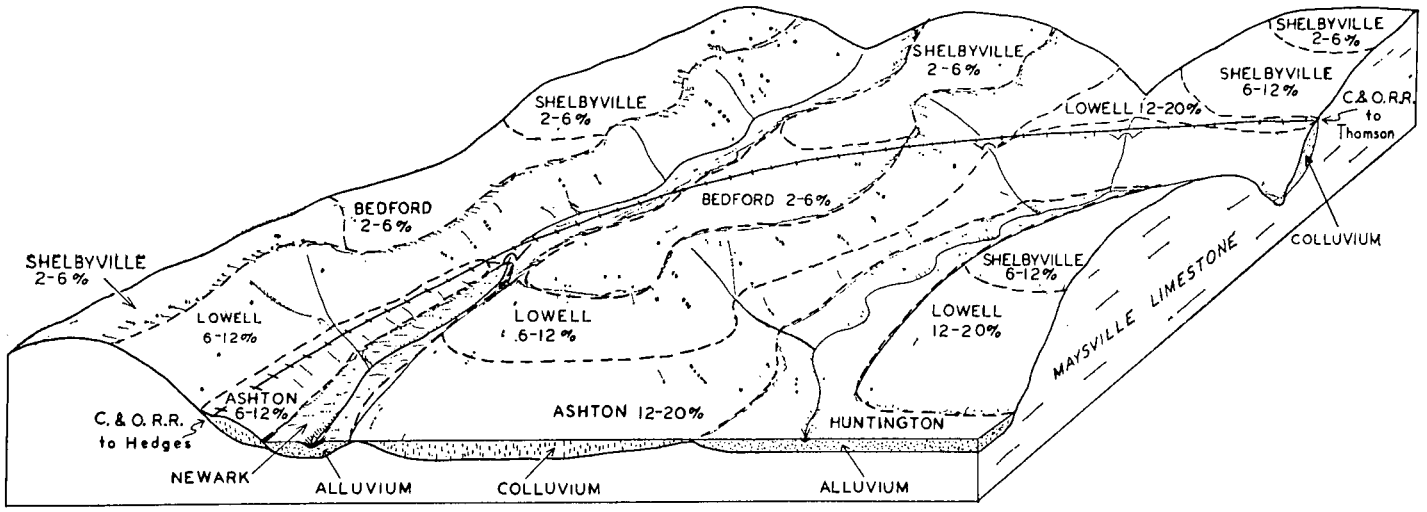

Figure 7.—**Major soil series in soil association 6, their relationship to the landscape, and the parent rocks from which the soils formed.**

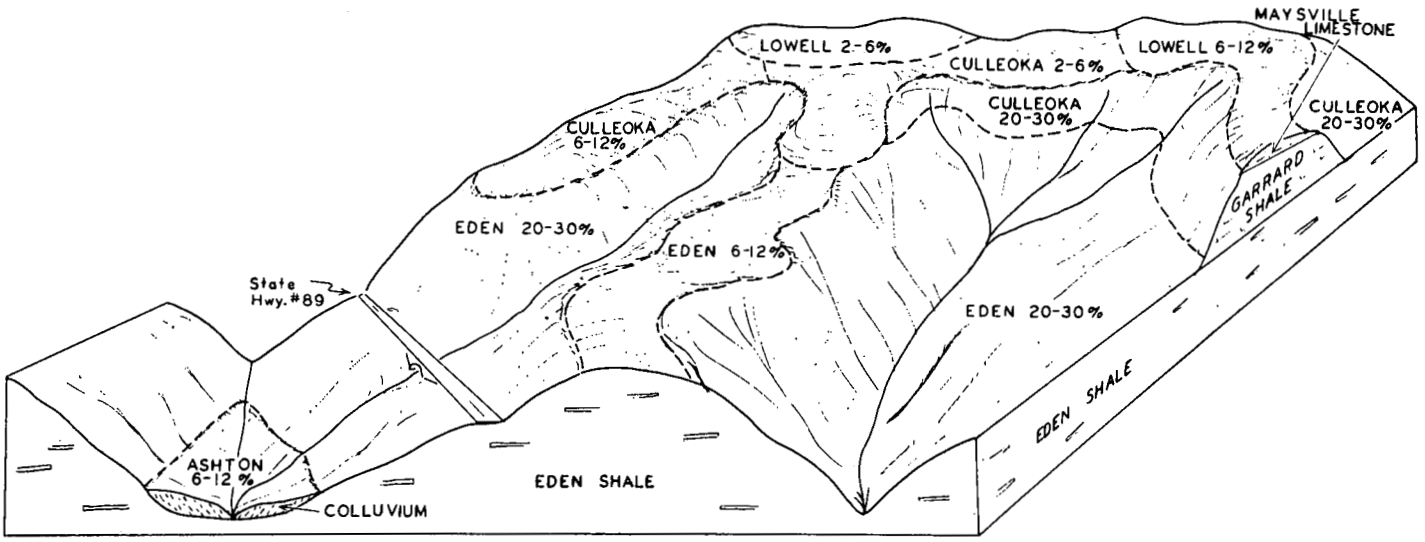

Figure 8.—**Major soil series in soil association 7, their relationship to the landscape, and the parent rocks from which the soils formed.**

Dominant in this association are the Eden, Lowell, and Culleoka soils (fig. 8). Eden soils are on all of the upland slopes and they make up 45 percent of the association. These soils are clayey and formed in material from calcareous shale and siltstone. Lowell soils are mostly on the upper slopes and the ridgetops, and they make up 25 percent of the association. Most of the Lowell soils, especially those on the side slopes, are clayey, and in many places they have outcrops of limestone. The Culleoka soils, on the upper side slopes and some of the ridgetops, make up 15 percent of the association. They formed in material from highly weathered, soft, calcareous shale and are silty and permeable.

The remainder of the association is made up of upland soils underlain by limestone and of soils on toe slopes and on bottom lands. Some of these minor upland soils are shallow and hard to till because of rocks, but others are deep and easily tilled. Most of the soils on the bottom lands have restricted drainage.

Most of the acreage in this association is in pasture. Tobacco is the main row crop, but some corn is grown. Hay is grown in some places, mostly on soils that are plowed periodically for tobacco. Thickets of black locust and stands of brushy, low-grade hardwoods cover about 5 percent of the association. Cultivated crops are grown mostly on the more productive soils on the ridgetops, on the toe slopes, and on the bottom lands that are not flooded. The pastures generally receive little management. Mowing is done late in the growing season, and the pastures are weedy and contain many inferior annual grasses. The pasture plants are lush and verdant early in spring, but by midsummer they are brown and stemmy.

A few of the farms are large, but most of them are about 150 acres in size. They are mainly subsistence farms that have only a small acreage suited to cultivation. The farms generally have a small acreage in burley tobacco and a few acres in corn and pasture. If the pastures are well managed, they have high production potential, especially for the raising of sheep. Early lambs raised on grass reach market size before midsummer, after which the productivity of the pastures is low.

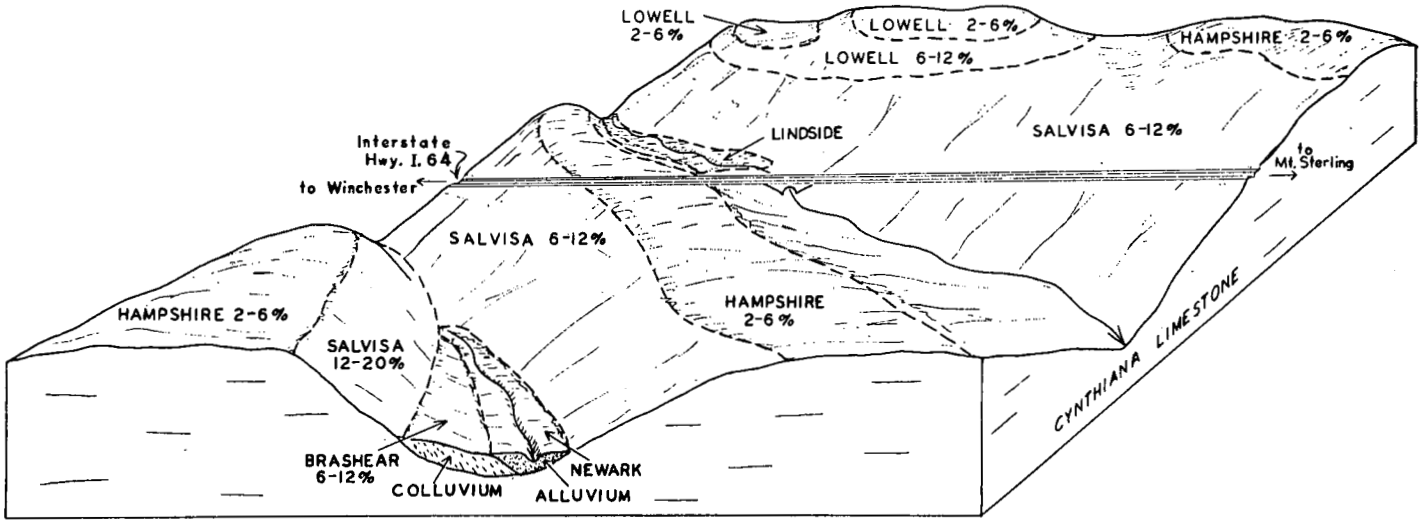

Figure 9.—**Major soil series in soil association 8, their relationship to the landscape, and the parent rocks from which the soils formed.**

8. Hampshire-Salvisa-Lowell Association

Dominantly strongly sloping uplands—deep, well-drained, gently sloping soils, with clayey subsoil, on ridges, and moderately deep, strongly sloping, clayey soils on side slopes

This association consists of gently sloping soils on rolling ridgetops dissected by many drains, and of strongly sloping soils on side slopes. The areas are in the northeastern part of the county. The ridgetops are fairly broad, and they are about 75 feet above the valley floors. The valley bottoms are generally no more than 200 feet wide. The side slopes range from 12 to 20 percent. This association occupies about 6 percent of the county.

The Hampshire, Salvisa, and Lowell soils account for 95 percent of the acreage of this association (fig. 9), and their acreage is about equal in size. Lowell soils are mostly in the northern part of the association; the Hampshire soils are mostly in the southern part; and the Salvisa soils are distributed throughout. Hampshire soils are underlain by limestone. They are deep, have a clayey subsoil, and are on the lower slopes. Salvisa soils are moderately deep, are clayey and somewhat rocky, and have outcrops of limestone. They are closely associated with the Hampshire soils. The Lowell soils are on the steep upper slopes and on the ridgetops. On the steep slopes they are generally moderately deep, are clayey, and have outcrops of limestone; on the ridgetops they are deep and generally formed partly in material from shale.

The remainder of the association is made up of soils on bottom lands and of a few areas of rocky soils on sharply breaking slopes.

Most cultivated areas in this association are on the ridges and in the valleys. The farms are mostly about 200 acres in size, but a few farms are larger. Much of the farm income comes from the sale of tobacco, but some comes from the sale of livestock. Beef cattle are generally raised to market weight by grazing the calves and cows together and letting the calves nurse for several months to supplement the feed they get from the pastures. Corn is grown in some places and fed to the calves to increase their growth.

9. Otway-Beasley Association

Deeply dissected uplands—shallow to moderately deep, dominantly droughty, sloping and steep soils, and some fairly wide bottoms

This association consists of soils on long ridges that break sharply to fairly wide bottoms. The areas are in the southeastern part of the county. The ridgetops range from fairly narrow to broad. They are about 150 feet above the valley floors, except along the Kentucky River where some ridgetops rise to 300 feet above the bottoms. The bottoms are level and range up to 1,000 feet in width. The side slopes are steep; the slope ranges from 20 to 50 percent. This association makes up about 9 percent of the county.

Dominant in this association are the Otway and Beasley soils (fig. 10). Otway soils, on narrow ridgetops and steep side slopes, make up 70 percent of the association. These soils formed in material from soft, calcareous shale. They are shallow and in many places have fragments of shale throughout their profile. Beasley soils are on some of the broad ridgetops, and they make up 5 percent of the association. They formed partly in material from calcareous shale and partly in material from limestone.

The remaining 25 percent of the association consists of soils in steep rocky areas, of soils on old, high terraces on the broad ridgetops, and of soils on bottom lands and toe slopes. Also on the broad ridgetops are a few soils formed partly in material from acid shale. Most of the soils on bottom lands on the narrow valley floors are poorly drained, but the Egam soils, on wide bottoms along the major streams, are well drained and occupy fairly large areas.

Most of this association is in native pasture. About 20 percent of the association is wooded, and redcedar is the dominant tree. The cultivated areas are mostly in the valleys and on the broad ridges.

A few of the farms are large, but most of them are about 100 acres in size. They are mainly subsistence farms that have only a small acreage suited to cultivation. A small amount of burley tobacco is generally grown on most farms. If the farm includes some soils on broad

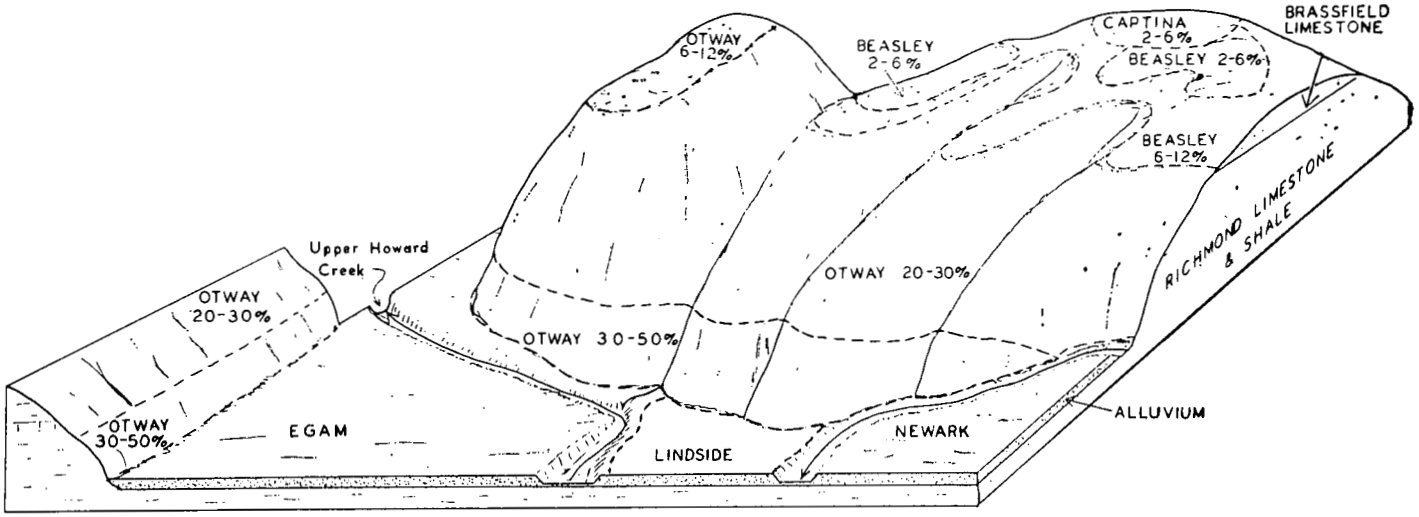

***Figure 10.*—Major soil series in soil association 9, their relationship to the landscape, and the parent rocks from which the soils formed.**

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ridgetops and some well-drained soils on the bottom lands, a few acres are planted to corn.

Many of the soils on the hillsides have been cultivated or overgrazed. As a result, many of the hillsides have gullied areas that support no vegetation. Continued grazing and trampling of these areas by livestock prevents vegetation from becoming established. Redcedar grows naturally on the Otway soils if those soils are protected from grazing.

10. Colyer-Trappist-Muse Association

Deeply dissected uplands—shallow, droughty soils of low fertility on sloping ridges and on steep slopes, and some gently sloping to steep, deep to moderately deep soils on lower slopes

This association consists of steep, hilly soils and of soils on broad flats. The areas are in the southeastern part of the county. In the hilly part of this association, long, narrow ridges, dissected by many drains, are dominant. The flatlands are at the base of the hills. The tops of the ridges are nearly 300 feet above the stream channels and about 100 feet above the flats. The stream channels have narrow bottoms, but the flats, which are in positions that resemble benches between the ridgetops and valley floors, are nearly a mile across in places. This association makes up about 6 percent of the county.

The Colyer, Trappist, and Muse soils are dominant in this association (fig. 11). Colyer soils are mostly on steep side slopes, and they make up 60 percent of the association. They are shallow and shaly. Trappist soils, on broad ridgetops, make up 15 percent of the area. They also formed in material from shale, but they are deep. The Muse soils are deep; they are on toe slopes at the base of hills underlain by shale, and they make up 10 percent of the area.

The remainder of the association consists of a few soils that are on the bottom lands and are mostly poorly drained, and of soils on the flats. The soils of the broad, nearly level flatlands generally have somewhat restricted internal drainage. These soils formed on terraces in old alluvium. They are closely associated with the Hagerstown soils, which are well drained and are underlain by limestone. They are also associated with other well-drained soils that formed in material from black shale.

About 80 percent of the acreage of steep soils in this association is in trees. Second-growth stands of Virginia pine, and mixed stands of pine and hardwood, provide most of the forest cover. The hardwoods are mostly inferior in quality and form, and they are not desirable for lumber. The softwoods are generally small, and board-foot yields for the number of trees cut are extremely low. Operators of small sawmills in this association gain only a small profit, even if they cut operating costs drastically. Most of the cultivated soils are on the broad, nearly level benches. Tile systems that improve drainage have been installed recently, and corn and hay are now grown intensively.

Most of the farms are small. The owners of many of these small farms maintain them only as homesites, and they earn much of their living by outside employment. If the hardwood trees are removed by chemical treatment, the shaly, hilly soils can be planted to pines, which are better suited to the soils.

11. Otway-Fleming-Shrouts Association

Deeply dissected uplands—gently sloping, moderately deep soils, with clayey subsoil, on ridges, and steep, mostly shallow, clayey soils on side slopes

This association consists of gently sloping soils on rolling ridgetops and of steep soils on side slopes. The areas are in the southeastern part of the county. The ridgetops are fairly narrow and have been cut into an irregular pattern by many drains. The Red River bottoms are about 200 feet lower than the crests of the ridges and are seldom more than 1,000 feet wide. The side slopes range from 20 to 50 percent. This association occupies about 5 percent of the county.

Dominant in this association are the Otway, Fleming, and Shrouts soils (fig. 12). Otway soils, mostly on narrow ridgetops and steep side slopes, make up 60 percent of the association. They formed in material from calcareous shale, and in most places they have fragments of

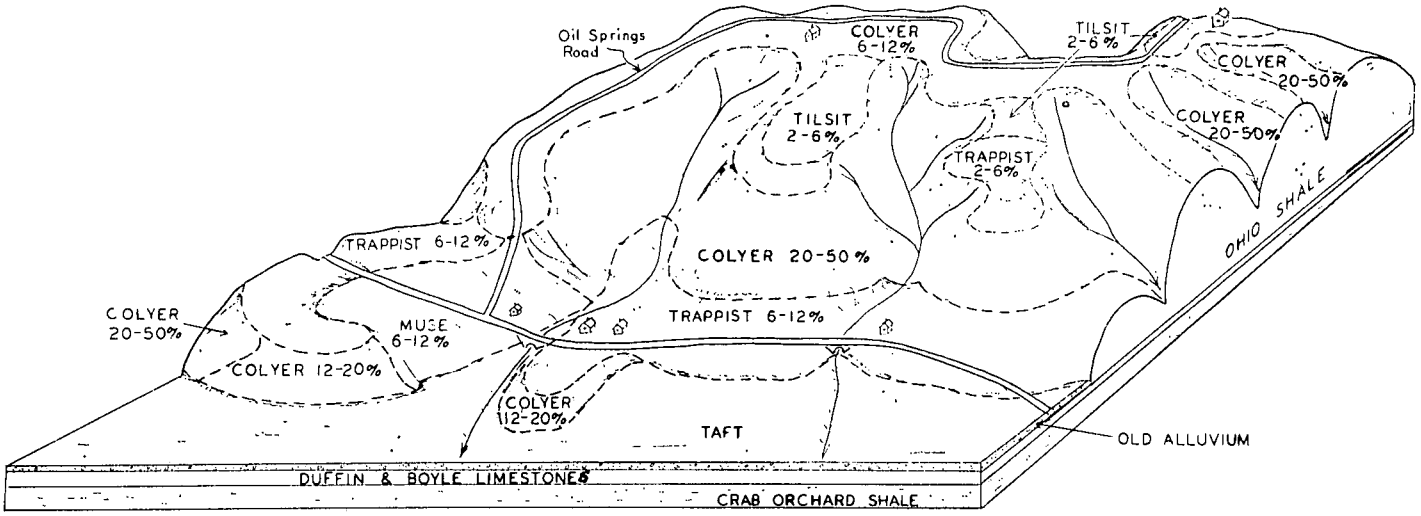

Figure 11.—Major soil series in soil association 10, their relationship to the landscape, and the parent rocks from which the soils formed.

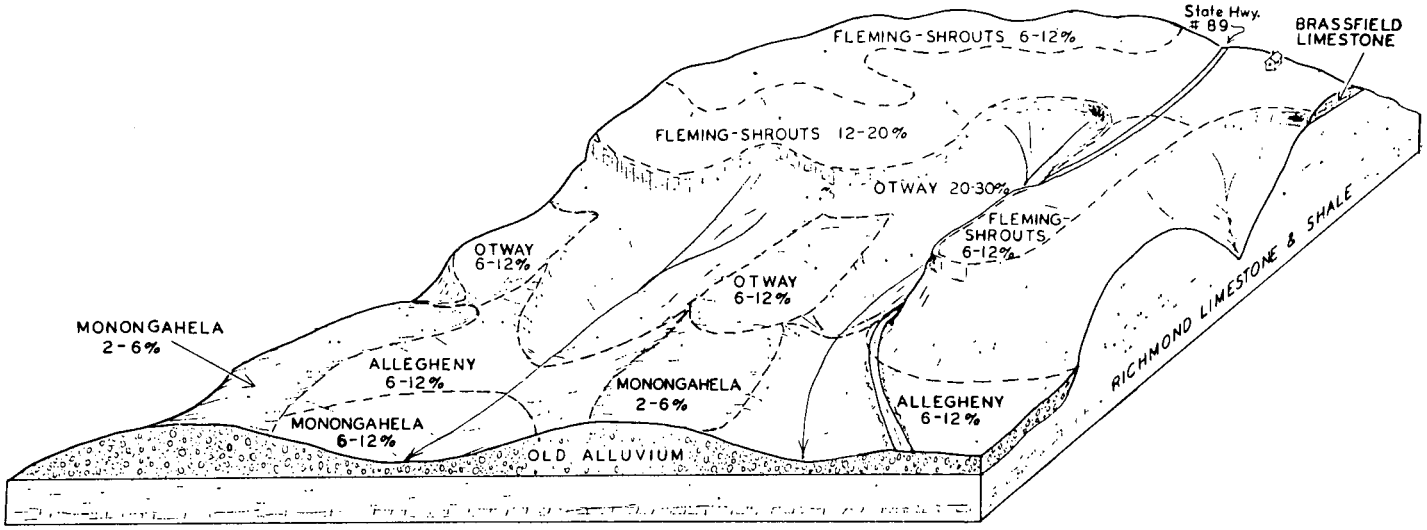

***Figure 12.*—Major soil series in soil association 11, their relationship to the landscape, and the parent rocks from which the soils formed.**

shale throughout the profile. The Fleming and Shrouts soils combined make up 30 percent of the association. They are mostly on hillside benches and formed in material from limestone and alkaline clay shale. All of these soils are shallow to moderately deep and are droughty.

The remainder of the association consists of Rock land, of soils on bottom lands that are mostly poorly drained, and of coarse-textured soils on terraces.

Much of this association is in pasture of low quality. Most cultivated areas are on bottom lands along the Red River and in a few places on the broad ridgetops. Woodland, mostly on the steep, rocky soils, covers about 25 percent of the association. Cedar is the main tree grown. Tobacco and corn are the chief cultivated crops, and most of the corn is harvested and fed to livestock on the farms.

The farms are small and are mainly of the subsistence type. A small acreage of burley tobacco provides most of the farm income. Generally, calves are brought to market size by grazing them in the same pasture with the cows and letting them nurse to supplement the feed they get from the pastures. On a few farms there are large areas of bottom lands. On those farms beef cattle are fed to market size entirely on grass.

How Soils Are Mapped and Classified

Soil scientists made this survey to learn what kinds of soils are in Clark County, where they are located, and how they can be used.

They went into the county knowing they likely would find many soils they had already seen, and perhaps some they had not. As they traveled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by roots of plants.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. To use this report efficiently, it is necessary to know the kinds of groupings most used in a local soil classification.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Lowell and Maury, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that go with their behavior in the natural, untouched landscape. Soils of one series can differ somewhat in texture of the surface soil and in slope, stoniness, or some other characteristic that affects the use of the soils by man.

Many soil series contain soils that are alike except for texture of their surface layer. According to such differences in texture, separations called soil types are made. Within a series, all the soils having a surface layer of the same texture belong to one soil type. Lowell silt loam and Lowell silty clay loam are two soil types in the Lowell series. The difference in texture of their surface layers is apparent from their names.

Some soil types vary so much in slope, degree of erosion, number and size of stones, or some other feature affecting their use, that practical suggestions about their management could not be made if they were shown on the soil map as one unit. Such soil types are divided into soil phases. The name of a soil phase indicates a feature that affects management. For example, Lowell silt loam, 2 to 6 percent slopes, is one of several phases of Lowell silt loam, a soil type that ranges from nearly level to steep.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodland, buildings, field borders, trees,

and other details that greatly help in drawing boundaries accurately. The soil map in the back of this report was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning management of farms and fields, a mapping unit is nearly equivalent to a soil type or a phase of a soil type. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil type or soil phase.

In preparing some detailed maps, the soil scientists have a problem of delineating areas where different kinds of soils are so intricately mixed, and so small in size, that it is not practical to show them separately on the map. Therefore, they show this mixture of soils as one mapping unit and call it a soil complex. Ordinarily, a soil complex is named for the major soil series in it, for example, Fleming-Shrouts complex. Also, on most soil maps, areas are shown that are so rocky, so shallow, or so frequently worked by wind and water that they cannot be called soils. These areas are shown on a soil map like other mapping units, but they are given descriptive names, such as Gullied land or Rock land, and are called land types rather than soils.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soils in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soils. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in a way that is readily useful to different groups of readers, among them farmers, ranchers, managers of woodland, engineers, and homeowners. Grouping soils that are similar in suitability for each specified use is the method of organization commonly used in the soil survey report. Based on the yield and practice tables and other data, the soil scientists set up trial groups, and test them by further study and by consultation with farmers, agronomists, engineers, and others. Then, the scientists adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

Descriptions of the Soils

This section is provided for those who want fairly detailed, nontechnical descriptions of the soil series and mapping units in Clark County. For more general information about the soils of the county, the reader can refer to the section "General Soil Map," in which broad patterns of soils are described; or, if he wants detailed, technical descriptions of soil series he can refer to the section "Formation, Morphology, and Classification of Soils."

In the pages that follow, the soil series and mapping units of the county are described in alphabetic order, by soil series name. Each series is described, and then the individual mapping units of that series. A soil profile is described for each series, and this profile is considered representative, or typical, for all mapping units of that series. The profile of some mapping units in a series will differ somewhat from the representative profile, but these differences are evident in the name of each mapping unit or are pointed out in its description.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map in the back of the report. The description of each mapping unit ends with a reference to the capability unit and woodland suitability group in which the soil has been placed. Capability units and woodland suitability groups are described in the sections "Use of the Soils for Crops and Pasture" and "Use of the Soils for Woodland."

Descriptions of soil series and mapping units contain some technical terms because there is no nontechnical term that conveys precisely the same meaning. Technical terms are defined in the Glossary.

The acreage and proportionate extent of the soils are given in table 1. Their location is shown on the soil map at the back of the report.

Allegheny Series

The Allegheny series consists of deep, well-drained soils derived from old alluvial sediments. These soils are gently sloping to strongly sloping and are on second bottoms and on ridgetops where the sediments cap residual material. Where not eroded, these soils have a dark-brown surface layer that overlies dark yellowish-brown and gray fine sandy clay loam.

Representative profile:

0 to 7 inches, dark-brown, very friable loam.
7 to 28 inches, dark yellowish-brown silty clay loam; angular blocky structure.
28 to 36 inches, yellowish-brown fine sandy clay loam that is mottled with pale brown and gray.

The thickness of the layers varies with the position and location of the soils. The surface layer ranges from silt loam to fine sandy loam in texture and from dark brown to brown in color. In some places there is a weak fragipan in the lower part of the subsoil. This layer has the grayish color of a fragipan but lacks noticeable compaction. Because of the depth at which it occurs and because of its lack of compaction, the fragipan layer is believed to have no influence on the drainage of the Allegheny soils.

These soils are medium to low in organic matter, very strongly acid, and moderately high in natural fertility.

Allegheny soils are in the southeastern part of the county on low terraces along the Kentucky River and on ridgetops as high as 300 feet above the river. Most areas are used for corn, tobacco, pasture grasses, and hay. Small patches of Virginia pine have grown up in abandoned fields.

Allegheny soils are easy to till and can be used for all the crops common to the county. Large amounts of lime are required, however, for successful growth of most legumes. All crops grown on these soils respond well to commercial fertilizer, barnyard manure, and green manure.

Allegheny loam, 2 to 6 percent slopes (AgB).—This is a deep, well-drained, somewhat sandy soil. It is on broad

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Acres	Percent
Allegheny loam, 2 to 6 percent slopes	358	0.2
Allegheny loam, 6 to 12 percent slopes, eroded	532	.3
Allegheny fine sandy loam, 12 to 20 percent slopes, eroded	168	.1
Armour silt loam, 0 to 2 percent slopes	111	.1
Armour silt loam, 2 to 6 percent slopes	282	.2
Armour silt loam, 6 to 12 percent slopes	146	.1
Ashton silt loam, 0 to 2 percent slopes	205	.1
Ashton silt loam, 2 to 6 percent slopes	926	.6
Ashton silt loam, 6 to 12 percent slopes	428	.3
Ashton silt loam, 6 to 12 percent slopes, eroded	397	.2
Ashton silt loam, 12 to 20 percent slopes, eroded	311	.2
Ashwood very rocky silty clay loam, 6 to 12 percent slopes	327	.2
Ashwood very rocky silty clay loam, 12 to 20 percent slopes	722	.4
Ashwood very rocky silty clay loam, 20 to 30 percent slopes	675	.4
Ashwood very rocky clay, 6 to 12 percent slopes, severely eroded	615	.4
Ashwood very rocky clay, 12 to 20 percent slopes, severely eroded	649	.4
Ashwood very rocky clay, 20 to 30 percent slopes, severely eroded	1,125	.7
Beasley silt loam, 2 to 6 percent slopes, eroded	245	.2
Beasley silt loam, 6 to 12 percent slopes, eroded	438	.3
Bedford silt loam, 0 to 2 percent slopes	182	.1
Bedford silt loam, 2 to 6 percent slopes	675	.4
Bedford silt loam, 6 to 12 percent slopes	271	.2
Brashear silt loam, 2 to 6 percent slopes	252	.2
Brashear silt loam, 6 to 12 percent slopes, eroded	1,821	1.1
Brashear silt loam, 12 to 20 percent slopes, eroded	228	.1
Braxton silt loam, 2 to 6 percent slopes	398	.2
Braxton silt loam, 6 to 12 percent slopes, eroded	763	.5
Bruno loamy fine sand	157	.1
Burgin silty clay loam	208	.1
Captina silt loam, 0 to 2 percent slopes	469	.3
Captina silt loam, 2 to 6 percent slopes	972	.6
Colyer silt loam, 6 to 12 percent slopes	899	.5
Colyer silt loam, 20 to 50 percent slopes	1,802	1.1
Colyer shaly silty clay loam, 6 to 12 percent slopes, severely eroded	352	.2
Colyer shaly silty clay loam, 12 to 20 percent slopes, severely eroded	534	.3
Colyer shaly silty clay loam, 20 to 50 percent slopes, severely eroded	1,312	.8
Culleoka silt loam, 2 to 6 percent slopes	328	.2
Culleoka silt loam, 6 to 12 percent slopes, eroded	1,638	1.0
Culleoka silt loam, 12 to 20 percent slopes, eroded	841	.5
Culleoka silt loam, 20 to 30 percent slopes, eroded	4,791	2.9
Culleoka flaggy silt loam, 20 to 30 percent slopes, eroded	514	.3
Culleoka flaggy silt loam, 30 to 50 percent slopes, eroded	1,487	.9
Eden silty clay loam, 6 to 12 percent slopes, eroded	1,340	.8
Eden silty clay loam, 12 to 20 percent slopes, eroded	368	.2
Eden silty clay loam, 20 to 30 percent slopes, eroded	2,338	1.4
Eden clay, 6 to 12 percent slopes, severely eroded	379	.2
Eden clay, 12 to 20 percent slopes, severely eroded	281	.2
Eden clay, 20 to 30 percent slopes, severely eroded	713	.4
Eden flaggy clay, 12 to 20 percent slopes, severely eroded	295	.2
Eden flaggy clay, 20 to 30 percent slopes, severely eroded	2,030	1.2
Egam silt loam	2,160	1.3
Fairmount flaggy silty clay loam, 20 to 30 percent slopes	705	.4
Fairmount flaggy clay, 20 to 30 percent slopes, severely eroded	242	.1
Fairmount flaggy clay, 30 to 50 percent slopes, severely eroded	865	.5
Fleming silt loam, 6 to 12 percent slopes, eroded	397	.2
Fleming-Shrouts complex, 6 to 12 percent slopes	535	.3
Fleming-Shrouts complex, 12 to 20 percent slopes	2,134	1.3
Fleming-Shrouts complex, 12 to 20 percent slopes, severely eroded	1,830	1.1
Fleming-Shrouts complex, 20 to 30 percent slopes	199	.1
Fleming-Shrouts complex, 20 to 30 percent slopes, severely eroded	209	.1
Gullied land	95	.1
Hagerstown silt loam, 0 to 2 percent slopes	94	.1
Hagerstown silt loam, 2 to 6 percent slopes	309	.2
Hagerstown silt loam, 6 to 12 percent slopes, eroded	148	.1
Hampshire silt loam, 2 to 6 percent slopes	10,169	6.1
Hampshire silt loam, 2 to 6 percent slopes, eroded	2,390	1.4
Hampshire silt loam, 6 to 12 percent slopes	2,745	1.7
Hampshire silt loam, 6 to 12 percent slopes, eroded	13,127	7.9
Hampshire silt loam, 12 to 20 percent slopes, eroded	768	.5
Hampshire silty clay loam, 6 to 12 percent slopes, severely eroded	337	.2
Huntington silt loam	4,312	2.6
Huntington silt loam, shallow	464	.3
Lanton and Dunning silty clay loams	722	.4
Lindside silt loam	2,545	1.5
Loradale silt loam, 2 to 6 percent slopes	2,727	1.6
Loradale silt loam, 6 to 12 percent slopes	764	.5
Loradale silt loam, 6 to 12 percent slopes, eroded	982	.6
Lowell silt loam, 2 to 6 percent slopes	1,166	.7
Lowell silt loam, 2 to 6 percent slopes, eroded	899	.5
Lowell silt loam, 6 to 12 percent slopes	495	.3
Lowell silt loam, 6 to 12 percent slopes, eroded	4,580	2.8
Lowell silt loam, 12 to 20 percent slopes, eroded	3,001	1.8
Lowell silt loam, 20 to 30 percent slopes, eroded	3,522	2.1
Lowell silty clay, shallow, 6 to 12 percent slopes, severely eroded	223	.1
Lowell silty clay, shallow, 12 to 20 percent slopes, severely eroded	445	.3
Lowell silty clay, shallow, 20 to 30 percent slopes, severely eroded	1,106	.7
Lowell silty clay loam, 6 to 12 percent slopes, severely eroded	402	.2
Lowell silty clay loam, 12 to 20 percent slopes, severely eroded	459	.3
Lowell silty clay loam, 20 to 30 percent slopes, severely eroded	882	.5
Lowell silty clay loam, shallow, 6 to 12 percent slopes, eroded	808	.5
Lowell silty clay loam, shallow, 12 to 20 percent slopes, eroded	732	.4
Lowell silty clay loam, shallow, 20 to 30 percent slopes, eroded	630	.4
Made land	157	.1
Maury silt loam, 0 to 2 percent slopes	551	.3
Maury silt loam, 2 to 6 percent slopes	3,961	2.4
Maury silt loam, 2 to 6 percent slopes, eroded	410	.3
Maury silt loam, 6 to 12 percent slopes	573	.3
Maury silt loam, 6 to 12 percent slopes, eroded	807	.5
McAfee silt loam, 2 to 6 percent slopes	779	.5
McAfee silt loam, 6 to 12 percent slopes	734	.4

TABLE 1.—*Approximate acreage and proportionate extent of the soils*—Continued

Soil	Acres	Percent	Soil	Acres	Percent
McAfee silty clay, 12 to 20 percent slopes, severely eroded	349	0. 2	Otway soils, 30 to 50 percent slopes	982	0. 6
McAfee silty clay loam, 2 to 6 percent slopes, eroded	354	. 2	Robertsville silt loam	346	. 2
McAfee silty clay loam, 6 to 12 percent slopes, eroded	4, 519	2. 7	Rock land	1, 556	. 9
McAfee silty clay loam, 12 to 20 percent slopes, eroded	2, 775	1. 7	Salvisa clay, 6 to 12 percent slopes, severely eroded	490	. 3
McAfee silty clay loam, 20 to 30 percent slopes, eroded	274	. 2	Salvisa clay, 12 to 20 percent slopes, severely eroded	439	. 3
McAfee very rocky silty clay loam, 12 to 20 percent slopes, eroded	367	. 2	Salvisa clay, 20 to 30 percent slopes, severely eroded	873	. 5
McAfee very rocky silty clay loam, 20 to 30 percent slopes, eroded	347	. 2	Salvisa silty clay loam, 2 to 6 percent slopes, eroded	666	. 4
Melvin silt loam	230	. 1	Salvisa silty clay loam, 6 to 12 percent slopes, eroded	4, 914	3. 0
Mercer silt loam, 2 to 6 percent slopes	1, 627	1. 0	Salvisa silty clay loam, 12 to 20 percent slopes, eroded	3, 649	2. 2
Mercer silt loam, 2 to 6 percent slopes, eroded	267	. 2	Salvisa silty clay loam, 20 to 30 percent slopes, eroded	581	. 4
Mercer silt loam, 6 to 12 percent slopes	530	. 3	Shelbyville silt loam, 2 to 6 percent slopes	2, 897	1. 8
Mercer silt loam, 6 to 12 percent slopes, eroded	761	. 5	Shelbyville silt loam, 2 to 6 percent slopes, eroded	301	. 2
Monongahela loam, 2 to 6 percent slopes	333	. 2	Shelbyville silt loam, 6 to 12 percent slopes	625	. 4
Monongahela loam, 6 to 12 percent slopes, eroded	141	. 1	Shelbyville silt loam, 6 to 12 percent slopes, eroded	1, 174	. 7
Muse silt loam, 6 to 12 percent slopes, eroded	393	. 2	Taft silt loam	559	. 3
Muse silt loam, 12 to 20 percent slopes, eroded	320	. 2	Tilsit silt loam, 2 to 6 percent slopes	812	. 5
Muse silt loam, 20 to 30 percent slopes, eroded	151	. 1	Trappist silt loam, 2 to 6 percent slopes	537	. 3
Newark silt loam	3, 220	1. 9	Trappist silt loam, 6 to 12 percent slopes, eroded	920	. 6
Otway silty clay, 6 to 12 percent slopes, severely eroded	474	. 3	Woolper silty clay loam, 6 to 12 percent slopes	532	. 3
Otway silty clay loam, 6 to 12 percent slopes	795	. 5			
Otway soils, 20 to 30 percent slopes, severely eroded	8, 086	4. 9	Total	165, 760	100. 0

upland ridgetops and on nearly level second bottoms along the major streams. The surface layer is dark-brown loam. The subsoil is brown silty clay loam. It grades to yellowish-brown fine sandy clay loam that is mottled with gray and pale brown at a depth of about 30 inches.

This soil has very high moisture-supplying capacity, is easy to till, and has a moderately permeable subsoil. It is strongly acid and moderately high in natural fertility.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. More lime than is generally used is needed for alfalfa and for most kinds of clover. If fertility is maintained and if erosion is controlled, this soil can be cropped year after year. (Capability unit IIe–1; woodland suitability group 3)

Allegheny loam, 6 to 12 percent slopes, eroded (AgC2).—This is a deep, well-drained, somewhat sandy soil of the terraces. It has a plow layer of dark yellowish-brown, friable loam. The subsoil is brown silty clay loam. The substratum, at a depth below 30 inches, is yellowish-brown fine sandy clay loam mottled with gray and pale brown. The surface layer is 6 to 10 inches thick and has material from the subsoil mixed into it.

Some areas of this soil are on the side slopes of broad ridgetops in the uplands. Others are in narrow bands along drainageways of tributaries to the major streams.

This soil has high moisture-supplying capacity, is easy to till, and has a moderately permeable subsoil. It is strongly acid and moderately high in natural fertility. Crops on this soil respond well to fertilizer and lime.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. More lime than is generally used is needed for alfalfa and for most kinds of clover. Practices that will maintain fertility, build up the supply of organic matter, and control erosion are farming on the contour, growing cover crops, and establishing sod waterways. The soil should not be used for cultivated crops more than one-third of the time. (Capability unit IIIe–1; woodland suitability group 3)

Allegheny fine sandy loam, 12 to 20 percent slopes, eroded (AfD2).—This is a deep, well-drained, sandy soil of the terraces. Its plow layer is dark yellowish-brown, very friable fine sandy loam. The subsoil is brown fine sandy clay loam that is mottled with pale brown and gray in the lower part.

Some areas of this soil are on rough, broken side slopes of terraces in the uplands. Others are on low terraces that are strongly dissected by tributary streams.

This soil is medium in natural fertility, low in organic matter, and moderately high in moisture-supplying capacity. The permeability of the subsoil is moderately rapid. The soil is strongly acid. It is easy to till and can be tilled within a wide range of moisture content.

Because of the hazard of further erosion, this soil is not suited to frequent cultivation. A large amount of lime is needed for most legumes. (Capability unit IVe–1; woodland suitability group 3)

Armour Series

The Armour series consists of deep, well-drained, nearly level to sloping soils of the terraces and colluvial slopes. These soils formed in material washed mostly from the Maury, Braxton, and associated soils of the uplands.

Armour soils have a surface layer of dark-brown silt loam. Their subsoil is brown to reddish-brown silty clay loam that is finer textured in the lower part.

Representative profile:

0 to 15 inches, dark-brown silt loam; weak, fine, granular and subangular blocky structure; friable.
15 to 48 inches, strong-brown silty clay loam; moderate, subangular blocky structure; friable.
48 inches +, reddish-brown to yellowish-red silty clay; moderate, subangular blocky structure.

The thickness of the solum and the texture of the soils vary according to the source of the alluvium and the depth of the deposit. In places the soils contain chert washed from the Braxton soils.

Armour soils are high in phosphate. They are fertile, high in organic matter, and medium acid.

These soils are mostly in the southwestern part of the county in the Inner Bluegrass section. All of the acreage has been cleared. The soils are highly productive of burley tobacco, corn, and alfalfa.

Armour silt loam, 0 to 2 percent slopes (ArA).—This is a deep, well-drained soil of low terraces and colluvial areas. It lies close to drainageways near soils of the uplands where the sediments were derived from phosphatic limestone. In appearance, this soil is much the same as soils of the bottom lands.

The surface layer is dark-brown, friable silt loam. The subsoil is brown silty clay loam that grades to reddish-brown and yellowish-red silty clay in the lower part.

This soil has very high moisture-supplying capacity and a moderately permeable subsoil. It is easily worked, medium acid, and highly fertile. Other than the scouring as the result of hillside runoff, it is not subject to erosion.

Row crops can be grown year after year on this soil if cover crops are plowed down to maintain the supply of organic matter. (Capability unit I–3; woodland suitability group 3)

Armour silt loam, 2 to 6 percent slopes (ArB).—This deep, well-drained soil of the terraces formed in sediments from soils underlain by phosphatic limestone. It is in the Inner Bluegrass section and occurs along drainageways just above the bottom lands.

The plow layer is dark-brown, friable silt loam, and the subsoil is brown to reddish-brown silty clay loam. In a few places few to many chert fragments are throughout the profile.

This soil has high fertility and very high moisture-supplying capacity. It is medium acid, medium in organic matter, and easily worked. The hazard of erosion is moderately low.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–1; woodland suitability group 3)

Armour silt loam, 6 to 12 percent slopes (ArC).—This is a deep, well-drained soil of the terraces that formed in sediments from soils underlain by phosphatic limestone. It is in the Inner Bluegrass section and occurs along drainageways just above the bottom lands.

The plow layer is dark-brown, friable silt loam. The subsoil is brown silty clay loam that grades to reddish-brown silty clay at a depth of about 36 inches.

This soil is high in natural fertility, very high in moisture-supplying capacity, and medium acid. It is easily worked. The permeability of the subsoil is moderately slow. The hazard of erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–1; woodland suitability group 3)

Ashton Series

The Ashton series consists of nearly level to strongly sloping, deep, well-drained soils that are chiefly on low terraces and colluvial slopes. These soils formed in material washed from upland soils that were derived mainly from limestone but partly from calcareous sandstone and shale. Where not eroded, the Ashton soils have a dark-brown surface layer and a brown to yellowish-brown subsoil of silty clay loam.

Representative profile:

0 to 9 inches, dark-brown, friable silt loam.
9 to 38 inches, dark-brown, friable silt loam; weak to medium, subangular blocky structure.
38 inches +, yellowish-brown silty clay; weak, coarse, angular blocky structure.

Rounded quartzite pebbles occur throughout the upper part of the solum. These pebbles are few in most places, but are numerous in some eroded areas. The solum of these soils ranges from 24 to 48 inches in thickness on the low terraces and colluvial slopes; it is shallower on the steeper slopes. In texture, the solum ranges from silt loam to silty clay loam or silty clay. The color of the subsoil ranges from yellowish brown to reddish brown. Thickness of the alluvial sediments over residual material ranges from 30 inches to several feet.

Ashton soils are fertile, easily worked, and high in moisture-supplying capacity. These soils are in the Hills of the Bluegrass, in the Inner Bluegrass, and in the Outer Bluegrass sections of the county. Most areas have been cleared and are used for all the crops commonly grown in the county. They are particularly well suited to burley tobacco and corn.

Ashton silt loam, 0 to 2 percent slopes (AsA).—This is a deep, well-drained soil of low terraces. Its plow layer, a dark-brown, friable silt loam, grades to brown silty clay loam. The layers in the substratum are not well defined, and the soil material is weakly aggregated.

This soil lies close to those drainageways where the sediments were not derived from phosphatic rock. In appearance this soil is similar to soils of the bottom lands, but it has a better developed profile.

This soil has very high moisture-supplying capacity, is easy to till, and has a moderately permeable subsoil. It is slightly to medium acid, but it is high in natural fertility. Other than the scouring as the result of hillside runoff, it is not subject to erosion.

Row crops can be grown year after year on this soil if cover crops are plowed down to maintain the supply of organic matter. Pure stands of alfalfa can be grown without causing erosion. Legume-grass pastures produce excellent yields and remain vigorous for more than 5 years if the soil fertility is maintained. (Capability unit I–3; woodland suitability group 1)

Ashton silt loam, 2 to 6 percent slopes (AsB).—This is a deep, well-drained soil on terraces and colluvial slopes.

It occurs along drainageways just above the bottom lands. The plow layer is dark-brown silt loam, and the subsoil is dark-brown silty clay loam. The subsoil is weakly aggregated, and the layers are not clearly defined.

This soil has high fertility, has very high moisture-supplying capacity, and is slightly acid to medium acid. It is easy to till and has a moderately permeable subsoil. The hazard of erosion is moderately low.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–1; woodland suitability group 3)

Ashton silt loam, 6 to 12 percent slopes (AsC).—This is a deep, well-drained soil on terraces and toe slopes.

It lies along drainageways just above the bottom lands. The surface layer is dark-brown, friable silt loam. The subsoil is brown and weakly aggregated. The layers are not clearly defined.

This soil is fertile, very high in moisture-supplying capacity, and easily worked. Permeability of the subsoil is moderate. The soil is medium acid and is susceptible to moderate erosion. Crops grown on it respond well to fertilizer and lime.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–1; woodland suitability group 3)

Ashton silt loam, 6 to 12 percent slopes, eroded (AsC2).—This is a deep, well-drained soil on terraces and toe slopes.

It occurs along drainageways just above the bottom lands. The plow layer is brown silt loam that is slightly sticky because some material that formerly was in the subsoil is mixed in it. The subsoil is brown, slightly firm silty clay loam. The boundaries between the horizons are not clearly defined, and the soil material is weakly aggregated.

This soil has high fertility and high moisture-supplying capacity, and it is easily worked. It has a moderately permeable subsoil. The soil is medium acid and low in organic matter. The hazard of further erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–1; woodland suitability group 3)

Ashton silt loam, 12 to 20 percent slopes, eroded (AsD2).—This is a deep, well-drained soil on terraces and toe slopes.

It lies along drainageways just above the bottom lands. The surface layer is brown silt loam that is slightly sticky because some material that was formerly in the subsoil is mixed in it. The subsoil is brown to yellowish-brown silty clay loam that grades to silty clay at a depth of about 30 inches. In the upper part of the profile, the layers are weakly defined, but in the lower part the layers are more clearly defined and the soil material is more strongly aggregated.

This soil is high in fertility, moderately low in moisture-supplying capacity, and easily worked. It has a moderately permeable subsoil. The soil is medium acid and low in organic matter. The hazard of further erosion is moderately high.

Grasses and legumes are better suited to this soil than row crops. It is best to use this soil for hay and pasture, but it can be cultivated occasionally if practices are used to control erosion. (Capability unit IVe–1; woodland suitability group 3)

Ashwood Series

The Ashwood series consists of shallow to very shallow, excessively drained soils underlain by limestone. The soils most commonly are on steep side slopes, but in places in rough broken areas they are on narrow ridgetops. Ashwood soils have a very dark gray to black organic surface layer, and a thin, yellowish-brown subsoil that rests on raw, massive clay. Rock ledges are numerous, and many slabs of rock are on the surface.

Representative profile:

0 to 5 inches, black very rocky silty clay loam; blocky structure.
5 to 15 inches, dark yellowish-brown very rocky clay.
15 to 21 inches, yellowish-brown, raw very rocky clay; massive.

These soils range from 12 to 30 inches in depth. In places the depth ranges from as little as 12 inches to as much as 30 inches within a short distance. Rock outcrops are common.

Ashwood soils are low in moisture-supplying capacity, moderate in fertility, and droughty. The surface layer is slightly acid to mildly alkaline. Structural aggregates are noticeable in the surface layer, and locally the soil is known as a coarse soil.

These soils are mainly in the part of the Inner Bluegrass that is in the southwestern corner of the county. Some small areas, however, are in other parts of the Inner Bluegrass wherever the topography is rough and broken. Brush, pasture, and almost pure stands of cedar are the most common kinds of vegetation. The range of suitable plants is narrow, and the productivity of the soils is low.

Ashwood very rocky silty clay loam, 6 to 12 percent slopes (AwC).—This shallow soil is underlain by limestone. It is on ridgetops in rough, broken areas.

The surface layer is black silty clay loam that is noticeably aggregated. The subsoil is dark yellowish-brown, sticky, plastic clay and is at a depth of 6 to 10 inches. Rock slabs and ledges outcrop in many places.

This soil has low moisture-supplying capacity, moderate fertility, and a high content of organic matter. The hazard of erosion is moderately high.

If grazing is limited, this soil can be pastured. Hay can be produced if suitable plants are grown. Kentucky 31 tall fescue is better suited than other grasses. Korean and sericea lespedezas, which are drought resistant, are suitable legumes. (Capability unit VIs–1; woodland suitability group 13)

Ashwood very rocky silty clay loam, 12 to 20 percent slopes (AwD).—This shallow, somewhat excessively drained soil is underlain by limestone. It is on side slopes in rough, broken areas.

The surface layer is dark silty clay loam that is strongly aggregated. It is underlain by a subsoil of sticky, plastic clay at a depth between 6 and 10 inches. Rock slabs and ledges are common.

This soil has rapid runoff, low moisture-supplying capacity, and moderate fertility. It is droughty, mildly alkaline, and highly susceptible to erosion.

If grazing is limited, this soil can be used for pasture, and it is best suited to that purpose. Hay can be grown in some places. Kentucky 31 tall fescue is better suited than other grasses for pasture and hay. If the soil is used for hay, more than half of the grass-legume mixture should be grass. Korean and sericea lespedezas are suitable legumes because they are drought resistant. (Capability unit VIs–1; woodland suitability group 13)

Ashwood very rocky silty clay loam, 20 to 30 percent slopes (AwE). This shallow, excessively drained soil is underlain by limestone. It is on steep side slopes where the terrain is rough and broken. Most of it is in areas immediately adjacent to streams that flow through deep valleys.

The surface layer is dark silty clay loam that is aggregated. The subsoil is yellowish-brown, massive clay and is at a depth of about 6 inches. Bedrock is generally at a depth between 6 and 24 inches, but rock outcrops are common.

This soil is moderately fertile and is mildly alkaline. It is highly susceptible to erosion.

This soil is mainly in woodland, and it is better suited to that use than to other uses. Limited grazing is feasible if drought-resistant plants are grown. (Capability unit VIIs–2; woodland suitability group 13)

Ashwood very rocky clay, 6 to 12 percent slopes, severely eroded (AvC3).—This soil is on narrow ridgetops in rough, broken areas. It is shallow, is somewhat excessively drained, and is underlain by limestone. Its surface layer is thin, yellowish-brown, plastic clay, and its subsoil is yellowish-brown, massive clay. Rock slabs and ledges outcrop in many places.

This soil is alkaline, and it is low in organic matter and in moisture-supplying capacity. The hazard of further erosion is moderately high.

Enough grass can be grown on this soil to furnish limited grazing. Hay crops can be grown, but yields are low, even if suitable plants are selected. Lime is not needed. If fertilizer is added, the increase in yields is not enough to pay for the cost. (Capability unit VIs–2; woodland suitability group 13)

Ashwood very rocky clay, 12 to 20 percent slopes, severely eroded (AvD3).—This excessively drained, shallow soil is underlain by limestone. It is on side slopes in rough, broken areas.

The surface layer is thin, yellowish-brown, plastic clay, and the subsoil is massive clay. Depth to bedrock is between 6 and 24 inches. Rock slabs and ledges outcrop in many places.

This soil is moderate in fertility, low in moisture-supplying capacity, and mildly alkaline. It is highly susceptible to further erosion. This soil is mainly wooded, and it is better suited to that use than to other uses. The stands are made up of mixed hardwoods and cedars. (Capability unit VIIs–2; woodland suitability group 13)

Ashwood very rocky clay, 20 to 30 percent slopes, severely eroded (AvE3).—This shallow, excessively drained soil is underlain by limestone. It is on steep side slopes in rough, broken areas. Most of these areas are immediately adjacent to streams that flow through deep valleys.

The surface layer is thin, yellowish-brown, plastic clay. The subsoil is yellowish-brown and olive, massive clay that is 6 to 16 inches thick. Rock slabs and ledges outcrop in many places.

This soil is moderate in fertility and very low in moisture-supplying capacity. It is low in organic matter.

This soil is mainly wooded, and it is better suited to trees than to crops or pasture. The trees are mixed hardwoods and cedars. (Capability unit VIIs–2; woodland suitability group 13)

Beasley Series

The Beasley series consists of deep, well-drained soils formed mainly in material from limestone but partly in material from soft, calcareous shale. These soils are gently sloping to sloping and are on ridgetops and side slopes. They have a surface layer of dark-brown silt loam. The subsoil is mainly brown, but it grades to yellowish brown in the lower part. The parent material is variegated olive, yellowish-brown, and gray clay that is stiff, plastic, and calcareous.

Representative profile:

0 to 8 inches, dark-brown silt loam; slightly acid.
8 to 30 inches, brown to yellowish-brown silty clay loam that grades to clay with increasing depth; slightly acid.
30 to 42 inches, variegated olive, yellowish-brown, and gray clay; massive; neutral to calcareous.

Depth to the clayey subsoil is greater in the more nearly level areas than on the slopes. The profile is deepest where the soils are underlain by limestone.

Beasley soils are low in organic matter, moderately high in fertility, and high in moisture-supplying capacity. They are easily tilled, but they are subject to erosion.

These soils are in the southeastern part of the county. Most of the acreage is in the Outer Bluegrass, but a small acreage is in the Knobs. All of the acreage has been cleared and used for row crops. In the many eroded areas, the soils are better suited to hay and pasture than to row crops.

Beasley silt loam, 2 to 6 percent slopes, eroded (BaB2).—This deep, well-drained soil is underlain by limestone and calcareous shale. It is on broad ridgetops in areas that are mostly rough and broken.

This soil has a dark-brown, friable plow layer. The subsoil is brown to yellowish-brown silty clay loam that grades to sticky clay at a depth of about 24 inches. The substratum is tight, plastic, alkaline clay that is mottled with olive, gray, and yellowish brown.

Mapped with this soil is a small acreage of a Fleming soil. The included soil is somewhat shallower over parent material than the Beasley soil. It also has a redder B horizon and is acid in the upper part of the substratum.

Beasley silt loam, 2 to 6 percent slopes, eroded, is high in moisture-supplying capacity. It is moderately high in fertility, medium acid, and easily tilled. The permeability of the subsoil is moderately slow, and the hazard of further erosion is moderately low.

Most locally grown row crops, pasture grasses, and legumes are well suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–2; woodland suitability group 8)

Beasley silt loam, 6 to 12 percent slopes, eroded (BaC2).—This deep, well-drained soil of the uplands is underlain by limestone and soft, calcareous shale. It is on narrow ridgetops and on gentle side slopes in areas that are mostly rough and broken.

The plow layer is brown, friable silt loam. The subsoil is yellowish-brown silty clay loam that grades to sticky clay at a depth of about 20 inches.

In some places material that was formerly in the subsoil and that is brighter colored and finer textured than that in the surface layer is exposed in small areas.

Beasley silt loam, 6 to 12 percent slopes, eroded, has moderately high moisture-supplying capacity. It is medium acid, low in organic matter, and medium in natural fertility. This soil is easily tilled. The permeability of the subsoil is moderately slow. The hazard of further erosion is moderate.

Most locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–2; woodland suitability group 8)

Bedford Series

The Bedford series consists of moderately deep, moderately well drained soils of the uplands. The soils have a fragipan in the lower part of the subsoil. They developed in residuum that weathered mainly from limestone but partly from calcareous shale. They are on broad, gently sloping ridgetops.

Representative profile:

0 to 10 inches, brown silt loam.
10 to 28 inches, yellowish-brown silty clay loam.
28 to 43 inches, light yellowish-brown, compact and brittle silt loam to silty clay loam that is mottled with gray and olive.
43 to 60 inches, mottled light-gray and light yellowish-brown, stiff clay; massive.

The color of the surface layer ranges from brown to grayish brown. In places the subsoil is more yellowish and is brighter and lighter colored than that in the profile described.

Bedford soils are medium in content of organic matter, and they are medium acid to strongly acid. They have moderately high fertility, are moderately high in moisture-supplying capacity, and are easily tilled.

These soils are mainly in a gently sloping part of the Outer Bluegrass between the Eden-Lowell-Culleoka soil association and the Otway-Beasley soil association. Most of the acreage has been cleared and is used for row crops. The soils are highly productive of corn and red clover hay.

Bedford silt loam, 0 to 2 percent slopes (BfA).—This moderately deep, moderately well drained soil is on broad, flat ridgetops in the uplands. It is underlain by limestone and calcareous shale.

The plow layer is brown, friable silt loam, and the subsoil is yellowish-brown silty clay loam to a depth of about 28 inches. Below the subsoil is a mottled gray and brown pan that is slowly permeable and is 18 to 30 inches thick.

This soil has moderately high moisture-supplying capacity. It is medium acid, moderately high in natural fertility, medium in organic matter, and easily tilled. The soil is not susceptible to erosion.

Most locally grown row crops, pasture grasses, and legumes are suited to this soil. In wet weather, practices that remove excess moisture are needed. (Capability unit IIw–1; woodland suitability group 6)

Bedford silt loam, 2 to 6 percent slopes (BfB).—This moderately deep, moderately well drained soil of the uplands is on broad ridgetops underlain by limestone and calcareous shale. Its plow layer is brown, friable silt loam, and its subsoil is yellowish-brown silty clay loam to a depth of about 24 inches. Below is a mottled gray and brown pan that is slowly permeable and is 18 to 30 inches thick.

This soil is moderately high in moisture-supplying capacity and in fertility. It is easily tilled and is medium acid. The content of organic matter is medium. The hazard of erosion is moderately low.

Most locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, however, practices are needed that effectively control runoff and erosion. (Capability unit IIe–6; woodland suitability group 6)

Bedford silt loam, 6 to 12 percent slopes (BfC).—This moderately deep, moderately well drained soil of the uplands is underlain by limestone and calcareous shale. It lies along the rims of ridgetops where there is a break to steep slopes.

The plow layer is ordinarily a brown, friable silt loam, but in places it is yellowish-brown silty clay loam because material from the subsoil has been mixed into it. At a depth of about 20 inches, there is a mottled gray and brown pan that is slowly permeable and is 18 to 30 inches thick.

This soil is moderately high in moisture-supplying capacity and in fertility. It is easily tilled and is medium acid. The content of organic matter is medium. The hazard of erosion is moderate.

Most locally grown row crops, pasture grasses, and legumes are suited to this soil, but tobacco and alfalfa are not well suited. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–8; woodland suitability group 6)

Brashear Series

The Brashear series consists of gently sloping to strongly sloping, deep, well drained to moderately well drained soils. These soils are on benches and toe slopes above stream bottoms. They formed in sediments washed from upland soils developed in material from limestone and calcareous shale. Brashear soils have a surface layer of brown silt loam. Their subsoil is yellowish brown, fine textured, and mottled in the lower part. The substratum is mottled, brownish, heavy clay.

Representative profile:

0 to 7 inches, dark-brown silt loam.
7 to 32 inches, yellowish-brown silty clay loam that is more clayey with increasing depth.
32 to 44 inches, mottled, olive and brown clay.

The color of the surface layer ranges from dark brown to grayish brown. The lower part of the subsoil and the substratum are mottled with olive in places.

Brashear soils are moderately high in moisture-supplying capacity and in fertility. The permeability of the subsoil is moderately slow.

These soils are in all parts of the county, but they are less common in the Knobs. They are generally associated with Hampshire, Eden, and Lowell soils. All of the acreage has been cleared at one time and used for corn, tobacco, and hay. Small, steep, eroded areas that are no longer used for crops have grown up in brushy thickets made up chiefly of black locust.

Brashear silt loam, 2 to 6 percent slopes (BhB).—This is a deep, moderately well drained soil on toe slopes. It is at the base of steep slopes, generally next to soils of the bottom lands. It formed in material washed from soils derived from limestone and calcareous shale.

The plow layer is dark-brown, friable silt loam. The subsoil is yellowish-brown silty clay loam that grades to sticky silty clay or clay at a depth of about 20 inches.

This soil has very high moisture-supplying capacity. It is medium acid, moderately high in natural fertility, and easy to till. Permeability of the subsoil is moderately slow. The hazard of erosion is moderately low.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–2; woodland suitability group 4)

Brashear silt loam, 6 to 12 percent slopes, eroded (BhC2).—This is a deep soil at the base of steep slopes, generally in bands along drainageways. It developed in material washed from soils derived from limestone and calcareous shale.

The plow layer is brown, slightly sticky silt loam. The subsoil is yellowish-brown silty clay loam that grades to sticky, plastic silty clay or clay at a depth of about 16 inches.

Mapped with this soil are some areas of a soil that has a friable plow layer. In this included soil, depth to silty clay is as much as 20 inches.

Brashear silt loam, 6 to 12 percent slopes, eroded, has very high moisture-supplying capacity. It is medium acid, moderately high in natural fertility, and easy to till. Permeability of the subsoil is moderately slow, and the hazard of further erosion is moderately low.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–2; woodland suitability group 4)

Brashear silt loam, 12 to 20 percent slopes, eroded (BhD2).—This is a deep soil at the base of steep slopes. Generally it is closer to the uplands than to the bottom lands. It developed in material washed from soils derived from limestone and calcareous shale.

The plow layer is brown, slightly sticky silt loam. The subsoil is yellowish-brown silty clay loam that grades to sticky, plastic silty clay or clay at a depth of about 16 inches. In a few places the slope is steeper than 20 percent, and in some places the plastic subsoil is exposed.

Brashear silt loam, 12 to 20 percent slopes, eroded, has moderately high moisture-supplying capacity. It is medium acid and moderately high in natural fertility. It is generally easy to till. The hazard of further erosion is moderately high.

Most locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IVe–3; woodland suitability group 4)

Braxton Series

The Braxton series consists of sloping, deep, well-drained soils that are on ridgetops in the uplands. These soils formed in material from phosphatic, cherty limestone. Where not eroded, the Braxton soils have a dark-brown surface layer, a reddish-brown to yellowish-red subsoil, and a yellowish-brown substratum. Chert fragments occur throughout the profile. In places there are horizontal layers of chert in the lower part of the subsoil or in the substratum.

Representative profile:

0 to 8 inches, dark-brown silt loam.
8 to 26 inches, reddish-brown silt loam that is finer textured with increasing depth.
26 to 39 inches, yellowish-red clay that contains pockets of silt loam and fragments of chert.

The lower part of the profile ranges from yellowish red to yellowish brown. In the surface layer the amount of chert ranges from almost none to as much as 50 percent.

Braxton soils are fertile and high in moisture-supplying capacity. They are generally easy to work, but in places the chert in the surface layer interferes with tillage.

These soils occur only in the Inner Bluegrass, and they are mostly in the southwestern part of the county near Becknerville. All of the soils have been cleared and used for corn, tobacco, hay, and small grain. Where not too cherty, these soils produce high yields of tobacco.

Braxton silt loam, 2 to 6 percent slopes (BoB).—This is a deep, well-drained soil of the uplands that formed in residuum from cherty limestone. It occurs on broad ridgetops in the Inner Bluegrass where the underlying material is phosphatic.

The plow layer is dark-brown, friable silt loam. The subsoil is reddish-brown silty clay loam that grades to yellowish-red clay at a depth of about 24 inches. Generally, chert fragments 1 to 5 inches in diameter occur throughout the soil and make up 10 to 20 percent of its volume. In a few places as much as 50 percent of the profile is chert.

This soil is high in natural fertility, very high in moisture-supplying capacity, and medium acid to strongly acid. Except in areas where the content of chert is high, this soil is easily tilled. Permeability of the subsoil is moderate. The hazard of erosion is moderately low.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–2; woodland suitability group 5)

Braxton silt loam, 6 to 12 percent slopes, eroded (BoC2).—This is a deep, well-drained soil of the uplands. It is on side slopes bordering undulating areas in the Inner Bluegrass where the underlying material is phosphatic. It formed in residuum from cherty limestone.

The plow layer is brown silt loam. The subsoil is reddish-brown silty clay loam that grades to yellowish-red clay at a depth of about 20 inches. Generally, chert fragments make up about 20 percent of the plow layer, by volume, but in many places they make up as much as 50 percent.

This soil is high in natural fertility and in moisture-supplying capacity. It is medium acid to strongly acid, and it is slightly difficult to till because of chert frag-

ments. The subsoil is moderately permeable. The hazard of further erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–2; woodland suitability group 5)

Bruno Series

The Bruno series consists of deep, sandy, excessively drained soils that are along river bottoms on flats or small dunelike mounds. These soils formed in sediments washed from soils of the uplands that were derived mainly from sandstone and shale but partly from limestone. The profile shows little or no development. The soils generally have a brown surface layer and subsoil, but the subsoil is somewhat reddish in places.

Representative profile:

0 to 7 inches, dark-brown loamy fine sand.
7 to 36 inches, brown loamy fine sand that ranges to silt loam with increasing depth.

This soil has a weak B horizon in places. The texture in the lower part of the subsoil ranges from loamy fine sand to silt loam.

Bruno soils are medium acid and low in organic matter. They are droughty and low in fertility.

These soils are in small areas that are scattered widely among other soils of the Kentucky River bottoms. They are used in the same way as the associated soils.

Bruno loamy fine sand (Br).—This is the only Bruno soil mapped in the county; it is along bottoms and low terraces next to the Kentucky River. The soil is deep and excessively drained, and it has a plow layer of dark-brown, very friable to loose loamy fine sand. The plow layer grades to a subsoil that is a lighter brown loamy fine sand and is several feet thick.

This soil is low in moisture-supplying capacity, in natural fertility, and in organic matter. It is medium acid, and it responds poorly to lime and fertilizer. This soil is slightly difficult to till because the texture of the plow layer is somewhat loose, but it can be cultivated throughout a wide range of moisture content. It is subject to overflow in periods of high water, but it is not subject to erosion.

Only crops that are drought resistant are suited to this soil. Practices are needed that maintain soil fertility. (Capability unit IIIs–1; woodland suitability group 1)

Burgin Series

The Burgin series consists of sloping, deep, very poorly drained soils that were formed in material from limestone. These soils are in flats or in slight depressions on ridgetops in the uplands. They have a surface layer of black silty clay loam and a grayish, mottled substratum that is fine textured.

Representative profile:

0 to 10 inches, black silty clay loam.
10 to 30 inches, grayish-brown, plastic clay that is mottled with olive brown.
30 to 40 inches, mottled olive-gray clay; massive; many concretions.

In places the surface layer is dark gray and the subsoil is grayish brown or light olive brown. The lower part of the subsoil is olive gray in some places.

Burgin soils are high in organic matter, moderately high in fertility, and high in moisture-supplying capacity. They are slightly difficult to till. These soils generally are neutral, but they are acid where they occupy flats that lie below soils underlain by acid, black shale.

These soils are mainly near the town of Indian Fields on flat plains at the outer fringes of the Knobs, but small areas are scattered throughout the county. All of the acreage has been cleared and used for row crops. If these soils are drained, they are well suited to corn.

Burgin silty clay loam (Bu).—This is the only Burgin soil mapped in the county. It is very poorly drained and is on flats in the uplands. The soil was derived from limestone.

The surface layer is black, slightly sticky silty clay loam. It is underlain at a depth of about 10 inches by plastic clay that is mottled with gray and olive brown. In some places the soil contains considerable material from black, acid shale.

This soil is high in moisture-supplying capacity, moderately high in fertility, and high in organic matter. It has a deep root zone, but it is slightly difficult to till. Permeability of the subsoil is moderately slow, and the water table is high. The soil is neutral, except in areas where it lies below soils formed in material from black shale. In these places the soil is slightly acid. This soil is not susceptible to erosion.

If drained, this soil is well suited to corn, soybeans, hay, and pasture. (Capability unit IIIw–2; woodland suitability group 2)

Captina Series

The Captina series consists of moderately deep, moderately well drained soils on terraces. These soils formed in sediments washed from upland soils derived from limestone. They are nearly level to sloping and are mostly along streams on benches that lie just above the bottoms. Where not eroded, the Captina soils have a brown surface layer and a brown to yellowish-brown subsoil. They have a compact fragipan at a depth of 16 to 24 inches.

Representative profile:

0 to 8 inches, brown, friable silt loam.
8 to 16 inches, dark-brown to dark yellowish-brown silt loam that grades to silty clay loam at a depth of about 12 inches.
16 to 36 inches, pale-brown, brittle and compact silt loam that is mottled with yellowish brown and dark brown.
36 to 45 inches, mottled light brownish-gray and yellowish-brown clay; massive.

These soils are moderately high in fertility. They have good tilth and moderately high moisture-supplying capacity. Their content of organic matter is medium.

Captina soils are scattered throughout the county, but most of the acreage is along tributaries of Stoner Creek and other streams in the Inner Bluegrass. These soils are used mostly for cultivated crops, and corn is the chief crop. Low-lying areas are subject to flooding when the streams overflow.

Captina silt loam, 0 to 2 percent slopes (CaA).—This moderately deep, moderately well drained soil was derived

from sediments washed from limestone uplands. It is on flats along stream bottoms.

The plow layer is brown, friable silt loam. The subsoil is yellowish-brown silty clay loam that is faintly mottled with gray to a depth of about 18 inches. Below is a compact, brittle pan layer.

This soil has moderately high moisture-supplying capacity. It is strongly acid, high in natural fertility, and easily worked. Permeability of the lower part of the subsoil is moderately slow. The soil is not susceptible to erosion.

Deep-rooted plants and plants that are subject to damage by flooding are not suited to this soil. If this soil is cultivated, practices are needed that remove excess water, permit tillage early in spring, and increase yields. (Capability unit IIw–1; woodland suitability group 6)

Captina silt loam, 2 to 6 percent slopes (CaB).—This moderately deep, moderately well drained soil of the terraces was formed in sediments washed from limestone uplands. It is mostly gently sloping, and it generally is on benches between the bottom lands and the slopes of the uplands.

The plow layer is brown, friable silt loam. The subsoil is yellowish-brown silty clay loam that is faintly mottled with gray to a depth of about 24 inches. Below is a compact, brittle pan layer.

Mapped with this soil are a few acres of a soil that is in more sharply breaking areas. This included soil occupies bands along the edges of this Captina soil.

Captina silt loam, 2 to 6 percent slopes, has moderately high moisture-supplying capacity. It is strongly acid, moderately high in natural fertility, and easily worked. Permeability of the lower subsoil is moderately slow. The hazard of erosion is moderately low.

Deep-rooted plants are not well suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. Tile drains are needed in places to remove seepage water. (Capability unit IIe–6; woodland suitability group 6)

Colyer Series

The Colyer series consists of shallow to very shallow, excessively drained soils of uplands. These soils are underlain by black, acid shale. They are on ridgetops and steep side slopes in rough, broken areas. Where not eroded, the Colyer soils have a thin surface layer of brown silty clay loam that is underlain by a mixture of mottled soil material and shale fragments. Below is black shale. Where they are eroded, these soils have a thin surface layer made up of a mixture of soil material and pieces of shale. In such eroded areas the surface layer lies directly on the shale.

Representative profile:

0 to 6 inches, brown, friable silt loam.
6 to 10 inches, variegated yellowish-red, pale-brown, and brown silty clay loam that contains small shale fragments.
10 inches, black, highly fissile shale.

Generally, the shallow Colyer soils are on south-facing slopes. That is because the soils on such slopes have been cropped more intensively than in other areas, or natural factors did not favor development of a deep soil.

Colyer soils are extremely acid, low in fertility, and droughty. They are in the Knobs in the southeastern part of the county. Most of the acreage is in a forest made up of low-grade hardwoods and a scattering of Virginia pines. Some areas have been cleared and planted to corn, but after a year or two of poor yields they have been allowed to revert to trees.

Colyer silt loam, 6 to 12 percent slopes (CtC).—This shallow, excessively drained soil of the uplands is underlain by black, acid shale. It is on broad ridgetops in rough, broken areas.

The surface layer is brown, friable silt loam that is 5 to 7 inches thick. The subsoil is variegated yellowish-red and brown silty clay loam that contains many, small fragments of shale. It is underlain by partly disintegrated black shale at a depth of about 10 inches. In a few places on the broader, smoother ridges, depth to shale is as much as 18 inches.

This soil is moderately low in moisture-supplying capacity, extremely acid, and low in natural fertility. The content of organic matter is low, and the hazard of erosion is moderately high.

Hay and pasture are the best crops for this soil. Plants that resist drought are better suited than other kinds. (Capability unit VIs–3; woodland suitability group 10)

Colyer silt loam, 20 to 50 percent slopes (CtE).—This very shallow, excessively drained soil is in steep, rough, broken areas on the uplands. It is underlain by black, acid shale.

The surface layer is thin silt loam that contains a few fragments of shale. Little or no profile development has taken place in the subsoil. Depth to shale is generally about 6 inches.

This soil is low in moisture-supplying capacity, extremely acid, and low in natural fertility and in content of organic matter. It is highly susceptible to erosion.

Trees and pasture plants that resist drought are better suited to this soil than row crops. If this soil is pastured, grazing should be limited. (Capability unit VIIs–1; woodland suitability group 10)

Colyer shaly silty clay loam, 6 to 12 percent slopes, severely eroded (CsC3).—This very shallow, excessively drained soil of the uplands is underlain by black shale. It is on narrow ridgetops in areas that are mostly steep and broken.

The surface layer is thin shaly silty clay loam. Little development has taken place in the subsoil, and depth to shale is generally about 6 inches.

This soil is very low in moisture-supplying capacity, extremely acid, and low in natural fertility. The content of organic matter is very low, and the hazard of further erosion is high.

Trees and pasture plants that resist drought are better suited to this soil than row crops. If this soil is pastured, grazing should be limited. (Capability unit VIIs–3; woodland suitability group 11)

Colyer shaly silty clay loam, 12 to 20 percent slopes, severely eroded (CsD3).—This very shallow, excessively drained soil of the uplands is underlain by black shale. It is on the crests and shoulders of narrow ridges in areas that are rough and broken.

The soil has a thin surface layer of shaly silty clay loam than in most places is less than 4 inches thick. The subsoil is typically thin, and depth to black shale is generally less than 6 inches.

Trees and plants that resist drought are better suited to this soil than row crops. If this soil is pastured, grazing should be limited. (Capability unit VIIs–3; woodland suitability group 11)

Colyer shaly silty clay loam, 20 to 50 percent slopes, severely eroded (CsE3).—This very shallow, excessively drained soil of the uplands is underlain by black shale. It is steep and is in rough, broken areas.

The surface layer is very thin shaly silty clay loam that in most places is less than 4 inches thick over shale. Generally, no development has taken place in the subsoil.

This soil is very low in moisture-supplying capacity, extremely acid, and low in natural fertility. The content of organic matter is very low, and the hazard of further erosion is high.

Trees and pasture plants that resist drought are better suited to this soil than row crops. If this soil is pastured, grazing should be limited. (Capability unit VIIs–3; woodland suitability group 11)

Culleoka Series

The Culleoka series consists of deep to shallow, well-drained soils of the uplands that formed in material from soft, calcareous siltstone. Where not eroded, these soils have a surface layer of brown silt loam. The subsoil is brownish, but it ranges to yellowish brown. Little clay has accumulated in the lower part of the subsoil. Depth to bedrock ranges from 20 to 60 inches. Fragments of siltstone are scattered throughout the profile.

Representative profile:

0 to 12 inches, dark-brown, friable silt loam that is weakly aggregated.
12 to 36 inches, yellowish-brown, friable silty clay loam; contains fragments of siltstone.
36 to 48 inches, mottled yellowish-brown and yellowish-red, loose sandy clay loam or friable silty clay loam; fragments of siltstone common.

Except where they are extremely stony, these soils are easily worked. Fertility is moderately high, and permeability is moderate in most places. Because of leaching, the uppermost soil layers are acid, but the substratum close to the underlying siltstone is neutral to alkaline.

Culleoka soils are in the Hills of the Bluegrass. Features of the topography are long, narrow, winding ridges, steep side slopes, and narrow bottoms. The areas extend from the Kentucky River to a point south of Winchester and in a discontinuous arc to the Montgomery County line just north of Sewell Shop.

These soils are farmed intensively, and they are well suited to all the crops commonly grown in the county. The steep soils are susceptible to erosion and lose their fertility if they are overcultivated. They then revert to thickets of brush made up mainly of black locust. The soils on the ridgetops are especially productive of high-quality burley tobacco.

Culleoka silt loam, 2 to 6 percent slopes (CvB).—This deep, well-drained soil is underlain by calcareous siltstone. It is on broad ridgetops in areas that are mostly steep and broken.

The plow layer is brown, friable silt loam. The subsoil is brown to yellowish-brown silty clay loam in which fragments of siltstone, 1 to 5 inches in diameter, are common. The soil also contains a few pockets of sandy material weathered from sandstone.

This soil is very high in moisture-supplying capacity. It is medium acid, moderately high in natural fertility, and easily tilled. The subsoil is moderately permeable. The hazard of erosion is moderately low.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. Burley tobacco of high quality can be grown. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–1; woodland suitability group 14)

Culleoka silt loam, 6 to 12 percent slopes, eroded (CvC2).—This moderately deep, well-drained soil is underlain by calcareous siltstone. It is on narrow ridgetops in areas that are mostly steep and broken.

The plow layer is brown, friable silt loam, and the subsoil is brown to yellowish-brown, friable silty clay loam. Fragments of siltstone, 1 to 5 inches in diameter, and a few pockets of sandy material weathered from sandstone are common. The underlying substratum is at a depth of about 30 inches and consists of mottled yellowish-brown and brownish-gray silty clay loam and of brown, weathered siltstone.

This soil is moderately high in moisture-supplying capacity. It is medium acid, moderately high in natural fertility, and easily tilled. Permeability of the subsoil is moderately rapid. The hazard of further erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–1; woodland suitability group 14)

Culleoka silt loam, 12 to 20 percent slopes, eroded (CvD2).—This shallow soil is underlain by calcareous siltstone. It is on the shoulders of ridges in steep, broken areas. The surface layer is brown, friable silt loam that is 5 to 10 inches thick. The subsoil is yellowish-brown silty clay loam that contains fragments of siltstone, 1 to 5 inches in diameter, and pockets of sandy material. It grades to a substratum of mottled yellowish-brown and brownish-gray silty clay loam and weathered siltstone at a depth of about 20 inches.

As the result of excessive runoff, this soil has only moderately low moisture-supplying capacity. It is medium acid, moderately high in natural fertility, and low in organic matter. The hazard of further erosion is moderately high.

This soil is better suited to hay and pasture crops than to row crops. Drought-resistant forage plants make better yields than other kinds of plants. If practices that control runoff and erosion are used, this soil can be cultivated occasionally. (Capability unit IVe–1; woodland suitability group 14)

Culleoka silt loam, 20 to 30 percent slopes, eroded (CvE2).—This shallow soil is underlain by calcareous siltstone. It is steep and is in rough, broken areas. The surface layer is brown, friable silt loam that is 4 to 8 inches thick. The subsoil is yellowish-brown silty clay loam that contains many fragments of siltstone, 1 to 5 inches in diameter, to a depth of about 20 inches. At that depth, it grades to a mixture of siltstone fragments and mottled, yellowish-brown and brownish-gray silty clay loam.

As the result of excessive runoff, this soil has only moderately low moisture-supplying capacity. It is medium acid, moderately high in natural fertility, and low in organic matter.

This soil is better suited to hay and pasture than to row crops. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIe–1; woodland suitability group 14)

Culleoka flaggy silt loam, 20 to 30 percent slopes, eroded (CuE2).—This shallow soil is underlain by calcareous siltstone. It is moderately steep and is in rough, broken areas.

The surface layer is friable silt loam that is 4 to 8 inches thick and that contains siltstone fragments as much as 10 inches in diameter. In places fragments of siltstone cover 50 percent of the surface. The subsoil is yellowish-brown silty clay loam. At a depth of about 20 inches, it grades to a substratum made up of a mixture of mottled yellowish-brown and brownish-gray silty clay loam and siltstone.

As the result of excessive runoff and a rapidly permeable subsoil, this soil has low moisture-supplying capacity. The soil is medium acid, moderately high in natural fertility, and low in organic matter. It is highly susceptible to further erosion.

This soil is not suited to row crops, but it is suited to pasture and hay. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIe–1; woodland suitability group 14)

Culleoka flaggy silt loam, 30 to 50 percent slopes, eroded (CuF2).—This shallow soil is underlain by calcareous siltstone. Mostly it is in sharp, broken areas, somewhat like escarpments, that lie next to natural drainageways.

The surface layer is friable silt loam that in most places is less than 6 inches thick and that contains fragments of siltstone as much as 10 inches in diameter. In places the fragments cover 50 percent of the surface. The subsoil is yellowish-brown silty clay loam that is about 10 inches thick over calcareous siltstone. Ledges of shale outcrop in places.

This soil has very low moisture-supplying capacity. It is medium acid, moderately high in natural fertility, and low in organic matter. The hazard of further erosion is very high.

Woodland and pasture are the best uses for this soil. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIIe–1; woodland suitability group 14)

Dunning Series

The Dunning series is made up of deep, somewhat poorly drained to very poorly drained soils of bottom lands. These soils consist of recent alluvium washed from upland soils derived from limestone. The surface layer is thick, dark silty clay loam, and the subsoil is silty clay or clay that is grayish and mottled.

The Dunning soils are similar to the Lanton soils, but they are more poorly drained and have a thinner, lighter colored surface layer. Also, their subsoil is more mottled and contains more concretionary material. In this county the Dunning soils have been mapped only in an undifferentiated unit with the Lanton soils.

Eden Series

The Eden series consists of moderately deep, somewhat excessively drained soils underlain by calcareous shale and thin-bedded limestone. These soils are on ridgetops and side slopes in the uplands. The areas are made up of long, winding ridges and narrow valleys that have moderately steep sides. Where not eroded, the Eden soils have a surface layer of dark grayish-brown silty clay loam. The subsoil is thin, yellowish-brown clay, and it overlies parent material of variegated, plastic, raw clay.

Representative profile:

0 to 6 inches, dark grayish-brown silty clay loam; neutral.
6 to 21 inches, yellowish-brown, sticky, plastic clay; neutral.
21 to 33 inches, yellowish-brown and olive-brown clay; massive; contains thin rock slabs; neutral.

In some places there are many rock slabs on the surface. The number of rock slabs throughout the profile ranges from none to many; most of the slabs are in the lower part of the subsoil and in the parent material. The profile ranges from nearly neutral in the upper part to calcareous in the lower.

Eden soils are moderately high in fertility, but they are low to very low in organic matter. Permeability is slow. The moisture-supplying capacity is generally low.

These soils are in the Hills of the Bluegrass. They are in a shallow arc that starts near Ford, which is along the Kentucky River, passes just east of Winchester, and extends to the Montgomery County line north of Sewell Shop.

Eden soils have been cropped intensively. As a result, they are eroded and their productivity has been greatly reduced. In places row crops are still grown on the ridges where these soils occur, but most of the cultivated crops once grown on these soils are now grown on associated soils of colluvial areas and bottom lands. Corn is a minor crop, and tobacco is the chief cultivated crop. Alfalfa and other hay and pasture crops are grown in some places. Thickets of black locust or cedar have generally grown up in abandoned areas.

Eden silty clay loam, 6 to 12 percent slopes, eroded (EhC2).—This moderately deep, somewhat excessively drained soil of the uplands is underlain by calcareous shale and thin-bedded limestone. It is on ridgetops in rough, broken areas.

The plow layer is dark grayish-brown, slightly firm silty clay, and the subsoil is yellowish-brown, plastic clay. At a depth of about 20 inches, the subsoil grades to olive-brown, massive clay that contains limestone slabs.

This soil has moderately high moisture-supplying capacity. It is neutral, moderately high in natural fertility, low in organic matter, and slightly difficult to till. Permeability of the subsoil is slow, and the hazard of further erosion is moderate.

Most locally grown row crops, pasture grasses, and legumes are suited to this soil. Alfalfa is better suited than other legumes and responds well to good management. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–4; woodland suitability group 12)

Eden silty clay loam, 12 to 20 percent slopes, eroded (EhD2).—This moderately deep, somewhat excessively drained soil of the uplands is on the crests and shoulders

of narrow ridges in rough, broken areas. It is underlain by calcareous shale and thin-bedded limestone.

The plow layer is dark grayish-brown, slightly firm silty clay loam. The subsoil is yellowish-brown, plastic clay that grades to olive-brown, massive clay at a depth of about 15 inches. Limestone slabs are common throughout the lower part of the substratum.

This soil has moderately low moisture-supplying capacity. It is neutral, moderately high in natural fertility, low in organic matter, and slightly difficult to till. Permeability of the subsoil is slow. The hazard of further erosion is moderately high.

Hay and pasture crops are better suited to this soil than row crops. Drought-resistant forage plants make better yields than other kinds of plants. If practices are used that control runoff and erosion, this soil can be cultivated occasionally. (Capability unit IVe–4; woodland suitability group 12)

Eden silty clay loam, 20 to 30 percent slopes, eroded (EhE2).—This moderately deep, somewhat excessively drained soil of the uplands is underlain by calcareous shale and thin-bedded limestone. It is on side slopes in rough, broken areas.

The surface layer is dark grayish-brown, slightly firm silty clay loam. It generally is no more than 4 inches thick and grades rapidly to massive, olive-brown clay that contains many limestone slabs.

This soil has low moisture-supplying capacity. It is neutral, moderately high in natural fertility, and low in organic matter. The subsoil is slowly permeable. The hazard of further erosion is high.

Hay and pasture crops are better suited to this soil than row crops. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIe–1; woodland suitability group 12)

Eden clay, 6 to 12 percent slopes, severely eroded (EcC3).—This moderately deep, somewhat excessively drained soil of the uplands is underlain by calcareous shale and thin-bedded limestone. It is on narrow ridgetops in rough, broken areas.

The surface layer is dark yellowish-brown, firm clay. It grades to olive-brown, massive clay that contains many limestone slabs at a depth of about 15 inches.

This soil has low moisture-supplying capacity. It is neutral, moderately high in natural fertility, very low in organic matter, and difficult to till. Permeability of the subsoil is slow, and the hazard of further erosion is moderate.

Hay and pasture crops are better suited to this soil than row crops. Drought-resistant forage plants make better yields than other kinds of plants. If practices that control runoff and erosion are used, this soil can be cultivated occasionally. (Capability unit IVe–10; woodland suitability group 13)

Eden clay, 12 to 20 percent slopes, severely eroded (EcD3).—This moderately deep, somewhat excessively drained soil of the uplands is underlain by calcareous shale and thin-bedded limestone. It is on the shoulders of narrow ridges in rough, broken areas.

The surface layer is dark yellowish-brown, firm clay. It grades to olive-brown, massive clay that contains many limestone slabs at a depth of about 10 inches.

This soil has low moisture-supplying capacity. It is neutral, moderately high in natural fertility, and very low in organic matter. The subsoil is slowly permeable. The hazard of further erosion is moderately high.

Hay and pasture crops are better suited to this soil than row crops. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VI–3; woodland suitability group 13)

Eden clay, 20 to 30 percent slopes, severely eroded (EcE3).—This moderately deep, somewhat excessively drained soil of the uplands is underlain by calcareous shale and thin-bedded limestone. It is on side slopes in rough, broken areas.

The surface layer is thin, yellowish-brown clay that is generally not more than 6 inches thick. The substratum is massive, olive-brown clay that contains many limestone slabs.

This soil has low moisture-supplying capacity. It is neutral, moderately high in natural fertility, and very low in organic matter. The subsoil is slowly permeable. The hazard of further erosion is high.

Hay and pasture crops are better suited to this soil than row crops. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIe–3; woodland suitability group 13)

Eden flaggy clay, 12 to 20 percent slopes, severely eroded (EfD3).—This moderately deep, somewhat excessively drained soil is underlain by calcareous shale and thin-bedded limestone. It is on the crests and shoulders of narrow ridges in rough, broken areas.

The surface layer is dark yellowish-brown, firm clay and is generally less than 10 inches thick. It overlies a substratum of olive-brown, massive clay. Rock slabs are common throughout the profile.

In places thin limestone slabs as much as 1 foot in diameter cover 50 percent of the surface. In nearly half the acreage the surface layer is silty clay loam, and in some places the slope is less than 12 percent.

Eden flaggy clay, 12 to 20 percent slopes, severely eroded, has low moisture-supplying capacity. It is neutral, moderately high in natural fertility, and very low in organic matter. The subsoil is slowly permeable. The hazard of further erosion is moderately high.

This soil is better suited to hay and pasture crops than to row crops. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIe–3; woodland suitability group 13)

Eden flaggy clay, 20 to 30 percent slopes, severely eroded (EfE3).—This moderately deep, somewhat excessively drained soil is underlain by calcareous shale and thin-bedded limestone. It occupies side slopes in rough, broken areas.

The surface layer is dark yellowish-brown, firm clay, generally less than 6 inches thick. It overlies a substratum of olive-brown, massive clay. Rock slabs are common throughout the profile.

In places thin limestone slabs as much as 1 foot in diameter cover nearly 50 percent of the surface. In a few acres the surface layer is flaggy silty clay loam.

Eden flaggy clay, 20 to 30 percent slopes, severely eroded, has very low moisture-supplying capacity. It is neutral, moderately high in natural fertility, and very low in organic matter. The subsoil is slowly permeable. The hazard of further erosion is high.

This soil is better suited to hay and pasture crops than to row crops. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIe–3; woodland suitability group 13)

Egam Series

The Egam series consists of deep, well-drained soils of the bottom lands. The soils formed in sediments washed from soils that have a high content of clay and that are underlain by limestone and calcareous shale. They have a surface layer of dark silt loam and a substratum of firm, compact silty clay loam that is slightly restricted in drainage.

Representative profile:

0 to 8 inches, very dark grayish-brown silt loam; weak, fine, granular structure.
8 to 40 inches, dark-brown to brown, firm silty clay loam; weak, angular structure; a few olive-brown mottles.

In a few places the texture of the surface layer is silty clay loam. Areas of these soils that are farthest from the stream channel have a slight slope in some places, and in a few places they have a sharply breaking slope.

Egam soils are medium in organic matter, nearly neutral, and high in moisture-supplying capacity. They are high in fertility and are easily worked.

These soils are mainly along the bottom lands of Upper Howard Creek, particularly along the lower part of the stream. A few areas are along the bottom lands of the Kentucky and Red Rivers.

All row crops, pasture grasses, and legumes common to the county can be grown on these soils. Flash floods during the growing season occasionally damage crops in some places. These soils are not susceptible to erosion.

Egam silt loam (Em).—The only Egam soil mapped in the county is this deep, well-drained soil of the bottom lands. This soil formed in sediments washed from soils that have a high content of clay and that are underlain by limestone and calcareous shale. It has a plow layer of very dark grayish-brown silt loam, and a substratum of brown, slightly compact, firm silty clay loam.

This soil has high moisture-supplying capacity. It is nearly neutral, high in natural fertility, and medium in organic matter. It is easily tilled. Permeability of the subsoil is somewhat restricted, and there are generally a few olive-brown mottles at a depth of about 20 inches.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. Ladino clover is especially well suited. If practices are used that maintain fertility and keep up the supply of organic matter, this soil can be cultivated continuously. (Capability unit I–1; woodland suitability group 1)

Fairmount Series

The Fairmount series consists of shallow, somewhat excessively drained soils of the uplands that are underlain by thin-bedded limestone. These soils are steep and are in areas that are rough and broken. Where not eroded, they have a surface layer of very dark gray silty clay loam. Their substratum is yellowish-brown to olive-brown clay. Slabs of rock are common on the surface and throughout the profile, and rock outcrops are numerous.

Representative profile:

0 to 8 inches, very dark gray silty clay loam; noticeably aggregated.
8 to 18 inches, brown, plastic clay that is drab colored with increasing depth.

Depth to bedrock ranges from a few inches to 30 inches within a few feet. Where eroded, the surface layer is clay in places.

Fairmount soils are alkaline, high in organic matter, and moderately high in fertility. They are droughty and are difficult to work.

These soils are in the Outer Bluegrass. They are scattered throughout an area that roughly parallels the Kentucky and Red Rivers and in another area that extends from southwest to northeast across the county, roughly east of Ruckerville and west of Goffs Corner. These soils are mostly covered by brushy pasture, cedar thickets, and hardwood stands of poor quality.

Fairmount flaggy silty clay loam, 20 to 30 percent slopes (FfE).—This shallow, somewhat excessively drained soil of the uplands is underlain by limestone. It is on side slopes in rough, broken areas.

The surface layer is very dark gray silty clay loam that is about 8 inches thick. The subsoil is brown, plastic clay that is drab or olive brown in the lower part. Rock slabs are common on the surface, and limestone ledges outcrop in many places. About one-tenth of the acreage has a slope of less than 20 percent.

This soil has moderately low moisture-supplying capacity. It is alkaline, moderately high in natural fertility, and high in organic matter. Permeability of the subsoil is moderately slow. The hazard of erosion is high.

Hay and pasture crops are better suited to this soil than row crops. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIe–1; woodland suitability group 12)

Fairmount flaggy clay, 20 to 30 percent slopes, severely eroded (FaE3).—This shallow, somewhat excessively drained soil of the uplands is underlain by limestone. It is on side slopes in rough, broken areas.

The surface layer is brown, plastic clay that is 4 to 8 inches thick. It is underlain by massive, olive-brown clay. Rock slabs are common on the surface and throughout the profile. Limestone ledges outcrop in many places. About one-tenth of the acreage has a slope of less than 20 percent.

This soil has very low moisture-supplying capacity. It is alkaline, moderately high in natural fertility, and very low in organic matter. Permeability of the subsoil is moderately slow. The hazard of erosion is very high.

Hay and pasture crops are better suited to this soil than row crops. Drought-resistant forage plants are better suited than other kinds of plants. If this soil is pastured, grazing should be limited. (Capability unit VIIe–2; woodland suitability group 13)

Fairmount flaggy clay, 30 to 50 percent slopes, severely eroded (FaF3).—This shallow, somewhat excessively drained soil of the uplands is underlain by limestone. It is in steep, rough, broken areas.

The surface layer is brown, plastic clay that is 2 to 6 inches thick, and the substratum is massive, olive-brown clay. Rock slabs are common on the surface and throughout the profile. Limestone ledges outcrop in many places.

About one-fourth of the acreage consists of a steep, flaggy Eden soil that has been mapped with this soil.

Fairmont flaggy clay, 30 to 50 percent slopes, severely eroded, has very low moisture-supplying capacity. It is alkaline, moderately high in natural fertility, and low in organic matter. Permeability of the subsoil is moderately slow. The hazard of erosion is very high.

This soil is better suited to limited grazing and to woodland than to other uses. Drought-resistant forage plants are better suited than other kinds of plants. Redcedar grows slowly, and hardwood trees have value mainly to provide protective cover for the watershed. (Capability unit VIIe–2; woodland suitability group 13)

Fleming Series

The Fleming series consists of moderately deep, well-drained soils of the uplands. These soils formed in residuum from limestone and alkaline clay shale. Their surface layer is dark reddish-brown silt loam; in most places, material from the subsoil is mixed in it. The subsoil is reddish-brown silty clay loam that grades to brown clay, and the substratum is olive and greenish-gray, massive clay. In the upper part, the substratum is strongly acid to neutral, but in the lower part, it is calcareous.

Representative profile:

0 to 6 inches, dark reddish-brown silt loam.
6 to 30 inches, reddish-brown silty clay loam that grades to brown, plastic clay with increasing depth.
30 to 40 inches, olive and greenish-gray clay; massive; acid in the upper part, but calcareous with increasing depth.

Depth to the clayey substratum ranges from 15 to 30 inches. The shallower soils generally have a yellowish-brown subsoil because the material in which they formed contains less residuum from limestone.

These soils are moderately high in moisture-supplying capacity, high in fertility, and easy to till. The content of organic matter is low, and the permeability of the subsoil is moderately slow.

These soils are in the Knobs in the southeastern part of the county. Typically, they are on ridgetops or on sloping to steep benches that are bounded on the top and bottom by limestone escarpments. On these benches the areas are small and the Fleming soils are intricately mixed with the Shrouts soils. As a result, the soils of the two series have been mapped together as a complex.

All of these soils have been cleared and used for row crops, and some of the acreage is still used for row crops. Most of the acreage, however, is used for hay, and a few areas are used for pasture.

Fleming silt loam, 6 to 12 percent slopes, eroded (FlC2).—This moderately deep, well-drained soil of the uplands is underlain by limestone and by alkaline clay shale. It is on the crests of ridges in rough, broken areas.

The plow layer is dark reddish-brown silt loam. The upper part of the subsoil is reddish-brown or yellowish-red silty clay loam that grades to brown silty clay at a depth of about 30 inches. Below is a substratum of olive and greenish-gray, massive, plastic clay.

This soil has moderately high moisture-supplying capacity. It is medium acid, high in natural fertility, and easily tilled. The content of organic matter is low, and the permeability of the subsoil is moderately slow. The hazard of erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–2; woodland suitability group 8)

Fleming-Shrouts complex, 6 to 12 percent slopes (FpC).—In this complex are well-drained to somewhat excessively drained soils of uplands that are underlain by limestone and by alkaline clay shale. The plow layer is mostly silty clay loam and is reddish brown to grayish brown. The subsoil is brown or olive-brown clay. Depth to the greenish, clayey substratum ranges from 6 to 15 inches. The soils are on hillside benches in rough, broken areas.

These soils have low to moderately low moisture-supplying capacity, and they are alkaline or medium acid. Natural fertility is moderately low to medium, the content of organic matter is medium to very low, and tillage is slightly difficult. Permeability of the subsoil is slow, and the hazard of erosion is moderately high.

Hay and pasture are better suited to these soils than cultivated crops. Drought-resistant forage plants make better yields than other kinds of plants. If practices are used that control runoff and erosion, these soils can be cultivated occasionally. (Capability unit IVe–6; woodland suitability group 8)

Fleming-Shrouts complex, 12 to 20 percent slopes (FpD).—In this complex are well-drained to somewhat excessively drained soils of the uplands that are underlain by limestone and by alkaline clay shale. They are on hillside benches in rough, broken areas.

The surface layer is mostly silty clay loam and ranges from reddish brown to grayish brown. The subsoil is brown or olive-brown clay. Depth to the greenish, clayey substratum ranges from 6 to 12 inches.

These soils have low moisture-supplying capacity, and they are alkaline or medium acid. Natural fertility is low to moderately low, and the content of organic matter is medium to very low. Permeability of the subsoil is slow to moderately slow. These soils are highly susceptible to erosion.

Hay and pasture are better suited to these soils than cultivated crops. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIe–8; woodland suitability group 8)

Fleming-Shrouts complex, 12 to 20 percent slopes, severely eroded (FpD3).—In this complex are somewhat excessively drained soils of uplands. They are on hillside benches in rough, broken areas. They are underlain by limestone and by alkaline clay shale.

The surface layer is mostly olive-brown, plastic clay, but in some small areas the greenish, clayey substratum is exposed. Depth to the substratum is generally less than 8 inches.

These soils have low to very low moisture-supplying capacity, and they are alkaline or medium acid. Natural fertility is low, the content of organic matter is very low, and the permeability of the subsoil is slow. These soils are highly susceptible to further erosion.

Use for limited grazing or as woodland is best on these soils. Redcedar is better suited than other trees, but yields are fairly low. (Capability unit VII–3; woodland suitability group 13)

Fleming-Shrouts complex, 20 to 30 percent slopes (FpE).—In this complex are somewhat excessively drained

soils of uplands underlain by limestone, and by alkaline clay shale. They are on hillsides in rough, broken areas.

The surface layer is mostly silty clay loam, and it is reddish brown to grayish brown. The subsoil is brown or olive-brown clay. Depth to the greenish, clayey substratum ranges from 4 to 10 inches.

These soils have low moisture-supplying capacity, and they are alkaline or medium acid. Natural fertility is moderately low to low, the content of organic matter is low to very low, and the permeability of the subsoil is slow. These soils are highly susceptible to erosion.

Limited use for grazing or woodland is the best for these soils. Drought-resistant forage plants make better yields than other kinds of plants, and redcedar makes moderately good growth. (Capability unit VIIe–2; woodland suitability group 8)

Fleming-Shrouts complex, 20 to 30 percent slopes, severely eroded (FpE3).—In this complex are somewhat excessively drained soils of uplands underlain by limestone and by alkaline clay shale. They are on hillsides in rough, broken areas.

The surface layer is mostly olive-brown, plastic clay, but in some small areas the greenish, clayey substratum is exposed. Depth to the substratum generally is less than 4 inches.

These soils have very low moisture-supplying capacity, and they are alkaline or medium acid. Natural fertility is low, the content of organic matter is very low, and the permeability of the subsoil is slow. The soils are highly susceptible to further erosion.

Limited use for grazing or woodland is best on these soils, and drought-resistant forage plants are the only suitable plants. Redcedar establishes itself naturally, but it grows slowly. (Capability unit VIIs–3; woodland suitability group 13)

Gullied Land (Gu)

Gullied land consists mostly of soils that are severely eroded and deeply dissected by gullies. Only small patches and narrow strips of soils remain between the gullies. Slopes are mostly more than 20 percent.

This land type is made up of areas of Eden, Culleoka, and Otway soils. The Eden soils are underlain by calcareous shale and limestone; the Culleoka, by siltstone; and the Otway, by marl and low-grade limestone. Some of the largest and deepest gullies are in the Otway soils. In these soils gullies can be stabilized if natural seeding of redcedar is encouraged and if livestock is kept out. In the other soils gullies are more difficult to stabilize. Here, land shaping and seeding are needed to establish desirable plants ahead of competing plants, and in some places maintenance is also needed.

Most areas of Gullied land are too steep for cultivation and have little or no value for agriculture. The areas can probably be improved, however, and used as pasture or woodland. Where native plants have reproduced naturally, the areas are suitable as habitats for wildlife. (Capability unit VIIe–4; woodland suitability group 15)

Hagerstown Series

The Hagerstown series consists of deep, well-drained soils that are underlain by high-grade limestone. The soils are nearly level to sloping and are in the uplands. Where they are not eroded, the surface layer is dark-brown silt loam. The subsoil is reddish-brown to yellowish-red silty clay loam that is more yellowish and more clayey in the lower part. Depth to underlying rock ranges from 40 inches to several feet.

Representative profile:

0 to 8 inches, dark-brown, friable silt loam.
8 to 30 inches, reddish-brown silty clay loam that grades to silty clay at a depth of about 20 inches; well aggregated.
30 to 50 inches, yellowish-red, massive silty clay or clay.

Where the soils are underlain by limestone of the Boyle and Duffin formations, the profile in many places has a thin band of disintegrated black shale in the lower part of the subsoil.

Hagerstown soils have high natural fertility, very high moisture-supplying capacity, and good tilth. They are medium acid to strongly acid, but the parent material next to bedrock is nearly neutral. These soils are in the easternmost part of the Outer Bluegrass and in the flatwoods area of the Knobs. Some of the soils lie between Kiddville and Goffs Corner, and others occupy areas scattered between those places and Bloomingdale.

All of these soils have been cleared and used for row crops, but some areas are now in rotation pasture and hay crops. The soils are particularly well suited to burley tobacco.

Hagerstown silt loam, 0 to 2 percent slopes (HgA).—This deep, well-drained soil of the uplands is underlain by limestone. It is on broad ridges in gently undulating areas.

The plow layer is dark-brown, friable silt loam. The subsoil is reddish-brown silty clay loam that grades to firm silty clay at a depth of about 20 inches. At a depth of nearly 5 feet is a substratum of reddish-yellow, massive clay.

This soil has very high moisture-supplying capacity. It is medium acid to strongly acid, medium in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderately rapid. The soil is not susceptible to erosion.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil, but burley tobacco is especially well suited. If practices are used that maintain fertility and the supply of organic matter, this soil can be cultivated continuously. (Capability unit I–3; woodland suitability group 5)

Hagerstown silt loam, 2 to 6 percent slopes (HgB).—This deep, well-drained soil of the uplands is underlain by limestone. It is on broad ridgetops in deeply dissected areas.

The plow layer is dark-brown to dark reddish-brown silt loam. The subsoil is reddish-brown silty clay loam that grades to firm silty clay at a depth of about 18 inches. At a depth of about 4 feet is a substratum of yellowish-red, massive clay.

This soil has very high moisture-supplying capacity. It is medium acid to strongly acid, medium in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderately rapid. The hazard of erosion is moderately low.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil, but burley tobacco is especially well suited. If this soil is cultivated, practices

are needed that effectively control runoff and erosion. (Capability unit IIe–1; woodland suitability group 5)

Hagerstown silt loam, 6 to 12 percent slopes, eroded (HgC2).—This deep, well-drained soil of the uplands is underlain by limestone. It is in deeply dissected areas on narrow ridges and on breaks of slopes.

The plow layer is dark-reddish brown silt loam. The subsoil is reddish-brown silty clay loam that grades to firm silty clay at a depth of about 12 inches. At a depth of about 3 feet is a substratum of yellowish-red, massive clay.

This soil has very high moisture-supplying capacity. It is strongly acid, low in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderately rapid, and the hazard of further erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–1; woodland suitability group 5)

Hampshire Series

The Hampshire series consists of deep, well drained to moderately well drained soils of the uplands. The soils developed in residuum from high-grade limestone. They are on ridgetops and side slopes in undulating areas. Where the soils are not eroded, the surface layer is dark grayish-brown silt loam. The subsoil is yellowish-brown, sticky and plastic silty clay.

Representative profile:

0 to 6 inches, dark grayish-brown, friable silt loam.
6 to 13 inches, brown, friable silty clay loam.
13 to 36 inches, yellowish-brown, plastic, tough silty clay or clay.
36 to 60 inches, mottled yellowish-brown and olive-gray clay; massive.

In places the upper part of the subsoil is more nearly brown than yellowish brown. The mottles in the subsoil range from nearly none to many. Depth to bedrock ranges from 4 to 8 feet.

Hampshire soils are acid. The permeability of the subsoil is moderately slow.

These are the major soils of the Inner Bluegrass in this county. Most of the acreage is west and north of Winchester, but small areas are northeast and southwest of that city. All of the acreage has been cleared. At one time corn was grown extensively, but now pastures, mainly of bluegrass, have been established in many places. The chief crop is burley tobacco, but corn and hay crops are grown in places.

Hampshire silt loam, 2 to 6 percent slopes (HmB).—This is a deep, well drained to moderately well drained soil of the uplands. It is gently sloping and is on ridgetops in undulating areas. It developed in residuum from limestone.

The plow layer is dark grayish-brown, friable silt loam. At a depth of about 12 inches is a subsoil of brown, friable silty clay loam that is about 8 inches thick. Below is yellowish-brown, firm silty clay that grades to mottled olive-brown and gray, massive clay at a depth of about 36 inches.

This soil has high moisture-supplying capacity. It is strongly acid, medium in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderately slow. The hazard of erosion is moderately low.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–2; woodland suitability group 4)

Hampshire silt loam, 2 to 6 percent slopes, eroded (HmB2) —This deep, well drained to moderately well drained soil of the uplands developed in residuum from limestone. It is on ridgetops in undulating areas.

The plow layer is dark-brown, friable silt loam. At a depth of not more than 8 inches is a subsoil of brown, friable silty clay loam that is about 8 inches thick. Below is yellowish-brown, firm silty clay that grades to mottled olive-brown and gray, massive clay at a depth of about 36 inches.

This soil has moderately high moisture-supplying capacity. It is strongly acid, low in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderately slow. The hazard of further erosion is moderately low.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–2; woodland suitability group 4)

Hampshire silt loam, 6 to 12 percent slopes (HmC).—This is a deep, well drained to moderately well drained soil of the uplands that developed in residuum from limestone. It is on gentle side slopes in undulating areas.

The plow layer is dark grayish-brown, friable silt loam. At a depth of about 10 inches is a subsoil of brown, friable silty clay loam that is about 6 inches thick. Below is yellowish-brown, firm silty clay that grades to mottled olive-brown and gray, massive clay at a depth of about 30 inches.

This soil has high moisture-supplying capacity. It is strongly acid, medium in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderately slow. The hazard of erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–2; woodland suitability group 4)

Hampshire silt loam, 6 to 12 percent slopes, eroded (HmC2).—This is a deep, well drained to moderately well drained soil of the uplands. It is on gentle side slopes in undulating areas. It developed in residuum from limestone.

The plow layer is dark-brown, friable silt loam. At a depth of not more than 8 inches is a subsoil of brown, friable silty clay loam that is about 6 inches thick. Below is yellowish-brown, firm silty clay that grades to mottled olive and gray, massive clay at a depth of about 30 inches.

This soil has high moisture-supplying capacity. It is strongly acid, low in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderately slow. The hazard of further erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–2; woodland suitability group 4)

Hampshire silt loam, 12 to 20 percent slopes, eroded (HmD2).—This is a deep, well drained to moderately well

drained soil of the uplands. It is on steep slopes in undulating areas. It developed in residuum from limestone.

The plow layer is dark-brown, friable silt loam. At a depth of not more than 6 inches is a subsoil of brown, friable silty clay loam that is about 4 inches thick. Below is yellowish-brown, firm silty clay that grades to mottled olive and gray, massive clay at a depth of about 24 inches. In about one-seventh of the acreage, the plow layer is silty clay loam.

This soil has moderately low moisture-supplying capacity. It is strongly acid, low in organic matter, and high in natural fertility. It is generally easy to till. Permeability of the subsoil is moderately slow. The soil is highly susceptible to further erosion.

Hay and pasture are better suited to this soil than row crops. Drought-resistant forage plants make better yields than other kinds of plants. If practices that control runoff and erosion are used, this soil can be cultivated occasionally. (Capability unit IVe–3; woodland suitability group 4)

Hampshire silty clay loam, 6 to 12 percent slopes, severely eroded (HpC3).—This deep, well drained to moderately well drained soil of the uplands developed in residuum from limestone. It is on narrow ridges and on sharply breaking side slopes in undulating areas.

The plow layer is dark yellowish-brown, slightly firm silty clay loam. The subsoil is yellowish-brown, firm silty clay that grades to mottled olive and gray, massive clay at a depth of about 30 inches.

This soil has low moisture-supplying capacity. It is strongly acid, very low in organic matter, moderately low in natural fertility, and slightly difficult to till. Permeability of the subsoil is moderately slow. The hazard of further erosion is moderately high.

Hay and pasture crops are better suited to this soil than row crops. Drought-resistant forage plants make better yields than other kinds of plants. If practices are used that control runoff and erosion, this soil can be cultivated occasionally. (Capability unit IVe–11; woodland suitability group 12)

Huntington Series

The Huntington series consists of deep or moderately deep, well-drained, neutral to slightly acid soils of the bottom lands. These soils formed in recent alluvium washed from upland soils that were derived mainly from limestone but partly from sandstone. Huntington soils occur along major streams and secondary drainageways, and in shallow depressions and basins of the uplands. They generally have a surface layer of friable silt loam. Their subsoil shows little or no development.

Representative profile:

0 to 14 inches, dark-brown, friable silt loam.
14 to 36 inches, brown, friable silt loam; weakly aggregated; a few pale mottles at a depth below 26 inches.

Where the Huntington soils formed partly in material from sandstone, their surface layer is fine sandy loam. In places the subsoil contains thin layers of various kinds of soil material. These layers range from brown to dark yellowish brown. In some places, however, the subsoil is brown throughout, and in other places it is yellowish brown.

Huntington soils have very high to moderately high moisture-supplying capacity. They are medium in organic matter, high in natural fertility, and easily tilled. Permeability is moderately high.

These soils are scattered throughout the county. They are well suited to all locally grown row crops and forage crops. Most areas are cultivated.

Huntington silt loam (Hs).—This is a deep, well-drained soil of the bottom lands. It formed in recent alluvium washed from upland soils that were derived mainly from limestone but partly from sandstone and shale.

Some areas of this soil are along streams and in small secondary drainageways. Others are in small depressions in the uplands. The surface layer is dark-brown, friable silt loam that grades to a subsoil of brown, friable silt loam at a depth of about 12 inches.

In places the lower part of the subsoil contains a few pale-brown mottles. Where the soil formed in alluvium that is largely from sandstone, the surface layer is fine sandy loam.

Huntington silt loam has very high moisture-supplying capacity. It is neutral to slightly acid, medium in organic matter, high in natural fertility, and easily tilled. Permeability is moderately rapid. The soil is not susceptible to erosion.

Except for a few areas that are subject to overflow, this soil is well suited to all locally grown row crops and forage crops. If practices are used that maintain fertility and build up the supply of organic matter, this soil can be cultivated year after year. (Capability unit I–1; woodland suitability group 1)

Huntington silt loam, shallow (Hu).—This is a moderately deep, well-drained soil of the bottom lands. It formed in recent alluvium washed from soils of the uplands that were derived from limestone. The soil is on bottoms along streams where alluvial material is deposited slowly or is removed by scouring when the streams overflow.

The surface layer is dark-brown, friable silt loam that grades to a subsoil of brown or dark yellowish brown at a depth of about 10 inches. Depth to the underlying rubbly limestone is about 18 to 20 inches. A few limestone slabs are on the surface or are scattered throughout the profile.

This soil has moderately high moisture-supplying capacity. It is neutral, medium in organic matter, high in natural fertility, and easily tilled. Permeability is moderately rapid. The soil is not susceptible to erosion, but the depth of the root zone is limited.

All locally grown crops are suited to this soil, but tobacco, corn, and other crops of high value are seldom grown because of the risk of damage by flooding. Forage plants that withstand flooding are better suited than other kinds of plants. (Capability unit IIs–5; woodland suitability group 1)

Lanton Series

The Lanton series consists of deep, very poorly drained to somewhat poorly drained soils of bottom lands. These soils consist of recent alluvium washed from upland soils derived from limestone. The surface layer is thick, dark silty clay loam, and the subsoil is silty clay or clay that is grayish and mottled. The Lanton soils are similar to

the Dunning soils, but they have somewhat better drainage, their surface layer is thinner and darker, and their subsoil is less mottled and contains less concretionary material.

Representative profile:

0 to 18 inches, black silty clay loam; moderately aggregated.
18 to 36 inches, dark-gray clay; faint mottles of olive brown; massive.

Lanton soils are high in moisture-supplying capacity, organic matter, and fertility. They are neutral, and they have moderately slow permeability.

These soils are mostly along the major streams of the Inner Bluegrass north and east of Winchester, but a few areas are scattered throughout the county. Most areas are in bluegrass pasture, but a few acres are in hay crops. Corn is grown in many places, and tobacco in a few places.

In Clark County the Lanton soils are mapped only in an undifferentiated unit with the Dunning soils.

Lanton and Dunning silty clay loams (La).—This is the only unit of Lanton and Dunning silty clay loams mapped in the county. These soils are on broad flats along drainageways in undulating areas. They are deep, very poorly drained to somewhat poorly drained soils of the bottom lands. They formed in recent alluvium washed from upland soils derived from limestone.

The surface layer is black silty clay loam that is as much as 18 inches thick in places. The subsoil is dark-gray, massive, plastic clay that is faintly mottled with olive brown. In some places the soils have a plow layer of silt loam.

These soils have high moisture-supplying capacity. They are neutral, high in organic matter, high in natural fertility, and slightly difficult to till. The soils have a high water table, but they are not susceptible to erosion.

If these soils are drained, they are highly productive of corn and forage crops. Because of the high water table, the use of the soils for cultivated crops is limited. (Capability unit IIIw–7; woodland suitability group 2)

Lindside Series

The Lindside series consists of deep, moderately well drained soils of first bottoms. These soils formed in recent alluvium washed from upland soils derived from limestone. Their surface layer is dark-brown silt loam, and their subsoil is brown silt loam. Faint mottling begins at a depth of 18 inches and grows more intense with increasing depth. There is little or no stratification in the profile, because the sediments in which the soils formed are fairly uniform.

Representative profile:

0 to 9 inches, dark-brown silt loam.
9 to 26 inches, brown silt loam that is dark grayish brown and slightly mottled in the lower part.

In places the surface layer is dark grayish brown; the subsoil is dark brown in places. In some places there are gleyed layers in the profile at a depth of 24 inches and below.

Lindside soils have very high moisture-supplying capacity and medium permeability. They are highly fertile, medium in organic matter, and easily worked. These soils occur throughout the county. Areas that are broad enough to be cultivated are used fairly intensively for crops.

Lindside silt loam (ld).—This is the only Lindside soil mapped in the county. It is a deep, moderately well drained soil that formed in recent alluvium washed from upland soils derived from limestone. Its surface layer is dark-brown silt loam that is 12 inches thick in places. The subsoil is brown silt loam that in places is mottled and gleyed at a depth below 24 inches. Some areas are on first bottoms along stream channels and drainageways, and others are in depressions.

This soil has very high moisture-supplying capacity. It is neutral, medium in organic matter, high in natural fertility, and easily tilled. The soil is not subject to erosion.

Slight internal wetness restricts the growth of some crops on this soil. Also, some low-lying areas are subject to overflow. Nevertheless, if practices that maintain fertility and build up the content of organic matter are used, this soil can be cultivated year after year. (Capability unit I–2; woodland suitability group 1)

Loradale Series

The Loradale series consists of deep, well-drained, gently sloping to sloping soils underlain by high-grade limestone. These soils are on ridgetops and side slopes in undulating areas on the uplands. Where the soils are not eroded, the surface layer is very dark grayish-brown silt loam. The subsoil is brown silty clay loam that becomes finer textured and more yellowish with increasing depth.

Representative profile:

0 to 8 inches, dark-brown, friable silt loam.
8 to 19 inches, dark-brown, friable silt loam.
19 to 36 inches, brown silty clay that grades to yellowish-brown silty clay; moderately aggregated; faint mottles.
36 to 48 inches, olive-brown, gray, and yellowish-brown, plastic clay; massive.

In some places the surface layer is brown and the lower part of the subsoil is predominantly brown.

Loradale soils are fertile and in good tilth. Except where the soils are eroded, the content of organic matter is medium. The moisture-supplying capacity is very high, and permeability is moderate. The profile is acid to within a few inches of the underlying limestone, where it is mildly alkaline.

These soils are in the Inner Bluegrass. They occur throughout the western half of the county, but most of the acreage is north and west of Winchester. The soils have all been cleared, and at one time they were used fairly intensively for row crops. The areas are now used mainly for rotation bluegrass pasture, but a considerable acreage is in meadow crops. Corn and tobacco are the chief row crops.

Loradale silt loam, 2 to 6 percent slopes (LeB).—This deep, well-drained soil of the uplands is underlain by limestone. It has a plow layer of dark-brown, friable silt loam. At a depth of about 12 inches is a subsoil of brown, friable silty clay loam that grades to yellowish-brown silty clay at a depth of approximately 24 inches. The soil is on broad ridgetops in undulating areas.

This soil has very high moisture-supplying capacity. It is medium acid, medium in organic matter, high in natural fertility, and easily tilled. The subsoil is moderately permeable. The hazard of erosion is moderately low.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–2; woodland suitability group 5)

Loradale silt loam, 6 to 12 percent slopes (LeC).—This deep, well-drained soil of the uplands is underlain by limestone. It is on moderately steep side slopes in undulating areas. The plow layer is dark-brown, friable silt loam. At a depth of about 8 inches is a subsoil of brown, friable silty clay loam that grades to yellowish-brown silty clay at a depth of approximately 20 inches.

This soil has high moisture-supplying capacity. It is medium acid, medium in organic matter, high in natural fertility, and easily tilled. The subsoil is moderately permeable. The hazard of erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–2; woodland suitability group 5)

Loradale silt loam, 6 to 12 percent slopes, eroded (LeC2).—This deep, well-drained soil of the uplands is underlain by limestone. It is on moderately steep side slopes in undulating areas. The plow layer is brown, friable silt loam. At a depth of about 8 inches is a subsoil of brown, friable silty clay loam that grades to yellowish-brown silty clay at a depth of approximately 18 inches.

This soil has high moisture-supplying capacity. It is medium acid, low in organic matter, high in natural fertility, and easily tilled. The subsoil is moderately permeable. The hazard of further erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–2; woodland suitability group 5)

Lowell Series

The Lowell series consists of deep to shallow, well-drained soils of the uplands. These soils formed in residuum from interbedded, calcareous siltstone and limestone. They occupy areas of undulating to rough and broken topography. Where the soil is not eroded, the surface layer is dark grayish-brown silt loam. The subsoil is yellowish-brown silty clay and clay that is stiff and plastic.

Representative profile:

0 to 9 inches, very dark grayish-brown, friable silt loam.
9 to 15 inches, brown, slightly firm silty clay loam.
15 to 20 inches, yellowish-brown silty clay that is tough and plastic; moderately aggregated.
20 to 36 inches, mottled olive-brown and gray clay that is tough and plastic.

In places the surface layer is brown or dark brown, and in some places the upper part of the subsoil is dark brown. Depth to silty clay varies in relation to the components of the underlying rocks. If the parent material is made up largely of material from siltstone, the surface layer generally is thinner than that described in the representative profile.

Lowell soils are naturally high in fertility. Permeability is moderate to moderately slow. In most places the soils are slightly acid to medium acid in the upper part of the profile and nearly neutral to slightly alkaline in the lower part where the soil is in contact with the parent rock.

These soils are in the Outer Bluegrass section of the county. They occur in a wide band that lies east of Winchester and west of Ruckerville and that extends across the county in a northeasterly direction from the Kentucky River to the Montgomery County line. The more gently sloping areas are used intensively for row crops and meadow crops. The steep and shallow soils are generally in pasture. Trees or brush of low quality have grown up on abandoned fields.

Lowell silt loam, 2 to 6 percent slopes (LoB).—This deep, well-drained soil of the uplands formed in residuum from interbedded, calcareous siltstone and limestone. It is on broad ridgetops in undulating areas. The plow layer is very dark grayish-brown, friable silt loam. At a depth of about 12 inches is a subsoil of brown, slightly firm silty clay loam that is about 6 inches thick. Below is yellowish-brown, firm silty clay that grades to mottled olive-brown and gray, massive clay at a depth of about 30 inches.

This soil has very high moisture-supplying capacity. It is medium acid, medium in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderate. The hazard of erosion is moderately low.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–2; woodland suitability group 4)

Lowell silt loam, 2 to 6 percent slopes, eroded (LoB2).—This is a deep, well-drained soil of the uplands. It is on broad ridgetops in undulating areas. It formed in residuum from interbedded, calcareous siltstone and limestone.

The plow layer is dark-brown, friable silt loam. At a depth of not more than 8 inches is a subsoil of brown, slightly firm silty clay loam that is about 6 inches thick. Below is yellowish-brown, firm silty clay that grades to mottled olive-brown and gray, massive clay at a depth of about 30 inches.

This soil has very high moisture-supplying capacity. It is medium acid, low in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderate. The hazard of further erosion is moderately low.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–2; woodland suitability group 4)

Lowell silt loam, 6 to 12 percent slopes (LoC).—This is a deep, well-drained soil of the uplands. It is on gentle side slopes in undulating areas. It formed in residuum from interbedded, calcareous siltstone and limestone.

The plow layer is very dark grayish-brown, friable silt loam. At a depth of about 10 inches is a subsoil of brown, slightly firm silty clay loam that is about 4 inches thick. Below is yellowish-brown, firm silty clay that grades to mottled olive-brown and gray, massive clay at a depth of about 26 inches.

This soil has very high moisture-supplying capacity. It is medium acid, medium in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderate. The soil is moderately susceptible to erosion.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–2; woodland suitability group 4)

Lowell silt loam, 6 to 12 percent slopes, eroded (LoC2).—This deep, well-drained soil of the uplands formed in residuum from interbedded, calcareous siltstone and limestone. It is on the crests of ridges and on gentle side slopes in areas that are undulating to rough and broken.

The plow layer is brown, friable silt loam. At a depth of not more than 8 inches is a subsoil of brown, slightly firm silty clay loam that is about 4 inches thick. Below is yellowish-brown, firm silty clay that grades to mottled olive-brown and gray, massive clay at a depth of about 26 inches.

This soil has very high moisture-supplying capacity. It is medium acid, low in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderate. The soil is moderately susceptible to further erosion.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–2; woodland suitability group 4)

Lowell silt loam, 12 to 20 percent slopes, eroded (LoD2).—This deep, well-drained soil of the uplands formed in residuum from interbedded, calcareous siltstone and limestone. It is on steep slopes in undulating areas.

The plow layer is dark-brown, friable silt loam. At a depth of not more than 6 inches is a subsoil of brown, slightly firm silty clay loam that is less than 4 inches thick. Below is yellowish-brown, firm silty clay that grades to mottled olive-brown and gray, massive clay at a depth of about 22 inches.

This soil has moderately low moisture-supplying capacity. It is medium acid, low in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderately slow. The soil is highly susceptible to further erosion.

Hay and pasture crops are better suited to this soil than row crops. Drought-resistant forage plants make better yields than other kinds of plants. If practices are used that control runoff and erosion, this soil can be cultivated occasionally. (Capability unit IVe–3; woodland suitability group 4)

Lowell silt loam, 20 to 30 percent slopes, eroded (LoE2).—This is a deep, well-drained soil of the uplands. It is steep and is in rough, broken areas. It formed in residuum from interbedded, calcareous siltstone and limestone.

The surface layer is brown, friable silt loam that in most places is not more than 6 inches thick. It is underlain by a subsoil of yellowish-brown silty clay that grades to mottled olive-brown and gray, massive clay at a depth of about 18 inches.

This soil has low moisture-supplying capacity. It is medium acid, low in organic matter, and high in natural fertility. Permeability of the subsoil is moderately slow. The soil is highly susceptible to further erosion.

Hay and pasture crops are better suited to this soil than row crops. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIe–1; woodland suitability group 4)

Lowell silty clay, shallow, 6 to 12 percent slopes, severely eroded (LsC3).—This is a shallow to moderately deep, well-drained soil of the uplands. It is on narrow ridgetops and on sharply breaking side slopes in rough, broken areas. It formed in residuum from interbedded, calcareous siltstone and limestone.

The surface layer is dark yellowish-brown silty clay that is generally not more than 6 inches thick. The subsoil is yellowish-brown, very firm silty clay. It is underlain at a depth of about 15 inches by variegated brown, light olive-brown, and yellowish-brown clay that is extremely firm and massive. Limestone slabs are at a depth of about 18 inches. Some slabs of limestone are on the surface, and ledges of limestone outcrop.

This soil has low moisture-supplying capacity. It is slightly acid, very low in organic matter, and medium in natural fertility. Permeability of the subsoil is moderately slow. The soil is highly susceptible to further erosion.

Hay and pasture are better suited to this soil than cultivated crops. Drought-resistant forage crops make better yields than other kinds of plants. (Capability unit VIe–4; woodland suitability group 13)

Lowell silty clay, shallow, 12 to 20 percent slopes, severely eroded (LsD3).—This is a shallow, well-drained soil of the uplands. It is on moderately steep side slopes in rough, broken areas. It formed in residuum from interbedded, calcareous siltstone and limestone.

The surface layer is yellowish-brown silty clay that generally is not more than 4 inches thick. The subsoil is yellowish-brown, very firm silty clay. It is underlain at a depth of about 12 inches by variegated brown, light olive-brown, and yellowish-brown clay that is extremely firm and massive. Limestone slabs are at a depth of about 15 inches. Some slabs of limestone are on the surface, and ledges of limestone outcrop.

This soil has low moisture-supplying capacity. It is slightly acid, very low in organic matter, and medium in natural fertility. Permeability of the subsoil is moderately slow. The soil is highly susceptible to further erosion.

Hay and pasture are better suited to this soil than cultivated crops. Drought-resistant forage crops make better yields than other kinds of plants. (Capability unit VIe–4; woodland suitability group 13)

Lowell silty clay, shallow, 20 to 30 percent slopes, severely eroded (LsE3).—This is a shallow, well-drained soil in rough, broken areas on the uplands. It formed in residuum from interbedded, calcareous siltstone and limestone.

The surface layer is very thin, dark yellowish-brown silty clay that generally is not more than 2 inches thick. The subsoil is yellowish-brown, very firm silty clay. It is underlain at a depth of about 8 inches by variegated brown, light olive-brown, and yellowish-brown clay that is firm and massive. Limestone slabs are at a depth of about 12 inches. Some slabs of limestone are on the surface, and ledges of limestone outcrop.

This soil has very low moisture-supplying capacity. It is slightly acid, very low in organic matter, and medium in natural fertility. Permeability of the subsoil is moderately slow. The soil is highly susceptible to further erosion.

This soil is not suited to cultivation. It is better suited to limited grazing and woodland than to other uses. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIIe–1; woodland suitability group 13)

Lowell silty clay loam, 6 to 12 percent slopes, severely eroded (LvC3).—This is a deep, well-drained soil of the uplands. It is on narrow ridgetops and on sharply breaking side slopes in undulating areas. It formed in residuum from interbedded, calcareous siltstone and limestone.

The plow layer is dark yellowish-brown, slightly firm silty clay loam. The subsoil is yellowish-brown, firm silty clay that grades to mottled olive-brown and gray, massive clay at a depth of about 30 inches.

This soil has low moisture-supplying capacity. It is medium acid, very low in organic matter, moderately fertile, and slightly difficult to till. Permeability of the subsoil is moderately slow. The hazard of further erosion is moderately high.

Hay and pasture are better suited to this soil than cultivated crops. Drought-resistant forage plants make better yields than other kinds of plants. If practices that control runoff and erosion are used, the soil can be cultivated occasionally. (Capability unit IVe–11; woodland suitability group 12)

Lowell silty clay loam, 12 to 20 percent slopes, severely eroded (LvD3).—This is a deep, well-drained soil of the uplands. It is on side slopes in undulating to rough and broken areas. It formed in residuum from interbedded, calcareous siltstone and limestone.

The surface layer is dark yellowish-brown, slightly firm silty clay loam that is not more than 6 inches thick. The subsoil is yellowish-brown, firm silty clay that grades to mottled olive-brown and gray, massive clay at a depth of about 24 inches.

This soil has low moisture-supplying capacity. It is medium acid, very low in organic matter, and moderately fertile. Permeability of the subsoil is moderately slow. The soil is highly susceptible to further erosion.

Hay and pasture are better suited to this soil than cultivated crops. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIe–2; woodland suitability group 12)

Lowell silty clay loam, 20 to 30 percent slopes, severely eroded (LvE3).—This moderately deep to deep, well-drained soil of the uplands is on steep slopes in rough, broken areas. It formed in residuum from interbedded, calcareous siltstone and limestone.

The surface layer is dark yellowish-brown, slightly firm silty clay loam that is not more than 6 inches thick. The subsoil is yellowish-brown, firm silty clay that grades to mottled olive-brown and gray, massive clay at a depth of about 18 inches.

This soil has very low moisture-supplying capacity. It is medium acid, very low in organic matter, and moderately fertile. Permeability of the subsoil is moderately slow. The soil is highly susceptible to further erosion.

Hay and pasture are better suited to this soil than cultivated crops. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIe–2; woodland suitability group 12)

Lowell silty clay loam, shallow, 6 to 12 percent slopes, eroded (LwC2).—This is a moderately deep, well-drained soil of the uplands. It is on narrow ridgetops and on sharply breaking side slopes in rough, broken areas. It formed in residuum from interbedded, calcareous siltstone and limestone.

The plow layer is dark-brown, slightly firm silty clay loam. The subsoil, which is at a depth of about 10 inches, is yellowish-brown, very firm silty clay. It is underlain at a depth of about 17 inches by variegated brown, light olive-brown, and yellowish-brown clay that is extremely firm and massive. Limestone slabs are at a depth of about 22 inches. Some slabs of limestone are on the surface, and ledges of limestone outcrop.

This soil has moderately high moisture-supplying capacity. It is slightly acid, low in organic matter, high in natural fertility, and slightly difficult to till. Permeability of the subsoil is moderately slow. The hazard of erosion is moderately high.

Hay and pasture are better suited to this soil than cultivated crops. Drought-resistant forage plants are better suited than other kinds of plants. If practices that control runoff and erosion are used, this soil can be cultivated occasionally. (Capability unit IVe–6; woodland suitability group 12)

Lowell silty clay loam, shallow, 12 to 20 percent slopes, eroded (LwD2).—This is a moderately deep, well-drained soil of the uplands. It is on moderately steep side slopes in rough, broken areas. It formed in residuum from interbedded, calcareous siltstone and limestone.

The surface layer is dark-brown, slightly firm silty clay loam that generally is not more than 6 inches thick. The subsoil is yellowish-brown, very firm silty clay. It is underlain at a depth of about 15 inches by variegated brown, light olive-brown and yellowish-brown clay that is extremely firm and massive. Limestone slabs are at a depth of about 20 inches. Some slabs of limestone are on the surface, and ledges of limestone outcrop.

This soil has low moisture-supplying capacity. It is slightly acid, low in organic matter, and high in natural fertility. Permeability of the subsoil is moderately slow. The soil is highly susceptible to further erosion.

Hay and pasture crops are better suited to this soil than cultivated crops. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIe–1; woodland suitability group 12)

Lowell silty clay loam, shallow, 20 to 30 percent slopes, eroded (LwE2).—This is a shallow to moderately deep, well-drained soil of the uplands. It is steep and is in rough, broken areas. It formed in residuum from interbedded, calcareous siltstone and limestone.

The surface layer is dark-brown, slightly firm silty clay loam that generally is not more than 6 inches thick. The subsoil is yellowish-brown, very firm silty clay. It is underlain at a depth of about 12 inches by variegated brown, light olive-brown, and yellowish-brown clay that is extremely firm and massive. Limestone slabs are at a depth of about 15 inches. Some slabs of limestone are on the surface, and ledges of limestone outcrop.

This soil has low moisture-supplying capacity. It is slightly acid, low in organic matter, and high in natural

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fertility. Permeability of the subsoil is moderately slow. The soil is highly susceptible to further erosion.

Hay and pasture are better suited to this soil than cultivated crops. Drought-resistant forage plants make better yields that other kinds of plants. (Capability unit VIe–1; woodland suitability group 12)

Made Land (Ma)

Made land consists of areas where the soils have been moved about by machinery and can no longer be identified by type or series.

Areas of this miscellaneous land type have been graded to make sites for industrial uses, for airports, for highway interchanges, and for other purposes. (Not assigned to a capability unit; woodland suitability group 15)

Maury Series

The Maury series consists of deep, well-drained, gently undulating soils of the uplands. These soils formed in residuum from high-grade, phosphatic limestone. Generally, they have a surface layer of dark-brown, friable silt loam and a subsoil of reddish-brown silty clay loam. The substratum is generally mottled with brown and dark brown.

Representative profile:

0 to 15 inches, dark-brown, friable silt loam.
15 to 30 inches, reddish-brown, firm silty clay loam that grades to silty clay; moderately aggregated.
30 to 35 inches, reddish-brown, firm silty clay; moderately aggregated.
35 to 65 inches, yellowish-red clay that is mottled with brown and yellowish brown; strongly aggregated.

In some places the subsoil is dark reddish brown. The color of the substratum ranges from yellowish red to yellowish brown. The silty clay loam in the profile ranges from 20 to 30 inches in thickness.

Maury soils are high in natural fertility. They have very high moisture-supplying capacity, are medium acid, and are easy to till. Permeability of the subsoil is moderately rapid.

These soils are in the western half of the county; most of the acreage is near Becknerville. All of the acreage has been cleared and used fairly intensively for row crops at one time. Most of the areas are now in bluegrass pastures that are plowed periodically and are then planted to tobacco or corn. Alfalfa and other hay crops are also grown in many places.

Maury silt loam, 0 to 2 percent slopes (MbA).—This deep, well-drained soil of the uplands is underlain by limestone. It is on broad ridgetops in undulating areas.

The plow layer is dark-brown, very friable silt loam. At a depth of about 15 inches is a subsoil of reddish-brown, friable silty clay loam that grades to firm, reddish-brown silty clay at a depth of about 30 inches. The substratum is yellowish-red, firm clay that is mottled with yellowish brown. It is at a depth of about 48 inches.

This soil has very high moisture-supplying capacity. It is medium acid, medium in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderately rapid. The soil is not susceptible to erosion.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil, and alfalfa and burley tobacco are especially productive. If practices are used that maintain organic matter and fertility, these soils can be cropped year after year. (Capability unit I–3; woodland suitability group 5)

Maury silt loam, 2 to 6 percent slopes (MbB).—This deep, well-drained soil of the uplands is underlain by limestone. It is on broad ridgetops in undulating areas.

The plow layer is dark-brown, very friable silt loam. At a depth of about 12 inches is a subsoil of reddish-brown, friable silty clay loam that grades to firm, reddish-brown silty clay at a depth of about 24 inches. The substratum is yellowish-red, firm clay that is mottled with yellowish brown. It is at a depth of about 40 inches.

This soil has very high moisture-supplying capacity. It is medium acid, medium in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderately rapid. The hazard of erosion is moderately low.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil, and alfalfa and burley tobacco are especially productive. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–1; woodland suitability group 5)

Maury silt loam, 2 to 6 percent slopes, eroded (MbB2).—This deep, well-drained soil of the uplands is underlain by limestone. It is on broad ridgetops in undulating areas.

The plow layer is brown, very friable silt loam. At a depth of about 8 inches is a subsoil of friable silty clay loam that grades to firm, reddish-brown silty clay at a depth of about 20 inches. The substratum is yellowish-red, firm clay that is mottled with yellowish brown. It is at a depth of about 36 inches.

This soil has very high moisture-supplying capacity. It is medium acid, low in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderately rapid. The hazard of further erosion is moderately low.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–1; woodland suitability group 5)

Maury silt loam, 6 to 12 percent slopes (MbC).—This deep, well-drained soil of the uplands is underlain by limestone. It is on gentle side slopes in undulating areas.

The plow layer is dark-brown, very friable silt loam. At a depth of about 10 inches is a subsoil of reddish-brown, friable silty clay loam that grades to firm, reddish-brown silty clay at a depth of about 20 inches. The substratum is yellowish-red, firm clay that is mottled with yellowish brown. It is at a depth of about 34 inches.

This soil has a very high moisture-supplying capacity. It is medium acid, medium in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderately rapid. The hazard of erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–1; woodland suitability group 5)

Maury silt loam, 6 to 12 percent slopes, eroded (MbC2).—This deep, well-drained soil of the uplands is underlain by limestone. Most of it is on gentle slopes in undulating areas, but a few areas are on sharply breaking slopes. The plow layer is brown, very friable silt loam. At a depth of about 18 inches is a subsoil of reddish-brown, friable silty clay loam that grades to firm, reddish-brown silty clay at a depth of about 18 inches. The substratum is yellowish-red, firm clay that is mottled with yellowish brown. It is at a depth of about 30 inches.

This soil has very high moisture-supplying capacity. It is medium acid, low in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderately rapid. The hazard of further erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–1; woodland suitability group 5)

McAfee Series

The McAfee series consists of moderately deep, well-drained soils of the uplands. These soils formed in residuum from high-grade, phosphatic limestone. They occupy areas that are undulating to rough and broken. Their surface layer generally is dark-brown, friable silt loam. The subsoil is reddish-brown, firm silty clay that is underlain at a depth of about 18 inches by brown, extremely firm clay. Slabs of limestone are at a depth of less than 36 inches, and outcrops of limestone are common.

Representative profile:

0 to 5 inches, dark-brown, friable silt loam.
5 to 11 inches, reddish-brown, very firm silty clay; strongly aggregated.
11 to 24 inches, brown, extremely firm clay; a few yellowish-brown mottles; a few small flecks of disintegrated chert; strongly aggregated; underlain by limestone.

The slabs of limestone that are on the surface range from few to many. In some places the profile is browner throughout than the one described. Firm silty clay loam is at a depth between 6 and 30 inches in places.

McAfee soils are moderate to high in natural fertility and are slightly acid. The moisture-supplying capacity is generally high, and tillage is mostly easy to slightly difficult. Permeability of the subsoil is moderately rapid.

These soils occur throughout the western half of the county, but most of the acreage is in the southwestern part where the Kentucky River and its tributaries have dissected the upland plateau.

McAfee soils are not well suited to cultivation, and areas once used for row crops have reverted to cedar and to brushy pastures. Pasture and hay are the most common uses. In many places the more gently sloping soils are used for tobacco, with corn as a minor crop.

McAfee silt loam, 2 to 6 percent slopes (McB).—This moderately deep, well-drained soil of the uplands formed in residuum for high-grade, phosphatic limestone.

It is on the crests of ridges in areas that are rough and broken. The plow layer is dark-brown, friable silt loam. At a depth of about 10 inches is the subsoil of reddish-brown, very firm silty clay that grades to brown, extremely firm clay at a depth of about 18 inches. Depth to the underlying limestone is about 30 inches.

This soil has high moisture-supplying capacity. It is slightly acid, medium in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderately rapid. The hazard of erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. Growth of deep-rooted crops is restricted because the depth of the root zone is limited. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–10; woodland suitability group 4)

McAfee silt loam, 6 to 12 percent slopes (McC).—This is a moderately deep, well-drained soil of the uplands. It is on gentle side slopes in areas that are mostly rough and broken. It formed in residuum from high-grade, phosphatic limestone.

The plow layer is dark-brown, friable silt loam. At a depth of about 8 inches is a subsoil of reddish-brown, very firm silty clay that grades to brown, extremely firm clay at a depth of about 15 inches. Depth to the underlying limestone is about 24 inches.

This soil has high moisture-supplying capacity. It is slightly acid, medium in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderately rapid. The hazard of erosion is moderately high.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. The depth of the root zone is limited, however, and restricts the growth of deep-rooted crops. Pasture and hay are the best uses for this soil. Nevertheless, if practices that control runoff and erosion are used, the soil can be cultivated occasionally. (Capability unit IVe–6; woodland suitability group 4)

McAfee silty clay, 12 to 20 percent slopes, severely eroded (MeD3).—This is a shallow to moderately deep, well-drained to somewhat excessively drained soil of the uplands. It is on moderately steep and sharply breaking side slopes in rough, broken areas. It formed in residuum from high-grade, phosphatic limestone.

The surface layer is dark reddish brown and is generally not more than 4 inches thick. The subsoil is reddish-brown, very firm silty clay that is underlain at a depth of about 12 inches by extremely firm, brown clay. Depth to limestone is about 18 inches. Many limestone slabs are on the surface, and a few ledges of limestone outcrop.

This soil has low moisture-supplying capacity. It is slightly acid, very low in organic matter, and medium in natural fertility. Permeability of the subsoil is moderately rapid. The soil is highly susceptible to further erosion.

Hay and pasture crops are better suited to this soil than cultivated crops. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIe–4; woodland suitability group 13)

McAfee silty clay loam, 2 to 6 percent slopes, eroded (MfB2).—This moderately deep, well-drained soil of the uplands formed in residuum from high-grade, phosphatic limestone. It is on the crests of ridges in areas that are mostly rough and broken.

The plow layer is brown, slightly firm silty clay loam. The subsoil, which is at a depth of about 6 inches, is reddish-brown, very firm silty clay that grades to brown, extremely firm clay at a depth of about 12 inches. Depth to the underlying limestone is about 24 inches.

This soil has moderately high moisture-supplying capacity. It is slightly acid, low in organic matter, moderately high in natural fertility, and slightly difficult to till. Permeability of the subsoil is moderately rapid. The hazard of further erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. The depth of the root zone is limited, however, and restricts the growth of deep-rooted plants. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–10; woodland suitability group 12)

McAfee silty clay loam, 6 to 12 percent slopes, eroded (MfC2).—This moderately deep, well-drained soil of the uplands formed in residuum from high-grade, phosphatic limestone. It is on gentle side slopes in areas that are mostly rough and broken.

The plow layer is brown, slightly firm silty clay loam. The subsoil, which is at a depth of about 6 inches, is reddish-brown, very firm silty clay that grades to brown, extremely firm clay at a depth of about 10 inches. Depth to the underlying limestone is about 21 inches. There are a few slabs of rock on the surface, and outcrops of rock are widely scattered.

This soil has moderately high moisture-supplying capacity. It is slightly acid, low in organic matter, moderately high in natural fertility, and slightly difficult to till. Permeability of the subsoil is moderately rapid. The hazard of further erosion is moderately high.

Hay and pasture crops are better suited to this soil than cultivated crops. Growth of deep-rooted plants is restricted because the depth of the root zone is limited. If practices that effectively control runoff and erosion are used, this soil can be cultivated occasionally. (Capability unit IVe–6; woodland suitability group 12)

McAfee silty clay loam, 12 to 20 percent slopes, eroded (MfD2).—This moderately deep, well-drained soil of the uplands formed in residuum from high-grade, phosphatic limestone. It is on moderately steep side slopes in rough, broken areas.

The surface layer is brown, slightly firm silty clay loam that generally is not more than 6 inches thick. The subsoil is reddish-brown, very firm silty clay that grades to brown, extremely firm clay at a depth of about 8 inches. Depth to the underlying limestone is about 18 inches. Slabs of limestone are common on the surface, and rock ledges outcrop in a few places.

This soil has moderately high moisture-supplying capacity. It is slightly acid, low in organic matter, and moderately high in natural fertility. Permeability of the subsoil is moderately rapid. The soil is highly susceptible to further erosion.

This soil is not suited to cultivation. Pasture and hay are the best uses, but the depth of the root zone is limited and restricts the growth of deep-rooted plants. (Capability unit VIe–1; woodland suitability group 12)

McAfee silty clay loam, 20 to 30 percent slopes, eroded (MfE2).—This moderately deep, well-drained soil of the uplands is on steep side slopes in areas that are rough and broken. It formed in residuum from high-grade, phosphatic limestone.

The surface layer is brown, slightly firm silty clay loam that generally is not more than 4 inches thick. The subsoil is reddish-brown, very firm silty clay that grades to brown, extremely firm clay at a depth of about 6 inches. Depth to the underlying limestone is about 15 inches. In many places slabs of limestone are on the surface and ledges of rock outcrop.

This soil has moderately high moisture-supplying capacity. It is slightly acid, low in organic matter, and moderately high in natural fertility. Permeability of the subsoil is moderately rapid. The soil is highly susceptible to further erosion.

This soil is not suited to cultivation. Pasture and hay are the best uses, but the depth of the root zone is limited and restricts the growth of deep-rooted plants. (Capability unit VIe–1; woodland suitability group 12)

McAfee very rocky silty clay loam, 12 to 20 percent slopes, eroded (MhD2).—This is a shallow to moderately deep, somewhat excessively drained soil of the uplands. It is on moderately steep side slopes in rough, broken areas. It formed in residuum from high-grade, phosphatic limestone.

The surface layer is brown, slightly firm silty clay loam that generally is not more than 4 inches thick. The subsoil is reddish-brown, very firm silty clay that grades to brown, extremely firm clay at a depth of about 8 inches. Depth to the underlying limestone is about 18 inches. Rock slabs are numerous on the surface, and they generally cover more than 40 percent of the surface. Ledges of rock outcrop in many places.

This soil has low moisture-supplying capacity. It is slightly acid, low in organic matter, and moderately high in natural fertility. Permeability of the subsoil is moderately slow. The soil is highly susceptible to erosion.

This soil is not suited to cultivation. Pasture and hay are the best uses, but the depth of the root zone is limited and restricts the growth of deep-rooted plants. (Capability unit VIs–1; woodland suitability group 12)

McAfee very rocky silty clay loam, 20 to 30 percent slopes, eroded (MhE2).—This shallow, somewhat excessively drained soil of the uplands is on steep side slopes in rough, broken areas. It formed in residuum from high-grade, phosphatic limestone.

The surface layer is brown, slightly firm silty clay loam that generally is not more than 4 inches thick. The subsoil is reddish-brown, very firm silty clay that grades to brown, extremely firm clay at a depth of about 6 inches. Depth to the underlying limestone is about 15 inches. Rock slabs are numerous on the surface, and they generally cover more than 40 percent of the surface. Ledges of rock outcrop in many places.

This soil has moderately low moisture-supplying capacity. It is slightly acid, low in organic matter, and moderately high in natural fertility. Permeability of the subsoil is moderately rapid. The soil is highly susceptible to further erosion.

This soil is better suited to woodland and limited grazing than to other uses. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIIs–2; woodland suitability group 12)

Melvin Series

The Melvin series consists of deep, poorly drained soils of the first bottoms. These soils formed in recent alluvium washed from upland soils that were derived mainly from limestone but partly from acid shale and sandstone.

Their surface layer is grayish-brown silt loam, and their substratum is light brownish-gray to gray silt loam. Mottling is evident in the surface layer but is more intense with increasing depth.

Representative profile:

0 to 7 inches, grayish-brown silt loam; common, fine mottles of yellowish brown and dark brown.
7 to 40 inches, light brownish-gray silt loam that grades to gray silty clay loam in the lower part; many mottles of yellowish brown and some of reddish brown; small, dark concretions throughout.

In some places there is stratification in these soils because the alluvial deposits are not uniform. The surface layer is dark grayish brown in places, and the lower part of the substratum is silty clay loam in places.

Melvin soils have very high moisture-supplying capacity. They are slightly acid to neutral, low in organic matter, medium in natural fertility, and easy to till. Permeability is moderate.

These soils are scattered throughout the county, but most of the acreage is in the eastern half where these soils are near finer textured soils of the uplands. Generally, these soils are not cultivated. Most of the areas have a cover of grasses and trees that tolerate water.

Melvin silt loam (Ml).—This is the only Melvin soil mapped in the county. It is on narrow first bottoms along drainageways near finer textured soils of the uplands that are underlain by limestone. The soil is deep and poorly drained. It formed in recent alluvium washed from upland soils that were derived mainly from limestone but partly from acid shale and sandstone.

The plow layer is grayish-brown silt loam. The subsoil is gray and is mottled with brown and yellowish brown.

This soil has very high moisture-supplying capacity. It is nearly neutral, low in organic matter, medium in natural fertility, and easily tilled. The subsoil is moderately permeable. The water table is high, and the soil is not susceptible to erosion.

Water-tolerant grasses and legumes are the only plants that are suited to this soil. If the soil is drained, however, it can be used for corn and for a wider variety of forage plants than are generally grown. In many places flooding and standing water are a hazard to crops. After this soil is drained, row crops can be grown year after year if practices that maintain fertility and build up the supply of organic matter are used. (Capability unit IIIw–5; woodland suitability group 2)

Mercer Series

The Mercer series consists of moderately deep, moderately well drained soils of the uplands. These soils formed in residuum from limestone and calcareous shale. They are on broad ridgetops and gentle side slopes in undulating areas. These soils generally have a surface layer of dark grayish-brown, friable silt loam. The upper part of the subsoil is yellowish-brown silty clay loam, and the lower part contains a compact, brittle fragipan. The fragipan is somewhat coarser textured than the layer immediately above and considerably coarser textured than the material in the layer below.

Representative profile:

0 to 7 inches, dark grayish-brown, friable silt loam.
7 to 15 inches, yellowish-brown, friable silty clay loam.
15 to 30 inches, mottled yellowish-brown, light brownish-gray, and dark-brown, firm and compact silt loam that grades to silty clay.
30 to 48 inches, mottled brown and light olive-gray, firm clay; massive.

In places the surface layer is brown and the upper part of the subsoil is dark yellowish brown. Depth to the fragipan ranges from 15 to 30 inches; the thickness of the fragipan ranges from 10 to 20 inches.

Mercer soils are strongly acid, moderately high in natural fertility, and easily tilled. The subsoil is moderately permeable.

These soils occur throughout the western half of the county, but most of the acreage is in the northwestern part. All of the acreage has been cleared and used fairly intensively for row crops. Now, the soils are used mainly for bluegrass pastures that are plowed periodically and then planted to tobacco and corn. The soils are not well suited to alfalfa, but shallow-rooted legumes are grown for hay and are an important source of feed.

Mercer silt loam, 2 to 6 percent slopes (MmB).—This moderately deep, moderately well drained soil of the uplands is underlain by limestone. It is on broad ridgetops in undulating areas.

The plow layer is dark grayish-brown, friable silt loam. The subsoil is yellowish-brown, friable silty clay loam and is at a depth of approximately 10 inches. At a depth of about 22 inches is a compact, slowly permeable pan that is approximately 15 inches thick. The substratum is mottled brown and gray clay that is massive and firm.

This soil has moderately high moisture-supplying capacity. It is strongly acid, medium in organic matter, moderately high in natural fertility, and easily tilled. Permeability of the subsoil is moderate. The hazard of erosion is moderately low.

Most locally grown row crops, pasture grasses, and legumes are suited to this soil. In wet seasons, however, alfalfa and burley tobacco are likely to drown out. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–6; woodland suitability group 6)

Mercer silt loam, 2 to 6 percent slopes, eroded (MmB2).—This moderately deep, moderately well drained soil of the uplands is underlain by limestone. It is on ridgetops in undulating areas.

The plow layer is brown, friable silt loam. The subsoil is yellowish-brown, friable silty clay loam and is at a depth of approximately 7 inches. At a depth of about 18 inches is a compact, slowly permeable pan that is about 15 inches thick. The substratum is mottled brown and gray clay that is massive and firm.

This soil has moderately low moisture-supplying capacity. It is strongly acid, low in organic matter, moderately high in natural fertility, and easily tilled. Permeability of the subsoil is moderate. The hazard of further erosion is moderately low.

Deep-rooted plants and plants that are damaged if the amount of water in the root zone is excessive do not grow

well on this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–6; woodland suitability group 6)

Mercer silt loam, 6 to 12 percent slopes (MmC).—This moderately deep, moderately well drained soil of the uplands is underlain by limestone. It is on gentle side slopes in undulating areas.

The plow layer is dark grayish-brown, friable silt loam. The subsoil is yellowish-brown, friable silty clay loam and is at a depth of approximately 8 inches. At a depth of about 20 inches is a compact slowly permeable pan that is about 12 inches thick. The substratum is mottled brown and gray clay that is massive and firm.

This soil has moderately high moisture-supplying capacity. It is strongly acid, medium in organic matter, moderately high in natural fertility, and easily tilled. Permeability of the subsoil is moderate. The soil is moderately susceptible to erosion.

Most locally grown row crops, pasture grasses, and legumes are suited to this soil. The depth of the root zone is limited and restricts the growth of deep-rooted plants. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–8; woodland suitability group 6)

Mercer silt loam, 6 to 12 percent slopes, eroded (MmC2).—This moderately deep, moderately well drained soil of the uplands is underlain by limestone. It is on gentle side slopes in undulating areas.

The plow layer is brown, friable silt loam. The subsoil is yellowish-brown, friable silty clay loam and is at a depth of approximately 7 inches. At a depth of about 16 inches is a compact, slowly permeable pan that is about 12 inches thick. The substratum is mottled brown and gray clay that is massive and firm.

This soil has moderately low moisture-supplying capacity. It is strongly acid, low in organic matter, moderately high in natural fertility, and easily tilled. Permeability of the subsoil is moderate. The hazard of further erosion is moderate.

Most locally grown row crops, pasture grasses, and legumes are suited to this soil. The depth of the root zone is limited and restricts the growth of deep-rooted plants. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–8; woodland suitability group 6)

Monongahela Series

The Monongahela series consists of moderately deep, moderately well drained soils that formed in old alluvium washed from soils developed from acid shale and sandstone. Some of these soils are on broad ridgetops and gentle side slopes in areas that are mostly rough and broken. Others are along the Kentucky River on second bottoms above the present flood plain. The surface layer is generally grayish-brown, friable loam. The upper part of the subsoil is a light yellowish-brown silt loam, and the lower part is a compact, brittle fragipan mottled with light olive brown and light brownish gray. Below is a substratum of brown and gray fine sandy clay that is hard and cemented.

Representative profile:

0 to 6 inches, grayish-brown, friable loam.
6 to 16 inches, light yellowish-brown, friable loam that grades to yellowish-brown, firm silty clay loam.
16 to 40 inches, mottled light yellowish-brown, brown, and light-gray, compact and brittle silty clay loam.
40 inches +, yellowish-brown, very firm fine sandy clay mottled with light brownish gray; massive.

The texture of the surface layer ranges from silt loam to fine sandy loam. Depth to the pan layer ranges from 15 to 20 inches.

Monongahela soils have moderately high moisture-supplying capacity. They are extremely acid, medium in natural fertility, and easily tilled.

These soils are along the southeastern edge of the county in scattered areas that are generally no more than 3 miles north of the Kentucky River. All of the areas have been cleared. They are used fairly intensively for row crops, mainly corn and tobacco. Shallow-rooted forage plants are grown for hay.

Monongahela loam, 2 to 6 percent slopes (MoB).—This moderately deep, moderately well drained soil has a plow layer of grayish-brown, friable loam. A subsoil of light yellowish-brown, friable loam is at a depth of approximately 10 inches. The subsoil grades to firm, yellowish-brown silty clay loam at a depth of about 15 inches. It is underlain at a depth of about 19 inches by a compact, mottled brown and gray pan that is slowly permeable. The substratum is very firm, massive fine sandy clay. In about half of the acreage, the texture of the surface layer is silt loam, and in the other half it is fine sandy loam. Some areas of this soil are on second bottoms. Others are on ridgetops in terrain that is undulating to rough and broken.

This soil has moderately high moisture-supplying capacity. It is extremely acid, medium in organic matter, medium in natural fertility, and easily tilled. Permeability of the subsoil is moderate. The hazard of erosion is moderately low.

Most locally grown row crops, pasture grasses, and legumes are suited to this soil. The depth of the root zone is limited and restricts the growth of deep-rooted crops. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–7; woodland suitability group 7)

Monongahela loam, 6 to 12 percent slopes, eroded (MoC2).—This moderately deep, moderately well drained soil has a plow layer of brown, friable loam. The subsoil is light yellowish-brown, friable loam and is at a depth of approximately 7 inches. It grades to yellowish-brown silty clay loam at a depth of about 15 inches. Below, at a depth of about 22 inches, is a compact, mottled brown and gray pan that is slowly permeable. The substratum is very firm, massive fine sandy clay. In places the texture of the surface layer ranges from fine sandy loam to silt loam. Some areas of this soil are on short slopes on second bottoms. Others are on gentle side slopes in terrain that is undulating to rough and broken.

Mapped with this soil are some areas in which the soil is not eroded. These included areas make up a little more than one-third of the total acreage.

Monongahela loam, 6 to 12 percent slopes, eroded, has moderately low moisture-supplying capacity. It is extremely acid, low in organic matter, medium in natural

fertility, and easily tilled. Permeability of the subsoil is moderate. The hazard of further erosion is moderate.

Most locally grown row crops, pasture grasses, and legumes are suited to this soil. The depth of the root zone is limited and restricts the growth of deep-rooted plants. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–9; woodland suitability group 7)

Muse Series

The Muse series consists of deep to moderately deep, well-drained soils on toe slopes. These soils formed in colluvium that washed or rolled from upland soils derived from acid shale. They are at the base of hills in a terrain that is rough and broken. These soils generally have a surface layer of brown, friable silt loam and a subsoil of strong-brown, firm silty clay loam that grades to silty clay with increasing depth. The substratum is mottled yellowish-red and light-gray clay.

Representative profile:

0 to 6 inches, brown, friable silt loam.
6 to 30 inches, brown, firm silty clay loam that grades to reddish-brown, firm silty clay at a depth of about 18 inches.
30 to 48 inches, reddish-brown, firm clay mottled with gray.
48 to 72 inches, variegated red, gray, and yellowish-brown, firm clay; massive.

Depth of the colluvial material over the residual material ranges from 30 to 48 inches. In some places the upper part of the subsoil is reddish brown or yellowish red.

Muse soils have high moisture-supplying capacity. They are extremely acid, low in organic matter, and moderately high in natural fertility. Permeability of the subsoil is moderately slow.

These soils are in the southeastern part of the county in the area known as the Knobs. They occupy a narrow band that extends from Kiddville southward to the vicinity of Trapp. These soils are among the most productive soils in the Knobs, and nearly all of the acreage has been cleared at one time. Corn was once an important crop, but tobacco is now the chief row crop. Hay and pasture crops are also important. Where the productivity of the soils has been lowered by excessive cropping, the areas have reverted to Virginia pine and other trees.

Muse silt loam, 6 to 12 percent slopes, eroded (MuC2).—This is a deep to moderately deep, well-drained soil on toe slopes in steep, hilly areas. It formed in material that moved downslope from soils on the slopes above that were derived from acid shale. Its plow layer is brown, friable silt loam, and its subsoil is brown, firm silty clay loam that grades to reddish-brown, firm silty clay at a depth of about 18 inches. The substratum is massive, very firm clay mottled with yellowish red and gray and is at a depth of about 36 inches.

Mapped with this soil are areas of a similar soil that has a slope of slightly less than 6 percent; these included areas make up one-eighth of the acreage. Also included are areas in which the soil has a shaly surface layer and that make up about one-sixth of the acreage.

Muse silt loam, 6 to 12 percent slopes, eroded, has high moisture-supplying capacity. It is extremely acid, low in organic matter, moderately high in natural fertility, and easily tilled. Permeability of the subsoil is moderately slow. The hazard of further erosion is moderate.

Most locally grown row crops and pasture grasses are suited to this soil. Legumes that need a soil that is nearly neutral do not grow well. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–2; woodland suitability group 9)

Muse silt loam, 12 to 20 percent slopes, eroded (MuD2).—This is a moderately deep, well-drained soil on moderately steep foot slopes in steep and hilly terrain. It formed in material that moved downslope from soils on slopes above that were derived from acid shale.

The plow layer is brown, friable silt loam, and the subsoil is brown, firm silty clay loam that grades to reddish-brown, firm silty clay at a depth of about 12 inches. The substratum is massive, very firm clay mottled with yellowish red and gray; it is at a depth of about 30 inches.

This soil has high moisture-supplying capacity. It is extremely acid, low in organic matter, moderately high in natural fertility, and easily tilled. Permeability of the subsoil is moderately slow. The hazard of erosion is moderately high.

Most locally grown row crops and pasture grasses are suited to this soil. Legumes that need a nearly neutral soil do not grow well. The soil is better suited to pasture and hay crops than to row crops. Nevertheless, it can be cultivated occasionally if practices that effectively control runoff and erosion are used. (Capability unit IVe–3; woodland suitability group 9)

Muse silt loam, 20 to 30 percent slopes, eroded (MuE2).—This is a moderately deep, well-drained soil on foot slopes in steep and hilly terrain. It formed in material that moved downslope from soils on slopes above that were derived from acid shale.

The surface layer is brown, friable silt loam that is generally less than 6 inches thick. The subsoil is brown, firm silty clay loam that is about 6 inches thick; it is underlain by reddish-brown, firm silty clay. The substratum is massive, very firm clay mottled with yellowish red and gray and is at a depth of about 24 inches.

This soil has moderately high moisture-supplying capacity. It is extremely acid, low in organic matter and moderately high in natural fertility. Permeability of the subsoil is moderately slow. The soil is highly susceptible to erosion.

Pasture and hay crops are better suited to this soil than cultivated crops. Legumes that require a nearly neutral soil do not grow well. (Capability unit VIe–1; woodland suitability group 9)

Newark Series

The Newark series consists of deep, somewhat poorly drained soils of the first bottoms. These soils formed in recent alluvium washed from soils of the uplands that were derived mainly from limestone but partly from acid shale and sandstone. The surface layer is generally dark grayish-brown silt loam. The subsoil is dark grayish-brown to grayish-brown silt loam and is mottled with dark yellowish brown.

Representative profile:

0 to 8 inches, dark grayish-brown silt loam.
8 to 36 inches, dark grayish-brown silt loam that grades to grayish brown at a depth of about 14 inches; mottled with dark yellowish brown.

In some places there is stratification in these soils because the alluvial deposits are not uniform. The surface layer is very dark brown in places.

Newark soils have very high moisture-supplying capacity. They are slighty acid, medium in organic matter, moderately high in natural fertility, and easy to till. Permeability is moderate.

These soils are scattered throughout the county. In cultivated areas corn is the major crop. In areas that are not cultivated, pasture is the chief use, but some areas are used for hay. Willows and other trees that tolerate water have grown up on areas no longer used for agriculture.

Newark silt loam (Ne).—This deep and somewhat poorly drained soil is the only Newark soil mapped in the county. It formed in recent alluvium washed from soils of the uplands derived mainly from limestone but partly from acid shale and sandstone. It is on first bottoms along streams and drainageways near soils of the uplands that are underlain by limestone.

The plow layer is dark grayish-brown silt loam, and the subsoil is grayish brown and is mottled with dark yellowish brown.

This soil has very high moisture-supplying capacity. It is slightly acid, medium in organic matter, moderately high in natural fertility, and easy to till. Permeability is moderate, and the water table is high. The soil is not susceptible to erosion.

Grasses and legumes that tolerate water are better suited to this soil than other plants. Except in abnormally wet years, yields of corn are generally high. Flooding and standing water are a hazard to crops in places. Where this soil is drained, row crops can be grown year after year if practices that maintain fertility and organic matter are used. (Capability unit IIw–4; woodland suitability group 2)

Otway Series

The Otway series consists of shallow to very shallow, somewhat excessively drained soils of the uplands. These soils formed in residuum from soft, calcareous shale, commonly called marl. They are in rough, broken areas. The surface layer is very dark grayish-brown, firm silty clay loam. The layer between the surface layer and the substratum is very thin or lacking, but if present, it is olive silty clay. The substratum is light olive-brown clay loam.

Representative profile:

0 to 6 inches, very dark grayish-brown, firm silty clay loam; strongly aggregated.
6 to 10 inches, olive, very firm silty clay; strongly aggregated.
10 to 18 inches, light olive-brown clay loam; many weathered pieces of sandy shale.

In places where the underlying shale is more sandy and contains less clay than that underlying the profile described, the upper part of the subsoil has a texture of clay loam.

Otway soils are calcareous, and they have moderately low to low moisture-supplying capacity. Permeability of the subsoil is moderately slow.

These soils are in the southeastern part of the county in an area that extends from the Kentucky River, south of Bloomingdale, northeastward between Ruckerville and Goffs Corner to the vicinity of Pilot View and Kiddville.

Otway soils are not suited to row crops, and they are used mainly for pasture and woodland. Some areas were cultivated or overgrazed and are now severely eroded and gullied. These areas have grown up in redcedar, brushy hardwoods, and grasses of poor quality.

Otway silty clay, 6 to 12 percent slopes, severely eroded (OsC3).—This shallow, somewhat excessively drained soil of the uplands is underlain by calcareous shale. It is on the crests of narrow ridges and on gentle side slopes in rough, broken areas.

The surface layer is olive, very firm silty clay that generally is less than 9 inches thick. The substratum contains many slabs of shale. It is very firm clay loam, but it is sandy in the lower part. Depth to bedrock is about 30 inches. In about one-sixth of the acreage, the slopes range from 12 to 20 percent.

Otway silty clay, 6 to 12 percent slopes, severely eroded, has very low moisture-supplying capacity. It is calcareous, low in organic matter, and low in natural fertility. Permeability of the subsoil is moderately slow. The soil is highly susceptible to further erosion.

This soil is not suited to cultivated crops, but it is suited to hay and pasture. Drought-resistant forage plants are better suited than other kinds of plants. (Capability unit VIs–5; woodland suitability group 13)

Otway silty clay loam, 6 to 12 percent slopes (OtC).—This shallow, somewhat excessively drained soil of the uplands is underlain by calcareous shale. Its surface layer is very dark brown, firm silty clay loam that is about 6 inches thick. The subsoil, which is mostly less than 9 inches thick, is very firm, olive silty clay. The substratum is light olive-brown clay loam that grades to olive-gray, highly weathered, soft, sandy shale at a depth of about 24 inches. Slabs of shale are common in the upper part of the substratum and are more numerous in the lower part. At a depth of about 48 inches, the slabs are closely spaced and form the upper limits of the bedrock. The soil is on the crests of ridges and on gentle side slopes in rough, broken areas. In about one-sixth of the acreage, the slopes range from 12 to 20 percent.

Otway silty clay loam, 6 to 12 percent slopes, has moderately low moisture-supplying capacity. It is calcareous, high in organic matter, medium in natural fertility, and slightly difficult to till. Permeability of the subsoil is moderately slow. The hazard of erosion is moderately high.

This soil is better suited to hay and pasture than to cultivated crops. Drought-resistant forage plants make better yields than other plants. If practices that control runoff and erosion are used, this soil can be cultivated occasionally. (Capability unit IVe–6; woodland suitability group 13)

Otway soils, 20 to 30 percent slopes, severely eroded (OwE3).—These very shallow, somewhat excessively drained soils of the uplands are underlain by calcareous shale. Erosion has removed the original surface layer

in most places. Generally, olive-colored, very firm silty clay that was formerly in the subsoil is exposed at the surface. At a depth of about 6 inches is the substratum of clay loam that contains slabs of shale. Depth to bedrock is less than 18 inches in most places. In about one-sixth of the acreage, there are a large number of thin slabs of limestone on the surface. The soils are on steep side slopes in rough, broken areas.

These soils have low moisture-supplying capacity. They are calcareous, low in organic matter, and moderately low in natural fertility. Permeability of the subsoil is moderately slow. The soils are highly susceptible to further erosion.

These soils are better suited to woodland and to limited grazing than to other uses. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIIs–3; woodland suitability group 13)

Otway soils, 30 to 50 percent slopes (OwF).—These very shallow, somewhat excessively drained soils of the uplands are underlain by calcareous shale. They are on steep side slopes in rough, broken areas.

Erosion has removed the original surface layer in most places. Generally, olive-colored, very firm silty clay that was formerly in the subsoil is exposed at the surface. At a depth of about 3 inches is the substratum of clay loam that contains slabs of shale. Depth to bedrock is less than 12 inches in most places. In about one-half of the acreage, there are a large number of thin slabs of limestone on the surface.

These soils have very low moisture-supplying capacity. They are calcareous, low in organic matter, and low in natural fertility. Permeability of the subsoil is moderately slow.

These soils are better suited to woodland and limited grazing than to other uses. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIIs–3; woodland suitability group 13)

Robertsville Series

The Robertsville series consists of shallow, poorly drained soils formed in old alluvium washed from soils derived mainly from limestone but partly from sandstone and acid shale. These soils are on broad, flat terraces. The surface layer is light-gray, friable silt loam that has brownish mottles, and the subsoil is light-gray silty clay loam that is similarly mottled. A compact, slowly permeable fragipan is at a depth of about 15 inches.

Representative profile:

0 to 8 inches, light-gray, friable silt loam mottled with yellowish brown.
8 to 15 inches, light-gray, friable silt loam mottled with yellowish brown and reddish brown; a few, small, dark, round concretions.
15 to 45 inches, light-gray, weakly cemented, compact silt loam mottled with yellowish brown that grades to gray silty clay loam mottled with olive brown at a depth of about 25 inches.
45 to 54 inches, light-gray, firm clay mottled with yellowish brown and brownish yellow; many small concretions and much soft, irregularly shaped concretionary material.

The fragipan is more strongly developed in some profiles than in others. Depth of the alluvium varies. In some places the profile has a substratum of plastic, alkaline clay at a depth of about 4 feet.

713–793—64——4

Robertsville soils have moderately low moisture-supplying capacity. They are very strongly acid, moderately low in natural fertility, and easily tilled.

These soils are in the eastern part of the county. Most of the acreage is in the small flatwoods section near the area known as the Knobs.

Nearly all the acreage has been cleared and used for cultivated crops, but yields are low unless the soils are drained. Suitable grasses have been established on most of the undrained areas, and these are now grazed. In some places grasses suitable for grazing have reseeded naturally. High yields of corn can be obtained if tile drains and other practices are used to improve drainage.

Robertsville silt loam (Rb).—This is the only Robertsville soil mapped in the county. It is shallow and poorly drained, and it formed on terraces in old alluvium washed mainly from soils of uplands underlain by limestone.

The plow layer is light-gray, friable silt loam mottled with yellowish brown. The subsoil is gray silt loam that is mottled with brown and is slightly compact at a depth of about 15 inches. This compact layer is approximately 30 inches thick, and it grades to silty clay loam in the lower part.

This soil has moderately low moisture-supplying capacity. It is strongly acid, low in organic matter, moderately low in natural fertility, and easy to till. The subsoil is moderately permeable. The water table is high, but the soil is not susceptible to erosion.

Wetness and the lack of natural drainageways to remove surface water restrict the kinds of plants that can be grown on this soil. Grasses and legumes that tolerate wetness grow better than other kinds of plants. If this soil is drained, and if practices that maintain fertility and build up the supply of organic matter are used, row crops can be grown year after year. (Capability unit IVw–1; woodland suitability group 2)

Rock Land (Ro)

Rock land consists of areas where rock outcrops cover much of the surface. Only small economic returns are made on this land type, even if suitable plants are grown. These areas occur on all slopes, but generally the slopes are more than 20 percent.

Mapped with this unit, and making up about one-sixth of the acreage, are areas of Ashwood very rocky clays and of Ashwood very rocky silty clay loams that have slopes of more than 30 percent. These included soils are the most productive part of the mapping unit. They have moderate fertility, but they are shallow and have low moisture-supplying capacity. Consequently, the included soils are suitable only for hardwoods of low quality and for redcedars. The hardwoods provide protection for the watershed, and the redcedars can be used for posts and specialty wood products. (Capability unit VIIs–5; woodland suitability group 13)

Salvisa Series

The Salvisa series consists of shallow to moderately deep, somewhat excessively drained soils of the uplands. The soils formed in residuum from high-grade limestone. They are in areas that are undulating to rough and broken. The surface layer is very dark grayish-brown

silty clay loam, and the subsoil is yellowish-brown, very firm silty clay or clay. Limestone bedrock is at a depth of about 30 inches.

Representative profile:

0 to 7 inches, very dark grayish-brown, friable silty clay loam.
7 to 18 inches dark yellowish-brown, firm silty clay that grades to yellowish-brown, very firm clay at a depth of about 11 inches; grayish-brown mottles.
18 to 30 inches, mottled light yellowish-brown, yellowish-brown, and light brownish-gray, very firm clay; massive; much soft, irregularly shaped, concretionary material.

In places there are slabs of limestone on the surface and outcrops or rock ledges. In some places the surface layer is dark brown. The lower part of the subsoil is light olive brown in places.

Salvisa soils are moderate to moderately high in natural fertility and are slightly acid. Permeability of the subsoil is moderately slow.

These soils are in every part of the county but the extreme southeastern quarter. They are not well suited to cultivation, and most areas are in pasture or hay. Areas once used for row crops and that are eroded have reverted to cedars and to brushy pastures.

Salvisa clay, 6 to 12 percent slopes, severely eroded (SaC3).—This shallow, somewhat excessively drained soil of the uplands formed in residuum from high-grade limestone.

It is on the crests of narrow ridges and on gentle side slopes in rough, broken areas. The surface layer is dark yellowish-brown clay that is underlain at a depth of about 6 inches by mottled light yellowish-brown and brownish-gray, massive clay. Depth to limestone is about 18 inches. A few slabs of limestone are generally on the surface.

This soil has low moisture-supplying capacity. It is slightly acid, very low in organic matter, and medium in natural fertility. Permeability of the subsoil is moderately slow. The soil is highly susceptible to further erosion.

This soil is not suited to cultivation. It is best suited to hay and pasture. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIe–4; woodland suitability group 13)

Salvisa clay, 12 to 20 percent slopes, severely eroded (SaD3).—This shallow, somewhat excessively drained soil of the uplands formed in residuum from high-grade limestone. It is on moderately steep and sharply breaking side slopes in rough, broken areas.

The surface layer is dark yellowish-brown clay that is underlain at a depth of about 6 inches by mottled light yellowish-brown and brownish-gray, massive clay. Depth to limestone is about 15 inches. Slabs of limestone are commonly on the surface, and ledges of limestone outcrop in a few places.

This soil has low moisture-supplying capacity. It is slightly acid, very low in organic matter, and medium in natural fertility. Permeability of the subsoil is moderately slow. The soil is highly susceptible to further erosion.

This soil is not suited to cultivation and is best suited to hay and pasture. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIe–4; woodland suitability group 13)

Salvisa clay, 20 to 30 percent slopes, severely eroded (SaE3).—This shallow, somewhat excessively drained soil of the uplands formed in residuum from high-grade limestone. It is on steep side slopes in rough, broken areas.

The surface layer is dark yellowish-brown clay that generally is not more than 4 inches thick. The substratum is mottled light yellowish-brown and brownish-gray, massive clay. Depth to limestone is about 15 inches. Slabs of limestone are on the surface in many places, and ledges of limestone outcrop in many places.

This soil has very low moisture-supplying capacity. It is slightly acid, very low in organic matter, and medium in natural fertility. Permeability of the subsoil is moderately slow. The hazard of further erosion is very high.

This soil is better suited to woodland and limited grazing than other uses. Drought-resistant forage plants make better yields than other kinds of plants. (Capability unit VIIe–1; woodland suitability group 13)

Salvisa silty clay loam, 2 to 6 percent slopes, eroded (ScB2).—This moderately deep, somewhat excessively drained soil of the uplands formed in residuum from high-grade limestone. It is on the crests of ridges in areas that are mostly rough and broken.

The plow layer is brown, friable silty clay loam. The subsoil, which is at a depth of about 6 inches, is yellowish-brown, very firm clay. It grades to mottled light yellowish-brown and light brownish-gray, very firm, massive clay at a depth of about 15 inches. Depth to the underlying limestone is about 24 inches. Slabs of rock are on the surface in a few places.

This soil has moderately high moisture-supplying capacity. It is slightly acid, low in organic matter, moderately high in natural fertility, and slightly difficult to till. Permeability of the subsoil is moderately slow. The hazard of further erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are suited to this soil, but the depth of the root zone is limited and restricts the growth of deep-rooted plants. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–10; woodland suitability group 12)

Salvisa silty clay loam, 6 to 12 percent slopes, eroded (ScC2).—This moderately deep, somewhat excessively drained soil of the uplands formed in residuum from high-grade limestone. It is on the crests of ridges and on gentle side slopes in areas that are mostly rough and broken.

The plow layer is brown, friable silty clay loam. The subsoil, which begins at a depth of about 6 inches, is yellowish-brown, very firm clay. It grades to mottled light yellowish-brown and light brownish-gray, very firm, massive clay at a depth of about 12 inches. Depth to the underlying limestone is about 21 inches. Slabs of rock are on the surface in a few places. Ledges of limestone outcrop, but they are widely scattered.

This soil has moderately high moisture-supplying capacity. It is slightly acid, low in organic matter, moderately high in natural fertility, and slightly difficult to till. Permeability of the subsoil is moderately slow. The hazard of further erosion is moderately high.

Hay and pasture crops are better suited to this soil than row crops. Growth of deep-rooted crops is restricted, however, because the depth of the root zone is limited. If practices that effectively control runoff and erosion are used, this soil can be cultivated occasionally. Capability unit IVe–6; woodland suitability group 12)

Salvisa silty clay loam, 12 to 20 percent slopes, eroded (ScD2).—This shallow, somewhat excessively drained soil of the uplands formed in residuum from high-grade limestone. It is on moderately steep side slopes in rough, broken areas.

The plow layer is brown, friable silty clay loam that generally is not more than 6 inches thick. The subsoil is yellowish-brown, very firm clay. It grades to mottled light olive-brown and light brownish-gray, very firm, massive clay at a depth of about 10 inches. Depth to the underlying limestone is about 18 inches. Slabs of limestone are common on the surface, and ledges outcrop in a few places.

This soil has low moisture-supplying capacity. It is slightly acid, low in organic matter, and moderately high in natural fertility. Permeability of the subsoil is moderately slow. The soil is highly susceptible to further erosion.

Pasture and hay crops are better suited to this soil than cultivated crops. Growth of deep-rooted crops is restricted, however, because the depth of the root zone is limited. (Capability unit VIe–1; woodland suitability group 12)

Salvisa silty clay loam, 20 to 30 percent slopes, eroded (ScE2).—This shallow, somewhat excessively drained soil of the uplands formed in residuum from high-grade limestone. Its surface layer is brown, friable silty clay loam that generally is not more than 4 inches thick. The subsoil is yellowish-brown, very firm clay. It grades to mottled light olive-brown and light brownish-gray, very firm, massive clay at a depth of about 8 inches. Depth to the underlying limestone is about 15 inches. Commonly, slabs of limestone are on the surface and ledges of rock outcrop.

This soil has low moisture-supplying capacity. It is slightly acid, low in organic matter, and moderately high in natural fertility. Permeability of the subsoil is moderately slow. The soil is highly susceptible to further erosion.

Pasture and hay crops are better suited to this soil than cultivated crops. Growth of deep-rooted crops is restricted, however, because the depth of the root zone is limited. (Capability unit VIe–1; woodland suitability group 12)

Shelbyville Series

The Shelbyville series consists of deep, well-drained soils of the uplands. The soils formed in residuum from high-grade limestone, and they occur in undulating areas. Their surface layer is dark-brown, friable silt loam. The subsoil is strong-brown silty clay loam in the upper part but grades to yellowish-brown silty clay in the lower part. The substratum is generally mottled brownish-yellow, yellowish-brown, and pale-olive clay that is firm and massive.

Representative profile:

0 to 7 inches, dark-brown, friable silt loam.
7 to 24 inches, strong-brown, friable silty clay loam.
24 to 40 inches, mottled yellowish-brown and light olive-brown silty clay; many concretions and much soft concretionary material.
40 to 60 inches, mottled yellowish-brown, brownish-yellow, and pale-olive, very firm clay; massive; much soft concretionary material.

Depth to the layer that contains concretionary material ranges from 20 to 36 inches. This layer is thick and highly developed in some profiles, but in others it is weakly defined.

Shelbyville soils have very high moisture-supplying capacity. They are medium acid, high in natural fertility, and easily tilled. Permeability of the subsoil is moderate.

These soils occupy several areas south and east of Winchester. The areas extend from Hunt in a northeastward direction to the Montgomery County line between Sewell Shop and Kiddville.

All of these soils have been cleared at one time and used fairly intensively for row crops. Most of the acreage is now used mainly for hay, but occasionally corn or tobacco is grown for 1 or 2 years, and then hay is reestablished.

Shelbyville silt loam, 2 to 6 percent slopes (SeB).—This deep, well-drained soil of the uplands is underlain by limestone. It is on broad ridgetops in undulating areas.

The plow layer is dark-brown, very friable silt loam. At a depth of approximately 10 inches is a subsoil of strong-brown, friable silty clay loam. In the lower part of the subsoil, at a depth of about 30 inches, is a layer of mottled yellowish-brown and olive-brown silty clay. This layer contains a large number of concretions and much soft concretionary material, and it is about 10 inches thick. Below is mottled yellowish-brown and pale-olive, massive clay.

This soil has very high moisture-supplying capacity. It is medium acid, medium in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderate. The hazard of erosion is moderately low.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil, and alfalfa and burley tobacco are especially productive. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–1; woodland suitability group 5)

Shelbyville silt loam, 2 to 6 percent slopes, eroded (SeB2).—This deep, well-drained soil of the uplands is underlain by limestone. It is on broad ridgetops in undulating areas.

The plow layer is brown, very friable silt loam. At a depth of approximately 7 inches is a subsoil of strong-brown, friable silty clay loam. In the lower part of the subsoil, at a depth of about 24 inches, is a layer of mottled yellowish-brown and olive-brown silty clay. This layer contains a large number of concretions and much soft concretionary material, and it is about 10 inches thick. Below is mottled yellowish-brown and pale-olive, massive clay.

This soil has very high moisture-supplying capacity. It is medium acid, low in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderate. The hazard of further erosion is moderately low.

All locally grown row crops, pasture grasses, and legumes are well suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–1; woodland suitability group 5)

Shelbyville silt loam, 6 to 12 percent slopes (SeC).—This deep, well-drained soil of the uplands is underlain by limestone. It is on gentle side slopes in undulating areas.

The plow layer is dark-brown, very friable silt loam. At a depth of approximately 8 inches is a subsoil of strong-brown, friable silty clay loam. In the lower part of the subsoil, at a depth of about 28 inches, is a layer of mottled yellowish-brown and olive-brown silty clay. This layer contains a large number of concretions and much soft concretionary material, and it is about 8 inches thick. Below is mottled yellowish-brown and pale-olive, massive clay.

This soil has very high moisture-supplying capacity. It is medium acid, medium in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderate. The hazard of erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–1; woodland suitability group 5)

Shelbyville silt loam, 6 to 12 percent slopes, eroded (SèC2).—This deep, well-drained soil of the uplands is underlain by limestone. It is in undulating areas. In most places it is on gentle side slopes, but in a few places it is on sharply breaking slopes.

The plow layer is brown, very friable silt loam. The subsoil of strong-brown, friable silty clay loam is generally at a depth of less than 6 inches. In the lower part of the subsoil, at a depth of about 20 inches, is a layer of mottled yellowish-brown and olive-brown silty clay. This layer contains a large number of concretions and much soft concretionary material, and it is about 8 inches thick. Below is mottled yellowish-brown and pale-olive, massive clay.

This soil has very high moisture-supplying capacity. It is medium acid, low in organic matter, high in natural fertility, and easily tilled. Permeability of the subsoil is moderate. The hazard of further erosion is moderate.

All locally grown row crops, pasture grasses, and legumes are suited to this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–1; woodland suitability group 5)

Shrouts Series

The Shrouts series consists of shallow, somewhat excessively drained soils of the uplands. These soils formed in residuum from greenish-gray, alkaline to calcareous, soft, clayey shale. They occur in rough, broken areas. Their surface layer is very dark grayish brown. The subsoil is olive-brown, extremely firm clay that is mottled with yellowish brown and brown. The substratum is pale-olive, extremely firm, massive clay that is faintly mottled with olive.

Representative profile:

0 to 4 inches, very dark grayish-brown, slightly firm silty clay loam.
4 to 10 inches, light olive-brown, extremely firm clay that is mottled with yellowish brown; strongly aggregated.
10 to 17 inches, pale-olive, extremely firm clay that is mottled with olive; massive.
17 to 34 inches, greenish-gray, soft, clayey shale.

In some profiles the B horizon is olive gray.

Shrouts soils occur near the Fleming soils. Because the areas are small and intricately mixed with the Fleming soils, the Shrouts soils are not mapped separately in this county. They are mapped in several complexes with the Fleming soils, and these complexes are described under the Fleming series.

Taft Series

The Taft series consists of moderately deep, somewhat poorly drained soils formed in old alluvium. The alluvium was washed from soils that were derived mainly from limestone but partly from sandstone and acid shale. These soils are on broad, flat terraces. Their surface layer is generally dark grayish-brown silt loam. The subsoil is pale-brown silty clay loam mottled with yellowish brown. A compact, slowly permeable fragipan is at a depth of about 18 inches.

Representative profile:

0 to 8 inches, grayish-brown, friable silt loam.
8 to 18 inches, pale-brown, slightly firm silty clay loam mottled with yellowish brown; a few, small, round concretions.
18 to 48 inches, light brownish-gray, firm and compact silty clay loam mottled with yellowish brown.

In some places the fragipan is more strongly developed than in others. Depth of the alluvium varies. The surface layer in some profiles is grayish brown, and the subsoil is grayer than in the profile described.

Taft soils have moderately high moisture-supplying capacity. They are very strongly acid, moderately low in natural fertility, and easily tilled.

These soils are mostly in the eastern part of the county in the flatwoods section near the area known as the Knobs. Small areas are in the northwestern part of the county on the broad, flat terraces of major streams.

Nearly all areas have been cleared and used for cultivated crops, but yields are low unless the soils are drained. Suitable grasses have been established on most of the undrained areas, and these areas are now grazed. In some places grasses have reseeded naturally, and these areas are also grazed. High yields of corn can be obtained if tile drains and other practices are used to improve drainage.

Taft silt loam (Ta).—This is the only Taft soil mapped in the county. It is a moderately deep, somewhat poorly drained soil of terraces. It lies several feet above the level of the streams. This soil formed in old alluvium washed from soils of the uplands that were derived mainly from limestone.

The plow layer is dark grayish-brown, friable silt loam. The subsoil is pale-brown, slightly firm silty clay loam that is mottled with yellowish brown and is slightly compact and gleyed at a depth of about 18 inches. This gleyed layer is finer textured and more gleyed with increasing depth.

This soil has moderately high moisture-supplying capacity. It is strongly acid, low in organic matter, moderately low in natural fertility, and easy to till. Permeability of the subsoil is moderate. This soil has a high water table. It is not susceptible to erosion.

Wetness and the lack of natural drainageways to remove surface water restrict the kinds of plants that can be grown on this soil. Grasses and legumes that tolerate

water make the best growth. If this soil is drained and practices that maintain fertility and the supply of organic matter are used, row crops can be grown year after year. (Capability unit IIIw–1; woodland suitability group 2)

Tilsit Series

The Tilsit series consists of moderately deep, moderately well drained soils of uplands formed in residuum from acid shale. Most of the areas are on broad, nearly flat ridgetops, but a few areas are level and lie between the crests of the ridges and the floors of the valleys. The surface layer is generally dark grayish-brown, friable silt loam, and the subsoil is slightly firm silty clay loam that grades to firm silty clay in the lower part. The lower part of the subsoil contains a mottled yellowish-brown and grayish-brown layer that is compact and slowly permeable. The substratum is mottled yellowish-brown and olive-gray, very firm, massive clay.

Representative profile:

0 to 8 inches, dark grayish-brown silt loam.
8 to 20 inches, yellowish-brown, slightly firm silty clay loam that grades to brownish-yellow, firm silty clay at a depth of about 14 inches.
20 to 26 inches, mottled yellowish-brown and grayish-brown, firm, compact silty clay; a few, small, round, dark concretions; much soft concretionary material.
26 to 48 inches, mottled yellowish-brown and olive-gray, very firm clay; massive.

In some places the upper part of the subsoil is light yellowish brown or brownish yellow. Depth to the underlying black shale ranges from 30 to 60 inches.

Tilsit soils have moderately high moisture-supplying capacity. They are extremely acid, medium in organic matter, medium in natural fertility, and easily tilled.

These soils are in the extreme southeastern part of the county in an area that extends from the vicinity of Trapp to near Kiddville. Most of the acreage has been cleared and was used for cultivated crops at one time. Now, the areas are generally used for pasture made up of low-grade, native grasses. A few areas are in corn. Some abandoned fields have reverted to brushy pastures or to hardwood trees of low quality.

Tilsit silt loam, 2 to 6 percent slopes (TsB).—This is the only Tilsit soil mapped in the county. It is a moderately deep, moderately well drained soil of the uplands and is underlain by acid shale. Most of this soil is on broad ridgetops in rough, broken areas, but a small acreage is on flats that lie between the crests of ridges and the streams.

The plow layer is dark grayish-brown, friable silt loam. The subsoil is yellowish brown in the upper part and has a mottled yellowish-brown and grayish-brown, compact, slowly permeable layer at a depth of about 20 inches. Mottled yellowish-brown and olive-gray, massive clay is at a depth of approximately 26 inches.

This soil has moderately high moisture-supplying capacity. It is extremely acid, medium in organic matter, medium in natural fertility, and easy to till. Permeability of the subsoil is moderate. The hazard of erosion is moderately low.

Crops and forage plants that require a deep root zone or that are not tolerant of an acid soil do not grow well on this soil. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–7; woodland suitability group 7)

Trappist Series

The Trappist series consists of moderately deep, well-drained soils of the uplands that formed in residuum from black, acid shale. These soils are on the crests of ridges and on the sides of gentle slopes in rough, broken areas. Their surface layer is generally very dark grayish-brown, friable silt loam. The subsoil is brown, slightly firm silty clay loam that grades to reddish-brown, firm silty clay in the lower part. The substratum is reddish-brown, firm clay that is mottled with gray.

Representative profile:

0 to 9 inches, very dark grayish-brown, friable silt loam.
9 to 14 inches, dark-brown, friable silt loam; a few small flecks of black shale.
14 to 27 inches, reddish-brown, firm silty clay that is mottled with olive gray in the lower part; the number of small, black fragments of shale increases with increasing depth.

In some places the lower part of the subsoil and the substratum are yellowish red.

Trappist soils have moderately high to high moisture-supplying capacity. They are extremely acid, moderately high to high in natural fertility, and easily tilled.

These soils are in the southeastern part of the county in an area that extends from the vicinity of Trapp to near Kiddville. Most of the acreage has been cleared and used for cultivated crops. Now, burley tobacco is the main crop, but corn is also an important crop. The remaining acreage is mostly in hay of Korean lespedeza or in pastures that are somewhat improved. A few abandoned fields have reverted to Virginia pine and other trees.

Trappist silt loam, 2 to 6 percent slopes (TtB).—This is a moderately deep, well-drained soil of the uplands that is underlain by acid shale. It is on broad ridgetops in rough, broken areas.

The plow layer is generally very dark grayish-brown, friable silt loam. The subsoil is dark-brown, friable silt loam and is at a depth of about 9 inches. At a depth of approximately 14 inches is reddish-brown silty clay that is mottled with olive gray at a depth of about 24 inches. Depth to the substratum of the highly weathered, dark reddish-brown shale is about 30 inches. In about one-fourth of the acreage, part of the surface layer has been removed by erosion.

Trappist silt loam, 2 to 6 percent slopes, has high moisture-supplying capacity. It is extremely acid, medium in organic matter, moderately high in natural fertility, and easily tilled. Permeability of the subsoil is moderately slow. The hazard of erosion is moderately low.

Most locally grown row crops and pasture grasses are suited to this soil, but legumes that require a nearly neutral soil do not grow well. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIe–1; woodland suitability group 9).

Trappist silt loam, 6 to 12 percent slopes, eroded (TtC2).—This moderately deep, well-drained soil of the uplands is underlain by acid shale. It is on gentle side slopes in rough, broken areas.

The plow layer is grayish-brown, friable silt loam. The subsoil is dark-brown, friable silt loam. At a depth of about 10 inches, it grades to reddish-brown silty clay that is mottled with olive gray at a depth of about 18 inches. Depth to the substratum of highly weathered, dark reddish-brown shale is about 30 inches. In about one-seventh of the acreage, the slope is slightly steeper than 12 percent.

Trappist silt loam, 6 to 12 percent slopes, eroded, has moderately high moisture-supplying capacity. It is extremely acid, low in organic matter, medium in natural fertility, and easily tilled. Permeability of the subsoil is moderate. The hazard of further erosion is moderate.

Most locally grown row crops and pasture grasses are suited to this soil, but legumes that require a nearly neutral soil do not grow well. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–7; woodland suitability group 9)

Woolper Series

The Woolper series consists of deep, moderately well drained to well drained soils on toe slopes. These soils formed in colluvium washed from finer textured upland soils underlain by limestone. They are generally along drainageways at the foot of steep slopes. Their surface layer is generally very dark grayish-brown, friable silty clay loam. The subsoil is very dark grayish-brown silty clay. It grades to dark-brown, firm clay that is mottled with yellowish brown in the lower part. The substratum is olive-brown and yellowish-brown, massive clay.

Representative profile:

0 to 9 inches, very dark grayish-brown silty clay loam.
9 to 15 inches, very dark grayish-brown silty clay.
15 to 32 inches, dark-brown clay that is mottled with yellowish brown in the lower part.
32 inches +, mottled light olive-brown, yellowish-brown, and olive, firm clay; massive.

These soils have very high moisture-supplying capacity. They are mildly alkaline, high in organic matter, high in natural fertility, and somewhat difficult to till. Permeability of the subsoil is moderately slow.

Woolper soils are mostly in that half of the county that lies east of Winchester. All of these soils have been cleared. They are used mainly for row crops, but some hay and pasture crops are grown. A few acres are eroded, and these areas have reverted to brushy pastures or to cedar.

Woolper silty clay loam, 6 to 12 percent slopes (WoC).—This is the only Woolper soil mapped in the county. It is a deep, well drained to moderately well drained soil on gentle toe slopes in terrain that is hilly. This soil is associated with soils of the uplands that are underlain by limestone.

The plow layer is very dark grayish-brown, friable silty clay loam. The subsoil of very dark grayish-brown silty clay is at a depth of about 9 inches. At a depth of approximately 15 inches is dark-brown clay that is mottled with yellowish brown at a depth of about 24 inches. A substratum of mottled light olive-brown, yellowish-brown, and olive, firm, massive clay is at a depth of about 30 inches.

Mapped with this soil are a few areas of a soil that has slopes of less than 6 percent and a few areas of a soil that has slopes of slightly more than 12 percent. Also included are some areas in which the color of the profile is more nearly olive brown than that of the representative profile described and is somewhat more mottled.

Woolper silty clay loam, 6 to 12 percent slopes, has high moisture-supplying capacity. It is mildly alkaline, medium in organic matter, high in natural fertility, and slightly difficult to till. Permeability of the subsoil is moderately slow. The hazard of erosion is moderate.

Generally, all locally grown row crops, pasture grasses, and legumes are well suited to this soil. There are a few places where legumes that require a soil that is well aerated and that roots can penetrate easily do not grow well. If this soil is cultivated, practices are needed that effectively control runoff and erosion. (Capability unit IIIe–4; woodland suitability group 8)

Use of the Soils for Crops and Pasture

This section gives the relative suitability of the soils for growing different crops and tells how they should be managed for sustained good yields. First is a discussion of general practices of management that apply to all of the soils. Next the system of soil capability classification used by the Soil Conservation Service is explained. Then management of groups of soils, the capability units, is described. Following this, estimated average acre yields for each soil are given for commonly grown crops and pasture; the yields given are those that can be obtained under a defined high level of management.

General Management

Differences among the soils of Clark County in slope, soil texture, depth to rock, fertility, wetness, and other properties result in differences in the crops that are suited to the soils and in the management needed. Each farm has its own soil pattern and therefore its own management problems, but some principles of farm management are general enough to apply to all the farms of the county. In this subsection general principles of management that are suitable for crops, pastures, trees, or wildlife are summarized and are to be considered along with the practices suggested in each capability unit.

Fertility needs.—Most soils in the county are naturally acid, moderately low in organic matter and available nitrogen, medium to low in potassium, and medium to high in available phosphorus. The soils generally respond well to additions of lime and fertilizer.

For good information about how much fertilizer and lime to add, the soils should be tested. The amounts of fertilizer and lime needed depend on the results of soil tests, the crops to be grown, the past cropping history, and the level of yield desired.

Soil samples taken for laboratory testing should consist of a single soil type, and each sample should represent no more than 10 acres. The soil map is a good guide for taking soil samples. Detailed information and instructions about taking soil samples for tests can be obtained from the county extension agent.

Maintain organic matter.—Organic matter helps to promote a good, mellow surface soil, and it also provides an important source of nitrogen for crops. Most of the better agricultural soils of Clark County were originally medium in content of organic matter, and it is important to keep building organic matter to a level as close to the original content as feasible.

Organic matter can be maintained by adding farm manure, by leaving plant residues on the soil, and by encouraging vigorous growth of plants that have an extensive root system. Maintaining organic matter in the soil is made easier by adding lime and fertilizer to promote higher crop yields.

Tillage.—The two major purposes of tillage are to prepare a seedbed and to control weeds. The planting, cultivating, and harvesting of crops generally break down the structure of the soil. Therefore, overcultivation should be avoided. Adding organic matter and growing sod crops help to restore the structure of the soil.

Some of the more clayey soils puddle during a heavy rain. As a result, the surface is sealed, infiltration of water is reduced, and runoff and erosion are increased. Tillage implements that stir the surface layer, but that leave crop residues on the top as a mulch, help protect the surface from the beating of the rain. Thus, the sealing of the surface is retarded, infiltration of water is increased, and runoff and erosion are reduced. The mulch also helps control loss of water through evaporation.

Soils high in clay become cloddy if worked when wet, and they can be worked only within a narrow range of moisture content. If some soils are plowed frequently to the same depth, a compacted layer, termed a plowpan or plowsole, often develops just below the plow depth. Development of this compacted layer can be avoided if sod crops are grown more often or if the plow depth is varied slightly from time to time.

Control erosion.—All of the sloping soils in Clark County are subject to erosion if they are cultivated. Sheet erosion causes loss of material from the surface layer, which generally contains most of the organic matter and plant nutrients in the soil. If proper measures are not applied to control erosion, gullies form in areas that receive large amounts of runoff. As a result, some areas are severely gullied and are no longer suitable for crops.

Most erosion on sloping soils that are cultivated occurs during the period when the crop is growing. Therefore, a cropping system that keeps losses of soil and water to a minimum and that is supported by one or more other practices to control erosion should be used. Suitable supporting practices are cultivating on the contour, terracing, stripcropping, constructing diversions, installing grassed waterways, using minimum tillage, leaving crop residues on the surface, growing cover crops, and applying enough fertilizer for high yields (fig. 13).

Different combinations of practices are needed to control erosion effectively on different kinds of soils. Also, several different combinations would be equally effective on the same soil. The factors to consider in determining the practices or combinations of practices that will be effective on a particular soil are the relative total

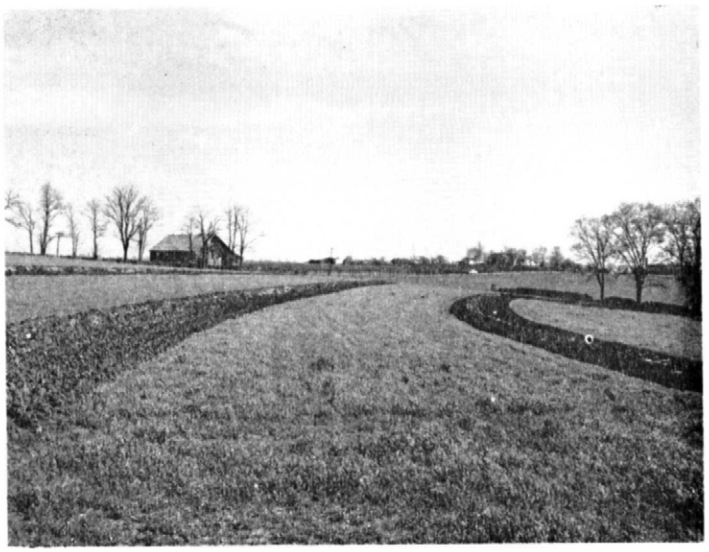

***Figure 13.*—Terraces under construction prior to plowing under the small grain cover crop.**

effectiveness of each of the practices applied to reduce erosion, the relative erodibility of the soils, the characteristics and distribution of rainstorms that cause erosion during the year, the length and steepness of the slopes, and the average annual loss of the soil material that can be tolerated. Except for the relative total effectiveness of each practice used to control erosion, all these factors depend on the kind of soil and the climate; and consequently, they do not vary appreciably for any one kind of soil.

The practices used can be applied singly or in combination, depending on the size of the erosion problem and the desires of the user. For example, a cropping system of 1 year of a row crop followed by 2 years of meadow crops, with enough fertilizer for high yields, but without any other practices to control erosion, keeps losses of soil material within permissible limits. If a shorter cropping system is desired, such as 1 year each of a row crop and a meadow crop, it would be necessary to also use one or more other practices that help control erosion (fig. 14). Assistance in selecting the proper combination of practices that will effectively control erosion on a particular farm can be obtained from the local staff of the Soil Conservation Service.

Drainage.—Yields of most crops, particularly of cultivated crops, can be increased on wet soils by removing excess water. Excess moisture prevents preparation of the seedbed at the correct time and delays planting. It also is likely to damage the roots of most common crops or to drown out the crop. Open ditches are generally used to remove excess water. Tile drains provide more satisfactory drainage in some places, but they are more expensive. Figure 15 shows a bucket-type ditcher that is used to dig a trench for drainage tile.

Soils underlain by a claypan or a fragipan are generally difficult to drain, and their response to management after drainage is poor. In soils that contain a pan, tile drains are only slightly effective and open ditches are effective only if they intercept water that moves later-

Figure 14.—**Constructing a diversion ditch that will help protect well-drained soils on a bottom from damage caused by runoff from the hillsides.**

ally on top of the pan. Even if the soil is drained, the pan layer may prevent high yields of corn and other cultivated crops. Wet soils that are deep and permeable generally are highly productive when drained if they are well fertilized and limed. A drainage system of ditches or tiles cannot be installed on these deep, permeable soils, however, unless a suitable outlet is available.

Figure 15.—**Self-propelled, bucket-type ditcher used to dig a trench for drainage tile.**

Capability Groups of Soils

The capability classification is a grouping that shows, in a general way, how suitable soils are for most kinds of farming. It is a practical grouping based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment.

In this system all the kinds of soil are grouped at three levels, the capability class, subclass, and unit. The eight capability classes in the broadest grouping are designated by Roman numerals I through VIII. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, shallow. or otherwise limited that they do not produce worthwhile yields of crops, forage, or wood products.

The subclasses indicate major kinds of limitations within the classes. Within most of the classes there can be up to four subclasses. The subclass is indicated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* means that water in or on the soil will interfere with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage) ; *s* shows that the soil is limited mainly because it is shallow, droughty, or stony, and *c*, used in only some parts of the country, indicates that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few or no limitations. Class V can contain, at the most, only subclasses *w*, *s*, and *c*, because the soils in it have little or no susceptibility to erosion but have other limitations that limit their use largely to pasture, range, woodland, or wildlife.

Within the subclasses are the capability units, groups of soils enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for many statements about management of soils. Capability units are generally identified by numbers assigned locally, for example, IIe–1 or IIIe–2.

Soils are classified in capability classes, subclasses, and units in accordance with the degree and kind of their permanent limitations; but without consideration of major and generally expensive landforming that would change the slope, depth, or other characteristics of the soil; and without consideration of possible but unlikely major reclamation projects.

The eight classes in the capability system, and the subclasses and units in this county, are described in the list that follows.

Class I.—Soils that have few limitations that restrict their use.

- Capability unit I–1: Nearly level, well-drained soils on bottom lands.
- Capability unit I–2: Nearly level, moderately well drained soil on bottom lands.
- Capability unit I–3: Nearly level, well-drained soils on low stream terraces, toe slopes, and uplands.

Class II.—Soils that have some limitations that reduce the choice of plants or require moderate conservation practices.
- Subclass IIe: Soils subject to moderate erosion if they are not protected.
  - Capability unit IIe–1: Gently sloping, well-drained soils on stream terraces, colluvial slopes, and uplands; silty surface layer; permeable subsoil.
  - Capability unit IIe–2: Gently sloping, well-drained soils on uplands and toe slopes; moderately permeable, clayey subsoil.
  - Capability unit IIe–6: Gently sloping, moderately well drained soil on uplands and terraces; compact layer in the lower part of the subsoil.
  - Capability unit IIe–7: Gently sloping, moderately well drained soils on uplands and terraces; compact layer in the lower part of the subsoil.
- Subclass IIw: Soils that have moderate limitations because of excess water.
  - Capability unit IIw–1: Nearly level, moderately well drained soils on uplands and terraces; compact layer in the lower part of the subsoil.
  - Capability unit IIw–4: Nearly level, somewhat poorly drained soils on bottom lands.
- Subclass IIs: Soils that have moderate limitations because of moisture capacity, tilth, or stones.
  - Capability unit IIs–5: Nearly level, well-drained soil on bottom lands; shallow to ledge rock or rubbly limestone.

Class III.—Soils that have severe limitations that reduce the choice of plants, require special conservation practices, or both.
- Subclass IIIe: Soils subject to severe erosion if they are cultivated and not protected.
  - Capability unit IIIe–1: Sloping, well-drained soils on stream terraces, colluvial slopes, and uplands; permeable subsoil.
  - Capability unit IIIe–2: Sloping, well-drained soils on uplands and toe slopes; moderately permeable, clayey subsoil.
  - Capability unit IIIe–4: Sloping, moderately well drained to somewhat excessively drained soils on uplands and toe slopes; permeability of the clayey subsoil is moderately slow.
  - Capability unit IIIe–7: Sloping, well-drained soil on uplands; moderately permeable, clayey subsoil.
  - Capability unit IIIe–8: Sloping, moderately well drained soils on uplands; compact layer in the lower part of the subsoil.
  - Capability unit IIIe–9: Sloping, moderately well drained soil on terraces; compact layer in the lower part of the subsoil.
  - Capability unit IIIe–10: Gently sloping, well-drained to somewhat excessively drained soils on uplands; moderately permeable, clayey subsoil.
- Subclass IIIw: Soils that have severe limitations because of excess water.
  - Capability unit IIIw–1: Nearly level, somewhat poorly drained soil of the terraces; compact layer in the subsoil.
  - Capability unit IIIw–2: Nearly level, poorly drained soil on uplands; dark-colored surface layer.
  - Capability unit IIIw–5: Nearly level, poorly drained soil on bottom lands; friable plow layer.
  - Capability unit IIIw–7: Nearly level, poorly drained to somewhat poorly drained soils on bottom lands; dark-colored surface layer.
- Subclass IIIs: Soils that have severe limitations of moisture capacity or tilth.
  - Capability unit IIIs–1: Nearly level, excessively drained, sandy soil on bottom lands.

Class IV.—Soils that have very severe limitations that restrict the choice of plants, require very careful management, or both.
- Subclass IVe: Soils subject to very severe erosion if they are cultivated and not protected.
  - Capability unit IVe–1: Strongly sloping, well-drained soils on terraces, toe slopes, and uplands; permeable subsoil.
  - Capability unit IVe–3: Strongly sloping, well-drained soils on uplands and colluvial slopes; moderately permeable, clayey subsoil.
  - Capability unit IVe–4: Strongly sloping, somewhat excessively drained soil on uplands; slowly permeable, clayey subsoil.
  - Capability unit IVe–6: Sloping, well-drained to somewhat excessively drained soils on uplands; firm, moderately permeable, clayey subsoil.
  - Capability unit IVe–10: Sloping, somewhat excessively drained soil; firm, plastic, slowly permeable, clayey subsoil.
  - Capability unit IVe–11: Sloping, well-drained soils on uplands; very firm, slowly permeable, clayey subsoil.
- Subclass IVw: Soils that have very severe limitations for cultivation because of excess water.
  - Capability unit IVw–1: Nearly level, poorly drained soils on terraces; compact layer in the upper part of the subsoil.

Class V.—Soils not likely to erode but that have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife food and cover. (None in Clark County.)

Class VI.—Soils that have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover.
- Subclass VIe: Soils severely limited, chiefly by risk of erosion, if protective cover is not maintained.
  - Capability unit VIe–1: Strongly sloping to moderately steep, well-drained to somewhat excessively drained soils on uplands and toe slopes; eroded; silty surface layer and clayey subsoil.

Capability unit VIe–2: Strongly sloping to moderately steep, well-drained soils on uplands; severely eroded; silty surface layer and clayey subsoil.

Capability unit VIe–3: Strongly sloping to moderately steep, somewhat excessively drained soils on uplands; severely eroded.

Capability unit VIe–4: Sloping to strongly sloping, well-drained to somewhat excessively drained soils on uplands; severely eroded.

Capability unit VI–8: Strongly sloping, somewhat excessively drained soils on uplands; shallow to heavy, alkaline clay shale.

Subclass VIs: Soils generally unsuitable for cultivation and limited for other uses by their moisture capacity, stones, or other features.

Capability unit VIs–1: Sloping to strongly sloping, somewhat excessively drained soils on uplands; moderately eroded; shallow to limestone.

Capability unit VIs–2: Sloping, somewhat excessively drained soil on uplands; shallow to limestone; severely eroded.

Capability unit VIs–3: Sloping, excessively drained soil on uplands; shallow to acid shale.

Capability unit VIs–5: Sloping, somewhat excessively drained soil on uplands; severely eroded; shallow over soft, calcareous shale.

Class VII.—Soils that have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife.

Subclass VIIe: Soils very severely limited, chiefly by risk of erosion, if protective cover is not maintained.

Capability unit VIIe–1: Moderately steep to steep, well-drained to somewhat excessively drained soils on uplands; eroded.

Capability unit VIIe–2: Moderately steep to steep, somewhat excessively drained soils that are shallow, rocky, and clayey.

Capability unit VIIe–4: Gullied land that is severely eroded and marked by an intricate pattern of gullies.

Subclass VIIs: Soils very severely limited by moisture capacity, stones, or other soil features.

Capability unit VIIs–1: Moderately steep to steep, excessively drained soils on uplands; extremely acid.

Capability unit VIIs–2: Strongly sloping to moderately steep, excessively drained soils on uplands; very rocky and clayey; eroded.

Capability unit VIIs–3: Sloping to steep soils on uplands; very shallow, rocky, or shaly; mostly severely eroded.

Capability unit VIIs–5: Land on which rock outcrop, mostly limestone, covers from 50 to 90 percent of the surface.

Class VIII.—Soils and landforms that have limitations that preclude their use for commercial production of plants and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes. (None in Clark County.)

Management by Capability Units

Soils that are in the same capability unit have about the same limitations and similar risks of damage. The soils in any one unit, therefore, need about the same kind of management. The capability units are described in the pages that follow. The soils in each unit are listed, and suitable crops and management for all the soils in the unit are suggested.

Capability unit I–1

In this unit are nearly level, well-drained soils on bottom lands. These soils formed in young alluvium washed mainly from soils of the uplands underlain by limestone. They have a friable surface layer and a deep root zone. These soils are high to very high in moisture-supplying capacity, high in natural fertility, and neutral to slightly acid. They are easily tilled, and they give good response to fertilizer. Lime is generally not required. These soils are—

Egam silt loam.
Huntington silt loam.

These soils occupy about 4 percent of the county. They are well suited to all the crops and pasture plants grown in the county. Tobacco, corn, and small grains produce high yields under a high level of management.

Cultivated crops can be grown year after year if practices that maintain tilth and fertility are used. Flooding during prolonged periods of excessive rainfall, and in some places flash flooding during the growing season, occasionally damages crops grown on part of the acreage.

Capability unit I–2

Lindside silt loam is the only soil in this unit. It is nearly level and moderately well drained, and it is on bottom lands. This soil formed in young alluvium washed mainly from soils of the uplands underlain by limestone. It has a friable surface layer and a deep root zone. This soil is very high in moisture-supplying capacity, high in natural fertility, and slightly acid. It gives good response to fertilizer, and it is easy to till.

This soil occupies about 1½ percent of the county. It is well suited to all the crops and pasture plants grown in the county. Tobacco, corn, and small grains produce high yields under a high level of management. Tobacco and other crops of high value are seldom grown, however, because of the danger of overflow during periods of excessive rainfall.

Slight wetness often delays tillage in spring, and internal wetness restricts the use of this soil for alfalfa or tobacco. Tile drains are effective in controlling the wetness. This soil is not susceptible to erosion. Row crops can be grown year after year if practices that maintain good tilth and productivity are used.

Capability unit I–3

In this unit are nearly level, well-drained soils on low stream terraces, toe slopes, and uplands. These soils formed in parent material derived from limestone. They have a friable plow layer and a deep root zone. These soils are very high in moisture-supplying capacity, high in natural fertility, and medium acid to strongly acid.

They give good response to fertilizer and lime, and they are easily tilled. These soils are—

Armour silt loam, 0 to 2 percent slopes.
Ashton silt loam, 0 to 2 percent slopes.
Hagerstown silt loam, 0 to 2 percent slopes.
Maury silt loam, 0 to 2 percent slopes.

These soils occupy six-tenths of 1 percent of the county. They are well suited to all the crops and pasture plants grown in the county. Tobacco, corn, and small grains produce high yields under a high level of management.

These soils are not susceptible to erosion. Cultivated crops can be grown year after year if practices that maintain good tilth and productivity are used.

Capability unit IIe-1

Gently sloping, well-drained soils on stream terraces, colluvial slopes, and uplands are in this unit. Most of these soils formed in material from limestone, but the Trappist soil formed in material from black, acid shale, the Allegheny from sandstone, and the Culleoka from siltstone. All of the soils have a friable plow layer. Except for the Trappist soil, which has a subsoil of firm silty clay, the subsoil is brownish or reddish and is permeable. These soils have a deep or moderately deep root zone. They are high to very high in moisture-supplying capacity, high to moderately high in natural fertility, and medium acid to strongly acid. The soils give good response to fertilizer and lime. They are easily tilled. These soils are—

Allegheny loam, 2 to 6 percent slopes.
Armour silt loam, 2 to 6 percent slopes.
Ashton silt loam, 2 to 6 percent slopes.
Culleoka silt loam, 2 to 6 percent slopes.
Hagerstown silt loam, 2 to 6 percent slopes.
Maury silt loam, 2 to 6 percent slopes.
Maury silt loam, 2 to 6 percent slopes, eroded.
Shelbyville silt loam, 2 to 6 percent slopes.
Shelbyville silt loam, 2 to 6 percent slopes, eroded.
Trappist silt loam, 2 to 6 percent slopes.

These soils occupy nearly 8 percent of the county. Most of the soils are well suited to the crops and pasture plants grown. Tobacco, corn, and small grains produce moderately high yields under a high level of management.

These soils can be cultivated year after year if proper practices that help to control erosion are used. If corn is grown continuously, plow-plant the corn and interseed a cover crop. Use contour tillage and establish sod waterways. For lower levels of management, a cropping system that keeps the soil in close-growing crops at least one-third of the time is necessary for the control of erosion. A suitable cropping system under a lower level of management is 1 year of corn, with a small grain as a cover crop, followed by 2 years of meadow. All tillage should be on the contour.

Capability unit IIe-2

In this unit are gently sloping, well-drained soils on uplands and toe slopes. These soils formed in material derived from limestone. They have a friable plow layer, and their subsoil is moderately permeable, firm, plastic silty clay and clay. These soils have a deep root zone. They are high to very high in moisture-supplying capacity, high to moderately high in natural fertility, and medium acid to strongly acid. The soils give good response to fertilizer and lime. In a few places chert fragments interfere with tillage, but the soils are generally easily tilled. These soils are—

Beasley silt loam, 2 to 6 percent slopes, eroded.
Brashear silt loam, 2 to 6 percent slopes.
Braxton silt loam, 2 to 6 percent slopes.
Hampshire silt loam, 2 to 6 percent slopes.
Hampshire silt loam, 2 to 6 percent slopes, eroded.
Loradale silt loam, 2 to 6 percent slopes.
Lowell silt loam, 2 to 6 percent slopes.
Lowell silt loam, 2 to 6 percent slopes, eroded.

These soils occupy nearly 10 percent of the county. They are well suited to all the crops and pasture plants grown in the county. Tobacco, corn, and small grains produce high yields on the soils under a high level of management. Bluegrass, smooth bromegrass, timothy, alfalfa, and Kobe lespedeza grow successfully under a high level of management. Kentucky 31 tall fescue, red clover, Korean lespedeza, and sericea lespedeza are well suited under a medium or high level of management.

Cultivated crops can be grown year after year on these soils if a high level of management is used. Installing a complete water-disposal system, cultivating on the contour, and interseeding a cover crop at the time of the last cultivation are practices that effectively control runoff and erosion. If a medium level of management is used, close-growing crops need to be grown at least one-third of the time. A suitable cropping system under medium management is 1 year of corn, followed by a cover crop of small grain, and then 2 years of meadow. All tillage should be on the contour.

Capability unit IIe-6

Gently sloping, moderately well drained soils on uplands and terraces are in this unit. These soils have a friable plow layer and a compact, slowly permeable zone in the lower part of the subsoil. They have a moderately deep root zone. They are moderately high in moisture-supplying capacity, moderately high in natural fertility, and medium acid to strongly acid. The soils give good response to fertilizer and lime. They can be cultivated throughout a wide range of moisture content without clodding or crusting. These soils are—

Bedford silt loam, 2 to 6 percent slopes.
Captina silt loam, 2 to 6 percent slopes.
Mercer silt loam, 2 to 6 percent slopes.
Mercer silt loam, 2 to 6 percent slopes, eroded.

These soils occupy about 2 percent of the county. They are well suited to most crops and pasture plants grown in the county. Tobacco, corn, and small grains produce moderately high yields under a high level of management. Bluegrass, orchardgrass, timothy, sericea lespedeza, and alfalfa also can be grown if a high level of management is used.

Capability unit IIe-7

In this unit are gently sloping, moderately well drained soils on uplands and terraces. These soils formed in material derived from acid shale and sandstone. They have a friable plow layer and a compact, slowly permeable zone in the lower part of the subsoil. These

soils have a moderately deep root zone. They are high in moisture-supplying capacity, medium in natural fertility, and extremely acid. Their response to fertilizer and lime is fairly good. The Monongahela soil is especially well suited to cultivation, and it can be cultivated throughout a wide range of moisture content without clodding or crusting. These soils are—

Monongahela loam, 2 to 6 percent slopes.
Tilsit silt loam, 2 to 6 percent slopes.

These soils occupy about 7 percent of the county. They are suited to most of the crops and pasture plants grown in the county. Cultivated crops can be grown year after year under a high level of management. Tobacco, corn, and small grains produce moderate yields on these soils under a high level of management. Bluegrass, orchardgrass, timothy, and sericea lespedeza can also be grown if a high level of management is used. Kentucky 31 tall fescue, redtop, alsike clover, ladino clover, and Korean lespedeza are well suited under a medium or high level of management.

Installing a system to dispose of excess water, using minimum tillage, managing crop residues, and interseeding cover crops the last time the crop is cultivated are practices that help control runoff and erosion. Seasonal wetness can be controlled in places by installing tile drains. In places diversion ditches on higher areas reduce erosion caused by hillside runoff. If a medium level of management is used, close-growing crops should be kept on these soils at least one-third of the time. A suitable cropping system under medium management is 1 year of corn, followed by a cover crop of small grain, and then meadow for 2 years. All tillage should be on the contour.

Capability unit IIw–1

Nearly level, moderately well drained soils on uplands and terraces are in this unit. These soils formed in material from limestone. They have a friable plow layer and a compact, slowly permeable zone in the lower part of the subsoil. These soils have a moderately deep root zone. They are moderately high in moisture-supplying capacity, high in natural fertility, and strongly acid to medium acid. They give good response to fertilizer and lime, and they are easily tilled. These soils are—

Bedford silt loam, 0 to 2 percent slopes.
Captina silt loam, 0 to 2 percent slopes.

These soils occupy about four-tenths of 1 percent of the county. They are suited to most of the crops and pasture plants grown. Tobacco, corn, and small grains produce moderately high yields on these soils under a high level of management. Bluegrass, orchardgrass, timothy, and ladino clover can also be grown if a high level of management is used. Kentucky 31 tall fescue, red clover, Kobe lespedeza, and Korean lespedeza are well suited under a medium or high level of management.

These soils are not susceptible to erosion, but in a few places high water damages crops. Controlling excessive internal wetness is the main problem. Diversion ditches are needed in places on hillsides to prevent water from accumulating. If practices are used that maintain natural fertility, the supply of organic matter, and good tilth, these soils can be used for row crops year after year.

Capability unit IIw–4

Newark silt loam is the only soil in this unit. It is a nearly level, somewhat poorly drained soil on bottom lands. This soil formed in young alluvium washed mainly from upland soils underlain by limestone. The plow layer is friable silt loam, and the subsoil is mottled gray and grayish-brown silt loam. This soil has a deep root zone. It is very high in moisture-supplying capacity, moderately high in natural fertility, and slightly acid. It gives good response to fertilizer and lime, and it is easily tilled.

This soil occupies about four-tenths of 1 percent of the county. It is better suited to crops and pasture plants that tolerate wetness than to other kinds of plants. Corn, tobacco, and small grains produce moderately high yields on this soil under a high level of management. Bluegrass, smooth bromegrass, and orchardgrass can also be grown under a high level of management. Kentucky 31 tall fescue, redtop, reed canarygrass, timothy, alsike clover, ladino clover, Kobe lespedeza, and Korean lespedeza are well suited under a medium or high level of management.

This soil is not susceptible to erosion, and it can be cultivated year after year if practices that maintain fertility and good tilth are used. For best yields of most crops, practices that control water are required. Installing diversion ditches at the foot of adjacent upland slopes prevents excess surface water from accumulating. Tile drains can be used to remove excess internal water.

If this soil is drained, alfalfa can be grown, but the stands are short lived. Tobacco can also be grown if the soil is drained. It makes moderately good yields, but it is likely to be damaged by flooding.

Capability unit IIs–5

Huntington silt loam, shallow, is the only soil in this unit. It is a nearly level, well-drained soil on bottom lands, and it is shallow to ledge rock or rubbly limestone. This soil formed in young alluvium washed from upland soils underlain by limestone. The plow layer is dark brown and friable. The subsoil is brown or dark yellowish-brown silt loam. In most places there is flaggy and rubbly limestone throughout the profile.

This soil has a moderately deep root zone. It is moderately high in moisture-supplying capacity, high in natural fertility, and neutral in reaction. It gives fair response to fertilizer and lime. Stones interfere with tillage, but good tilth is easily maintained. The soil can be cultivated throughout a wide range of moisture content without clodding or crusting.

This soil occupies about three-tenths of 1 percent of the county. It is suited to most crops and pasture plants grown in the county. Tobacco, corn, and small grains produce moderately high yields under a high level of management. Smooth bromegrass, orchardgrass, and alfalfa can also be grown if a high level of management is used. Bluegrass, Kentucky 31 tall fescue, timothy, alsike clover, ladino clover, red clover, Kobe lespedeza, Korean lespedeza, and sericea lespedeza are well suited under a medium or high level of management.

This soil is not susceptible to erosion, and it can be cultivated year after year if practices that maintain fertility and good tilth are used. Because of the risk of flash floods during the growing season, however, row crops of high value are seldom grown.

Capability unit IIIe-1

In this unit are sloping, well-drained soils on stream terraces, colluvial slopes, and uplands. These soils formed in material derived from limestone, siltstone, or sandstone. They have a friable plow layer and a brownish or reddish subsoil of firm, permeable silty clay loam or silty clay. These soils have a deep root zone. They are moderately high to very high in moisture-supplying capacity, moderately high to high in natural fertility, and strongly acid to medium acid. The soils give good response to fertilizer and lime, and they are easily tilled. These soils are—

Allegheny loam, 6 to 12 percent slopes, eroded.
Armour silt loam, 6 to 12 percent slopes.
Ashton silt loam, 6 to 12 percent slopes.
Ashton silt loam, 6 to 12 percent slopes, eroded.
Culleoka silt loam, 6 to 12 percent slopes, eroded.
Hagerstown silt loam, 6 to 12 percent slopes, eroded.
Maury silt loam, 6 to 12 percent slopes.
Maury silt loam, 6 to 12 percent slopes, eroded.
Shelbyville silt loam, 6 to 12 percent slopes.
Shelbyville silt loam, 6 to 12 percent slopes, eroded.

These soils occupy about 4 percent of the county. They are well suited to most crops and pasture plants grown in the county. Tobacco, corn, and small grains produce high to moderately high yields under a high level of management. Bluegrass, smooth bromegrass, alfalfa, and alsike clover can also be grown if a high level of management is used. Kentucky 31 tall fescue, orchardgrass, timothy, ladino clover, red clover, Kobe lespedeza, Korean lespedeza, and sericea lespedeza are well suited under a medium or high level of management.

Row crops can be grown as often as one-half of the time on these soils under a high level of management if practices are used that control erosion. The soils are generally too steep for terraces, but stripcropping can be used and the natural waterways established in sod. Other important practices are minimum tillage, crop-residue management, and seeding of a cover crop at the time of the last cultivation. At a medium level of management, close-growing crops should be left on the soils at least three-fourths of the time. A suitable cropping system under medium management is 2 years of corn, followed by 6 years of meadow or pasture. All tillage should be on the contour.

Capability unit IIIe-2

Sloping, well-drained soils on uplands and toe slopes are in this unit. These soils formed in material derived from limestone or acid shale. They have a friable plow layer and a firm, plastic subsoil of silty clay loam to clay that is moderately permeable. These soils have a deep to moderately deep root zone. They are mostly moderately high to very high in moisture-supplying capacity, but a few of the eroded soils are moderately low in moisture-supplying capacity. Natural fertility ranges from moderately high to medium in most of the soils, but a few have moderately low natural fertility. The soils are medium acid to strongly acid. They give good response to fertilizer and lime, and they are easily tilled. These soils are—

Beasley silt loam, 6 to 12 percent slopes, eroded.
Brashear silt loam, 6 to 12 percent slopes, eroded.
Braxton silt loam, 6 to 12 percent slopes, eroded.
Fleming silt loam, 6 to 12 percent slopes, eroded.
Hampshire silt loam, 6 to 12 percent slopes.
Hampshire silt loam, 6 to 12 percent slopes, eroded.
Loradale silt loam, 6 to 12 percent slopes.
Loradale silt loam, 6 to 12 percent slopes, eroded.
Lowell silt loam, 6 to 12 percent slopes.
Lowell silt loam, 6 to 12 percent slopes, eroded.
Muse silt loam, 6 to 12 percent slopes, eroded.

These soils occupy about 16 percent of the county. They are suited to most crops and pasture plants grown in the county. Tobacco, corn, and small grains produce moderate to moderately high yields under a high level of management. Bluegrass, orchardgrass, timothy, alfalfa, alsike clover, sweetclover, and Kobe lespedeza can also be grown if a high level of management is used.

Row crops can be grown as often as one-half of the time under a high level of management, but practices are required that control erosion. Generally, the soils are too steep for terraces, but stripcropping can be used along with sodded waterways. Other practices that are effective in maintaining the productivity of the soils are minimum tillage, crop-residue management, and interseeding a cover crop at the time of the last cultivation. At a medium level of management, close-growing crops should be kept on the soils for at least three-fourths of the time. A suitable cropping system under medium management is 1 year of corn, followed by 3 years of meadow. All tillage should be on the contour.

Capability unit IIIe-4

In this unit are sloping, moderately well drained to somewhat excessively drained soils on uplands and toe slopes. These soils formed in material derived from calcareous siltstone and limestone. They have a slightly firm plow layer and a very firm subsoil of silty clay and clay that has moderately slow permeability. These soils have a moderately deep to deep root zone. They are moderately high to high in moisture-supplying capacity and natural fertility and are mildly alkaline. They give good response to fertilizer. These soils can be tilled only within a narrow range of moisture content. If they are tilled when wet, they clod and crust. These soils are—

Eden silty clay loam, 6 to 12 percent slopes, eroded.
Woolper silty clay loam, 6 to 12 percent slopes.

These soils occupy about 1 percent of the county. They are suited to most crops and pasture plants grown in the county. Tobacco, corn, and small grains produce moderate yields under a high level of management. Ladino clover and Kobe lespedeza can also be grown if a high level of management is used. Bluegrass, smooth bromegrass, Kentucky 31 tall fescue, orchardgrass, timothy, alfalfa, red clover, sweetclover, Korean lespedeza, and sericea lespedeza are well suited under a medium or high level of management.

Cultivated crops can be grown on these soils as often as one-half of the time under a high level of management if practices are used that control erosion. Most of the soils are too steep for terraces, but stripcropping can be used along with sodded waterways. Other practices

that are effective in controlling erosion when the soils are used intensively are minimum tillage, crop-residue management, and interseeding of a cover crop at the time of the last cultivation. At a medium level of management, a cropping system is required that keeps a cover of close-growing crops on the soils 1 year out of 4. Therefore, to maintain good tilth and the content of organic matter in the soils, the row crop should not be grown in successive years. A suitable cropping system under medium management is 1 year of corn, followed by 3 years of meadow. All tillage should be on the contour.

Capability unit IIIe–7

Trappist silt loam, 6 to 12 percent slopes, eroded, is the only soil in this unit. It is a sloping, well-drained soil on uplands. This soil formed in material from acid shale. It has a friable plow layer and a subsoil of reddish silty clay that is moderately permeable. This soil has a moderately deep root zone. It is moderately high in moisture-supplying capacity, medium in natural fertility, and strongly acid. It gives fairly good response to fertilizer and lime, and it is easily tilled.

This soil occupies about six-tenths of 1 percent of the county. It is suited to most crops and pasture plants grown in the county. Tobacco, corn, and small grains produce moderate yields under a high level of management. Orchardgrass, red clover, and Kobe lespedeza can also be grown if a high level of management is used. Kentucky 31 tall fescue, ladino clover, red clover, Korean lespedeza, and sericea lespedeza are well suited under a medium or high level of management.

This soil can be cultivated one-half of the time under a high level of management if practices are used that control erosion. Practices that are effective in controlling erosion when the soil is used intensively are stripcropping along with sodded waterways, crop-residue management, minimum tillage, and interseeding of a cover crop at the time of the last cultivation. At a medium level of management, cropping systems are needed that keep close-growing crops on the soil three-fourths of the time for effective control of erosion. A suitable cropping system under medium management is 1 year of corn, followed by 3 years of meadow. The meadow probably would be best used as pasture the third year. All tillage should be on the contour.

Capability unit IIIe–8

In this unit are sloping, moderately well drained soils on uplands. These soils are underlain by limestone and calcareous shale. They have a friable plow layer and a compact, slowly permeable zone in the lower part of the subsoil. These soils have a moderately deep root zone. Except for the eroded soil, which is moderately low in moisture-supplying capacity, these soils are moderately high in moisture-supplying capacity. They are moderately high in natural fertility and are medium to strongly acid. These soils give good response to fertilizer and lime, and they are easily tilled. These soils are—

Bedford silt loam, 6 to 12 percent slopes.
Mercer silt loam, 6 to 12 percent slopes.
Mercer silt loam, 6 to 12 percent slopes, eroded.

These soils occupy nearly 1 percent of the county. They are suited to most crops and pasture plants grown in the county. Tobacco, corn, and small grains produce moderate yields under a high level of management. Bluegrass, orchardgrass, timothy, reed canarygrass, alsike clover, ladino clover, and red clover can also be grown under a high level of management. Kentucky 31 tall fescue, Kobe lespedeza, Korean lespedeza, and sericea lespedeza are well suited under a medium or high level of management.

If a high level of management is used and the proper plants are selected, these soils can be cultivated one-half of the time without eroding. Practices that help to control erosion under intensive use are minimum tillage, planting buffer strips, stripcropping on long slopes, returning crop residues to the soils, interseeding a cover crop at the time of the last cultivation, and sodding waterways. At a medium level of management, close-growing crops should be kept on the soil three-fourths of the time. A suitable cropping system under medium management is 2 years of corn, followed by 2 years of meadow, and then 4 years of pasture. All tillage should be on the contour.

Capability unit IIIe–9

Monongahela loam, 6 to 12 percent slopes, eroded, is the only soil in this unit. It is a sloping, moderately well drained soil on terraces. It formed in old alluvium washed from soils derived from acid sandstone and shale. It has a friable plow layer and a compact, slowly permeable zone in the lower part of the subsoil. This soil has a moderately deep root zone. It is low in moisture-supplying capacity, medium in natural fertility, and extremely acid. The soil gives fair response to fertilizer and lime, and it is easily tilled. It can be cultivated throughout a wide range of moisture content without crusting or clodding.

This unit occupies about one-tenth of 1 percent of the county. It is suited to most crops and pasture plants grown in the county. Tobacco, corn, and small grains produce moderately low yields under a high level of management. Bluegrass, orchardgrass, timothy, alsike clover, red clover, and Kobe lespedeza can also be grown under a high level of management. Kentucky 31 tall fescue, ladino clover, Korean lespedeza, and sericea lespedeza are well suited under a medium or high level of management.

Under a high level of management, row crops can be grown on this soil one-half of the time if the row crop is not grown more than 2 consecutive years and if practices that control erosion and maintain productivity are used. Stripcropping and buffer strips, along with sodded waterways, should be used instead of terraces because much of the acreage is too steep for a water-disposal system. Runoff can be reduced and the content of organic matter maintained by using minimum tillage, crop-residue management, and interseeding a cover crop. At a medium level of management, close-growing crops should be kept on the soil three-fourths of the time. A suitable cropping system under a medium level of management is 1 year of corn, followed by 3 years of meadow or pasture. All tillage should be on the contour.

Capability unit IIIe–10

In this unit are gently sloping, well-drained to somewhat excessively drained soils on uplands. These soils are underlain by limestone. They have a friable to

slightly firm plow layer and a very firm subsoil of silty clay or clay that is moderately permeable. These soils have a moderately deep root zone. They are high to moderately high in moisture-supplying capacity and natural fertility and are slightly acid. These soils give good response to fertilizer and lime. They are slightly difficult to till, and if cultivated when wet, they will crust and clod. These soils are—

McAfee silt loam, 2 to 6 percent slopes.
McAfee silty clay loam, 2 to 6 percent slopes, eroded.
Salvisa silty clay loam, 2 to 6 percent slopes, eroded.

These soils occupy about 1 percent of the county. They are suited to most crops and pasture plants grown in the county. Tobacco, corn, and small grains produce moderate yields under a high level of management. Orchardgrass, timothy, alfalfa, ladino clover, red clover, and Kobe lespedeza can also be grown under a high level of management. Bluegrass, Kentucky 31 tall fescue, Korean lespedeza, and sericea lespedeza are well suited under a medium or high level of management.

The soils in this unit are suitable for cultivation one-half of the time under a high level of management, but practices are required that control erosion. Practices that reduce runoff and help to control erosion are strip-cropping and terracing, along with sodded waterways, minimum tillage, crop-residue management, and interseeding of cover crops. All tillage should be on the contour.

Capability unit IIIw–1

Taft silt loam is the only soil in this unit. It is a nearly level, somewhat poorly drained soil of the terraces. This soil formed in old alluvium washed from soils underlain by limestone. It has a friable plow layer and a subsoil of pale-brown silty clay loam that is mottled with yellowish brown. A compact layer is in the subsoil. This soil has a moderately deep root zone. It is high in moisture-supplying capacity, moderately low in natural fertility, and strongly acid. It gives fair response to fertilizer and lime, and it is easily tilled.

This soil occupies about three-tenths of 1 percent of the county. Unless it is artificially drained, it is poorly suited to most crops and pasture plants grown in the county. If the soil is drained, and if other practices that build fertility are used, tobacco, corn, and small grains produce moderate to moderately low yields. Orchardgrass, timothy, alsike clover, and red clover can be grown on this soil under a high level of management. Kentucky 31 tall fescue, redtop, reed canarygrass, ladino clover, Kobe lespedeza, and Korean lespedeza are well suited under a medium or high level of management.

Since this soil is not susceptible to erosion, it can be cultivated year after year if practices that maintain fertility and good tilth are used. The soil is low in organic matter. Therefore, if it is cultivated continuously, large amounts of fertilizer are needed, crop residues should be returned to the soil, and a cover crop should be interseeded in the rows. Under a medium level of management, a cropping system is required that keeps close-growing crops on the soil 1 year out of 3.

Capability unit IIIw–2

Burgin silty clay loam is the only soil in this unit. It is nearly level and very poorly drained, and it is on uplands. This soil is underlain by limestone. It has a dark-colored, slightly firm plow layer and a subsoil of grayish-brown, plastic clay mottled with olive brown. This soil has a deep root zone. It is high in moisture-supplying capacity, moderately high in natural fertility, and neutral in most places. The soil gives good response to fertilizer. It is slightly difficult to till, and if it is tilled when wet, the surface layer tends to crust and clod.

This soil occupies about one-tenth of 1 percent of the county. Unless it is artificially drained, this soil is poorly suited to most crops and pasture plants grown in the county. If the soil is drained, and if other practices used under a high level of management are applied, corn and small grains produce high yields. Tobacco is generally not grown, because of wetness and the fine texture of the soil. Bluegrass, orchardgrass, timothy, alsike clover, red clover, Kobe lespedeza, and Korean lespedeza can be grown under a high level of management. Kentucky 31 tall fescue, reed canarygrass, and ladino clover are well suited under a medium or high level of management.

If a high level of management is used, this soil can be cultivated year after year. The soil is not susceptible to erosion, but in most years excess internal water must be removed before adequate yields can be obtained. Tile drains can be installed for that purpose.

Capability unit IIIw–5

Melvin silt loam is the only soil in this unit. It is nearly level and poorly drained, and it is on bottom lands. This soil formed in recent alluvium washed mostly from soils derived from limestone. It has a friable plow layer and a gray silt loam to silty clay loam subsoil mottled with yellowish brown. This soil has a deep root zone. It is very high in moisture-supplying capacity, medium in natural fertility, and neutral to slightly acid. The soil gives good response to fertilizer, and it is easy to till.

This soil occupies about one-tenth of 1 percent of the county. Unless it is artificially drained, it is poorly suited to most crops and pasture plants grown in the county. If the soil is drained, and if other practices used under a high level of management are applied, tobacco, corn, and small grains produce moderate yields. Orchardgrass, timothy, red clover, Kobe lespedeza, and Korean lespedeza can also be grown under a high level of management. Kentucky 31 tall fescue, redtop, reed canarygrass, alsike clover, and ladino clover are well suited under a medium or high level of management.

This soil is not susceptible to erosion, and it can be cultivated year after year if practices that maintain good tilth and the content of organic matter are used. Applying large amounts of fertilizer and returning crop residues to the soil help maintain the content of organic matter. Tile drains are needed to remove excess internal water. In places diversion ditches are needed on adjacent upland slopes to keep excessive surface water from accumulating. Under a medium level of management, a

suitable cropping system is 1 year of a cultivated crop followed by 2 years of close-growing crops. The close-growing crops are then plowed under. They help to maintain good tilth, and they also supply organic matter.

Capability unit IIIw-7

Lanton and Dunning silty clay loams, mapped together, are in this capability unit. They are nearly level, poorly drained to somewhat poorly drained soils on bottom lands. These soils formed in recent alluvium washed from soils derived from limestone. Their plow layer is dark-colored silty clay loam, and their subsoil is gray, very firm, plastic clay mottled with olive brown. These soils have a deep root zone. They are high in moisture-supplying capacity and in natural fertility, and they are neutral. These soils give good response to fertilizer. They are slightly difficult to till, however, and their surface layer is likely to crust and clod if the soils are tilled when wet.

This mapping unit occupies about four-tenths of 1 percent of the county. Unless the soils are artificially drained, they are poorly suited to most crops and pasture plants grown in the county. If the soils are drained, and if other practices used under a high level of management are applied, yields of corn and small grains are high. Tobacco is generally not grown, because of wetness and the fine texture of the soil. Bluegrass, smooth bromegrass, orchardgrass, and redtop can be grown under a high level of management. Kentucky 31 tall fescue, reed canarygrass, timothy, alsike clover, ladino clover, Kobe lespedeza, and Korean lespedeza are well suited under a medium or high level of management.

If a high level of management is used, these soils can be cultivated year after year without eroding. Tile drains are needed to remove excess internal water, and in places diversion ditches are needed on upland slopes to keep excess surface water from accumulating.

Capability unit IIIs-1

Bruno loamy fine sand is the only soil in this unit. It is a nearly level, excessively drained, sandy soil on bottom lands. This soil formed in young alluvium washed mostly from soils derived from acid sandstone and shale. The plow layer is loose or very friable, and the subsoil is highly permeable sand or fine sandy loam. This soil has a deep root zone. It is low in moisture-supplying capacity, low in natural fertility, and medium acid. The soil gives moderately low response to fertilizer and lime. It can be tilled throughout a wide range of moisture content without clodding or crusting.

This soil occupies about one-tenth of 1 percent of the county. It is poorly suited to the crops and pasture plants grown in the county. Tobacco, corn, and small grains produce moderately low yields under a high level of management. Orchardgrass, timothy, red clover, and Korean lespedeza can also be grown under a high level of management, but the stands are short lived or produce low yields. Kentucky 31 tall fescue and sericea lespedeza are well suited under a medium or high level of management.

Although this soil is only slightly susceptible to erosion, practices are required that help maintain fertility and supply organic matter. If a high level of management is used, this soil can be kept in cultivated crops one-half of the time. Practices needed when the soil is used intensively are adding large amounts of fertilizer, crop-residue management, and interseeding a cover crop in the rows. Under a medium level of management, a suitable cropping system is 1 year of a row crop, followed by 3 years of a close-growing crop. The close-growing crop is then plowed down, and thus helps maintain the productivity of the soil.

Capability unit IVe-1

In this unit are strongly sloping, well-drained soils on terraces, toe slopes, and uplands. These soils formed in old alluvium or colluvium that originated from soils derived from limestone, sandstone, or siltstone. The plow layer is friable. The subsoil is brownish, permeable silty clay loam. These soils have a deep to shallow root zone. They are very high to moderately low in moisture-supplying capacity, medium to moderately high in natural fertility, and medium acid to strongly acid. Most of them give good response to fertilizer and lime. The soils are easily tilled, and they generally can be cultivated throughout a wide range of moisture content without clodding and crusting. These soils are—

Allegheney fine sandy loam, 12 to 20 percent slopes, eroded.
Ashton silt loam, 12 to 20 percent slopes, eroded.
Culleoka silt loam, 12 to 20 percent slopes, eroded.

These soils occupy about three-tenths of 1 percent of the county. They are well suited to most crops and pasture plants grown in the county. Tobacco, corn, and small grains produce moderate yields under a high level of management. Bluegrass, smooth bromegrass, alfalfa, alsike, and ladino clover can also be grown under a high level of management. Kentucky 31 tall fescue, orchardgrass, red clover, Korean lespedeza, and sericea lespedeza are well suited under a medium or high level of management.

Because of the risk of erosion, these soils can be cultivated only occasionally. If the soils are cultivated, tillage should be on the contour. Also, practices that maintain fertility and the content of organic matter should be used, along with a suitable cropping system. Stripcropping and vegetated waterways are particularly helpful on long slopes. A mixture of Kentucky 31 tall fescue and sericea lespedeza or Korean lespedeza is suitable for hay or pasture. Row crops should not be grown for 2 years in succession, nor more often than 1 year in 5.

Capability unit IVe-3

Strongly sloping, well-drained soils on uplands and colluvial slopes are in this unit. These soils formed in material derived from limestone and acid shale. The plow layer is friable, and the subsoil is moderately permeable, firm, plastic silty clay or clay. These soils have a deep to moderately deep root zone. They are moderately high to moderately low in moisture-supplying capacity, high to moderately high in natural fertility, and medium acid to extremely acid. The soils give good response to fertilizer and lime, and they are easily tilled. These soils are—

Brashear silt loam, 12 to 20 percent slopes, eroded.
Hampshire silt loam, 12 to 20 percent slopes, eroded.
Lowell silt loam, 12 to 20 percent slopes, eroded.
Muse silt loam, 12 to 20 percent slopes, eroded.

These soils occupy about 2½ percent of the county. They are suited to most crops and pasture plants grown in the county. Tobacco, corn, and small grains produce moderate yields under a high level of management. Smooth bromegrass and alsike clover can also be grown under a high level of management. Bluegrass, Kentucky 31 tall fescue, orchardgrass, timothy, alfalfa, ladino clover, red clover, Kobe lespedeza, Korean lespedeza, and sericea lespedeza are well suited under a medium or high level of management.

These soils can be cultivated occasionally if they are protected from erosion. Practices that control erosion effectively are contour tillage, sodded waterways, and stripcropping. A suitable cropping system is one in which close-growing crops are kept on the soils 5 out of 6 years. Under a high level of management, the number of suitable forage plants is only slightly limited, and the stands persist for a number of years.

Capability unit IVe-4

Eden silty clay loam, 12 to 20 percent slopes, eroded, is the only soil in this unit. It is a strongly sloping, somewhat excessively drained soil on uplands. This soil is underlain by calcareous shale and thin-bedded limestone. Its plow layer is slightly firm, and its subsoil is slowly permeable, very firm, plastic clay. This soil has a moderately deep to deep root zone. It is moderately low in moisture-supplying capacity, moderately high in natural fertility, and neutral. It gives fair response to fertilizer. Lime is not needed. The surface layer is clayey, and as a result, the range of moisture within which these soils can be cultivated without clodding and crusting is narrow.

This soil occupies about one-tenth of 1 percent of the county. It is suited to most crops and pasture plants grown in the county. Tobacco, corn, and small grains produce moderately low yields under a high level of management. Bluegrass, smooth bromegrass, timothy, alfalfa, alsike clover, ladino clover, and sweetclover can also be grown under a high level of management. Kentucky 31 tall fescue, orchardgrass, redtop, red clover, Korean lespedeza, and sericea lespedeza are well suited under a medium or high level of management.

This soil is better suited to hay and pasture than to cultivated crops. It can be cultivated occasionally if it is protected from erosion. Practices that control erosion effectively are contour tillage, sodded waterways, and stripcropping. Cultivated crops should be grown no more often than 1 year in 8.

Under a high level of management, alfalfa can be grown on this soil, along with Kentucky 31 tall fescue, and the stand lasts for an acceptable length of time. At a medium or high level of management, sericea lespedeza persists longer than alfalfa.

Capability unit IVe-6

In this unit are sloping, well-drained to somewhat excessively drained soils on uplands. These soils are underlain by limestone and calcareous shale. The plow layer is mostly silty clay loam, and the subsoil is firm, moderately permeable silty clay. These soils have a moderately deep to very shallow root zone. They are high to moderately low in moisture-supplying capacity, low to high in natural fertility, and slightly acid to calcareous. They give fair response to fertilizer, and in most places they respond to lime. The soils are slightly difficult to till, and because of the clay in the surface layer, the range of moisture content at which they can be cultivated without clodding and crusting is restricted. These soils are—

Fleming-Shrouts complex, 6 to 12 percent slopes.
Lowell silty clay loam, shallow, 6 to 12 percent slopes, eroded.
McAfee silt loam, 6 to 12 percent slopes.
McAfee silty clay loam, 6 to 12 percent slopes, eroded.
Otway silty clay loam, 6 to 12 percent slopes.
Salvisa silty clay loam, 6 to 12 percent slopes, eroded.

These soils occupy about 7 percent of the county. They are suited to most crops and pasture plants grown in the county. Tobacco, corn, and small grains produce moderate to moderately low yields under a high level of management. Bluegrass, timothy, alfalfa, alsike clover, ladino clover, red clover, and sweetclover can also be grown under a high level of management. Kentucky 31 tall fescue, orchardgrass, Korean lespedeza, and sericea lespedeza are well suited under a medium or high level of management.

These soils are better suited to forage plants than to row crops. They can be cultivated occasionally if practices are used to control erosion. Practices that are effective in controlling erosion are contour tillage, sodded waterways, and stripcropping. Row crops should be grown no more often than 1 year in 8. Kentucky 31 tall fescue and sericea lespedeza are forage plants that maintain a stand for a number of years at a medium or high level of management.

Capability unit IVe-10

Eden clay, 6 to 12 percent slopes, severely eroded, is the only soil in this unit. It is sloping and somewhat excessively drained, and it is on uplands. This soil is underlain by calcareous shale and thin-bedded limestone. The plow layer and subsoil consist of firm, plastic clay. The subsoil is slowly permeable. This soil has a moderately deep root zone. It is low in moisture-supplying capacity, moderately high in natural fertility, and neutral in reaction. The soil gives fair response to fertilizer, but it requires no lime. This soil is difficult to till. The surface layer is likely to clod and crust if the soil is cultivated when too wet.

This soil occupies about two-tenths of 1 percent of the county. It is suited to most crops and pasture plants grown in the county. Tobacco, corn, and small grains produce moderately low yields under a high level of management. Bluegrass, smooth bromegrass, orchardgrass, timothy, ladino clover, and red clover can also be grown under a high level of management.

Because of the risk of erosion, this soil should not be cultivated more often than 1 year in 8. Practices that help control erosion are contour tillage, stripcropping, or grassed buffer strips on short slopes, along with sodded waterways. A mixture of alfalfa and Kentucky 31 tall fescue, grown under a high level of management, provides hay for 4 years before the alfalfa dies out. Sericea lespedeza, however, can be grown along with the fescue year after year under a high level of management.

Capability unit IVe-11

In this capability unit are sloping, well-drained soils on uplands. These soils are underlain by limestone and calcareous shale. The surface layer is slightly firm, and the subsoil is very firm silty clay that is slowly permeable. These soils have a moderately deep root zone. They are low in moisture-supplying capacity, moderate to moderately low in natural fertility, and medium to strongly acid. The soils give fair response to fertilizer and lime. They are slightly difficult to till, and they are likely to clod and crust if cultivated when wet. These soils are—

Hampshire silty clay loam, 6 to 12 percent slopes, severely eroded.
Lowell silty clay loam, 6 to 12 percent slopes, severely eroded.

These soils occupy about four-tenths of 1 percent of the county. They are suited to most crops and pasture plants grown in the county. Tobacco, corn, and small grains produce moderately low yields under a high level of management. Bluegrass, orchardgrass, redtop, timothy, red clover, and Kobe lespedeza can also be grown under a high level of management. Kentucky 31 tall fescue, Korean lespedeza, and sericea lespedeza are well suited under a medium or high level of management.

Because of the risk of erosion, these soils should not be cultivated more often than 1 year in 8. Practices that help control erosion are contour tillage, stripcropping, or growing vegetated buffer strips on short slopes, along with sodded waterways. Forage plants that persist for a number of years are best suited. Kentucky 31 tall fescue and sericea lespedeza last longer than other forage plants under a medium level of management. They produce higher yields than other forage plants under a high level of management.

Capability unit IVw-1

Robertsville silt loam is the only soil in this unit. It is nearly level and poorly drained, and it is on terraces. This soil formed in old alluvium that was derived mainly from limestone. The plow layer is grayish and friable. The subsoil has a compact, slowly permeable zone in the upper part. This soil has a shallow root zone. It is moderately low in moisture-supplying capacity and in natural fertility, and it is strongly acid. The soil is easily tilled, but excess water in the plow layer delays tillage at the start of the growing season.

This soil occupies about two-tenths of 1 percent of the county. It is poorly suited to most crops and pasture plants grown in the county. Tobacco, corn, and small grains produce moderately low yields under a high level of management. Alsike clover and Korean lespedeza can also be grown under a high level of management. Kentucky 31 tall fescue, redtop, reed canarygrass, ladino clover, and Kobe lespedeza are suited under a medium or high level of management.

Although this soil is not susceptible to erosion, it is limited in use by excess wetness. The soil can be cultivated year after year if a high level of management is used and if excess subsurface water is removed by artificial drainage. Tile drains can be used for that purpose. Practices needed to maintain the content of organic matter are adding large amounts of fertilizer and returning crop residues to the soil. Under a medium level of management, close-growing crops should be grown two-thirds of the time. The close-growing crops should be plowed under prior to planting a row crop.

Capability unit VIe-1

In this unit are strongly sloping to moderately steep, eroded, well-drained to somewhat excessively drained soils on uplands and toe slopes. Most of these soils formed in material from limestone and from calcareous siltstone and shale, but the Muse soil formed in colluvium from acid shale. The surface layer is silty and is flaggy in some places. The subsoil in most places is firm silty clay loam, silty clay, and clay. These soils have a moderately deep to shallow root zone. They are low in moisture-supplying capacity and high to moderately high in natural fertility. Except for the Muse soil, which is extremely acid, the soils are slightly acid to neutral. These soils are—

Culleoka silt loam, 20 to 30 percent slopes, eroded.
Culleoka flaggy silt loam, 20 to 30 percent slopes, eroded.
Eden silty clay loam, 20 to 30 percent slopes, eroded.
Fairmount flaggy silty clay loam, 20 to 30 percent slopes.
Lowell silt loam, 20 to 30 percent slopes, eroded.
Lowell silty clay loam, shallow, 12 to 20 percent slopes, eroded.
Lowell silty clay loam, shalow, 20 to 30 percent slopes, eroded.
McAfee silty clay loam, 12 to 20 percent slopes, eroded.
McAfee silty clay loam, 20 to 30 percent slopes, eroded.
Muse silt loam, 20 to 30 percent slopes, eroded.
Salvisa silty clay loam, 12 to 20 percent slopes, eroded.
Salvisa silty clay loam, 20 to 30 percent slopes, eroded.

These soils occupy about 13 percent of the county. They are highly susceptible to erosion if they are used for row crops, and they are best used for pasture and hay. Bluegrass, smooth bromegrass, Kentucky 31 tall fescue, orchardgrass, redtop, timothy, alfalfa, red clover, sweetclover, Kobe lespedeza, Korean lespedeza, and sericea lespedeza are well suited and produce moderate yields under a high level of management. Except for fescue, Korean lespedeza, and sericea lespedeza, yields of all these plants are lower under a medium level of management and the life of the stand is shorter. Practices that help control erosion are selecting suitable forage plants and tilling only when necessary to reestablish the plants.

Capability unit VIe-2

Strongly sloping to moderately steep, severely eroded, well-drained soils on uplands are in this unit. These soils are underlain by interbedded limestone and calcareous shale. The surface layer is silty, and the subsoil is firm silty clay. These soils have a moderately deep root zone. They are low to very low in moisture-supplying capacity, moderately fertile, and medium acid. These soils are—

Lowell silty clay loam, 12 to 20 percent slopes, severely eroded.
Lowell silty clay loam, 20 to 30 percent slopes, severely eroded.

These soils occupy nearly 1 percent of the county. They are highly susceptible to erosion if they are used for row crops, and they are best used for pasture and hay. Yields of forage, however, are moderately low,

even under a high level of management. Adequate fertilizer and timely harvesting are needed for long-lived stands of suitable plants. Kentucky 31 tall fescue and sericea lespedeza give better yields than other forage plants under all management levels. Alfalfa and orchardgrass can be grown under a high level of management.

Capability unit VIe–3

Strongly sloping to moderately steep, severely eroded, somewhat excessively drained soils on uplands are in this unit. These soils are underlain by calcareous shale and thin-bedded limestone. The surface layer and the subsoil are firm, plastic clay. In many places there are thin slabs of limestone on the surface. These soils have a moderately deep root zone. They are low to very low in moisture-supplying capacity, high in natural fertility, and neutral. These soils are—

Eden flaggy clay, 12 to 20 percent slopes, severely eroded.
Eden flaggy clay, 20 to 30 percent slopes, severely eroded.
Eden clay, 12 to 20 percent slopes, severely eroded.
Eden clay, 20 to 30 percent slopes, severely eroded.

These soils occupy about 2 percent of the county. They are highly susceptible to erosion if they are used for row crops, and they are best used for pasture and hay. Numerous slabs of limestone on the surface interfere with the preparation of the seedbed and with harvesting. Therefore, it is better to use the areas for grazing than for hay.

Sericea lespedeza and Kentucky 31 tall fescue are forage plants that are well suited under a high or medium level of management. Sweetclover and Korean lespedeza are also well suited under a high level of management, but they are not so long lived as sericea lespedeza and fescue, and they do not yield so well under a medium level of management. Any of these plants are suitable for maintaining a stand sufficiently vigorous to provide the needed ground cover. Yields are low, even under a high level of management that includes applying adequate fertilizer and timely harvesting.

Capability unit VIe–4

In this unit are sloping to strongly sloping, severely eroded, well-drained to somewhat excessively drained soils on uplands. These soils are underlain by calcareous shale and limestone. The surface laver is firm and clayey. There are rock outcrops in many places. These soils have a shallow root zone. They are low in moisture-supplying capacity, medium in natural fertility, and slightly acid. These soils are—

Lowell silty clay, shallow, 6 to 12 percent slopes, severely eroded.
Lowell silty clay, shallow, 12 to 20 percent slopes, severely eroded.
McAfee silty clay, 12 to 20 percent slopes, severely eroded.
Salvisa clay, 6 to 12 percent slopes, severely eroded.
Salvisa clay, 12 to 20 percent slopes, severely eroded.

These soils occupy about 1 percent of the county. They are highly susceptible to erosion if they are used for row crops, and they are best used for pasture and hay. Nevertheless, even under a high level of management, yields of forage are moderately low.

Bluegrass, timothy, orchardgrass, red clover, sweetclover, and Korean lespedeza can be grown at a high level of management, but the stands are not vigorous and long lived. Kentucky 31 tall fescue and sericea lespedeza are better suited than other forage plants under a medium or a high level of management, and they provide a better protective cover. Yields are best if adequate fertilizer is applied and harvesting is timely.

Capability unit VIe–8

Fleming-Shrouts complex, 12 to 20 percent slopes, is in this unit. These are strongly sloping, somewhat excessively drained soils on uplands, and they are underlain by limestone and alkaline clay shale. They have a surface layer of firm silty clay loam and a subsoil of plastic clay. These soils have a shallow root zone. They are moderately low in moisture-supplying capacity, moderately low in natural fertility, and alkaline to medium acid.

These soils occupy about 1 percent of the county. They are likely to be severely eroded if they are used for row crops, and they are best used for pasture and hay. Yields of forage, however, are moderately low even under a high level of management. Growing suitable plants, applying adequate fertilizer, and harvesting at the right time are practices needed to control erosion.

Bluegrass, orchardgrass, alfalfa, ladino clover, and red clover can be grown, but they require a high level of management. Kentucky 31 tall fescue, timothy, Kobe lespedeza, Korean lespedeza, and sericea lespedeza can be grown under a medium or high level of management. Plants that require a high level of management do not yield so much forage as plants grown under a medium level of management, nor are the plants so long lived. The best yields of forage are obtained if the best suited plants are grown under a high level of management. Such plants also provide a better protective cover than plants that are less well suited.

Capability unit VIs–1

In this unit are sloping to strongly sloping and somewhat excessively drained soils on uplands. These soils are shallow to limestone, and they are moderately eroded. Slabs of limestone are common on the surface, and ledges outcrop in many places. These soils have a shallow to moderately deep root zone. They are low in moisture-supplying capacity, medium to moderately high in natural fertility, and alkaline to slightly acid. These soils are—

Ashwood very rocky silty clay loam, 6 to 12 percent slopes.
Ashwood very rocky silty clay loam, 12 to 20 percent slopes.
McAfee very rocky silty clay loam, 12 to 20 percent slopes, eroded.

These soils occupy nearly 1 percent of the county. They are too rocky and erodible to be used for row crops, and they are best used for pasture and hay. Loose rocks and rock outcrops interfere with tillage and make preparation of the seedbed for hay crops difficult. Consequently, the soils are probably better suited to pasture than hay. Yields of forage are moderate under a high level of management that includes adequate fertilizer and controlled grazing.

Best yields are obtained on these soils if the best suited plants are grown under a high level of management. Kentucky 31 tall fescue and sericea lespedeza make better yields than other forage plants under a high or medium level of management and provide the needed

protective cover. Bluegrass, orchardgrass, timothy, alfalfa, red clover, and sweetclover can be grown under a high level of management, but the stands are not vigorous and long lived.

Capability unit VIs–2

Ashwood very rocky clay, 6 to 12 percent slopes, severely eroded, is in this unit. It is sloping and somewhat excessively drained, and it is on uplands. This soil is shallow to limestone, and it is severely eroded. Numerous slabs of limestone are on the surface, and ledges outcrop in many places. The surface layer is very firm, plastic clay. This soil has a shallow root zone. It is low in moisture-supplying capacity, moderate in natural fertility, and mildly alkaline.

This soil occupies about four-tenths of 1 percent of the county. It is too rocky and too erodible to be used for row crops, and it is best used for pasture and hay. Loose rocks, rock ledges, and the fine texture of the surface layer interfere with tillage and make preparation of the seedbed for hay crops difficult. Therefore, the soil is probably better suited to pasture than to hay. Yields of forage, however, are low even under a high level of management that includes adequate fertilizer and controlled grazing.

Bluegrass, timothy, alfalfa, red clover, and sweetclover can be grown on these soils, but they require a high level of management. If these plants are grown under a medium level of management, the growth is not vigorous enough for the plants to last long and to provide the protective cover needed. Kentucky 31 tall fescue, Korean lespedeza, and sericea lespedeza can be grown at a medium or high level of management. Selecting forage plants that grow well under a medium level of management, and then applying practices used under a high level of management, help provide a protective cover of vegetation.

Capability unit VIs–3

Colyer silt loam, 6 to 12 percent slopes, is the only soil in this unit. It is sloping and excessively drained, and it is on uplands. This soil is shallow to acid shale. The surface layer is thin, and the subsoil of silty clay loam contains numerous fragments of shale. This soil has a shallow root zone. It is moderately low in moisture-supplying capacity, low in natural fertility, and extremely acid.

This soil occupies about one-half of 1 percent of the county. It is highly susceptible to erosion if it is used for row crops, and it is best used for pasture and hay. Yields of forage are low, however, even under a high level of management that includes adequate fertilizer, suitable forage plants, and timely harvesting.

Bluegrass, orchardgrass, and red clover can be grown under a high level of management, but the stands are not vigorous or long-lived enough to provide the protection the soil needs. Kentucky 31 tall fescue, redtop, Korean lespedeza, and sericea lespedeza are suited at a medium or high level of management. Best yields of forage plants are obtained by selecting plants that grow well at all management levels, and then applying practices used at a high level of management. Such plants also provide a suitable ground cover.

Capability unit VIs–5

Otway silty clay, 6 to 12 percent slopes, severely eroded, is the only soil in this unit. It is sloping and somewhat excessively drained, and it is on uplands. This soil is shallow over soft, calcareous shale. It has a very firm surface layer. The subsoil is a mixture of firm clay loam and thin slabs of shale. This soil has a very shallow root zone. It is very low in moisture-supplying capacity, low in natural fertility, and calcareous.

This soil occupies about three-tenths of 1 percent of the county. It is too erodible and too unproductive for row crops, and it is best used for hay and pasture. Yields of forage are low, even under a high level of management that includes suitable forage plants, adequate fertilizer, and timely harvesting.

The number of suitable forage plants is limited because the soil is calcareous. Sweetclover is well suited under a high or medium level of management. Sericea lespedeza and Kentucky 31 tall fescue can also be grown at a medium or high level of management, but high-level management practices are needed for long-lived, vigorous stands.

Capability unit VIIe–1

In this unit are moderately steep to steep, well-drained to somewhat excessively drained soils on uplands. These soils are underlain by limestone and calcareous shale. The surface layer is silt loam and contains numerous rock fragments, or it consists of firm silty clay and clay. These soils are eroded and have a shallow root zone. They are very low in moisture-supplying capacity, moderately high to medium in natural fertility, and slightly acid to medium acid. These soils are—

Culleoka flaggy silt loam, 30 to 50 percent slopes, eroded.
Lowell silty clay, shallow, 20 to 30 percent slopes, severely eroded.
Salvisa clay, 20 to 30 percent slopes, severely eroded.

These soils occupy about 2 percent of the county. They are suited only to limited grazing or to woodland. The choice of suitable forage plants is limited. Kentucky 31 tall fescue, redtop, sweetclover, Korean lespedeza, and sericea lespedeza produce very low yields, even under a high level of management. Bluegrass and alfalfa can also be grown under a high level of management, but the stands are not vigorous or long lived.

Strong slopes make it difficult to operate farm machinery on these soils. Consequently, mowing for weed control, spreading fertilizer and lime, and applying other practices used under a high level of management are often costly in time and effort. Selecting plants that are well suited and controlling grazing are practices that help maintain an effective cover of vegetation. Trees already on these soils should be kept, and the more desirable species should be encouraged by using suitable management practices.

Capability unit VIIe–2

Moderately steep to steep, somewhat excessively drained soils on uplands are in this unit. These soils are underlain by limestone and soft, alkaline clay shale. The surface layer is very firm, plastic clay. In most

places many rock slabs are on the surface and numerous ledges outcrop. These soils have a shallow root zone. They are low to very low in moisture-supplying capacity, low to moderately high in natural fertility, and alkaline to medium acid. These soils are—

Fairmount flaggy clay, 20 to 30 percent slopes, severely eroded.
Fairmount flaggy clay, 30 to 50 percent slopes, severely eroded.
Fleming-Shrouts complex, 20 to 30 percent slopes.

These soils occupy nearly 1 percent of the county. They are suited only to limited grazing or woodland. Under a high level of management, Kentucky 31 tall fescue, redtop, sweetclover, Korean lespedeza, and sericea lespedeza maintain stands that are sufficiently vigorous for the control of erosion.

Farm machinery is difficult to operate on these rocky, ledgy, and steep soils. Therefore, in most places the only management practice feasible is the regulation of grazing. Most of these soils are wooded. Management is needed that encourages growth of the desirable trees in the stands, or desirable trees should be planted.

Capability unit VIIe–4

Gullied land, a miscellaneous land type, is in this unit. The areas are severely eroded and marked by an intricate pattern of gullies. They are in the uplands, and they are generally moderately steep to steep, but the range of slopes is wide. In places gullying has removed all soil material above the bedrock. Between the gullies the original surface layer remains in places, but in most places the subsoil and parent material are exposed. The subsoil is mostly gray and olive clay or clay loam. Generally, the subsoil is alkaline or calcareous, but in some places it is acid, brownish clay.

This miscellaneous land type occupies about one-tenth of 1 percent of the county. The areas have been cleared of native vegetation, and they have been cropped or grazed intensively. As a result, the soils are now suitable only for woodland, and they are reverting to herbaceous vegetation, brush, and trees. If livestock are fenced out of the areas, redcedar will establish itself naturally in many places.

Capability unit VIIs–1

Colyer silt loam, 20 to 50 percent slopes, is the only soil in this unit. It is moderately steep to steep and excessively drained, and it is on uplands. This soil is underlain by black shale. It has a thin surface layer that lies directly on weathered, black shale. The soil has a shallow root zone. It is very low in moisture-supplying capacity, low in natural fertility, and extremely acid.

This soil occupies about 1 percent of the county. It is suited only to limited grazing or woodland. Kentucky 31 tall fescue, redtop, and sericea lespedeza can be grown under a high level of management, but yields are low. Because of the steep slopes and low productivity of these soils, the only management practices that are generally feasible are planting suitable forage plants and regulating grazing. Woodland is generally the best use for these soils. A high level of management is required to provide the long-lived, vigorous stands of grasses and legumes that are needed to protect these soils.

Capability unit VIIs–2

In this capability unit are strongly sloping to moderately steep, excessively drained soils on uplands. These soils are underlain by limestone. The surface layer is firm clay that contains many slabs of rocks. Also, ledge rock outcrops in many places. These soils have a shallow root zone. They are low to very low in moisture-supplying capacity, low to moderately high in natural fertility, and alkaline to slightly acid. These soils are—

Ashwood very rocky clay, 12 to 20 percent slopes, severely eroded.
Ashwood very rocky silty clay loam, 20 to 30 percent slopes.
Ashwood very rocky clay, 20 to 30 percent slopes, severely eroded.
McAfee very rocky silty clay loam, 20 to 30 percent slopes, eroded.

These soils occupy nearly 2 percent of the county. They are suited only to limited grazing or to woodland. Kentucky 31 tall fescue, redtop, and sericea lespedeza can be grown under a high or medium level of management, and they provide long-lived, vigorous stands of vegetation that help to supply the protection these soils need. Adding adequate fertilizer, mowing for weed control, selecting suitable forage plants, and controlling grazing are practices required under a high level of management. Even under a high level of management, however, yields of forage are very low. The steep slopes and the rocks in these soils make it difficult to use a high level of management in most places. Consequently, for the time and effort involved, better protection of the areas can probably be obtained if the soils are used for woodland rather than for other purposes.

Capability unit VIIs–3

Sloping to steep soils on uplands are in this unit. These soils are very shallow, rocky, or shaly, and most of them are severely eroded. They are very droughty, have a shallow root zone, and have low productivity. These soils are—

Colyer shaly silty clay loam, 6 to 12 percent slopes, severely eroded.
Colyer shaly silty clay loam, 12 to 20 percent slopes, severely eroded.
Colyer shaly silty clay loam, 20 to 50 percent slopes, severely eroded.
Fleming-Shrouts complex, 12 to 20 percent slopes, severely eroded.
Fleming-Shrouts complex, 20 to 30 percent slopes, severely eroded.
Otway soils, 20 to 30 percent slopes, severely eroded.
Otway soils, 30 to 50 percent slopes.

These soils occupy about 8 percent of the county. They are mostly in woodland, for which they are best suited. Under a high level of management, Kentucky 31 tall fescue and sericea lespedeza provide limited grazing, but the plants do not last long enough to supply the protection these soils need. Because forage plants are hard to establish and maintain, the soils are most productive if used for woodland. Practices are needed to encourage desirable trees already in the stands or to

convert the stands to desirable trees. Most open areas are desirable sites for planting trees.

Capability unit VIIs-5

Rock land, a miscellaneous land type, is in this unit. It consists mostly of rock outcrops. Rock ledges and steep bluffs cover from 50 to 90 percent of the surface. The root zone is extremely shallow, and vegetation is sparse and of low quality.

Rock land covers about 9 percent of the county. Trees are on some of the areas, but they grow slowly and are poorly shaped. The areas have value chiefly as habitats for wildlife and as scenic and recreational sites. Also, in some places the areas serve to retain moisture where it falls. Redcedar can be harvested for posts and specialty wood products, but the economic returns are small. The areas must be protected from fire and grazing. Harvesting should be done with care.

Estimated Yields

In table 2 the soils of Clark County are listed, and the estimated average acre yields that may be expected from the principal crops grown under a high level of management are given. A high level of management includes using the practices described in the sections "General Management" and "Management by Capability Units." These practices generally help control erosion, improve the structure of the soils, build up the supply of organic matter, and increase productivity.

TABLE 2.—*Estimated average acre yields of crops*

[Where yields are not given, the soil is considered unsuitable for the crop; Gullied land, Made land, and Rock land are not listed in this table]

Soil	Corn	Tobacco	Wheat	Alfalfa	Red clover		Lespedeza	Pasture
					First year	Second year		
	Bu.	*Lb.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]
Allegheny loam, 2 to 6 percent slopes	90	2,200	35	3.7	1.1	3.0	2.0	180
Allegheny loam, 6 to 12 percent slopes, eroded	80	1,850	30	3.3	1.1	3.0	1.9	165
Allegheny fine sandy loam, 12 to 20 percent slopes, eroded	70	1,400	25	3.0	1.0	2.6	1.6	125
Armour silt loam, 0 to 2 percent slopes	105	2,200	40	4.0	1.1	3.0	2.0	195
Armour silt loam, 2 to 6 percent slopes	105	2,200	40	3.9	1.1	3.0	2.0	190
Armour silt loam, 6 to 12 percent slopes	100	2,050	40	3.6	1.1	3.0	2.0	185
Ashton silt loam, 0 to 2 percent slopes	105	2,200	40	4.0	1.1	3.0	2.1	195
Ashton silt loam, 2 to 6 percent slopes	100	2,200	40	3.9	1.1	3.0	2.1	195
Ashton silt loam, 6 to 12 percent slopes	100	2,050	40	3.6	1.1	3.0	2.0	185
Ashton silt loam, 6 to 12 percent slopes, eroded	90	1,850	36	3.4	1.1	3.0	1.9	180
Ashton silt loam, 12 to 20 percent slopes, eroded	85	1,700	34	3.3	1.1	3.0	1.9	165
Ashwood very rocky silty clay loam, 6 to 12 percent slopes				1.8	.6	1.7	1.0	115
Ashwood very rocky silty clay loam, 12 to 20 percent slopes				1.8	.6	1.6	1.0	114
Ashwood very rocky silty clay loam, 20 to 30 percent slopes								105
Ashwood very rocky clay, 6 to 12 percent slopes, severely eroded				1.1	.3	.9	.6	75
Ashwood very rocky clay, 12 to 20 percent slopes, severely eroded								75
Ashwood very rocky clay, 20 to 30 percent slopes, severely eroded								70
Beasley silt loam, 2 to 6 percent slopes, eroded	75	1,650	30	3.0	.9	2.8	1.7	175
Beasley silt loam, 6 to 12 percent slopes, eroded	75	1,500	25	2.7	.8	2.2	1.6	165
Bedford silt loam, 0 to 2 percent slopes	80	1,700	30	2.3	1.0	2.7	1.8	171
Bedford silt loam, 2 to 6 percent slopes	80	1,800	30	2.4	1.1	2.8	1.9	171
Bedford silt loam, 6 to 12 percent slopes	75	1,650	25	2.3	1.0	2.6	1.7	165
Brashear silt loam, 2 to 6 percent slopes	85	1,800	35	3.5	1.2	3.2	2.0	185
Brashear silt loam, 6 to 12 percent slopes, eroded	70	1,600	30	3.0	1.1	2.9	1.9	170
Brashear silt loam, 12 to 20 percent slopes, eroded	60	1,250	25	2.9	1.0	2.7	1.7	165
Braxton silt loam, 2 to 6 percent slopes	90	2,100	35	3.9	1.1	3.0	2.0	185
Braxton silt loam, 6 to 12 percent slopes, eroded	75	1,750	30	3.4	1.1	3.0	1.9	170
Bruno loamy fine sand	50	1,550	19	2.0	.7	1.8	1.1	125
Burgin silty clay loam	100		30	3.0	1.0	2.7	2.0	170
Captina silt loam, 0 to 2 percent slopes	80	1,950	30	2.5	1.1	2.8	2.0	175
Captina silt loam, 2 to 6 percent slopes	80	2,000	30	2.5	1.1	2.8	2.0	170
Colyer silt loam, 6 to 12 percent slopes	35	1,150	15				1.0	90
Colyer silt loam, 20 to 50 percent slopes								80
Colyer shaly silty clay loam, 6 to 12 percent slopes, severely eroded								50
Colyer shaly silty clay loam, 12 to 20 percent slopes, severely eroded								50

See footnote at end of table.

TABLE 2.—*Estimated average acre yields of crops*—Continued

Soil	Corn	Tobacco	Wheat	Alfalfa	Red clover		Lespedeza	Pasture
					First year	Second year		
	Bu.	*Lb.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]
Colyer shaly silty clay loam, 20 to 50 percent slopes, severely eroded								65
Culleoka silt loam, 2 to 6 percent slopes	85	1,950	35	2.9			1.7	165
Culleoka silt loam, 6 to 12 percent slopes, eroded	75	1,650	30	2.5			1.4	150
Culleoka silt loam, 12 to 20 percent slopes, eroded	55	1,400	20	2.5			1.3	145
Culleoka silt loam, 20 to 30 percent slopes, eroded				2.3			1.3	140
Culleoka flaggy silt loam, 20 to 30 percent slopes, eroded				2.3			1.3	140
Culleoka flaggy silt loam, 30 to 50 percent slopes, eroded								100
Eden silty clay loam, 6 to 12 percent slopes, eroded	60	1,450	25	2.7	0.9	2.3	1.4	130
Eden silty clay loam, 12 to 20 percent slopes, eroded	55	1,250	20	2.5	.9	2.3	1.4	130
Eden silty clay loam, 20 to 30 percent slopes, eroded				2.4	.8	2.1	1.3	115
Eden clay, 6 to 12 percent slopes, severely eroded	40	1,300	15	2.2	.7	1.8	1.1	105
Eden clay, 12 to 20 percent slopes, severely eroded	35	1,050	15	2.1	.6	1.7	1.0	100
Eden clay, 20 to 30 percent slopes, severely eroded				2.0	.6	1.6	1.0	90
Eden flaggy clay, 12 to 20 percent slopes, severely eroded				2.1	.6	1.7	1.0	100
Eden flaggy clay, 20 to 30 percent slopes, severely eroded				2.0	.6	1.6	1.0	90
Egam silt loam	100	1,900	35	3.5	1.1	2.8	2.0	190
Fairmount flaggy silty clay loam, 20 to 30 percent slopes				2.1	.8	2.0	2.0	105
Fairmount flaggy clay, 20 to 30 percent slopes, severely eroded				1.3	.4	1.1	1.3	70
Fairmount flaggy clay, 30 to 50 percent slopes, severely eroded								45
Fleming silt loam, 6 to 12 percent slopes, eroded	70	1,650	30	2.9	1.0	2.7	1.6	135
Fleming-Shrouts complex, 6 to 12 percent slopes	35	1,150	15				1.3	120
Fleming-Shrouts complex, 12 to 20 percent slopes			15				1.3	120
Fleming-Shrouts complex, 12 to 20 percent slopes, severely eroded								70
Fleming-Shrouts complex, 20 to 30 percent slopes								120
Fleming-Shrouts complex, 20 to 30 percent slopes, severely eroded								65
Hagerstown silt loam, 0 to 2 percent slopes	105	2,200	40	4.0	1.1	3.0	2.0	190
Hagerstown silt loam, 2 to 6 percent slopes	100	2,200	40	3.9	1.1	3.0	2.0	185
Hagerstown silt loam, 6 to 12 percent slopes, eroded	85	1,900	35	3.4	1.1	3.0	1.9	170
Hampshire silt loam, 2 to 6 percent slopes	85	1,950	35	3.3	1.1	3.0	2.0	185
Hampshire silt loam, 2 to 6 percent slopes, eroded	75	1,750	30	3.0	1.1	2.8	1.9	180
Hampshire silt loam, 6 to 12 percent slopes	80	1,800	35	3.1	1.1	2.9	2.0	180
Hampshire silt loam, 6 to 12 percent slopes, eroded	70	1,650	30	2.9	1.0	2.7	1.9	170
Hampshire silt loam, 12 to 20 percent slopes, eroded	65	1,400		2.8	1.0	2.6	1.8	165
Hampshire silty clay loam, 6 to 12 percent slopes, severely eroded	45	1,450	15	2.4	.8	2.2	1.5	145
Huntington silt loam	110	2,200	45	4.0	1.1	3.0	2.0	195
Huntington silt loam, shallow	100		40	3.8	1.1	3.0	2.0	185
Lanton and Dunning silty clay loams	95		35	3.2	1.0	2.7	2.0	170
Lindside silt loam	100	2,000	35	3.5	1.1	3.0	2.0	195
Loradale silt loam, 2 to 6 percent slopes	90	2,200	35	3.9	1.1	3.0	2.0	185
Loradale silt loam, 6 to 12 percent slopes	85	2,050	35	3.6	1.1	3.0	2.0	180
Loradale silt loam, 6 to 12 percent slopes, eroded	80	1,850	30	3.4	1.1	3.0	1.9	170
Lowell silt loam, 2 to 6 percent slopes	90	2,050	35	3.8	1.1	3.0	2.0	185
Lowell silt loam, 2 to 6 percent slopes, eroded	80	1,850	35	3.5	1.1	3.0	2.0	175
Lowell silt loam, 6 to 12 percent slopes	85	1,900	35	3.5	1.1	3.0	2.0	180
Lowell silt loam, 6 to 12 percent slopes, eroded	75	1,650	30	3.3	1.1	3.0	1.9	170
Lowell silt loam, 12 to 20 percent slopes, eroded	75	1,600	25	3.2	1.1	3.0	1.8	165
Lowell silt loam, 20 to 30 percent slopes, eroded				3.1	1.1	2.9	1.7	160
Lowell silty clay, shallow, 6 to 12 percent slopes, severely eroded			10	2.0	.7	1.8	1.1	100
Lowell silty clay, shallow, 12 to 20 percent slopes, severely eroded				1.9	.6	1.7	1.1	95
Lowell silty clay, shallow, 20 to 30 percent slopes, severely eroded								80
Lowell silty clay loam, 6 to 12 percent slopes, severely eroded	55	1,500	20	2.7	.9	2.5	1.6	140
Lowell silty clay loam, 12 to 20 percent slopes, severely eroded				2.7	.9	2.5	1.6	130
Lowell silty clay loam, 20 to 30 percent slopes, severely eroded				2.5	.9	2.4	1.5	125
Lowell silty clay loam, shallow, 6 to 12 percent slopes, eroded	50	1,200	20	2.5	.9	2.3	1.4	125

See footnote at end of table.

TABLE 2.—*Estimated average acre yields of crops*—Continued

Soil	Corn	Tobacco	Wheat	Alfalfa	Red clover		Lespedeza	Pasture
					First year	Second year		
	Bu.	*Lb.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]
Lowell silty clay loam, shallow, 12 to 20 percent slopes, eroded				2.5	0.8	2.2	1.4	125
Lowell silty clay loam, shallow, 20 to 30 percent slopes, eroded				2.3	.8	2.1	1.3	120
Maury silt loam, 0 to 2 percent slopes	105	2,200	40	4.0	1.1	3.0	2.0	190
Maury silt loam, 2 to 6 percent slopes	100	2,200	40	3.9	1.1	3.0	2.0	185
Maury silt loam, 2 to 6 percent slopes, eroded	90	2,050	35	3.6	1.1	3.0	2.0	180
Maury silt loam, 6 to 12 percent slopes	95	2,050	40	3.6	1.1	3.0	2.0	180
Maury silt loam, 6 to 12 percent slopes, eroded	85	1,850	35	3.4	1.1	3.0	1.9	170
McAfee silt loam, 2 to 6 percent slopes	80	1,750	30	3.3	1.0	2.7	1.4	150
McAfee silt loam, 6 to 12 percent slopes	70	1,600	30	3.1	1.0	2.6	1.3	140
McAfee silty clay, 12 to 20 percent slopes, severely eroded				1.9	.5	1.5	1.0	95
McAfee silty clay loam, 2 to 6 percent slopes, eroded	65	1,550	25	3.0	.9	2.5	1.2	135
McAfee silty clay loam, 6 to 12 percent slopes, eroded	60	1,300	25	2.9	.9	2.3	1.1	125
McAfee silty clay loam, 12 to 20 percent slopes, eroded				2.8	.8	2.2	1.1	125
McAfee silty clay loam, 20 to 30 percent slopes, eroded				2.6	.8	2.1	1.0	115
McAfee very rocky silty clay loam, 12 to 20 percent slopes, eroded								125
McAfee very rocky silty clay loam, 20 to 30 percent slopes, eroded								115
Melvin silt loam	70	1,550	25				1.8	170
Mercer silt loam, 2 to 6 percent slopes	80	1,950	30		1.0	2.7	2.0	170
Mercer silt loam, 2 to 6 percent slopes, eroded	70	1,750	25		.9	2.5	1.9	155
Mercer silt loam, 6 to 12 percent slopes	75	1,800	25		1.0	2.6	1.9	160
Mercer silt loam, 6 to 12 percent slopes, eroded	60	1,600	20		.9	2.3	1.8	150
Monongahela loam, 2 to 6 percent slopes	70	1,700	25	2.0	.9	2.3	1.7	165
Monongahela loam, 6 to 12 percent slopes, eroded		1,300	20	1.5	.7	1.8	1.4	135
Muse silt loam, 6 to 12 percent slopes, eroded	70	1,650	30	3.0	1.1	2.9	1.7	150
Muse silt loam, 12 to 20 percent slopes, eroded	65	1,400	25	2.9	1.1	2.8	1.6	145
Muse silt loam, 20 to 30 percent slopes, eroded				2.7	1.0	2.7	1.5	135
Newark silt loam	85	1,750	30	3.1	.9	2.5	1.8	185
Otway silty clay, 6 to 12 percent slopes, severely eroded		1,350		2.7	.7	1.9	1.2	125
Otway silty clay loam, 6 to 12 percent slopes	55	1,550	20	3.0	.8	2.2	1.4	140
Otway soils, 20 to 30 percent slopes, severely eroded								80
Otway soils, 30 to 50 percent slopes								60
Robertsville silt loam	40	1,300					1.7	150
Salvisa clay, 6 to 12 percent slopes, severely eroded			10	2.0	.6	1.6	1.1	100
Salvisa clay, 12 to 20 percent slopes, severely eroded				1.9	.5	1.5	1.0	95
Salvisa clay, 20 to 30 percent slopes, severely eroded								90
Salvisa silty clay loam, 2 to 6 percent slopes, eroded	55	1,500	20	2.7	.9	2.3	1.5	13
Salvisa silty clay loam, 6 to 12 percent slopes, eroded	50	1,300	20	2.5	.8	2.1	1.4	125
Salvisa silty clay loam, 12 to 20 percent slopes, eroded			15	2.5	.8	2.0	1.4	125
Salvisa silty clay loam, 20 to 30 percent slopes, eroded				2.3	.7	1.9	1.3	115
Shelbyville silt loam, 2 to 6 percent slopes	100	2,200	40	3.9	1.1	3.0	2.0	185
Shelbyville silt loam, 2 to 6 percent slopes, eroded	90	2,050	35	3.5	1.1	3.0	1.9	180
Shelbyville silt loam, 6 to 12 percent slopes	100	2,050	40	3.8	1.1	3.0	1.9	180
Shelbyville silt loam, 6 to 12 percent slopes, eroded	80	1,850	35	3.2	1.1	3.0	1.8	175
Taft silt loam	55	1,500	15				1.7	155
Tilsit silt loam, 2 to 6 percent slopes	75	1,900	25	2.2	.9	2.4	1.8	155
Trappist silt loam, 2 to 6 percent slopes	80	1,850	35	2.9	1.0	2.7	1.9	165
Trappist silt loam, 6 to 12 percent slopes, eroded	65	1,450	25	2.5	.9	2.3	1.7	150
Woolper silty clay loam, 6 to 12 percent slopes	80	1,950	30	3.1	1.1	2.8	1.8	170

[1] The number of days 1 acre will support one cow, horse or steer without injury to the pasture.

The management used to obtain the yields given in table 2 also includes the following practices:

1. Using adapted varieties of plants that give high yields and that resist disease.
2. Seeding or planting at the proper rate or time, according to approved methods, and spacing the plants properly.
3. Selecting crops and crop rotations that return organic residues to the soils and add organic matter, that maintain or improve the structure of the soils, and that help to prevent erosion.
4. Controlling excess water by draining the soils, providing vegetated waterways and diversion ditches, tilling on the contour, constructing terraces, and using stripcropping.
5. Inoculating legumes.
6. Controlling weeds, insects, and diseases.
7. Using shallow cultivation.

8. Applying adequate amounts of lime, where needed.
9. Protecting the soils from overgrazing.
10. Using suitable practices for harvesting.
11. Using good pasture management.
12. Applying fertilizer in amounts equal to or in excess of the current recommendations of the Kentucky Agricultural Experiment Station, or equal to or in excess of the need shown by soil tests that are properly interpreted, and assuming that the fertilizer is applied at the proper place in the cropping system, by methods that permit the most efficient use of the nutrients by the crop.

The estimated yields given in table 2 are only for the soils considered to be suitable for a particular crop. For example, corn yields were not listed for soils in capability class VI, because those soils are eroded, steep, rocky, shallow, or have some other limitation that makes it impractical, under present methods, to grow corn on them.

The estimates given in table 2 are based on yields obtained on soils that had received the average amount of rainfall over a long period of time and that had not been irrigated. Since the frequency of flooding and the amount of damage caused by flooding vary, flooding was not taken into consideration in estimating the yields.

Use of the Soils for Woodland[1]

At the time of settlement nearly all of Clark County was forested. On uplands where the soils are deep over limestone were white oak, northern red oak, yellow-poplar, black walnut, and other desirable trees. On uplands where the soils were shallow over limestone, however, there grew a variety of fair- to low-quality hardwoods and good-quality redcedars. The shallow soils on the Knobs supported mainly black oak, white oak, chestnut oak, and Virginia pine. The lowlands along stream valleys supported mainly pin oak, sweetgum, cottonwood, sycamore, willow, and red maple.

Except for a few rough areas in the Knobs, nearly all the areas have been cleared. Only a few small areas of woodland remain on the soils that are deep over limestone, and these are primarily pastures that are partly shaded by overmature trees. A few thousand acres of the soils that are shallow over limestone have reverted to redcedar, low-quality hardwoods, and other woody plants. Most of the soils in the Knobs have reverted to woodland made up mainly of Virginia pine and low-quality oaks and hickories. Nearly all the lowlands have been cleared and drained, and only a small acreage is wooded.

Fairly good markets exist for fair- to good-quality woodland products. The market is also fairly good for good-quality timber for use on the farm and for fence posts.

Most of the woodlands in the county receive little management. The woodland on the Knobs has been severely damaged by repeated burning. Consequently, areas on the Knobs now support little growth that could be developed so that the trees would be of profitable quality. Woodland in the areas where the soils are shallow over limestone is generally used as pasture rather than as woodland.

Woodland Suitability Groups

In the following pages information is given concerning the effect of the many different kinds of soils in Clark County on woodland use and management. This information is based on studies made in the field and on the results of research. To simplify the presentation and understanding of the information, soils that are similar, according to certain interpretations, have been placed in woodland suitability groups. Each woodland suitability group contains soils that (1) produce similar kinds of woodcrops or perform about the same under similar kinds of management, (2) require similar kinds of conservation practices, and (3) have similar potential productivity. The groups and interpretations for each group are given in table 3.

The interpretations that are made in table 3 for each woodland suitability group of soils include (1) the potential productivity of the soils for woodcrops, (2) the preferred species to favor in existing woodland, (3) the preferred species for planting, and (4) critical management factors. The interpretations are explained as follows:

Potential soil productivity was estimated after studying nearly 150 wooded sites in Clark County and in other locations where the soils are similar to those in this county. Each site was selected to represent a specific kind of woodcrop growing on a recognized kind of soil. As nearly as possible, studies were confined to well-stocked, naturally occurring, even-aged, and unmanaged forest stands not adversely affected by fire, livestock grazing, insects, or disease. On each site, measurements were made of trees that were dominant in the stand. The total height and age of these trees were used to obtain site indexes that are considered to be good indicators of potential productivity. For some species, sites suitable for measurement could not be found on all kinds of soils. For those species, site index values were interpolated by using data on the site index for similar soils.

Site index, for all trees except cottonwood, is the average height of the dominant species in the stand at 50 years of age. For cottonwood, an age of 30 years was used in determining the site index.

The site indexes for the important species for each of 14 of the woodland suitability groups are listed in table 3. Woodland suitability group 15 consists of Gullied land and Made land, which are not well suited to trees. The site indexes were related to the production figures in table 4, which follows table 3, by using research published by the U.S. Forest Service and by using other sources.

To get the production figures given in table 4, site index values for yellow-poplar, Virginia pine, and shortleaf pine on uplands, and for upland oak were related to published research studies (*2*, *6*, *7*, *10*).[2] The site index

[1] By E. A. OREN, woodland conservationist, and E. V. HUFFMAN, assistant State soil scientist, Soil Conservation Service.

[2] Numbers in parentheses refer to Literature Cited, p. 118.

713-793—64——5

values of cottonwood, sweetgum, and red oak growing on the lowlands can be related to published research to estimate the approximate potential production of those trees under good management (*5*).

Soils that have a site index of 100 or more for cottonwood have an average annual production potential of 770 board feet per acre. To get this production, several intermediate harvests are followed by a final harvest when the cottonwood trees are 45 years old and have an average diameter of about 34 inches at breast height.

Soils that have a site index of 90 or more for pin oak have an average production potential of 520 board feet per acre annually. This potential is based on several intermediate harvests and a final harvest when the trees are 80 years old and have an average diameter of about 38 inches at breast height.

Soils that have a site index of 90 or more for sweetgum have an average production potential of 360 board feet per acre annually. This is based on several intermediate harvests and on a final harvest when the trees are 96 years old and have an average diameter of about 34 inches at breast height.

Species to favor in existing woodland are listed according to priority in table 3. The factors that work together to determine priority are site index, quality of the tree, and density of growth in natural stands. The species first listed in table 3, and those that follow in decreasing order of desirability, are generally the trees to favor in weeding, improvement cutting, and similar woodland management.

Species preferred for planting are listed in table 3 in order of preference. Experience indicates that cottonwood is generally the best tree to plant in open fields on lowlands and that pine is best planted in open fields on uplands.

Critical management factors to be considered in woodland management are plant competition, equipment limitations, hazard of gully erosion, and seedling mortality. These hazards and limitations are listed in table 3 and are described in the discussion of each woodland suitability group.

TABLE 3.—*Woodland suitability groups of soils*

Woodland suitability group	Potential soil productivity (site index)	Preferred species for—		Critical management factors
		Existing woodland	Open land	
1. Deep, well drained to moderately well drained, nearly level soils, mainly on bottoms and stream terraces; the surface layer is mostly silt loam, and the subsoil is silt loam to silty clay loam; a few of the soils are loamy fine sand.	Pin oak: 95±6. Sweetgum: 92. Cottonwood: 110.	Cottonwood, pin oak, sweetgum.	Cottonwood, pin oak, sweetgum.	Plant competition.
2. Dominantly deep, poorly drained to somewhat poorly drained soils on bottoms and stream terraces; in most places the surface layer is silt loam and the subsoil is silt loam to silty clay loam; in some places the surface layer is silty clay loam, and in other places there is a fragipan at a depth between 15 and 20 inches.	Cottonwood: 106±6. Pin oak: 99±5. Sweetgum: 92.	Cottonwood, pin oak, sweetgum.	Cottonwood, pin oak, sweetgum.	Plant competition; equipment limitations.
3. Deep, well-drained, gently sloping to strongly sloping soils on stream terraces; in most places the surface layer is silt loam and the subsoil is silty clay loam to loam; in places the surface layer is fine sandy loam, and in some places the soils are moderately eroded.	Yellow-poplar: 100 to 110. Upland oak: 75 to 85.	Yellow-poplar, white oak, northern red oak, black walnut, cottonwood.	Cottonwood, black walnut, yellow-poplar.	Plant competition.
4. Dominantly deep, well-drained, gently sloping to strongly sloping soils derived from limestone; these soils are on uplands and foot slopes; the surface layer is silt loam, and the subsoil is silty clay; erosion is slight to moderate; the soils are moderately steep in a few areas; in places bedrock is at a depth of 30 inches or less.	Upland oak: 70 to 80. Yellow-poplar: 80 to 85.	White oak, northern red oak, black oak, yellow-poplar.	White pine, shortleaf pine, loblolly pine, black locust.	Plant competition; equipment limitations and hazard of gully erosion on slopes of more than 12 percent.

TABLE 3.—*Woodland suitability groups of soils*—Continued

Woodland suitability group	Potential soil productivity (site index)	Preferred species for—		Critical management factors
		Existing woodland	Open land	
5. Deep, well-drained, nearly level to sloping soils on limestone; these soils are on uplands; their surface layer is silt loam, and their subsoil is silty clay loam; erosion is slight to moderate.	Yellow-poplar: 95 to 105. Upland oak: 80 to 90.	Black walnut, yellow-poplar, basswood, white oak, northern red oak, sugar maple.	Black locust, black walnut, yellow-poplar, white pine.	Plant competition.
6. Moderately deep, moderately well drained, nearly level to sloping soils on limestone; the soils are on uplands and stream terraces; their surface layer is silt loam, and their subsoil is silty clay loam that is 16 to 28 inches thick over an impervious fragipan; in some places the soils are moderately eroded.	Upland oak: 80 to 90. Yellow-poplar: 85 to 95. Sweetgum: 80 to 85.	Northern red oak, white oak, yellow-poplar, basswood, black walnut.	White pine, shortleaf pine, loblolly pine, black walnut, black locust, yellow-poplar.	Plant competition.
7. Moderately deep, moderately well drained, dominantly gently sloping soils derived from sandstone and shale materials; these soils are on uplands and stream terraces; the surface layer is silt loam or loam, and the subsoil is loam to silty clay loam that is 15 to 26 inches thick over an impervious fragipan; some of the soils are sloping and eroded.	Upland oak: 71±3. Virginia pine: 84. Shortleaf pine: 81.	Shortleaf pine, black oak, Virginia pine, white oak.	Shortleaf pine, loblolly pine, white pine.	Plant competition.
8. Moderately deep to deep, well-drained, gently sloping to moderately steep soils derived from shale and limestone materials; these soils are on uplands and foot slopes; the surface layer is silt loam to silty clay loam, and the subsoil is silty clay to silty clay loam; some of the soils are eroded.	Upland oak: 55 to 60. Redcedar: 35 to 45.	Redcedar, black oak, southern red oak.	Redcedar, white pine.	Equipment limitations on slopes of more than 12 percent; hazard of gully erosion on slopes of more than 6 percent.
9. Moderately deep to deep, well-drained gently sloping to strongly sloping soils derived from black shale; these soils are on foot slopes and uplands; their surface layer is silt loam, and their subsoil is silty clay loam to silty clay; erosion is generally moderate.	Upland oak: 58±4. Virginia pine: 62±3.	Virginia pine, black oak, southern red oak, white oak, hickory.	Shortleaf pine, loblolly pine, white pine.	Plant competition; equipment limitations on slopes of more than 12 percent; hazard of gully erosion on slopes of more than 6 percent.
10. Shallow to very shallow, somewhat excessively drained, sloping to steep upland soils on black shale; the surface layer is silt loam, and the subsoil is thin silty clay loam.	Upland oak: 60±5. Virginia pine: 56±3. Shortleaf pine: 50.	Virginia pine, black oak, chestnut oak, shortleaf pine.	Shortleaf pine, loblolly pine.	Equipment limitations; hazard of gully erosion.
11. Very shallow, severely eroded, sloping to steep silty clay loams of uplands over black shale.	Upland oak: 52±2. Virginia pine: 55±3. Shortleaf pine: 50.	Virginia pine, shortleaf pine, chestnut oak, black oak, hickory.	Shortleaf pine, loblolly pine.	Equipment limitations; hazard of gully erosion; seedling mortality.

TABLE 3.—*Woodland suitability groups of soils*—Continued

Woodland suitability group	Potential soil productivity (site index)	Preferred species for—		Critical management factors
		Existing woodland	Open land	
12. Eroded, moderately deep or shallow well-drained, sloping to moderately steep upland soils on limestone or calcareous shale; the surface layer is silty clay loam, and the subsoil is clay; some of the soils are very rocky, and a few are severely eroded in places.	Upland oak: 55 to 65. Redcedar: 40 to 50.	Redcedar, red mulberry, hickory, white oak, chinquapin oak.	Redcedar.	Plant competition; equipment limitations on slopes of more than 12 percent; hazard of gully erosion on slopes of more than 6 percent; seedling mortality.
13. Dominantly shallow to very shallow, somewhat excessively drained, severely eroded, sloping to steep soils from calcareous shale and limestone; the soils are generally clay in texture; rocks make up 10 to 50 percent of the surface layer in some places	Redcedar: 30 to 40. Upland oak: 40 to 50.	Redcedar.	Redcedar.	Equipment limitations; hazard of gully erosion; seedling mortality.
14. Dominantly deep, somewhat excessively drained, sloping to steep soils on soft shale and siltstone; the surface layer is silt loam, and the subsoil is loam to clay loam; erosion is moderate; in some places siltstone flags are common on the surface.	Upland oak: 70 to 80. Yellow-poplar: 85 to 95.	Yellow-poplar, black walnut, northern red oak, white oak, sugar maple.	White pine, shortleaf pine, loblolly pine, black locust, black walnut, yellow-poplar.	Plant competition; equipment limitations on slopes of more than 12 percent; hazard of gully erosion on slopes of more than 6 percent.
15. Miscellaneous land types: Gullied land and Made land. (See discussion of woodland suitability group 15.)				

TABLE 4.—*Estimated annual growth of well-stocked, unthinned stands of yellow-poplar, Virginia pine, and shortleaf pine, on uplands, and of well-managed stands of upland oak* [1]

Dashes indicate that the particular species does not occur on the soils of the group indicated or that it is not significant on those soils]

Woodland suitability group	Yellow-poplar [2]		Virginia pine [3]		Shortleaf pine [4]		Upland oak [5]	
	Board feet, International rule	Rough cords	Board feet, International rule	Rough cords	Board feet, International rule	Rough cords	Board feet, International rule	Rough cords
3	790	2.0	----	----	----	----	560	1.2
4	410	1.3	----	----	----	----	490	1.0
5	700	1.8	----	----	----	----	640	1.3
6	500	1.4	----	----	----	----	640	1.3
7	----	----	530	1.3	650	1.6	430	1.0
8	----	----	----	----	----	----	250	.7
9	----	----	390	1.0	----	----	265	.7
10	----	----	330	.8	220	.9	280	.8
11	----	----	320	.8	220	.9	210	.6
12	----	----	----	----	----	----	280	.8
13	----	----	----	----	----	----	155	.5
14	540	1.5	----	----	----	----	490	1.0

[1] To age 60 for board foot yields, and to age 35 for cord yields of yellow-poplar, Virginia pine, and shortleaf pine; to period of 65 to 80 years for board foot yields, and to period of 30 to 60 years for cord yields of upland oak.

[2] Based on interpretation of data in USDA Tech. Bul. 356 (*2*).

[3] Based on interpretation of data in N.C. Agr. Expt. Sta. Tech. Bul. 100 (*7*).

[4] Based on interpretation of data in USDA Misc. Pub. 50 (*10*).

[5] Based on interpretation of data in USDA Tech. Bul. 560 (*6*).

Woodland suitability group 1

This group consists of deep, well drained to moderately well drained soils mainly on bottoms and stream terraces. These soils are—

Ashton silt loam, 0 to 2 percent slopes (AsA).
Bruno loamy fine sand (Br).
Egam silt loam (Em).
Huntington silt loam (Hs).
Huntington silt loam, shallow (Hu).
Lindside silt loam (Ld).

The potential productivity of suitable trees on these soils is high and justifies intensive management.

Plant competition is severe because abundant moisture is available during the growing season. Shade-tolerant trees of low quality establish themselves in the understory of stands to be cut for saw logs. When the stands are removed by logging, these shade-tolerant trees generally prevent the satisfactory reestablishment of desirable trees unless the site is weeded intensively. Interplanting or conversion planting generally is not feasible, because competition from undesirable trees is severe. Trees planted in open fields generally need to be cultivated one or more times.

Woodland suitability group 2

In this group are dominantly deep, poorly drained to somewhat poorly drained soils on bottoms and stream terraces. These soils are—

Burgin silty clay loam (Bu).
Lanton and Dunning silty clay loams (La).
Melvin silt loam (Ml).
Newark silt loam (Ne).
Robertsville silt loam (Rb).
Taft silt loam (Ta).

The potential productivity of suitable trees on these soils is high and justifies intensive management.

Plant competition is severe. Because of the abundant moisture available during the growing season, shade-tolerant trees of low quality grow in the understory of trees to be cut for saw logs. When the stands are cut, these shade-tolerant trees generally prevent satisfactory reestablishment of desirable trees unless the site is weeded intensively. Generally, interplanting or conversion planting is not feasible, because competition from undesirable trees is severe. Trees planted in open fields will likely require one or more cultivations.

Limitations to the use of equipment are severe. The soils are under water or are wet for more than 3 months each year, and conventional logging equipment cannot be used during those wet periods.

Woodland suitability group 3

This group consists of deep, well-drained soils on stream terraces. These soils are—

Allegheny fine sandy loam, 12 to 20 percent slopes, eroded (AfD2).
Allegheny loam, 2 to 6 percent slopes (AgB).
Allegheny loam, 6 to 12 percent slopes, eroded (AgC2).
Armour silt loam, 0 to 2 percent slopes (ArA).
Armour silt loam, 2 to 6 percent slopes (ArB).
Armour silt loam, 6 to 12 percent slopes (ArC).
Ashton silt loam, 2 to 6 percent slopes (AsB).
Ashton silt loam, 6 to 12 percent slopes (AsC).
Ashton silt loam, 6 to 12 percent slopes, eroded (AsC2).
Ashton silt loam, 12 to 20 percent slopes, eroded (AsD2).

The potential productivity of suitable trees on these soils is high and justifies intensive management.

Because of the abundant moisture available during the growing season, plant competition is severe. Shade-tolerant trees of low quality establish themselves in the understory of stands to be cut for saw logs. When the stands are cut, these shade-tolerant trees generally prevent the reestablishment of desirable trees unless the site is weeded intensively. Interplanting or conversion planting generally is not feasible, because competition from other plants is severe. Trees planted in open fields generally require one or more cultivations.

Woodland suitability group 4

This group consists of eroded, dominantly deep, well-drained soils derived from limestone. These soils are—

Brashear silt loam, 2 to 6 percent slopes (BhB).
Brashear silt loam, 6 to 12 percent slopes, eroded (BhC2).
Brashear silt loam, 12 to 20 percent slopes, eroded (BhD2).
Hampshire silt loam, 2 to 6 percent slopes (HmB).
Hampshire silt loam, 2 to 6 percent slopes, eroded (HmB2).
Hampshire silt loam, 6 to 12 percent slopes (HmC).
Hampshire silt loam, 6 to 12 percent slopes, eroded (HmC2).
Hampshire silt loam, 12 to 20 percent slopes, eroded (HmD2).
Lowell silt loam, 2 to 6 percent slopes (LoB).
Lowell silt loam, 2 to 6 percent slopes, eroded (LoB2).
Lowell silt loam, 6 to 12 percent slopes (LoC).
Lowell silt loam, 6 to 12 percent slopes, eroded (LoC2).
Lowell silt loam, 12 to 20 percent slopes, eroded (LoD2).
Lowell silt loam, 20 to 30 percent slopes, eroded (LoE2).
McAfee silt loam, 2 to 6 percent slopes (McB).
McAfee silt loam, 6 to 12 percent slopes (McC).

The potential productivity of suitable trees is moderately high and justifies intensive management.

Plant competition is severe because a favorable supply of moisture, which is available during the growing season, helps the shade-tolerant trees of low quality to establish themselves in the understory of stands to be cut for saw logs. When the overstory is removed by logging, these shade-tolerant trees generally prevent the satisfactory reestablishment of desirable trees. One or more weedings are generally required to assure the dominance of a desirable woodcrop. Generally, interplanting or conversion planting is not feasible. There is generally severe competition to newly planted trees in open fields that have not been used for crops or pasture for 2 or more years.

Equipment limitations are moderately severe on slopes of more than 12 percent. Track-type equipment is needed to harvest timber efficiently.

The hazard of gully erosion is severe on slopes of more than 12 percent, mainly because of the length of the slope. Therefore, special care is needed in locating, constructing, and maintaining roads and skid trails.

Woodland suitability group 5

Deep, well-drained soils on limestone are in this group. These soils are—

Braxton silt loam, 2 to 6 percent slopes (BoB).
Braxton silt loam, 6 to 12 percent slopes, eroded (BoC2).
Hagerstown silt loam, 0 to 2 percent slopes (HgA).
Hagerstown silt loam, 2 to 6 percent slopes (HgB).
Hagerstown silt loam, 6 to 12 percent slopes, eroded (HgC2).
Loradale silt loam, 2 to 6 percent slopes (LeB).
Loradale silt loam, 6 to 12 percent slopes (LeC).
Loradale silt loam, 6 to 12 percent slopes, eroded (LeC2
Maury silt loam, 0 to 2 percent slopes (MbA).

Maury silt loam, 2 to 6 percent slopes (MbB).
Maury silt loam, 2 to 6 percent slopes, eroded (MbB2).
Maury silt loam, 6 to 12 percent slopes (MbC).
Maury silt loam, 6 to 12 percent slopes, eroded (MbC2).
Shelbyville silt loam, 2 to 6 percent slopes (SeB).
Shelbyville silt loam, 2 to 6 percent slopes, eroded (SeB2).
Shelbyville silt loam, 6 to 12 percent slopes (SeC).
Shelbyville silt loam, 6 to 12 percent slopes, eroded (SeC2).

The potential productivity of suitable trees is high and justifies intensive management.

Plant competition is severe. A favorable supply of moisture is available during the growing season and helps the shade-tolerant trees of low quality to establish themselves in the understory of stands to be cut for saw logs. When the overstory is removed by logging, these shade-tolerant trees generally prevent the satisfactory reestablishment of desirable trees. One or more weedings are generally required to assure the dominance of a desirable woodcrop. Interplanting or conversion planting generally is not feasible. There is usually severe competition to newly planted trees in open fields that have not been used for crops or pasture for 2 or more years.

Woodland suitability group 6

This group consists of moderately deep, moderately well drained soils on limestone. These soils have a fragipan. They are—

Bedford silt loam, 0 to 2 percent slopes (BfA).
Bedford silt loam, 2 to 6 percent slopes (BfB).
Bedford silt loam, 6 to 12 percent slopes (BfC).
Captina silt loam, 0 to 2 percent slopes (CaA).
Captina silt loam, 2 to 6 percent slopes (CaB).
Mercer silt loam, 2 to 6 percent slopes (MmB).
Mercer silt loam, 2 to 6 percent slopes, eroded (MmB2).
Mercer silt loam, 6 to 12 percent slopes (MmC).
Mercer silt loam, 6 to 12 percent slopes, eroded (MmC2).

The potential productivity of suitable trees is high and justifies intensive management.

Plant competition is severe. The favorable moisture available during the growing season helps the shade-tolerant trees of low quality to establish themselves in the understory of stands to be cut for saw logs. When the overstory is removed by logging, these shade-tolerant trees generally prevent the satisfactory reestablishment of desirable trees. One or more weedings are generally required to assure the dominance of a desirable woodcrop. Interplanting or conversion planting generally is not feasible. There is usually severe competition to newly planted trees in open fields that have not been used for crops or pasture for 2 or more years.

Woodland suitability group 7

In this group are moderately deep, moderately well drained soils derived from sandstone and shale materials, on the terraces and uplands. These soils have a fragipan. They are—

Monongahela loam, 2 to 6 percent slopes (MoB).
Monongahela loam, 6 to 12 percent slopes, eroded (MoC2).
Tilsit silt loam, 2 to 6 percent slopes (TsB).

The potential productivity of suitable trees is moderately high and justifies intensive management.

Plant competition is severe. A favorable supply of moisture is available during the growing season and helps the shade-tolerant trees of low quality to establish themselves in the understory of stands to be cut for saw logs. When the overstory is removed by logging, these shade-tolerant trees generally prevent the satisfactory reestablishment of desirable trees. One or more weedings are generally required to assure the dominance of a desirable woodcrop. Interplanting or conversion planting generally is not feasible. Usually, there is severe competition to newly planted trees in fields that have not been used for crops or pasture for 2 or more years.

Woodland suitability group 8

This group consists of moderately deep to deep, well-drained soils derived from shale and limestone materials. These soils are—

Beasley silt loam, 2 to 6 percent slopes, eroded (BaB2).
Beasley silt loam, 6 to 12 percent slopes, eroded (BaC2).
Fleming silt loam, 6 to 12 percent slopes, eroded (FlC2).
Fleming-Shrouts complex, 6 to 12 percent slopes (FpC).
Fleming-Shrouts complex, 12 to 20 percent slopes (FpD).
Fleming-Shrouts complex, 20 to 30 percent slopes (FpE).
Woolper silty clay loam, 6 to 12 percent slopes (WoC).

The potential productivity of suitable trees is fair and justifies management of medium intensity.

Limitations to the use of equipment are moderately severe on slopes of more than 12 percent. Track-type equipment is needed to harvest timber efficiently.

The hazard of gully erosion is moderately severe on slopes of more than 6 percent, mainly because of the length of the slopes. Therefore, care is needed in locating, constructing, and maintaining roads and skid trails.

Woodland suitability group 9

Moderately deep to deep, well-drained soils derived from black shale are in this group. These soils are—

Muse silt loam, 6 to 12 percent slopes, eroded (MuC2).
Muse silt loam, 12 to 20 percent slopes, eroded (MuD2).
Muse silt loam, 20 to 30 percent slopes, eroded (MuE2).
Trappist silt loam, 2 to 6 percent slopes (TtB).
Trappist silt loam, 6 to 12 percent slopes, eroded (TtC2).

The potential productivity of suitable trees is fair and justifies management of medium intensity.

A favorable supply of moisture during the growing season helps to make plant competition severe. Shade-tolerant trees of low quality generally grow in the understory of stands that are to be cut for saw logs. When the overstory is removed by logging, these shade-tolerant trees generally prevent the satisfactory reestablishment of desirable trees. One or more weedings are generally required to assure the dominance of a desirable woodcrop. Interplanting or conversion planting generally is not feasible. Generally, competition to newly planted trees is severe in open fields that have not been used for crops or pasture for 2 or more years.

Limitations to the use of equipment are moderately severe on slopes of more than 12 percent. Track-type equipment is needed to harvest timber efficiently.

The hazard of gully erosion is dominantly severe on slopes of more than 6 percent, mainly because of the length of the slopes. Therefore, special care is needed in locating, constructing, and maintaining roads and skid trails.

Woodland suitability group 10

This group consists of shallow to very shallow, somewhat excessively drained soils on black shale. These soils are—

Colyer silt loam, 6 to 12 percent slopes (CtC).
Colyer silt loam, 20 to 50 percent slopes (CtE).

The potential productivity of suitable trees is fair and justifies management of medium intensity.

Limitations to the use of equipment are severe because the slopes are steep and the areas are rough. Track-type equipment and power winches are needed for efficient harvesting of timber.

The hazard of gully erosion is severe, mainly because of the steep slopes. Therefore, special attention is needed in locating, constructing, and maintaining roads and skid trails.

Woodland suitability group 11

Severely eroded, very shallow soils over black shale are in this group. These soils are—

Colyer shaly silty clay loam, 6 to 12 percent slopes, severely eroded (CsC3).
Colyer shaly silty clay loam, 12 to 20 percent slopes, severely eroded (CsD3).
Colyer shaly silty clay loam, 20 to 50 percent slopes, severely eroded (CsE3).

The potential productivity of suitable trees is moderately low and justifies only limited management.

Limitations to the use of equipment are severe because the slopes are steep and the areas are rough. Track-type equipment and power winches are needed to harvest timber efficiently.

The hazard of gully erosion is severe, mainly because of the steep slopes. As a result, special care is needed in locating, constructing, and maintaining roads and skid trails.

Seedling mortality is severe during periods of drought that occur in the early part of some growing seasons and that last 2 to 3 weeks. These dry periods cause severe losses of newly planted trees and of newly germinated seedlings.

Woodland suitability group 12

Eroded, moderately deep or shallow soils on limestone or calcareous shale are in this group. Some of the soils are rocky, and some are severely eroded. These soils are—

Eden silty clay loam, 6 to 12 percent slopes, eroded (EhC2).
Eden silty clay loam, 12 to 20 percent slopes, eroded (EhD2).
Eden silty clay loam, 20 to 30 percent slopes, eroded (EhE2).
Fairmount flaggy silty clay loam, 20 to 30 percent slopes (FfE).
Hampshire silty clay loam, 6 to 12 percent slopes, severely eroded (HpC3).
Lowell silty clay loam, 6 to 12 percent slopes, severely eroded (LvC3).
Lowell silty clay loam, 12 to 20 percent slopes, severely eroded (LvD3).
Lowell silty clay loam, 20 to 30 percent slopes, severely eroded (LvE3).
Lowell silty clay loam, shallow, 6 to 12 percent slopes, eroded (LwC2).
Lowell silty clay loam, shallow, 12 to 20 percent slopes, eroded (LwD2).
Lowell silty clay loam, shallow, 20 to 30 percent slopes, eroded (LwE2).
McAfee very rocky silty clay loam, 12 to 20 percent slopes, eroded (MhD2).
McAfee very rocky silty clay loam, 20 to 30 percent slopes, eroded (MhE2).
McAfee silty clay loam, 2 to 6 percent slopes, eroded (MfB2).
McAfee silty clay loam, 6 to 12 percent slopes, eroded (MfC2).
McAfee silty clay loam, 12 to 20 percent slopes, eroded (MfD2).
McAfee silty clay loam, 20 to 30 percent slopes, eroded (MfE2).
Salvisa silty clay loam, 2 to 6 percent slopes, eroded (ScB2).
Salvisa silty clay loam, 6 to 12 percent slopes, eroded (ScC2).
Salvisa silty clay loam, 12 to 20 percent slopes, eroded (ScD2).
Salvisa silty clay loam, 20 to 30 percent slopes, eroded (ScE2).

The potential productivity of redcedar is moderately high, and that of upland oak is low to fair. Intensive management is justified for redcedar.

Plant competition is severe on most of these soils, mainly because the soils are moderately high in fertility. When the woodcrop is removed by logging or when open areas are protected from livestock, grasses, shrubs, or herbaceous plants soon cover the areas and often hinder development of the redcedar woodcrop. Plant competition is not critical on the severely eroded soils.

Limitations to the use of equipment are severe where slopes are more than 12 percent, and on the soils that are rough and rocky.

The hazard of gully erosion is severe on slopes of more than 6 percent, mainly because of the length of the slopes. In most of the soils, there are depressions or gullies that receive runoff, which causes further gullying. Special attention needs to be given to the proper location, construction, and maintenance of roads and skid trails.

On the severely eroded soils, seedling mortality is severe during short droughts in the early part of some growing seasons. These dry periods last 2 to 3 weeks and cause severe loss of newly planted trees and of newly germinated seedlings.

Woodland suitability group 13

This group consists of dominantly shallow to very shallow soils from calcareous shale and limestone. These soils are mostly clayey. They are—

Ashwood very rocky clay, 6 to 12 percent slopes, severely eroded (AvC3).
Ashwood very rocky clay, 12 to 20 percent slopes, severely eroded (AvD3).
Ashwood very rocky clay, 20 to 30 percent slopes, severely eroded (AvE3).
Ashwood very rocky silty clay loam, 6 to 12 percent slopes (AwC).
Ashwood very rocky silty clay loam, 12 to 20 percent slopes (AwD).
Ashwood very rocky silty clay loam, 20 to 30 percent slopes (AwE).
Eden clay, 6 to 12 percent slopes, severely eroded (EcC3).
Eden clay, 12 to 20 percent slopes, severely eroded (EcD3).
Eden clay, 20 to 30 percent slopes, severely eroded (EcE3).
Eden flaggy clay, 12 to 20 percent slopes, severely eroded (EfD3).
Eden flaggy clay, 20 to 30 percent slopes, severely eroded (EfE3).
Fairmount flaggy clay, 20 to 30 percent slopes, severely eroded (FaE3).
Fairmount flaggy clay, 30 to 50 percent slopes, severely eroded (FaF3).
Fleming-Shrouts complex, 12 to 20 percent slopes, severely eroded (FpD3).
Fleming-Shrouts complex, 20 to 30 percent slopes, severely eroded (FpE3).

Lowell silty clay, shallow, 6 to 12 percent slopes, severely eroded (LsC3).
Lowell silty clay, shallow, 12 to 20 percent slopes, severely eroded (LsD3).
Lowell silty clay, shallow, 20 to 30 percent slopes, severely eroded (LsE3).
McAfee silty clay, 12 to 20 percent slopes, severely eroded (MeD3).
Otway silty clay, 6 to 12 percent slopes, severely eroded (OsC3).
Otway silty clay loam, 6 to 12 percent slopes (OtC).
Otway soils, 20 to 30 percent slopes, severely eroded (OwE3).
Otway soils, 30 to 50 percent slopes (OwF).
Rock land (Ro).
Salvisa clay, 6 to 12 percent slopes, severely eroded (SaC3).
Salvisa clay, 12 to 20 percent slopes, severely eroded (SaD3).
Salvisa clay, 20 to 30 percent slopes, severely eroded (SaE3).

The potential productivity of redcedar is fair, but that of other species is very low. Redcedar is the only tree of satisfactory commercial quality. Only a limited management is justified.

Limitations to the use of equipment are severe where slopes are more than 12 percent because the soils are steep, rough, and rocky. Track-type equipment is needed to harvest timber efficiently.

The hazard of gully erosion is severe. Therefore, the location, construction, and maintenance of roads and skid trails need special attention.

Seedling mortality is severe on the severely eroded soils during periods of short droughts in the early part of some growing seasons. These dry periods last 2 to 3 weeks and cause severe loss of newly planted trees and of newly germinated seedlings.

Woodland suitability group 14

Dominantly deep, somewhat excessively drained soils on soft shale and siltstone are in this group. These soils are—

Culleoka silt loam, 2 to 6 percent slopes (CvB).
Culleoka silt loam, 6 to 12 percent slopes, eroded (CvC2).
Culleoka silt loam, 12 to 20 percent slopes, eroded (CvD2).
Culleoka silt loam, 20 to 30 percent slopes, eroded (CvE2).
Culleoka flaggy silt loam, 20 to 30 percent slopes, eroded (CuE2).
Culleoka flaggy silt loam, 30 to 50 percent slopes, eroded (CuF2).

The potential productivity of suitable trees is high and justifies intensive management.

A favorable supply of moisture during the growing season helps to make plant competition severe. Shade-tolerant trees of low quality generally establish themselves in the understory of stands to be cut for saw logs. When the overstory is removed by logging, these shade-tolerant trees generally prevent the satisfactory reestablishment of desirable trees. One or more weedings are generally required to assure the dominance of a desirable woodcrop. Interplanting or conversion planting generally is not feasible. In open land that has not been used for crops or pasture for 2 or more years, competition to newly planted trees is usually severe.

Limitations to the use of equipment are moderately severe where slopes are more than 12 percent. Track-type equipment is needed to harvest timber efficiently.

The hazard of gully erosion is severe on slopes of more than 6 percent because the soils are loamy and have long, steep slopes. Consequently, special attention is needed in locating, constructing, and maintaining roads and skid trails.

Woodland suitability group 15

This group contains the following miscellaneous land types—

Gullied land (Gu).
Made land (Ma).

Gullied land consists of areas made up of an intricate pattern of deep gullies. Between the gullies are narrow strips of soil material left after the original soil profile was removed through sheet erosion. On most of this land, trees grow very slowly and are of little commercial quality.

Made land is made up of areas where the soil material has been moved about in grading or in excavating and the original soil profile can no longer be identified. This land varies considerably in origin and compaction. Therefore, each site needs to be examined and considered before the kind of trees and the management that applies can be determined.

Use of the Soils for Wildlife[3]

The principal kinds of wildlife in Clark County are cottontail rabbit, gray squirrel, fox squirrel, bobwhite quail, mourning dove, waterfowl (mainly several kinds of duck, but a few geese), ruffed grouse, white-tailed deer, raccoon, opossum, skunk, mink, muskrat, red fox, and possibly gray fox. There are also many kinds of nongame birds and mammals.

In the streams of the county are the kinds of game fish, pan fish, and rough fish that are common in streams throughout the State. The Kentucky Department of Fish and Wildlife Resources has stocked most of the farm ponds with such game fish as largemouth bass and bluegill. Carp, bullhead, and other rough fish are common. Streams that have considerable numbers of fish are the Kentucky and Red Rivers, which form the southern boundary of the county, and Stoner Creek in the northeastern part of the county. Big muskies have been taken from the Red River.

The population of game animals and birds varies. Cottontail rabbits are common, but their number fluctuates from year to year. They are fairly evenly distributed throughout the county.

Gray squirrels are also common, and they occur throughout the county. They are more numerous, however, in the southeastern half of the county in the Eden-Culleoka, Lowell-Shelbyville, Eden-Lowell-Culleoka, Otway-Beasley, Colyer-Trappist-Muse, and Otway-Fleming-Shrouts soil associations than they are in the other soil associations in the county. Fox squirrels are also common, but they prefer less wooded areas than the gray squirrels. Therefore, they are most numerous in the northwestern part of the county.

Bobwhite quail are common, but they are less numerous in the Maury-McAfee-Salvisa, Hampshire-Mercer, and Hampshire-Salvisa associations than in the other associations in the county. For the entire county, the average population density of bobwhite quail is about 1¼ coveys per 100 acres.

[3] By WILLIAM CASEY, biologist, Soil Conservation Service.

Mourning doves are common, and they are most numerous in the Maury-McAfee-Salvisa, McAfee-Salvisa-Ashwood, Hampshire-Salvisa, and Hampshire-Salvisa-Lowell associations, which are farmed more intensively than the other soil associations. Lesser numbers are in the Eden-Culleoka, Lowell-Shelbyville, Eden-Lowell-Culleoka, Otway-Beasley, Colyer-Trappist-Muse, and Otway-Fleming-Shrouts associations.

Several species of duck concentrate along the Kentucky and Red Rivers during periods of migration. Here the soil associations are the McAfee-Salvisa-Ashwood, Eden-Culleoka, Otway-Beasley, and the Otway-Fleming-Shrouts. Even in these areas, ducks are rare, and they occur only incidentally elsewhere in the county. Geese are also rare, and, if present, they are found in the same soil associations as the ducks.

Ruffed grouse are seen only occasionally. If present, they are most likely to be in the Eden-Culleoka, Otway-Beasley, and Otway-Fleming-Shrouts soil associations in the southern part of the county along the bluffs of the Kentucky River.

White-tailed deer are also rare. They are most likely to be found in the Colyer-Trappist-Muse and Otway-Fleming-Shrouts associations in the southeastern part of the county. A few have been seen in the adjacent Otway-Beasley association.

Raccoon, opossum, skunk, mink, and muskrat are common and are distributed fairly evenly throughout the county. Red foxes are common. They are least numerous in the Hampshire-Mercer, Lowell-Shelbyville, and Hampshire-Salvisa-Lowell associations. There is some doubt as to whether or not gray foxes are present in the county. If they are, they are rare and probably are mostly in the Eden-Culleoka, Otway-Beasley, and Otway-Fleming-Shrouts associations along the Kentucky River.

Songbirds and other nongame birds are common. and they are evenly distributed throughout the county. Nevertheless, some species are more numerous in one part of the county than in others. This is a reflection of the different uses man has made of the soils, and accordingly, of the kinds of vegetation growing on the soils. The exact number of species present in the county is not known, but most of the 228 species known to visit the State are probably in this county at one time or another.

Habitat Requirements

A knowledge of the kinds of habitat required is essential if wildlife populations are to be increased and controlled. Following is a discussion of the habitat requirements of the more common kinds of wildlife in the county.

Cottontail rabbits are most numerous in agricultural areas. They are vegetarians and eat such a wide variety of plants that food is seldom a problem. The lack of suitable cover, however, is a problem. The proverbial brier patch is a good example of the best protection the rabbit can have. Farms that have both cropland and pasture support the most rabbits, provided the fields are separated by wide, brushy fence rows. In periods of bitter cold, rabbits use abandoned groundhog burrows.

Gray squirrels prefer large, unbroken expanses of hardwood forest. A forest that has a large proportion of mature or decaying hardwood trees supports the most squirrels because these trees furnish dens for most of these animals. Since squirrels prefer nuts, their number fluctuates widely, according to the yield from the trees that furnish the bulk of their food. Among the important producers of food for squirrels are shagbark hickory, white oak, black oak, walnut, hackberry, sassafras, dogwood, and blackgum. Squirrels are also fond of mulberry and Osage-orange.

Fox squirrels, in contrast to gray squirrels, prefer small farm woodlots that have parklike openings. The need for den trees and food-producing trees is the same for fox squirrels as for gray squirrels, and the same kinds of trees meet this need. For some reason not clearly understood, fox squirrels seem to have a greater preference for bottom lands and other areas along streams than do gray squirrels.

Bobwhite quail thrive best on farms that have a mixture of cultivated land, pasture, and woodland. The fields most attractive to quail are those not more than 10 acres in size that are separated by wide, brushy fence rows. Quail require grass and other herbaceous cover for nesting. They also need cultivated crops and wild seed-bearing plants for food, and brush and trees for protection from weather and natural enemies. It is not necessary to provide open water for drinking, except possibly during periods of extreme drought. Ordinarily, quail obtain sufficient moisture from insects, berries, and fleshy fruits they eat.

Mourning doves are migratory, but some remain in Clark County throughout the winter. They eat seeds and therefore, they find the agricultural areas where grain crops are grown especially attractive. Partly because they do not eat insects, doves require open water for drinking. Farm ponds are an important source of this water. Most doves nest in pines, elms, or other trees that have fairly open foliage. A few nest on the ground. Plantings of pine trees or ornamental evergreens in urban parks and cemeteries are preferred nesting sites.

Waterfowl, with the exception of the wood duck, do not nest in this county. They are regular visitors in winter, however, when water and food are available. Ducks prefer millet, corn, smartweed, soybeans, and small acorns, expecially those from pin oaks. Ducks sometimes feed in dry cornfields, but they prefer that their food be flooded with 1 to 12 inches of water. For this reason, ducks are most numerous on bottom lands that produce food and that are flooded periodically. Geese also eat grain, but they readily feed in a dry cornfield. They are also grazers, and they are especially fond of winter wheat and ladino clover.

Ruffed grouse live in the forest, but they are attracted to natural or manmade openings because many of their preferred food plants are there. Among these food plants are blackberry, wild cherry, flowering dogwood, and apple trees. When insects and acorns are available, grouse also eat them. In winter, when other foods are scarce, grouse feed almost exclusively upon buds of woody plants. Wherever they live, drumming logs are required because the males perform their courtship display on these logs. They particularly like old logs that are partly decayed and that are more than 20 inches in diameter.

White-tailed deer also live in the forest, but they are most numerous in agricultural areas where there is a

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fairly large proportion of woodland that is interspersed with cropland and pasture. Deer browse rather than graze, and their food habits change with the seasons. In spring they eat tender grass and clover, but in summer they generally eat the leaves of herbs, shrubs, and trees. Then, in fall, they eat acorns. They do most of their browsing in winter, when they eat tender twigs of shrubs and trees. Deer also like corn and apples. They require open water for drinking, especially during dry periods.

Skunks are most abundant in agricultural areas that consist of a well-balanced acreage of woodland, brushland, and grassland. These beneficial animals seldom stray farther than a couple of miles from water. The den is generally a hole in the ground, but they also use old buildings as temporary shelter. Their food consists of insects, mice, eggs, and various fruits and berries.

Opossum are most common on farmland, but they are primarily woodland animals. Their dens are in abandoned groundhog burrows, under brushpiles or old buildings, or in hollow trees. Their diet consists of fruits, particularly persimmons, and of insects, mice, garbage, and carrion. Wherever they live, opossums must have sufficient water.

Raccoon are likely to be found wherever there is woodland that contains large hollow trees suitable for dens. They are especially attracted to wooded areas along streams or near other bodies of water. Their principal plant foods are persimmons, pecans, acorns, grapes, pokeberries, and corn. Their animal foods include crayfish, insects, frogs, and small mammals.

Mink, like raccoon, also prefer wooded streams and lakes. Their home is most often a brushpile or a burrow in a streambank. They spend most of their life near water, where they feed on sick muskrats, aquatic insects, crayfish, frogs, and small fish. Occasionally, they roam a considerable distance from water, probably because food is scarce where they normally live.

Muskrats require an aquatic habitat. They live along streams and in farm ponds, generally in burrows they dig into banks along the shore. In marshes they build houses out of mud and aquatic vegetation. Their principal food consists of the stems and roots of cattails, rushes, and other aquatic vegetation. Sometimes they eat frogs, turtles, and fish. At certain times of the year, changed environmental conditions result in a shuffling of muskrat populations. This explains why muskrats constantly reappear in farm ponds from which they have been removed.

Red foxes are most numerous in rolling or hilly country where the topography dictates use of the land partly for crops, partly for meadow, and partly for fairly open woods. Red foxes generally live in abandoned groundhog burrows. Rabbits and mice make up about 45 percent of their food; birds, 15 percent; insects, 20 percent; and vegetables and such fruits as persimmons and grapes, 20 percent.

Gray foxes are more secretive than red foxes. They are most numerous along river bottoms, on bluffs or cliffs, and in areas of fairly open brushland. In contrast to red foxes, gray foxes generally live in a hollow log or in a hole in a cliff, rather than in a hole in the ground. Gray foxes also can climb trees. They eat about the same kinds of food as the red foxes, but they probably eat more vegetable matter.

The kinds of habitat required by songbirds are many and varied. Some nest on the ground, some in shrubs, some in tall trees, and some in hollow trees. Their food requirements are similarly varied. Some eat mostly seeds, insects, and fruits; others eat mostly meat. The landscape that has the most diverse and ample vegetation has the greatest number and kinds of birds.

Large numbers of game, pan, and rough fish normally are not found together in the same body of water. These different kinds of fish require, or can tolerate, water with markedly different physical and chemical properties. Generally speaking, rough fish tolerate water that contains less than the minimum amount of oxygen required by game fish and pan fish. Also, rough fish feed largely by taste and smell. For this reason they do not require water so clear as that needed by the game fish and pan fish, both of which feed by sight. This partly explains why silt-laden, chemically polluted waters are usually devoid of the more desirable kinds of game and pan fish.

Wildlife Suitability Groups

Soils vary in their ability to support wildlife according to their capacity to grow many kinds of plants in large quantities. The soils of the county have been placed in three broad groups. All the soils in one group are estimated to have similar capacity to produce food and cover for wildlife.

Wildlife suitability group 1

The soils in this group have a high to very high moisture-supplying capacity and are moderately high to high in natural fertility. They are the most productive soils of the county. They can grow many kinds of plants in large quantities. These soils are—

Allegheny loam, 2 to 6 percent slopes.
Allegheny loam, 6 to 12 percent slopes, eroded.
Armour silt loam, 0 to 2 percent slopes.
Armour silt loam, 2 to 6 percent slopes.
Armour silt loam, 6 to 12 percent slopes.
Ashton silt loam, 0 to 2 percent slopes.
Ashton silt loam, 2 to 6 percent slopes.
Ashton silt loam, 6 to 12 percent slopes.
Ashton silt loam, 6 to 12 percent slopes, eroded.
Braxton silt loam, 2 to 6 percent slopes.
Braxton silt loam, 6 to 12 percent slopes, eroded.
Culleoka silt loam, 2 to 6 percent slopes.
Culleoka silt loam, 6 to 12 percent slopes, eroded.
Egam silt loam.
Hagerstown silt loam, 0 to 2 percent slopes.
Hagerstown silt loam, 2 to 6 percent slopes.
Hagerstown silt loam, 6 to 12 percent slopes, eroded.
Hampshire silt loam, 2 to 6 percent slopes.
Hampshire silt loam, 2 to 6 percent slopes, eroded.
Hampshire silt loam, 6 to 12 percent slopes.
Hampshire silt loam, 6 to 12 percent slopes, eroded.
Huntington silt loam.
Lindside silt loam.
Loradale silt loam, 2 to 6 percent slopes.
Loradale silt loam, 6 to 12 percent slopes.
Loradale silt loam, 6 to 12 percent slopes, eroded.
Lowell silt loam, 2 to 6 percent slopes.
Lowell silt loam, 2 to 6 percent slopes, eroded.
Lowell silt loam, 6 to 12 percent slopes.

Lowell silt loam, 6 to 12 percent slopes, eroded.
Maury silt loam, 0 to 2 percent slopes.
Maury silt loam, 2 to 6 percent slopes.
Maury silt loam, 2 to 6 percent slopes, eroded.
Maury silt loam, 6 to 12 percent slopes.
Maury silt loam, 6 to 12 percent slopes, eroded.
Shelbyville silt loam, 2 to 6 percent slopes.
Shelbyville silt loam, 2 to 6 percent slopes, eroded.
Shelbyville silt loam, 6 to 12 percent slopes.
Shelbyville silt loam, 6 to 12 percent slopes, eroded.
Trappist silt loam, 2 to 6 percent slopes.

Most of the acreage of these soils is cultivated, and the soils probably produce more rabbits and mourning doves than any other kinds of wildlife. If they were not so intensively cultivated, these soils would support large and more varied populations of both resident and migratory wildlife. The areas could be improved for bobwhite quail by planting hedgerows around cropland and pasture. Other kinds of wildlife can benefit best if woodland and idle land are protected from grazing.

Fishponds constructed on these soils will probably produce 600 to 1,000 pounds of fish per surface acre without fertilization.

Wildlife suitability group 2

In this group the soils are moderately low to high in moisture-supplying capacity and moderate to moderately low in natural fertility. These soils can grow almost as many kinds of plants as the soils in wildlife suitability group 1, but in lesser amounts. The soils are—

Allegheny fine sandy loam, 12 to 20 percent slopes, eroded.
Ashton silt loam, 12 to 20 percent slopes, eroded.
Beasley silt loam, 2 to 6 percent slopes, eroded.
Beasley silt loam, 6 to 12 percent slopes, eroded.
Bedford silt loam, 0 to 2 percent slopes.
Bedford silt loam, 2 to 6 percent slopes.
Bedford silt loam, 6 to 12 percent slopes.
Brashear silt loam, 2 to 6 percent slopes.
Brashear silt loam, 6 to 12 percent slopes, eroded.
Brashear silt loam, 12 to 20 percent slopes, eroded.
Bruno loamy fine sand.
Captina silt loam, 0 to 2 percent slopes.
Captina silt loam, 2 to 6 percent slopes.
Culleoka flaggy silt loam, 20 to 30 percent slopes, eroded.
Culleoka silt loam, 12 to 20 percent slopes, eroded.
Culleoka silt loam, 20 to 30 percent slopes, eroded.
Eden clay, 6 to 12 percent slopes, severely eroded.
Eden clay, 12 to 20 percent slopes, severely eroded.
Eden clay, 20 to 30 percent slopes, severely eroded.
Eden flaggy clay, 12 to 20 percent slopes, severely eroded.
Eden flaggy clay, 20 to 30 percent slopes, severely eroded.
Eden silty clay loam, 6 to 12 percent slopes, eroded.
Eden silty clay loam, 12 to 20 percent slopes, eroded.
Eden silty clay loam, 20 to 30 percent slopes, eroded.
Fleming silt loam, 6 to 12 percent slopes, eroded.
Fleming-Shrouts complex, 6 to 12 percent slopes.
Fleming-Shrouts complex, 12 to 20 percent slopes.
Hampshire silt loam, 12 to 20 percent slopes, eroded.
Hampshire silty clay loam, 6 to 12 percent slopes, severely eroded.
Huntington silt loam, shallow.
Lowell silt loam, 12 to 20 percent slopes, eroded.
Lowell silt loam, 20 to 30 percent slopes, eroded.
Lowell silty clay, shallow, 6 to 12 percent slopes, severely eroded.
Lowell silty clay, shallow, 12 to 20 percent slopes, severely eroded.
Lowell silty clay loam, 6 to 12 percent slopes, severely eroded.
Lowell silty clay loam, 12 to 20 percent slopes, severely eroded.
Lowell silty clay loam, 20 to 30 percent slopes, severely eroded.
Lowell silty clay loam, shallow, 6 to 12 percent slopes, eroded.
Lowell silty clay loam, shallow, 12 to 20 percent slopes, eroded.
Lowell silty clay loam, shallow, 20 to 30 percent slopes, eroded.
McAfee silt loam, 2 to 6 percent slopes.
McAfee silt loam, 6 to 12 percent slopes.
McAfee silty clay, 12 to 20 percent slopes, severely eroded.
McAfee silty clay loam, 2 to 6 percent slopes, eroded.
McAfee silty clay loam, 6 to 12 percent slopes, eroded.
McAfee silty clay loam, 12 to 20 percent slopes, eroded.
McAfee silty clay loam, 20 to 30 percent slopes, eroded.
Mercer silt loam, 2 to 6 percent slopes.
Mercer silt loam, 2 to 6 percent slopes, eroded.
Mercer silt loam, 6 to 12 percent slopes.
Mercer silt loam, 6 to 12 percent slopes, eroded.
Monongahela loam, 2 to 6 percent slopes.
Monongahela loam, 6 to 12 percent slopes, eroded.
Muse silt loam, 6 to 12 percent slopes, eroded.
Muse silt loam, 12 to 20 percent slopes, eroded.
Muse silt loam, 20 to 30 percent slopes, eroded.
Newark silt loam.
Otway silty clay loam, 6 to 12 percent slopes.
Salvisa clay, 6 to 12 percent slopes, severely eroded
Salvisa clay, 12 to 20 percent slopes, severely eroded.
Salvisa silty clay loam, 2 to 6 percent slopes, eroded.
Salvisa silty clay loam, 6 to 12 percent slopes, eroded.
Salvisa silty clay loam, 12 to 20 percent slopes, eroded.
Salvisa silty clay loam, 20 to 30 percent slopes, eroded.
Taft silt loam.
Tilsit silt loam, 2 to 6 percent slopes.
Trappist silt loam, 6 to 12 percent slopes, eroded.
Woolper silty clay loam, 6 to 12 percent slopes.

About half of the acreage is used for crops, and about half is used for pasture. The soils in this group probably support more rabbits and mourning doves than any other kinds of wildlife common in the county. They support moderate populations of other resident wildlife species and of migratory wildlife.

Farm ponds on these soils probably can produce from 200 to 600 pounds of fish per surface acre without fertilization.

Wildlife suitability group 3

In this group are soils that are severely limited in the kinds of plants they can support and in the amount of vegetation they can produce. Some of the soils are droughty and support only a few kinds of plants. Others are high in fertility, but can grow only a few kinds of plants because they are wet. Still other soils have adequate moisture-supplying capacity but produce only a small amount of vegetation because they are low in fertility. The soils in this group are—

Ashwood very rocky clay, 6 to 12 percent slopes, severely eroded.
Ashwood very rocky clay, 12 to 20 percent slopes, severely eroded.
Ashwood very rocky clay, 20 to 30 percent slopes, severely eroded.
Ashwood very rocky silty clay loam, 6 to 12 percent slopes.
Ashwood very rocky silty clay loam, 12 to 20 percent slopes.
Ashwood very rocky silty clay loam, 20 to 30 percent slopes.
Burgin silty clay loam.
Colyer shaly silty clay loam, 6 to 12 percent slopes, severely eroded.
Colyer shaly silty clay loam, 12 to 20 percent slopes, severely eroded.
Colyer shaly silty clay loam, 20 to 50 percent slopes, severely eroded.
Colyer silt loam, 6 to 12 percent slopes.
Colyer silt loam, 20 to 50 percent slopes.
Culleoka flaggy silt loam, 30 to 50 percent slopes, eroded.
Fairmount flaggy clay, 20 to 30 percent slopes, severely eroded.
Fairmount flaggy clay, 30 to 50 percent slopes, severely eroded.

Fairmount flaggy silty clay loam, 20 to 30 percent slopes.
Fleming-Shrouts complex, 12 to 20 percent slopes, severely eroded.
Fleming-Shrouts complex, 20 to 30 percent slopes.
Fleming-Shrouts complex, 20 to 30 percent slopes, severely eroded.
Gullied land.
Lanton and Dunning silty clay loams.
Lowell silty clay, shallow, 20 to 30 percent slopes, severely eroded.
Made land.
McAfee very rocky silty clay loam, 12 to 20 percent slopes, eroded.
McAfee very rocky silty clay loam, 20 to 30 percent slopes, eroded.
Melvin silt loam.
Otway silty clay, 6 to 12 percent slopes, severely eroded.
Otway soils, 20 to 30 percent slopes, severely eroded.
Otway soils, 30 to 50 percent slopes.
Robertsville silt loam.
Rock land.
Salvisa clay, 20 to 30 percent slopes, severely eroded.

Since none of the acreage is cultivated and little is in pasture, the areas support only a few quail, rabbits, and mourning doves. Gray foxes are probably more numerous on these soils than on soils of the other two wildlife groups, but this group supports considerably less of other kinds of wildlife.

Providing openings in the more heavily forested areas, and then seeding them to palatable grasses and legumes would benefit deer and ruffed grouse. Keeping livestock out of the woods would also benefit both these two species, as well as gray squirrels. Probably, however, the best way to improve conditions for wildlife would be to apply practices that build up soil fertility.

Farm ponds on these soils probably would produce about 200 pounds of fish per surface acre without fertilization.

Use of the Soils for Engineering[4]

Soils engineering deals with soils as structural material and as foundation material upon which structures are built. Some soil properties are of special interest to engineers because they affect the construction and maintenance of roads, airports, pipelines, building foundations, facilities for water storage, erosion control structures, drainage systems, sewage disposal systems, and many other engineering structures. The soil properties most important to the engineer are permeability to water, shear strength, compaction characteristics, soil drainage, shrink-swell characteristics, grain size, plasticity, and degree of acidity or alkalinity. The topography and the depth to the water table and to bedrock also are important. An estimate of most of these properties has been made for each soil in the county and included in the appropriate tables of the report.

Information in the report can be used to—

1. Make soil and land use studies that will aid in selecting and developing industrial, business, residential, and recreational sites.
2. Make preliminary estimates of the engineering properties of soils in the planning of soil and water conservation systems, including surface and internal drainage, and water storage and supply systems.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting locations for

[4] By WILLIAM M. ADAMS, civil engineer, and E. V. HUFFMAN, assistant State soil scientist, Soil Conservation Service.

TABLE 5.—*Engineering test data for soil samples*

Name of soil and location	Parent material	Bureau of Public Roads report number	Depth	Horizon	Moisture-density	
					Maximum dry density	Optimum moisture
			Inches		*Lb. per cu. ft.*	*Percent*
Ashwood silty clay loam:[6]						
0.75 mile N. of the Kentucky River along route 227.	Limestone.	S-30844	2–9	B1	91	25
		S-30845	9–26	C1	94	25
1.0 mile W. of Lisletown along the Athens-Boonesboro Road.	Limestone and calcareous, massive clay.	S-30846	0–5	A1	87	27
		S-30847	5–13	B1	89	28
		S-30848	15–21	C1	94	25
Eden silty clay loam:						
1.5 miles E. of Winchester along Route 15.	Soft shale and limestone.	S-30853	2–6	B1	93	23
		S-30854	6–28	C1	93	27
3.5 miles S. of Winchester along Cole Road.	Soft shale and limestone.	S-30871	2–10	B2	95	23
		S-30872	10+	C1	97	24
Hagerstown silt loam:						
1.5 miles W. of Goffs Corner along Route 15.	Limestone.	S-30858	0–4	Ap	104	19
		S-30859	9–26	B21 and B22	105	20
		S-30860	48–50+	C1	96	26
2.0 miles S. of Route 15 along Crowe Ridge Road.	Limestone.	S-30883	0–4	Ap	94	24
		S-30884	10–24	B21 and B22	107	20
		S-30885	40–50+	C1	95	26

See footnotes at end of table.

highways, airports, pipelines, and cables and in planning detailed investigations at the selected locations.

4. Locate probable sources of sand and gravel for use in construction.
5. Correlate performance of engineering structures with soil mapping units, and thus develop information for overall planning that will be useful in designing and maintaining the structures.
6. Determine the suitability of soils for the cross-country movement of vehicles and construction equipment.
7. Supplement the information obtained from other published maps, reports, and aerial photographs to make maps and reports that can be used readily by engineers.
8. Develop other preliminary estimates for construction purposes pertinent to a particular area.

It is not intended, however, that this report will eliminate the need for on-site sampling and testing of the soils for design and construction of specific engineering works and uses. The interpretations in the report should be used primarily in planning more detailed field investigations to determine the in-place condition of the soils at the proposed site for engineering works.

Some of the information useful for engineering can be obtained from the soil map. It will often be necessary, however, to refer to other parts of the report, particularly to the section, "Descriptions of the Soils." Also useful is information about the properties of the soils given in tables 5, 6, and 7 in this section. By using the information in the soil map, the profile descriptions, and the tables, the soils engineer can plan a detailed survey of the soil at the construction site. Then, after he has made a detailed survey and has tested the soils and observed their behavior in structures and foundations, he can estimate design requirements for the different soils shown on the map.

Some of the terms used by the soil scientist may not be familiar to the engineer, and some terms may have special meanings in soil science. Most of these terms, as well as other special terms used in this report, are defined in the Glossary at the back of the report.

Engineering Classification Systems

The United States Department of Agriculture system of classifying soil texture is used by agricultural scientists (*9*). In this system, classes of soil texture are based on different combinations of sand (2.0 to 0.05 millimeters in diameter), silt (0.05 to 0.002 millimeter in diameter), and clay (less than 0.002 millimeter in diameter). The classes in order of increasing proportions 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. Those with the term "sand" in the name are modified for very fine, fine, coarse, or very coarse sand. Gravelly refers to soils that contain gravel up to 3 inches in diameter, and stony refers to soils that contain stones more than 10 inches in diameter. Shaly soils contain flattened fragments of shale that are less than 6 inches long along the longer axis. Flaggy soils contain relatively thin fragments, 6 to 15 inches long, of sandstone, limestone, slate, or shale.

taken from eight extensive series, Clark County, Ky.[1]

Mechanical analysis[2]											Liquid limit	Plasticity index	Classification	
Percentage passing sieve[3]—							Percentage smaller than[3]—							
1 in.	¾ in.	⅜ in.	No. 4 (4.76 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO[4]	Unified[5]
------	100	99	98	96	92	84	82	69	48	38	58	24	A–7–5(17)------	MH.
------	------	------	100	99	95	87	35	74	59	52	60	31	A–7–6(20)------	MH–CH.
------	------	------	------	100	96	93	90	76	46	33	54	17	A–7–5(14)------	MH.
------	------	------	------	100	97	94	93	78	52	43	57	21	A–7–5(16)------	MH.
------	------	------	100	96	93	89	86	74	54	46	61	32	A–7–6(20)------	MH–CH.
[7] 97	97	97	97	97	97	94	90	76	53	43	56	24	A–7–5(17)------	MH.
------	------	------	100	98	98	97	96	88	74	66	78	46	A–7–5(20)------	CH.
------	------	------	------	------	100	99	98	89	70	59	66	36	A–7–5(20)------	CH.
[8] 90	89	88	87	86	86	85	84	79	65	56	72	43	A–7–6(20)------	CH.
------	------	------	100	99	94	88	85	70	39	25	35	11	A–6(8)---------	ML–CL.
------	------	------	100	98	91	86	84	74	54	43	47	25	A–7–6(15)------	CL.
------	------	------	100	99	92	82	79	70	55	47	60	28	A–7–5(19)------	MH–CH.
------	------	------	100	97	90	86	84	71	41	26	48	16	A–7–5(12)------	ML.
------	------	------	100	94	85	82	81	68	45	34	46	20	A–7–6(13)------	ML–CL.
100	99	98	95	90	85	83	82	74	61	51	78	41	A–7–5(20)------	MH–CH.

TABLE 5.—*Engineering test data for soil samples*

Name of soil and location	Parent material	Bureau of Public Roads report number	Depth	Horizon	Moisture-density	
					Maximum dry density	Optimum moisture
			Inches		*Lb. per cu. ft.*	*Percent*
Hampshire silt loam:						
2.75 miles N. of Winchester along Route 227.	Limestone.	S-30855	0–6	Ap	96	23
		S-30856	19–36	B3	103	22
		S-30857	13–60	C1	94	26
1.0 mile E. of Winchester along Route 15.	Limestone.	S-30864	0–4	Ap	97	22
		S-30865	10–24	B3	96	25
		S-30866	24–60+	C1	101	21
Lowell silt loam:						
1.0 mile S. of Pilot View along Route 15.	Siltstone and limestone.	S-30841	0–10	Ap	102	20
		S-30842	21–33	B3	100	23
		S-30843	33+	Cg	95	25
2.0 miles N. of Kiddville.	Siltstone and limestone.	S-30876	4–12	A2	103	20
		S-30877	17–32	B21 and B22	109	18
		S-30878	32–60+	Cg	91	25
Mercer silt loam:						
6.0 miles W. of Winchester along U.S. Highway 60.	Limestone.	S-30849	0–7	Ap	107	19
		S-30850	12–18	B2	110	17
		S-30851	18–39	B3m	107	19
		S-30852	39+	C1	90	26
4.5 miles W. of Winchester along U.S. Highway 60.	Limestone.	S-30886	0–6	Ap	100	21
		S-30887	12–18	B2	108	19
		S-30888	18–40	B3m	106	19
		S-30889	40–60+	C1	97	25
Tilsit silt loam:						
2,000 ft. S. of Goffs Corner along the road to Trapp.	Black shale.	S-30879	4–11	A2	102	20
		S-30880	14–21	B2	106	18
		S-30881	21–29	B3m	106	20
		S-30882	29+	C1	105	19
0.75 mile N. of Red River Road along Goolman Road.	Black shale.	S-30867	0–5	Ap	99	22
		S-30868	10–18	B2	108	18
		S-30869	18–26	B3m	105	20
		S-30870	26–30+	C1	97	24
Trappist silt loam:						
750 ft. E. of Corinth Church on Trapp to Right Angle Road.	Black shale.	S-30861	0–4	Ap	97	22
		S-30862	8–16	B2	104	20
		S-30863	22–34	C1	104	20
150 ft. N. of Route 15 on road to Indian Fields Post Office.	Black shale.	S-30873	0–5	Ap	99	21
		S-30874	14–24	B2	101	23
		S-30875	27–36	Dr	95	26

[1] Tests performed by the Bureau of Public Roads in accordance with standard procedures of the American Association of State Highway Officials (AASHO).

[2] According to the AASHO Designation: T 88–54. Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes of soils.

taken from eight extensive series, Clark County, Ky. [1]—Continued

Mechanical analysis [2]											Liquid limit	Plasticity index	Classification	
Percentage passing sieve [3]—							Percentage smaller than [3]—							
1 in.	¾ in.	⅜ in.	No. 4 (4.76 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO [4]	Unified [5]
				100	96	92	91	77	41	26	44	14	A-7-5(10)	ML.
				100	96	91	90	78	55	43	50	25	A-7-6(16)	CL.
				100	99	95	94	88	75	65	74	42	A-7-5(20)	CH.
			100	99	97	93	91	75	42	29	42	14	A-7-6(10)	ML.
					100	99	98	86	66	56	66	38	A-7-6(20)	CH.
					100	99	98	86	68	55	61	32	A-7-6(20)	MH-CH.
				100	97	94	90	74	42	28	38	12	A-6(9)	ML-CL.
				100	98	95	93	82	58	48	57	28	A-7-6(19)	MH-CH.
				100	99	96	94	85	66	56	67	34	A-7-5(20)	MH-CH.
				100	98	96	92	73	39	25	37	12	A-6(9)	ML-CL.
				100	95	91	85	67	41	29	34	12	A-6(9)	ML-CL.
					100	98	93	76	65	60	74	41	A-7-5(20)	MH-CH.
				100	96	94	92	75	37	24	34	10	A-4(8)	ML-CL.
				100	93	91	89	74	42	29	36	13	A-6(9)	ML-CL.
			100	97	86	84	83	72	46	34	41	17	A-7-6(11)	ML-CL.
				100	97	94	93	85	72	62	80	42	A-7-5(20)	MH-CH.
				100	96	92	91	76	41	26	38	11	A-6(8)	ML.
				100	95	91	90	77	46	31	38	15	A-6(10)	ML-CL.
			100	99	92	87	87	77	50	37	41	18	A-7-6(11)	CL.
				100	99	95	94	87	70	59	68	38	A-7-5(20)	CH.
			100	99	95	93	92	78	42	25	33	8	A-4(8)	ML-CL.
			100	99	95	93	91	77	43	27	30	7	A-4(8)	ML-CL.
		100	98	94	91	89	88	76	52	36	40	16	A-6(10)	ML-CL.
	100	96	89	77	71	68	67	56	42	32	44	17	A-7-6(10)	ML-CL.
			100	99	95	91	87	71	39	25	38	11	A-6(8)	ML.
				100	95	91	88	71	43	32	36	14	A-6(10)	CL.
			100	99	92	87	83	66	46	35	44	21	A-7-6(13)	CL.
				100	99	94	90	81	65	56	70	43	A-7-6(20)	CH.
			100	97	92	88	87	71	40	26	40	10	A-4(8)	ML.
		100	99	97	94	92	91	81	52	38	44	17	A-7-6(12)	ML-CL.
[7] 98	95	90	83	71	69	67	66	60	40	28	44	16	A-7-6(9)	ML-CL.
	100	98	94	90	79	72	69	58	34	22	43	12	A-7-5(9)	ML.
			100	99	96	94	93	84	63	46	47	20	A-7-6(13)	ML-CL.
[9] 93	90	84	77	70	68	66	66	60	43	33	50	20	A-7-5(12)	ML-CL.

[3] Based on total material. Laboratory test data corrected for amount discarded in field sampling.

[4] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (pt. 1, ed. 7). The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, AASHO Designation: M 145–49.

[5] Based on the Unified Soil Classification System, Tech. Memo. No. 3–357, v. 1, Waterways Expt. Sta. Corps of Engin., March 1953.

[6] Areas of Ashwood silty clay loam are too small to be mapped separately in this county, but they are included with other Ashwood soils.

[7] A total of 100 percent passed the 2-inch sieve.

[8] A total of 93 percent passed the 3-inch sieve; 7 percent of the fragments were larger than 3 inches.

[9] A total of 100 percent passed the 3-inch sieve.

TABLE 6.—*Brief description of the soils of Clark County,*

[Dashes indicate does not apply

Symbol on map	Soil name	Description of soil and site	Depth to bedrock
			Feet
AgB AgC2 AfD2	Allegheny loam, 2 to 6 percent slopes. Allegheny loam, 6 to 12 percent slopes, eroded. Allegheny fine sandy loam, 12 to 20 percent slopes, eroded.	Loam or fine sandy loam over silty clay loam; below is fine sandy clay loam; the underlying material consists of layers of sand, silt, and gravel 4 to 12 feet thick; the soils are well drained and are on alluvial stream terraces.	4 to 12 or more.
ArA ArB ArC	Armour silt loam, 0 to 2 percent slopes. Armour silt loam, 2 to 6 percent slopes. Armour silt loam, 6 to 12 percent slopes.	Silt loam over silty clay loam; below is silty clay; the soils are well drained and are on alluvial stream terraces, fans, and toe slopes; the underlying alluvium is 2 to 10 feet thick.	4 to 10 or more.
AsA AsB AsC AsC2 AsD2	Ashton silt loam, 0 to 2 percent slopes. Ashton silt loam, 2 to 6 percent slopes. Ashton silt loam, 6 to 12 percent slopes. Ashton silt loam, 6 to 12 percent slopes, eroded. Ashton silt loam, 12 to 20 percent slopes, eroded.	Silt loam over silt loam or silty clay loam; below is silty clay underlain by limestone; the soils are well drained and are on stream terraces and toe slopes.	About 5 to 15.
AwC AwD AwE	Ashwood very rocky silty clay loam, 6 to 12 percent slopes. Ashwood very rocky silty clay loam, 12 to 20 percent slopes. Ashwood very rocky silty clay loam, 20 to 30 percent slopes.	Silty clay loam over clay; below is limestone; the soils are excessively drained and are on narrow ridgetops and side slopes; slabs and ledges of rock outcrop.	10 inches to 2½ feet.
AvC3 AvD3 AvE3	Ashwood very rocky clay, 6 to 12 percent slopes, severely eroded. Ashwood very rocky clay, 12 to 20 percent slopes, severely eroded. Ashwood very rocky clay, 20 to 30 percent slopes, severely eroded.	Clay underlain by limestone; the soils are excessively drained and are on narrow ridgetops and side slopes; slabs and ledges of rock outcrop.	A few inches to 2 feet.
BaB2 BaC2	Beasley silt loam, 2 to 6 percent slopes, eroded. Beasley silt loam, 6 to 12 percent slopes, eroded.	Silt loam over silty clay loam or silty clay; below is clay underlain by soft limestone and soft, calcareous shale; the soils are well drained and are on ridgetops and side slopes.	About 4+.
BfA BfB BfC	Bedford silt loam, 0 to 2 percent slopes. Bedford silt loam, 2 to 6 percent slopes. Bedford silt loam, 6 to 12 percent slopes.	Silt loam over silty clay loam; below is clay underlain by limestone; the soils are moderately well drained and are on uplands.	About 5.
BhB BhC2 BhD2	Brashear silt loam, 2 to 6 percent slopes. Brashear silt loam, 6 to 12 percent slopes, eroded. Brashear silt loam, 12 to 20 percent slopes, eroded.	Silt loam over silty clay loam; below is clay underlain by thin interbedded layers of limestone, calcareous shale, and siltstone; the soils are well drained to moderately well drained and are on benches and toe slopes above stream bottoms.	About 4+.
BoB BoC2	Braxton silt loam, 2 to 6 percent slopes. Braxton silt loam, 6 to 12 percent slopes, eroded.	Silt loam over silty clay loam; below is clay underlain by limestone; the soils are well drained and are on ridgetops.	2 to 8.
Br	Bruno loamy fine sand.	Loamy fine sand over stratified layers of sand, silt, and clay; the soils are excessively drained and are on bottoms along the rivers.	More than 20.
Bu	Burgin silty clay loam.	Silty clay loam over plastic clay underlain by limestone; the soils are poorly drained and are on level areas or in slight depressions on sloping ridgetops.	About 3 to 12.

Ky., and their estimated physical and chemical properties

or information was not available]

Depth from surface	Classification			Permeability	Available water capacity	Reaction
	USDA texture	Unified	AASHO			
Inches				*Inches per hour*	*Inches per inch*	*pH value*
0–7	Loam or fine sandy loam	ML–CL	A–4	2. 0 – 5. 0	0. 13–0. 18	4. 5–5. 0
7–28	Silty clay loam	CL	A–6	0. 8 – 2. 0	. 19	4. 5–5. 0
28–36+	Fine sandy clay loam	ML, CL, or SC	A–4 or A–6	0. 8 – 2. 0	. 17	4. 5–5. 0
0–15	Silt loam	ML–CL	A–6	0. 2 – 0. 8	. 22	5. 0–6. 5
15–48	Silty clay loam	CL	A–6	0. 2 – 0. 8	. 18	5. 0–6. 5
48+	Silty clay	MH–CH	A–7–6	0. 2 – 0. 8	. 16	5. 0–6. 5
0–9	Silt loam	ML	A–4	2. 0 – 5. 0	. 22	5. 0–6. 5
9–38	Silt loam or silty clay loam	ML–CL	A–6	0. 8 – 2. 0	. 19	5. 0–6. 5
38–48+	Silty clay	CH	A–7	0. 2 – 0. 8	. 16	5. 0–6. 5
0–5	Silty clay loam	CL	A–6	0. 2 – 0. 8	. 18	6. 6–7. 3
5–26	Clay	MH–CH	A–7–6	0. 2 – 0. 8	. 14	6. 6–7. 3
0–15	Clay	MH–CH	A–7–6	0. 2 – 0. 8	. 14	6. 6–7. 3
15–48+	Rock					
0–8	Silt loam	ML–CL	A–4 or A–6	0. 2 – 0. 8	. 22	5. 0–6. 5
8–30	Silty clay loam or silty clay	CH	A–7–6	0. 2 – 0. 8	. 19	5. 0–6. 5
30–48+	Clay	MH–CH	A–7–5	0. 2 – 0. 8	. 14	6. 6–8. 0
0–10	Silt loam	ML–CL	A–4 or A–6	0. 2 – 0. 8	. 22	5. 0–6. 0
10–43	Silty clay loam	CL	A–6	0. 05– 0. 2	. 19	5. 0–6. 0
43–60	Clay	MH–CH	A–7–6	0. 05– 0. 2	. 14	5. 0–6. 0
0–7	Silt loam	ML–CL	A–4 or A–6	0. 2 – 0. 8	. 22	5. 1–6. 0
7–32	Silty clay loam	CL	A–6	0. 2 – 0. 8	. 19	5. 1–6. 0
32–48+	Clay	CH	A–7–6	0. 2 – 0. 8	. 14	5. 0–6. 5
0–8	Silt loam	ML–CL or CL	A–4 or A–6	0. 8 – 2. 0	. 22	5. 5–6. 5
8–26	Silty clay loam	ML–CL or CL	A–6	0. 8 – 2. 0	. 19	5. 5–6. 0
26–48+	Clay	CL	A–7–6	0. 8 – 2. 0	. 14	5. 5–6. 0
0–48+	Loamy fine sand	SM or ML	A–2 or A–4	5. 0 –10. 0+	. 08	5. 5–6. 5
0–10	Silty clay loam	CL or ML–CL	A–6 or A–7–6	0. 05– 0. 20	. 19	6. 6–7. 3
10–48+	Clay	CH	A–7–6	0. 05– 0. 20	. 14	6. 5–7. 3

TABLE 6.—*Brief description of the soils of Clark County,*

Symbol on map	Soil name	Description of soil and site	Depth to bedrock
			Feet
CaA CaB	Captina silt loam, 0 to 2 percent slopes. Captina silt loam, 2 to 6 percent slopes.	Silt loam over silty clay loam; below is silt loam underlain by clay and alluvium; the soils are moderately well drained and are on terraces that are between stream bottoms and upland slopes.	3 to 15.
CtC CtE	Colyer silt loam, 6 to 12 percent slopes. Colyer silt loam, 20 to 50 percent slopes.	Silt loam over shaly silty clay loam; below is fissile, black shale; the soils are excessively drained and are on ridgetops and steep side slopes.	About ⅝.
CsC3 CsD3 CsE3	Colyer shaly silty clay loam, 6 to 12 percent slopes, severely eroded. Colyer shaly silty clay loam, 12 to 20 percent slopes, severely eroded. Colyer shaly silty clay loam, 20 to 50 percent slopes, severely eroded.	Shaly silty clay loam over fissile, black shale; the soils are excessively drained and are on narrow ridgetops and steep side slopes.	About ⅓ to ½.
CvB CvC2 CvD2 CvE2	Culleoka silt loam, 2 to 6 percent slopes. Culleoka silt loam, 6 to 12 percent slopes, eroded. Culleoka silt loam, 12 to 20 percent slopes, eroded. Culleoka silt loam, 20 to 30 percent slopes, eroded.	Silt loam over flaggy silty clay loam; below is soft siltstone; the soils are well drained and are on narrow ridgetops and steep slopes.	About 1½ to 5.
CuE2 CuF2	Culleoka flaggy silt loam, 20 to 30 percent slopes, eroded. Culleoka flaggy silt loam, 30 to 50 percent slopes, eroded.	Flaggy silt loam over flaggy silty clay loam; below is soft siltstone; the soils are well drained and are on steep slopes.	About 1 to 5.
EhC2 EhD2 EhE2	Eden silty clay loam, 6 to 12 percent slopes, eroded. Eden silty clay loam, 12 to 20 percent slopes, eroded. Eden silty clay loam, 20 to 30 percent slopes, eroded.	Silty clay loam over plastic clay; below is interbedded clay, shale, and thin-bedded limestone; the soils are well drained and are on upland slopes.	About 2.
EcC3 EcD3 EcE3	Eden clay, 6 to 12 percent slopes, severely eroded. Eden clay, 12 to 20 percent slopes, severely eroded. Eden clay, 20 to 30 percent slopes, severely eroded.	Clay over flaggy clay; below is interbedded clay, shale, and limestone; the soils are excessively drained and are on narrow ridgetops and side slopes.	About 1½.
EfD3 EfE3	Eden flaggy clay, 12 to 20 percent slopes, severely eroded. Eden flaggy clay, 20 to 30 percent slopes, severely eroded.	Flaggy clay over interbedded clay, shale, and limestone; the soils are excessively drained and are on side slopes.	About 1½.
Em	Egam silt loam.	Silt loam over silty clay loam; the soil is well drained and is on bottoms.	About 3 to 7.
FfE	Fairmount flaggy silty clay loam, 20 to 30 percent slopes.	Flaggy silty clay loam over flaggy clay; underlain by limestone; limestone ledges outcrop in many places; the soil is excessively drained and is on uplands.	Generally less than 3.
FaE3 FaF3	Fairmount flaggy clay, 20 to 30 percent slopes, severely eroded. Fairmount flaggy clay, 30 to 50 percent slopes, severely eroded.	Flaggy clay over limestone rock; limestone ledges outcrop in many places; the soils are excessively drained and are on uplands.	Generally less than 3.
FlC2	Fleming silt loam, 6 to 12 percent slopes, eroded.	Silt loam over silty clay loam; below is clay underlain by soft clay shale and limestone; the soils are well drained and are on ridgetops and side slopes of benches. (See also Fleming-Shrouts complexes.)	About 5.

Ky., and their estimated physical and chemical properties—Continued

Depth from surface	Classification			Permeability	Available water capacity	Reaction
	USDA texture	Unified	AASHO			
Inches				*Inches per hour*	*Inches per inch*	*pH value*
0–8	Silt loam	ML–CL	A–4 or A–6	0. 2 – 0. 8	0. 22	5. 1–6. 0
8–16	Silty clay loam	CL	A–6	0. 2 – 0. 8	. 19	4. 5–5. 5
16–36	Silt loam	CL	A–6	0. 2 – 0. 8	. 22	4. 5–5. 5
36–48+	Clay	CH	A–7–6	0. 2 – 0. 8	. 14	4. 5–5. 5
0–6	Silt loam	ML	A–4	0. 8 – 2. 0	. 22	4. 5–5. 5
6–10	Shaly silty clay loam	ML	A–7–5	0. 8 – 2. 0	. 19	4. 5–5. 1
10–48+	Rock					
0–6	Shaly silty clay loam	ML	A–7–5	0. 8 – 2. 0	. 19	4. 5–5. 1
6–48+	Rock					
0–12	Silt loam	ML	A–4	0. 8 – 2. 0	. 22	5. 6–6. 5
12–36	Flaggy silty clay loam	ML–CL	A–6 or A–7–6	0. 8 – 2. 0	. 19	5. 5–6. 5
36–48+	Rock					
0–6	Flaggy silt loam	ML	A–4	0. 8 – 2. 0	. 22	5. 6–6. 5
6–24	Flaggy silty clay loam	ML–CL	A–6	0. 8 – 2. 0	. 19	5. 6–6. 6
24–48+	Rock					
0–6	Silty clay loam	MH	A–7–5	0. 8 – 2. 0	. 19	6. 6–7. 3
6–28	Clay	CH	A–7–5	0. 05– 0. 2	. 14	6. 6–7. 3
28+	Rock					
0–12	Clay	CH	A–7–5	0. 2 – 0. 8	. 14	6. 6–7. 3
12–18	Flaggy clay	MH or CH	A–7–5 or A–7–6	0. 05– 0. 2	. 14	6. 6–7. 3
18–48+	Parent rock					
0–18	Flaggy clay	MH or CH	A–7–5 or A–7–6	0. 05– 0. 2	. 14	6. 6–7. 3
18–48+	Rock					
0–8	Silt loam	ML–CL	A–6	0. 8 – 2. 0	. 22	6. 6–7. 3
8–48+	Silty clay loam	MH–CH	A–7	0. 2 – 0. 8	. 19	6. 6–7. 3
0–8	Flaggy silty clay loam	CL	A–6	0. 8 – 2. 0	. 19	7. 0–8. 0
8–18	Flaggy clay	CL or CH	A–7–6	0. 2 – 0. 8	. 14	7. 4–8. 0
18–48+	Rock					
0–15	Flaggy clay	CL or CH	A–7–6	0. 2 – 0. 8	. 14	7. 0–8. 0
15–48+	Rock					
0–6	Silt loam	ML–CL	A–4	0. 8 – 2. 0	. 22	5. 0–6. 0
6–12	Silty clay loam	CL	A–6	0. 2 – 0. 8	. 19	5. 0–5. 9
12–48+	Clay	MH–CH	A–7–6	0. 05– 0. 20	. 14	5. 0–7. 5

TABLE 6.—*Brief description of the soils of Clark County,*

Symbol on map	Soil name	Description of soil and site	Depth to bedrock
			Feet
FpC	Fleming-Shrouts complex, 6 to 12 percent slopes.	Silty clay loam over clay; below is soft, clayey shale; the soils are excessively drained and are on uplands.	2 to 4.
FpD	Fleming-Shrouts complex, 12 to 20 percent slopes.		
FpD3	Fleming-Shrouts complex, 12 to 20 percent slopes, severely eroded.		
FpE	Fleming-Shrouts complex, 20 to 30 percent slopes.		
FpE3	Fleming-Shrouts complex, 20 to 30 percent slopes, severely eroded.		
HgA	Hagerstown silt loam, 0 to 2 percent slopes.	Silt loam over silty clay loam and silty clay; below is clay; the soils are well drained and are on uplands.	About 5.
HgB	Hagerstown silt loam, 2 to 6 percent slopes.		
HgC2	Hagerstown silt loam, 6 to 12 percent slopes, eroded.		
HmB	Hampshire silt loam, 2 to 6 percent slopes.	Silt loam over silty clay loam; below is clay; the soils are well drained and are on uplands.	About 3 to 7.
HmB2	Hampshire silt loam, 2 to 6 percent slopes, eroded.		
HmC	Hampshire silt loam, 6 to 12 percent slopes.		
HmC2	Hampshire silt loam, 6 to 12 percent slopes, eroded.		
HmD2	Hampshire silt loam, 12 to 20 percent slopes, eroded.		
HpC3	Hampshire silty clay loam, 6 to 12 percent slopes, severely eroded.	Silty clay loam over silty clay; below is clay; the soils are well drained and are on uplands.	About 3 to 7.
Hs	Huntington silt loam.	Silt loam over stratified layers of silt, sand, or clay; the soil is well drained and is along stream channels in small secondary drainageways and in small depressions in the uplands.	More than 5.
Hu	Huntington silt loam, shallow.	Silt loam over rubbly limestone or bedrock limestone; the soils are well drained and are on bottoms along the channels of streams.	About 1½.
La	Lanton and Dunning silty clay loams.	Silty clay loam over plastic clay; the soil is poorly drained to somewhat poorly drained and is on bottoms.	2½ to 8.
Ld	Lindside silt loam.	Silt loam over stratified layers of silt and clay; the soil is moderately well drained and is on first bottoms.	More than 5.
LeB	Loradale silt loam, 2 to 6 percent slopes.	Silt loam over silty clay loam; below is silty clay over clay; underlain by limestone; the soils are well drained and are on ridgetops and side slopes.	About 5 to 20.
LeC	Loradale silt loam, 6 to 12 percent slopes.		
LeC2	Loradale silt loam, 6 to 12 percent slopes, eroded.		
LoB	Lowell silt loam, 2 to 6 percent slopes.	Silt loam over silty clay loam; below is plastic silty clay over plastic clay; underlain by limestone; the soils are well drained and are on uplands.	3 to 6 or more.
LoB2	Lowell silt loam, 2 to 6 percent slopes, eroded.		
LoC	Lowell silt loam, 6 to 12 percent slopes.		
LoC2	Lowell silt loam, 6 to 12 percent slopes, eroded.		
LoD2	Lowell silt loam, 12 to 20 percent slopes, eroded.		
LoE2	Lowell silt loam, 20 to 30 percent slopes, eroded.		
LsC3	Lowell silty clay, shallow, 6 to 12 percent slopes, severely eroded.	Silty clay over clay; below is clayey shale and limestone; the soils are well drained and are on uplands.	1½ to 3.
LsD3	Lowell silty clay, shallow, 12 to 20 percent slopes, severely eroded.		
LsE3	Lowell silty clay, shallow, 20 to 30 percent slopes, severely eroded.		

Ky., and their estimated physical and chemical properties—Continued

Depth from surface	Classification			Permeability	Available water capacity	Reaction
	USDA texture	Unified	AASHO			
Inches				*Inches per hour*	*Inches per inch*	*pH value*
0–4	Silty clay loam	CL or CH	A–7–6	0. 2 – 0. 8	0. 19	5. 0–6. 5
4–17	Clay	MH or CH	A–7–6	0. 05– 0. 2	. 14	6. 6–7. 3
17–48+	Shale					
0–8	Silt loam	ML–CL	A–6	2. 0 – 5. 0	. 19–0. 22	5. 5–6. 0
8–30	Silty clay loam and silty clay	CL	A–7–6	0. 8 – 2. 0	. 16	5. 5–6. 0
30–50+	Clay	MH–CH	A–7–5	0. 8 – 2. 0	. 14	5. 5–6. 0
0–8	Silt loam	ML	A–7–5	0. 8 – 2. 0	. 22	4. 0–6. 1
8–30	Silty clay loam	CL	A–7–6	0. 2 – 0. 8	. 19	5. 0–5. 9
30–60+	Clay	CH	A–7–5	0. 2 – 0. 8	. 14	4. 5–6. 0
0–6	Silty clay loam	ML	A–7–6	0. 2 – 0. 8	. 19	4. 5–6. 0
6–30	Silty clay	CH	A–7–6	0. 2 – 0. 8	. 16	4. 5–5. 5
30–60+	Clay	MH–CH	A–7–6	0. 2 – 0. 8	. 14	5. 1–6. 0
0–48+	Silt loam	ML–CL	A–4 or A–6	2. 0 – 5. 0	. 22	6. 0–7. 3
0–18	Silt loam	ML–CL	A–4 or A–6	2. 0 – 5. 0	. 22	6. 6–7. 3
18+	Rock					
0–18	Silty clay loam	CL or CH	A–6 or A–7	0. 2 – 0. 8	. 19	6. 6–7. 3
18–48+	Clay	CL or CH	A–6 or A–7	0. 2 – 0. 8	. 14	6. 6–7. 3
0–36+	Silt loam	CL or ML–CL	A–6 or A–7–6	0. 8 – 2. 0	. 22	6. 6–7. 3
0–8	Silt loam	CL or ML–CL	A–6	2. 0 – 5. 0	. 22	5. 6–6. 5
8–18	Silty clay loam	CL	A–7	0. 8 – 2. 0	. 19	5. 5–6. 0
18–36	Silty clay	CL	A–6 or A–7	0. 2 – 0. 8	. 16	5. 5–6. 0
36–48+	Clay	CL or CH	A–7–6	0. 2 – 0. 8	. 14	5. 5–6. 0
0–9	Silt loam	ML–CL	A–6	2. 0 – 5. 0	. 22	5. 5–7. 0
9–15	Silty clay loam	ML–CL	A–6	0. 8 – 2. 0	. 19	5. 6–6. 5
15–20	Silty clay	MH–CH	A–7–6	0. 2 – 0. 8	. 16	5. 6–6. 5
20–48+	Clay	MH–CH	A–7–5	0. 05– 0. 2	. 14	5. 6–6. 5
0–10	Silty clay	MH–CH	A–7	0. 8 – 2. 0	. 16	5. 6–6. 5
10–15	Clay	MH–CH	A–7	0. 2 – 0. 8	. 14	5. 6–6. 5
15–48+	Rock					

TABLE 6.—*Brief description of the soils of Clark County,*

Symbol on map	Soil name	Description of soil and site	Depth to bedrock
			Feet
LvC3	Lowell silty clay loam, 6 to 12 percent slopes, severely eroded.	Silty clay loam over silty clay; below is clay underlain by clayey shale and limestone; the soils are well drained and are on uplands.	3 to 6 or more.
LvD3	Lowell silty clay loam, 12 to 20 percent slopes, severely eroded.		
LvE3	Lowell silty clay loam, 20 to 30 percent slopes, severely eroded.		
LwC2	Lowell silty clay loam, shallow, 6 to 12 percent slopes, eroded.	Silty clay loam over silty clay; below is clay underlain by clayey shale and limestone; the soils are well drained and are on uplands.	1½ to 3.
LwD2	Lowell silty clay loam, shallow, 12 to 20 percent slopes, eroded.		
LwE2	Lowell silty clay loam, shallow, 20 to 30 percent slopes, eroded.		
MbA	Maury silt loam, 0 to 2 percent slopes.	Silt loam over silty clay loam; below is silty clay over clay; where slopes are 8 percent or more, the soils are shallow to bedrock; the soils are well drained and are on uplands.	3 to 12.
MbB	Maury silt loam, 2 to 6 percent slopes.		
MbB2	Maury silt loam, 2 to 6 percent slopes, eroded.		
MbC	Maury silt loam, 6 to 12 percent slopes.		
MbC2	Maury silt loam, 6 to 12 percent slopes, eroded.		
McB	McAfee silt loam, 2 to 6 percent slopes.	Silt loam over silty clay; below is clay underlain by limestone; the soils are well drained and are on uplands.	2 to 4.
McC	McAfee silt loam, 6 to 12 percent slopes.		
MeD3	McAfee silty clay, 12 to 20 percent slopes, severely eroded.	Silty clay over clay; underlain by limestone; the soil is somewhat excessively drained and is on uplands.	1½ to 3.
MfB2	McAfee silty clay loam, 2 to 6 percent slopes, eroded.	Silty clay loam over silty clay; below is clay underlain by limestone; the soils are well drained and are on uplands.	2 to 4.
MfC2	McAfee silty clay loam, 6 to 12 percent slopes, eroded.		
MfD2	McAfee silty clay loam, 12 to 20 percent slopes, eroded.		
MfE2	McAfee silty clay loam, 20 to 30 percent slopes, eroded.		
MhD2	McAfee very rocky silty clay loam, 12 to 20 percent slopes, eroded.	Silty clay loam over silty clay; below is clay underlain by limestone; the soils are somewhat excessively drained and are on uplands.	1½ to 3.
MhE2	McAfee very rocky silty clay loam, 20 to 30 percent slopes, eroded.		
Ml	Melvin silt loam.	Silt loam over silty clay loam; below is stratified layers of silt and clay; this soil is poorly drained and is on bottom lands.	More than 5.
MmB	Mercer silt loam, 2 to 6 percent slopes.	Silt loam over silty clay loam; below is silty clay over clay; the soils are well drained and are on uplands.	5 to 9.
MmB2	Mercer silt loam, 2 to 6 percent slopes, eroded.		
MmC	Mercer silt loam, 6 to 12 percent slopes.		
MmC2	Mercer silt loam, 6 to 12 percent slopes, eroded.		
MoB	Monongahela loam, 2 to 6 percent slopes.	Loam over silty clay loam; below is fine sandy clay underlain by stratified layers of sand, silt, and clay; the soils are moderately well drained and are on broad ridges and side slopes and on second bottoms along the Kentucky River.	More than 5.
MoC2	Monongahela loam, 6 to 12 percent slopes, eroded.		

Ky., and their estimated physical and chemical properties—Continued

Depth from surface	Classification			Permeability	Available water capacity	Reaction
	USDA texture	Unified	AASHO			
Inches				*Inches per hour*	*Inches per inch*	*pH value*
0–15	Silty clay loam	ML–CL	A–6	0. 8 – 2. 0	0. 19	5. 5–6. 5
15–20	Silty clay	MH–CH	A–7	0. 2 – 0. 8	. 16	5. 5–6. 5
20–48+	Clay	MH–CH	A–7	0. 2 – 0. 8	. 14	5. 5–6. 5
0–6	Silty clay loam	ML–CL	A–6	0. 8 – 2. 0	. 19	5. 5–6. 5
6–12	Silty clay	MH–CH	A–7	0. 2 – 0. 8	. 16	5. 5–6. 5
12–18	Clay	MH–CH	A–7	0. 2 – 0. 8	. 14	5. 5–6. 5
18–48+	Rock					
0–15	Silt loam	ML–CL	A–4 or A–6	2. 0 – 5. 0	. 22	5. 5–6. 5
15–30	Silty clay loam	ML–CL	A–7–6	0. 8 – 2. 0	. 19	5. 5–6. 5
30–35	Silty clay	ML–CL	A–7–6	0. 8 – 2. 0	. 16	5. 0–5. 6
35–65	Clay	MH–CH	A–7–5	0. 2 – 0. 8	. 14	5. 0–5. 6
0–6	Silt loam	CL or ML–CL	A–6	2. 0 – 5. 0	. 22	5. 5–6. 5
6–12	Silty clay	CL	A–6	0. 8 – 2. 0	. 16	5. 1–6. 0
12–24	Clay	CL	A–7–6	0. 8 – 2. 0	. 14	6. 1–7. 3
24–48+	Rock					
0–12	Silty clay	CL or ML–CL	A–6	2. 0 – 5. 0	. 16	5. 5–6. 5
12–18	Clay	CL	A–7–6	0. 8 – 2. 0	. 14	6. 4–7. 3
18–48+	Rock					
0–6	Silty clay loam	CL or ML–CL	A–6	2. 0 – 5. 0	. 19	5. 5–6. 5
6–10	Silty clay	CL	A–6	0. 8 – 2. 0	. 16	5. 5–6. 5
10–21	Clay	CL	A–7–6	0. 8 – 2. 0	. 14	6. 4–7. 3
21–48+	Rock					
0–4	Silty clay loam	CL or ML–CL	A–6	2. 0 – 5. 0	. 19	5. 5–6. 5
4–8	Silty clay	CL	A–6	0. 8 – 2. 0	. 16	5. 6–6. 5
8–18	Clay	CL	A–7–6	0. 8 – 2. 0	. 14	6. 6–7. 3
18–48+	Rock					
0–18	Silt loam	CL or ML–CL	A–4 or A–6	0. 8 – 2. 0	. 22	5. 6–7. 3
18–48+	Silty clay loam	CL	A–6	0. 8 – 2. 0	. 19	6. 0–7. 3
0–7	Silt loam	ML or ML–CL	A–4 or A–6	2. 0 – 5. 0	. 22	5. 0–6. 1
7–15	Silty clay loam	ML–CL	A–6	0. 8 – 2. 0	. 19	5. 0–6. 0
15–30	Silty clay	CL or ML–CL	A–7–6	0. 8 – 2. 0	. 16	<5
30–48+	Clay	CH or MH–CH	A–7–5	0. 8 – 2. 0	. 14	<5
0–14	Loam	ML or CL	A–4	0. 8 – 2. 0	. 18	4. 5–5. 6
14–38	Silty clay loam	CL	A–6	0. 8 – 2. 0	. 19	4. 5–5. 5
38–48+	Fine sandy clay	CL or CH	A–6 or A–7	0. 8 – 2. 0	. 15	<5

TABLE 6.—*Brief description of the soils of Clark County,*

Symbol on map	Soil name	Description of soil and site	Depth to bedrock
			Feet
MuC2 MuD2 MuE2	Muse silt loam, 6 to 12 percent slopes, eroded. Muse silt loam, 12 to 20 percent slopes, eroded. Muse silt loam, 20 to 30 percent slopes, eroded.	Silt loam over silty clay loam; below is silty clay over clay underlain by shale; the soils are well drained and are on toe slopes.	About 4 to 10.
Ne	Newark silt loam.	Silt loam over stratified layers of silt and clay; this soil is somewhat poorly drained and is on first bottoms along streams and drainageways.	About 6 to 10.
OsC3 OtC	Otway silty clay, 6 to 12 percent slopes, severely eroded. Otway silty clay loam, 6 to 12 percent slopes.	Silty clay or silty clay loam over silty clay; below is clay loam that contains sandy shale fragments and is underlain by soft shale bedrock; the soils are somewhat excessively drained and are on ridge crests and side slopes.	About 2 to 5.
OwE3 OwF	Otway soils, 20 to 30 percent slopes, severely eroded. Otway soils, 30 to 50 percent slopes.	Silty clay over clay loam that contains sandy shale fragments; below is soft shale bedrock; the soils are somewhat excessively drained and are on steep side slopes on uplands.	About 2 to 5.
Rb	Robertsville silt loam.	Silt loam over compact silt loam; below is clay over alluvium 4 to 15 feet thick; this soil is poorly drained and is on broad, flat terraces.	4 to 15.
SaC3 SaD3 SaE3	Salvisa clay, 6 to 12 percent slopes, severely eroded. Salvisa clay, 12 to 20 percent slopes, severely eroded. Salvisa clay, 20 to 30 percent slopes, severely eroded.	Clay over limestone; the soils are somewhat excessively drained and are on narrow ridge crests and side slopes.	15 inches to 1½ feet.
ScB2 ScC2 ScD2 ScE2	Salvisa silty clay loam, 2 to 6 percent slopes, eroded. Salvisa silty clay loam, 6 to 12 percent slopes, eroded. Salvisa silty clay loam, 12 to 20 percent slopes, eroded. Salvisa silty clay loam, 20 to 30 percent slopes, eroded.	Silty clay loam over silty clay; below is clay underlain by limestone; the soils are somewhat excessively drained and are on ridge crests and side slopes.	1½ to 2.
SeB SeB2 SeC SeC2	Shelbyville silt loam, 2 to 6 percent slopes. Shelbyville silt loam, 2 to 6 percent slopes, eroded. Shelbyville silt loam, 6 to 12 percent slopes. Shelbyville silt loam, 6 to 12 percent slopes, eroded.	Silt loam over silty clay loam; below is silty clay over clay; the soils are well drained and are on broad ridgetops and gentle side slopes.	4½ to 9.
Ta	Taft silt loam.	Silt loam over silty clay loam; formed in alluvium 4 to 12 or more feet thick; the soil is somewhat poorly drained and is on terraces.	4 to 12 or more.
TsB	Tilsit silt loam, 2 to 6 percent slopes.	Silt loam over silty clay loam; below is silty clay over clay underlain by highly fissile, black shale; the soil is moderately well drained and is on uplands.	3 to 5½.
TtB TtC2	Trappist silt loam, 2 to 6 percent slopes. Trappist silt loam, 6 to 12 percent slopes, eroded.	Silt loam over silty clay loam; below is silty clay over highly fissile, black shale; the soils are well drained and are on uplands.	About 2½ to 3.
WoC	Woolper silty clay loam, 6 to 12 percent slopes.	Silty clay loam over silty clay; below is clay underlain by limestone; this soil is moderately well drained to well drained and is on toe slopes of steep hills.	2½ or more.

Ky., and their estimated physical and chemical properties—Continued

Depth from surface	Classification			Permeability	Available water capacity	Reaction
	USDA texture	Unified	AASHO			
Inches				*Inches per hour*	*Inches per inch*	*pH value*
0–6	Silt loam	ML or CL	A–4 or A–6	2. 0 – 5. 0	. 22	4. 5–6. 0
6–18	Silty clay loam	MH, CL, or CH	A–6 or A–7	0. 8 – 2. 0	. 19	4. 5–5. 5
18–30	Silty clay	MH, CL, or CH	A–6 or A–7	0. 8 – 2. 0	. 16	4. 5–5. 5
30–48+	Clay	CH or MH–CH	A–6 or A–7	0. 2 – 0. 8	. 14	4. 5–5. 5
0–36+	Silt loam	CL or ML–CL	A–4 or A–6	0. 8 – 2. 0	. 22	5. 6–6. 5
0–6	Silty clay or silty clay loam	CL	A–6	0. 8 – 2. 0	16–0. 19	6. 0–8. 0
6–10	Silty clay	CH	A–7–6	0. 2 – 0. 8	. 16	7. 0–8. 0
10–18	Clay	MH–CH	A–7–5	0. 2 – 0. 8	. 18	7. 5–8. 0
18–48+	Rock					
0–6	Silty clay	CH	A–7–6	0. 2 – 0. 8	. 16	7. 4–8. 0
6–12	Clay	MH–CH	A–7–5	0. 5 – 0. 2	. 18	7. 4–8. 0
12–48+	Rock					
0–15	Silt loam	ML or CL	A–4	0. 8 – 2. 0	. 22	4. 6–5. 0
15–45	Silt loam	CL	A–6	0. 05– 0. 8	. 22	4. 5–5. 6
45–54	Clay	MH or CH	A–7	0. 05– 0. 8	. 14	4. 5–5. 5
0–15	Clay	ML–CL or CH	A–7–6	2. 0 – 5. 0	. 14	6. 1–7. 0
15–48+	Rock					
0–7	Silty clay loam	CL or ML–CL	A–6	2. 0 – 5. 0	. 19	6. 0–7. 0
7–18	Silty clay	ML–CL	A–6 or A–7–6	0. 8 – 2. 0	. 16	6. 1–7. 0
18–30	Clay	CH	A–7–6	0. 8 – 2. 0	. 14	6. 1–7. 4
30–48+	Rock					
0–7	Silt loam	ML–CL	A- 6	2. 0 – 5. 0	. 22	5. 6–6. 1
7–24	Silty clay loam	CL	A–6	0. 8 – 2. 0	. 19	5. 6–6. 1
24–40	Silty clay	CH	A–7–5	0. 8 – 2. 0	. 16	5. 6–6. 1
40–48+	Clay	CH	A–7–6	0. 05– 0. 8	. 14	5. 6–6. 1
0–8	Silt loam	ML or CL	A–4	0. 8 – 2. 0	. 22	4. 5–6. 0
8–48+	Silty clay loam	CL or ML–CL	A–6	0. 8 – 2. 0	. 19	4. 5–5. 5
0–8	Silt loam	ML	A–6	0. 8 – 2. 0	. 22	4. 5–5. 5
8–14	Silty clay loam	CL	A–6	0. 8 – 2. 0	. 19	4. 5–5. 5
14–26	Silty clay	CL	A–7–6	0. 8 – 2. 0	. 16	4. 5–5. 5
26–30+	Clay	CH	A–7–6	0. 05– 0. 8	. 14	4. 5–5. 0
0–5	Silt loam	ML	A–7–5	2. 0 – 5. 0	. 22	4. 0–5. 0
5–9	Silty clay loam	ML–CL	A–7–6	0. 8 – 2. 0	. 19	4. 0–5. 0
9–30	Silty clay	ML–CL	A–7–5	0. 8 – 2. 0	. 16	4. 0–5. 0
30+	Rock					
0–9	Silty clay loam	CL	A–6	0. 8 – 2. 5	. 19	6. 0–7. 0
9–15	Silty clay	CH	A–7–6	0. 2 – 0. 8	. 16	6. 5–7. 0
15–48+	Clay	CH	A–7–6	0. 05– 0. 2	. 14	6. 5–7. 0

TABLE 7.—*Interpretation of engineering*

[Dashes indicate the soil is not suitable for the particular practice or the practice is not needed;

Soils series and map symbols	Suitability as source of topsoil	Workability as construction material	Compaction characteristics	Suitability for road fill	Soil features affecting engineering practices	
					Farm ponds	Reservoir area
Allegheny (AgB, AgC2, AfD2)	Good	Good to fair	Good to poor	Good to fair	Substratum is variable; seepage is a problem in places.	
Armour (ArA, ArB, ArC)	Good	Good to poor	Good to poor	Fair to poor	Seepage is a problem in places.	
Ashton (AsA, AsB, AsC, AsC2, AsD2).	Good	Good to poor	Good to poor	Fair to poor	Seepage is a problem in places.	
Ashwood (AwC, AwD, AwE, AvC3, AvD3, AvE3).	Poor	Poor	Fair to poor	Poor; plastic and shallow to bedrock.	Shallow over thin-bedded limestone; excessive seepage.	
Beasley (BaB2, BaC2)	Fair	Fair to poor	Fair to poor	Fair to poor	Excessive seepage may occur if bedrock is exposed.	
Bedford (BfA, BfB, BfC)	Good	Good to poor	Fair to poor	Fair to poor	None	
Brashear (BhB, BhC2, BhD2)	Fair	Good to poor	Fair to poor	Fair to poor	None	
Braxton (BoB, BoC2)	Fair	Good to fair	Good to fair	Fair to poor	In places shallow over creviced limestone.	
Bruno (Br)	Poor	Fair	Good to fair	Good to poor	Seepage is a problem in places	
Burgin (Bu)	Fair to poor	Fair to poor	Fair to poor	Fair to poor	None	
Captina (CaA, CaB)	Good	Good to poor	Fair to poor	Fair to poor	Good to fair	
Colyer (CtC, CtE, CsC3, CsD3, CsE3).	Poor	Fair	Good to poor	Poor; shallow to bedrock.	Fair	
Culleoka (CvB, CvC2, CvD2, CvE2, CuE2, CuF2).	Good	Good to fair	Good to poor	Fair to poor	None	
Eden (EhC2, EhD2, EhE2, EcC3, EcD3, EcE3, EfD3, EfE3).	Poor	Poor	Fair to poor	Poor; plastic and shallow to bedrock.	Seepage in places because of creviced bedrock.	
Egam (Em)	Good to Fair	Fair to poor	Fair to poor	Fair to poor	None	
Fairmount (FfE, FaE3, FaF3)	Poor	Fair to poor	Fair to poor	Fair to poor	Poor; shallow to bedrock; excessive seepage because of creviced bedrock.	

properties of soils in Clark County, Ky.

the entry is "None" if there are no features known that might affect the installation of the practice]

Soil features affecting engineering practices—Continued					Remarks
Farm ponds—Continued: Embankment	Agricultural drainage	Irrigation	Terraces and diversions	Waterways	
None		None	None	None	
Range of moisture content for suitable compaction is narrow.		None	None	None	
None		None	None	None	Some areas subject to infrequent overflow.
				Shallow, moderately steep, and rocky.	
Fair stability; subsoil is good core material.		None	None	Vegetation limited in places by exposures of marl.	
None	Seepage from side slopes may be a problem; surface drainage needed in places.	Slow permeability in the fragipan.	None	None	Fragipan 18 to 30 inches thick at a depth between 18 and 30 inches.
Fair stability	Sidehill seepage; a cutoff is needed in places.	None	None	None	
Soil is shallow in some places.		None	Rocky and shallow in some places.	Rock outcrops occur in places in shallow areas.	
Erodible; subject to piping.		Rapid permeability	Erodible; subject to channel filling.	Difficult to establish vegetation because of erosion.	Possible source of sand; subject to overflow.
Subject to slipping	Tile or open ditch needed; tile should be placed above plastic clay if feasible.	Slow permeability in the subsoil.	Terraces not needed.	None	Seasonal high water table.
None	Surface drainage needed in places.	Slow permeability because of the fragipan in the subsoil.	None	Wetness because of side slope seepage.	Fragipan at a depth between 16 and 24 inches.
Soil material is limited.		Suitable only for mapping unit CtE.		Very shallow soil; underlain by black shale.	
Fair		Suitable only for mapping units CvB, CvC2, and CvD2.	None	None	
Subject to slipping		Suitable only for mapping units EhC2 and EhD2.	Stones interfere with workability.	Steep slopes hinder establishment of vegetation.	
None	Not needed in most areas.	None	None	None	Subject to overflow.
Availability of soil material is limited.			Shallow to bedrock.	Steep slopes; shallow to bedrock; difficult to build waterways and maintain them.	

TABLE 7.—*Interpretation of engineering*

Soils series and map symbols	Suitability as source of topsoil	Workability as construction material	Compaction characteristics	Suitabality for road fill	Soil features affecting engineering practices	
					Farm ponds	
					Reservoir area	
Fleming (FlC2)	Fair	Good to poor	Fair to poor	Fair to poor	None	
Fleming-Shrouts complexes (FpC, FpD, FpD3, FpE, FpE3).	Poor	Fair to poor	Fair to poor	Fair to poor	None	
Hagerstown (HgA, HgB, HgC2).	Good	Good to poor	Good to poor	Fair to poor	Seepage in places because of creviced bedrock.	
Hampshire (HmB, HmB2, HmC, HmC2, HmD2, HpC3).	Fair	Good to poor	Fair to poor	Fair to poor	None	
Huntington (Hs, Hu)	Excellent	Good to fair	Good to poor	Fair to poor	Excessive seepage because of permeability; creviced rock under the shallow soil.	
Lanton and Dunning (La)	Good	Fair to poor	Fair to poor	Poor	None	
Lindside (Ld)	Excellent	Fair to poor	Fair to poor	Fair to poor	Seepage because of permeable, piping subsoil.	
Loradale (LeB, LeC, LeC2)	Good to fair	Good to poor	Good to poor	Fair to poor	None	
Lowell (LoB, LoB2, LoC, LoC2, LoD2, LoE2, LvC3, LvD3, LvE3).	Fair	Fair to poor	Fair to poor	Fair to poor	Seepage may occur if thin-bedded limestone is exposed.	
Lowell, shallow (LsC3, LsD3, LsE3, LwC2, LwD2, LwE2)	Poor	Fair to poor	Fair to poor	Poor; plastic and shallow to bedrock.	Limestone outcrops; subject to seepage.	
Maury (MbA, MbB, MbB2, MbC, MbC2).	Good	Good to poor	Good to poor	Fair to poor	Permeable subsoil	
McAfee (McB, McC, MeD3, MfB2, MfC2, MfD2, MfE2, MhD2, MhE2).	Good	Good to fair	Good to fair	Fair to poor; shallow to bedrock.	Shallow to creviced bedrock	
Melvin (Ml)	Good	Good to fair	Good to fair	Fair to poor	Subject to seepage	
Mercer (MmB, MmB2, MmC, MmC2).	Good	Fair to poor	Good to poor	Fair to poor	None	
Monongahela (MoB, MoC2)	Good	Good to poor	Good to poor	Fair to poor	Subject to seepage	
Muse (MuC2, MuD2, MuE2)	Good	Fair to poor	Fair to poor	Fair to poor	None	

properties of soils in Clark County, Ky.—Continued

Soil features affecting engineering practices—Continued					Remarks
Farm ponds—Continued	Agricultural drainage	Irrigation	Terraces and diversions	Waterways	
Embankment					
Subsoil has poor stability, but is good core material.		Moderately slow to slow permeability.	None	None	
Subsoil has poor stability, but is good core material.		Suitable only for mapping unit FpC.	Use limited to the more gentle slopes.	Steep slopes; difficult to build waterways and maintain them.	
Good core material; lower part of the subsoil has poor stability.		None	None	None	
Poor stability		None	None	None	
Subject to piping		None	Terraces not needed; the shallow soil is stony in places.	Stones are a problem in the shallow soil in places.	Subject to overflow.
None	Needs drainage; tile drains should be placed above plastic clay if feasible.	Slow permeability in lower part of subsoil.	Terraces not needed.	Subject to overflow	Seasonal high water table; subject to overflow.
Subject to piping	Tile drainage is not needed for crops, but tiling will lengthen time for field operations.	None	Terraces not needed.	None	Subject to overflow.
None		None	None	None	
Poor workability and stability; subsoil is good core material.		Suitable for mapping units LoB, LoB2, LoC, LoC2, and LoD2.	None	None	
Soil material shallow over bedrock; good core material.			Rock outcrops in many places.	Rock outcrops in many places.	
None		None	None	None	
Availability of soil material is limited.		Suitable only for mapping units McB, McC, MfB2, MfC2, MfD2.	Shallow to bedrock; rocky in many places.	Shallow to bedrock; rocky in many places.	
Subject to piping	Needs drainage; tile or open ditches can be used.		Runoff from hillsides; diversions may be needed.	None	Seasonal high water table.
Poor stability		Slow permeability in the fragipan.	None	Seepage from side slopes is a problem.	Fragipan 10 to 20 inches thick at a depth between 15 and 30 inches.
None	Not needed in most areas.	Slow permeability in the fragipan.	None	None	Fragipan at a depth between 15 and 20 inches.
None		None; not suitable for mapping unit MuE2.	None	None	

TABLE 7.—*Interpretation of engineering*

Soils series and map symbols	Suitability as source of topsoil	Workability as construction material	Compaction characteristics	Suitability for road fill	Soil features affecting engineering practices	
					Farm ponds	
					Reservoir area	
Newark (Ne)	Good	Good to fair	Good to poor	Fair to poor	Subject to excessive seepage through subsoil.	
Otway (OsC3, OtC, OwE3, OwF).	Fair	Poor	Fair to poor	Fair to poor	None	
Robertsville (Rb)	Good	Good to poor	Good to poor	Fair to poor	None	
Salvisa (SaC3, SaD3, SaE3, ScB2, ScC2, ScD2, ScE2).	Fair	Fair to poor	Good to poor	Poor; plastic and shallow to bedrock.	Creviced bedrock	
Shelbyville (SeB, SeB2, SeC, SeC2).	Excellent	Good to poor	Good to poor	Fair to poor	Seepage through concretionary layer.	
Taft (Ta)	Good	Good to fair	Good to poor	Fair to poor	None	
Tilsit (TsB)	Fair	Good to poor	Good to poor	Fair to poor	None	
Trappist (TtB, TtC2)	Good	Good to fair	Good to poor	Fair to poor	None	
Woolper (WoC)	Fair	Fair to poor	Fair to poor	Fair to poor	None	

The Unified soil classification system was developed by the U.S. Army, Corps of Engineers (*11*) and is used by the U.S. Bureau of Reclamation. In this system, soil materials are identified as coarse grained, eight classes; fine grained, six classes; and highly organic soils. An approximate classification of soils by this system can be made in the field.

Many highway engineers use the system approved by the American Association of State Highway Officials (*1*). In this system, soil materials are classified in seven principal groups. The groups range from A–1, which is gravelly soil of high bearing capacity, to A–7, which consists of clay soil having low strength when wet. In each group the relative engineering value of the soil material is indicated by a group index number. Group index numbers range from 0 for the best material to 20 for the poorest.

Engineering Test Data

Soil samples of the principal soil types of each of eight extensive series in the county were tested at the Bureau of Public Roads laboratory, in accordance with standard procedures of the American Association of State Highway Officials (AASHO) to help evaluate the soils for engineering purposes. The data are given in table 5.

The engineering soil classifications in table 5 are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. The table also gives the engineering classification for each soil sample. The soil materials tested were obtained at a depth of not more than 6 feet, and they are not generally representative of material at a greater depth.

Table 5 also gives compaction, or moisture-density, data. If a soil material is compacted at successively higher moisture contents, assuming that the compactive effort remains constant, the density of the compacted material will increase until the optimum moisture content is reached. After that, the density decreases with increase in moisture content. The highest dry density obtained in the compaction test is termed "maximum dry density." Moisture-density data are important in earthwork because, as a rule, optimum stability is obtained if the soil is compacted to about the maximum dry density, when it is at approximately the optimum moisture content.

properties of soils in Clark County, Ky.—Continued

Soil features affecting engineering practices—Continued					Remarks
Farm ponds—Continued	Agricultural drainage	Irrigation	Terraces and diversions	Waterways	
Embankment					
Subject to piping in places.	Needs drainage; tile or open ditches can be used.	None	Terraces not needed.	None	Seasonal high water table.
Poor stability; good core material.		Slow permeability; suitable for mapping unit OtC.	Suitable only for mapping units OsC3 and OtC.	Suitable for mapping units OsC3 and OtC.	
Seasonal high water table.	Needs drainage; surface drainage suggested because of fragipan.		Terraces not needed.	None	Fragipan at a depth of about 15 inches, seasonal high water table.
Availability of soil material is limited.		Suitable for mapping units ScB2, ScC2, ScD2.	Shallow to bedrock in some areas; steep soils are not suitable.	Shallow to bedrock in some areas; steep slopes a problem.	
Soil material has poor workability.		None	None	None	Concretionary layer 10 inches thick at a depth between 24 and 30 inches.
None	Needs drainage; surface drainage suggested because of fragipan.	Slow permeability in the fragipan.	Fragipan	Seepage from side slopes in places.	Fragipan at a depth of about 18 inches.
Subject to piping in places.		Very slow permeability in the fragipan.	None	Seepage from side slopes in places.	Fragipan at a depth of about 20 inches.
None		None	None	None	
Poor stability		Slow permeability in lower part of subsoil.	Difficult to work	Difficult to work	

Mechanical analyses were made by combined sieve and hydrometer methods, and they were used to determine the relative proportions of the different sizes of particles in the soil sample. Clay content (percentage of particles smaller than 0.002 millimeter) was obtained by the hydrometer method.

The liquid limit and plastic limit tests measure the effect of water on the consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a solid to a semisolid or plastic state. As the moisture content is further increased, the material changes from a plastic to a liquid state. The *plastic limit* is the moisture content, on a dry basis, at which the soil material changes from a semisolid to a plastic state. The *liquid limit* is the moisture content at which the material changes from a plastic to a liquid state. The *plasticity index* is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

Engineering Properties

Table 6 lists the soils in the county and the map symbol for each, and it gives a brief description of the soils and of their estimated physical and chemical properties. It also gives the textural classification of the U.S. Department of Agriculture, estimates of the Unified classification, and estimates of the classification used by the American Association of State Highway Officials. In addition, the permeability, available water capacity, and reaction are estimated.

The soil's name gives the soil type and the percent slope. The brief description of the soil gives the texture and thickness of significant horizons, some properties, and the position of the soil on the landscape. The description is for the soil material to a depth between 36 and 60 inches.

Depth to bedrock is generally the depth to noncompressible material; for example, depth to shale or limestone. Depth from the surface and the thickness of each layer are also shown.

The permeability of each soil layer was estimated for soil material in place, and it is expressed in inches per

hour. The estimates were made in the field by soil scientists who were familiar with the properties of the soils.

The available water capacity, expressed in inches per inch of soil depth, is the approximate amount of capillary water held in the soil when wet to field capacity. This amount of water will wet air-dry soil to a depth of 1 inch without deeper percolation. These estimates were based on data from similar soils in Kentucky and in Tennessee.

The column showing reaction gives the degree of acidity or alkalinity of the different layers in the profile, expressed in pH values. The pH scale is divided into 14 units, numbered from 1 to 14. Soils that have a pH value of 7 are neutral, those that have a pH below 7 are acid, and those that have a pH above 7 are alkaline. The pH values given in this column are based on results of quick tests made with Soiltex.

Engineering properties are not described for Gullied land, Made land, or Rock land, because of the variability of their soil material.

Interpretation of the Soils for Engineering

Table 7 rates the soils according to their suitability for use in the construction of highways and for general engineering purposes. It also gives features of the soils that affect their use for engineering practices that are effective in controlling erosion and runoff. Additional information about the topography of the county, the association of specific soils with other soils, the parent materials, and the underlying rock strata can be found in the section "Description of the Soils."

The columns that show suitability of the soil material for topsoil, workability as construction material, compaction characteristics, and suitability for road fill give ratings of the soil material, expressed as good, fair, or poor.

Topsoil is rated for its use as material to promote the growth of vegetation on slopes, shoulders, and ditchbanks along roads and on other earth structures that require a protective cover.

Workability is a qualitative rating of the soils. This rating indicates the relative desirability of the different soil types for engineering construction.

Compaction characteristics are estimates of the properties of the soils based on average field conditions at suitable moisture content and with proper placement controls. The estimates also consider that a reasonable number of passes are made with equipment suitable for a particular engineering project.

The suitability of the soil material for road fill depends largely on the texture of the soil material and its natural content of water. Highly plastic soil materials are rated "Poor" or "Fair" for road fill, depending on the natural content of water in the soil materials and the ease with which the materials can be handled, dried, and compacted. Highly erodible soils, such as silts and fine sands, are difficult to compact, and they require moderately gentle slopes and fast vegetation coverage. They are, therefore, rated "Poor to fair."

Table 7 also lists soil features that affect the installation of engineering structures that affect the conservation of soil and water on farmlands. Statements concerning soil features that are likely to affect the installation are made for each soil under the listed practice. The miscellaneous land types Gullied land, Made Land, and Rock land are not listed in the table, because of the variability of their soil material.

Formation, Morphology, and Classification of Soils

In this section are discussed the factors that affect soil formation. Also discussed are the morphology and classification of the soils.

Formation of Soils

Soil is formed by weathering and other processes that act on the parent material. The characteristics of the soil at any given point depend upon the climate; the physical and mineralogical composition of the parent material; the relief, or lay of the land; the plant and animal life in and on the soil; and time. Climate and its effect on soil and plants is modified by the characteristics of the soil and by relief. Relief, in turn, strongly influences drainage, aeration, runoff, and exposure of the soil to sun and wind.

All five factors come into play in the formation of every soil. In some places, however, one factor may have more influence than the other factors on the formation of a soil and may account for most of its properties, as is common if the parent material is quartz sand. Little can happen to quartz sand, and the soils derived from it have only weakly developed horizons. But, even in quartz sand, distinct profiles can be formed under certain types of vegetation where the topography is low and flat and a high water table is present. Thus, for every soil, the present character depends on the past combination of these five factors of soil formation.

Climate

Climate is directly or indirectly responsible for the kinds of plants and animals that live in an area. It affects the weathering of rocks and the removal and deposition of material by water. It is also responsible for the percolation of water through the soil.

The climate of Clark County is temperate and moist. Winters are fairly short, and there are only a few days when temperatures are extremely low. Summers are long, but periods of excessive heat are short. Frequent changes of temperature occur in all seasons.

Precipitation is fairly evenly distributed throughout the year, and the soils are therefore moist much of the time. They are subject to leaching, and the insoluble materials move downward throughout most of the year. Biological activity is also fairly constant. Alternate periods of freezing and thawing hasten weathering and changes caused by other factors that affect the formation of the soils. Throughout the county the climate has been a uniform factor in soil formation and has caused only slight differences among the soils.

Parent materials

The parent materials from which the soils of Clark County formed are of three main kinds: (1) Material weathered from rocks in place; (2) alluvium deposited by streams, and (3) local alluvium transported by water and gravity from the sides of hills and deposited on areas below.

Most of the parent materials formed in place are from formations of limestone, of interbedded calcareous shale and limestone, of calcareous shale, and of acid shale. Transported materials are made up of materials washed mainly from soils underlain by these formations and partly from soils underlain by sandstone.

In the Bluegrass section of the county, the soils formed in material weathered from calcareous shale or limestone, or of various mixtures of the two. The parent material of soils in the Knobs is similar to that of soils of the Bluegrass section, but it also includes weathered acid shale.

The textural, chemical, and mineral properties of the soils of the county have been greatly influenced by the kind of parent material from which the soils developed. For example, the Allegheny soils formed in unconsolidated beds of sand and gravel. They are much coarser textured than the Shrouts soils, which formed in material weathered from clay shale. The Maury soils, which are high in phosphate, formed in material from limestone high in phosphate, and the Eden soils are high in potash because they formed in material from shale high in potash. The Culleoka soils are examples of soils formed in material from calcareous siltstone; they have a higher pH value throughout the profile than the Colyer soils, which formed in material from acid shale.

The alluvium in which soils along the Kentucky River formed was transported a considerable distance, and much of it came from the mountains in eastern Kentucky. However, the alluvium along the small streams was washed there from the watersheds of those small streams. The soils on the foot slopes formed in local alluvium that washed or rolled to those lower areas from the sides of adjacent steep hills.

Relief

Relief in Clark County has largely been determined by the underlying formations of bedrock, by the geologic history of the area, and through dissection by rivers and streams. The range is from areas that are highly dissected and have narrow ridgetops and steep side slopes to broad, gently undulating areas.

Relief influences the formation of soils chiefly through its effect on drainage and erosion, but also through its effect on variations in exposure to climatic forces and plant cover. The direction a slope faces, for example, has an effect on the amount of sunlight the soil receives. This, in turn, directly affects the temperature of the soils and the type of plant cover and biological activity the soils will support. Also, differences in relief affect the amount of moisture within a soil.

In steep areas large amounts of water run off the surface, and little water percolates through the soil. As a result, erosion is rapid and the soil material is removed almost as rapidly as it is formed. The soils on steep slopes, therefore, are shallow and weakly developed. The Otway and Colyer soils are examples of soils formed in steep areas.

In nearly level areas much of the rain that falls enters the soil and percolates downward through it. Little of the soil material is lost through erosion. As a result, the soils in nearly level areas are generally deep. Examples of such soils that have a well-developed profile are those of the Maury series. In some nearly level areas, the soils formed from parent material that contains much silt and clay. In these areas continued percolation of water down through the soil causes the finer particles to concentrate in the subsoil in a dense, brittle layer, or pan. The Bedford soils are examples of soils that contain a pan.

Plant and animal life

Plants and animals are active forces in the soil-forming processes. The kinds of changes they bring about depend, among other things, upon the kinds of life and the life processes peculiar to each. The kinds of plants and animals that live on and in the soil are affected, in turn, by the climate, parent material, relief, and age of the soil, and by the associated organisms. Two of the chief functions of plants and animals are to furnish organic matter and to bring plant nutrients from the lower part of the solum to the upper layers.

The native vegetation in this county was mostly forests of mixed hardwoods, but there were some parklike glades of open grassland. Redcedar grew mainly on shallow soils underlain by limestone, and yellow pine on shallow soils underlain by acid shale. The forest cover was uniform throughout the county, and only slight differences among the soils occurred because of differences in vegetation. The presence of trees as the dominant vegetation, however, greatly influenced the development of specific characteristics common to all the soils.

Time

Time is required by the active agents of soil formation to form soils from soil material. Generally, more time is needed for parent materials to accumulate than for different horizons to form in the profile. The length of time needed for a particular soil to form depends on the other factors involved.

When soils begin to form, they have characteristics almost identical with those of the parent material and are said to be immature. Among such immature soils in this county are the Huntington soils and other soils of bottom lands. These soils are forming in fairly recent deposits and have little or no profile development.

A soil is generally said to be mature when it has acquired well-developed profile characteristics and when it is nearly in equilibrium with its present environment. Examples of mature soils in this county are those of the Loradale series. These soils are deep. They have developed distinct horizons, and the soil particles have a definite arrangement in relation to each other.

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Morphology and Classification of Soils

The soil classification used in the United States has several categories. The lower categories—soil type and soil series—are discussed in the section "How Soils are Mapped and Classified." Soil series are also grouped into great soil groups and soil orders (*8*). All the soil orders—the zonal, intrazonal, and azonal—are represented in this county.

The zonal order consists of soils that have a well-developed soil profile. The soils reflect the predominant influence of climate and plant and animal life in their formation. They are nearly level to strongly sloping, are well drained, and have formed in parent material that is not extreme in texture or composition. In Clark County the Gray-Brown Podzolic soils, the Reddish-Brown Lateritic soils and the Red-Yellow Podzolic soils are in the zonal order.

Intrazonal soils have more or less well-developed, genetically related horizons that reflect the dominant influence of a local factor of relief or parent material over the effects of climate and plant and animal life. In Clark County the Humic Gley soils, Low-Humic Gley soils, Planosols, Rendzinas, and solodized-Solonetz soils are in the intrazonal order.

Azonal soils are young and do not have distinct, genetically related horizons. The soils lack well-developed profile characteristics, commonly because of youth, resistant parent material, or excessive relief. In Clark County the azonal order is made up of Alluvial soils and Lithosols.

Table 8 lists the soil series by orders and great soil groups and the principal characteristics and genetic relationships that are important in classification. In the pages that follow the great soil groups are discussed, each soil series in the group is described in alphabetic order, and a description of a representative profile in that series is given.

Gray-Brown Podzolic soils

These soils have a fairly thin organic A0 layer that overlies an organic-mineral layer, or A1 horizon. The organic-mineral layer overlies a grayish-brown, leached A2 horizon, which, in turn, rests upon a fine-textured, illuvial, brown B horizon.

The Gray-Brown Podzolic soils in this county formed under deciduous forest in a temperate, moist climate. The Armour, Beasley, Brashear, Culleoka, Hampshire, Loradale, Lowell, Shelbyville, and Woolper soils are representative of soils in this group. The Allegheny, Ashton, Eden, and Salvisa soils are also Gray-Brown Podzolic soils, but the Allegheny are intergrading toward Red-Yellow Podzolic soils, the Ashton are intergrading toward Alluvial soils, and the Eden and Salvisa are intergrading toward Lithosols.

Allegheny Series

The Allegheny series is made up of deep, well-drained soils. These soils formed in alluvium washed from soils that were derived from acid sandstone and shale. Allegheny soils that are on old, high terraces formed in material from soils derived from the Irvine formation. However, the Allegheny soils that are on more recent stream terraces formed in material from soils derived from sediments made up of a mixture of sandstone that came from an indeterminate source. All of the Allegheny soils are leached and are strongly acid. They are generally medium in organic matter. Allegheny soils are most nearly like Gray-Brown Podzolic soils, but they have some characteristics of Red-Yellow Podzolic soils. Thus, they are classified as Gray-Brown Podzolic soils that intergrade toward Red-Yellow Podzolic soils.

Allegheny soils are closely associated with the Monongahela soils, but they are browner than those soils and lack a fragipan.

The native vegetation was forests of hardwoods. Oak, hickory, and yellow-poplar were the chief trees.

Typical profile:

A1—0 to 2 inches, brown (10YR 4/3)[5] loam; very weak, very fine, angular blocky structure; very friable to loose; very strongly acid; clear, smooth boundary.

A2—2 to 7 inches, brown (10YR 4/3) loam; weak, fine, angular blocky structure; very friable; very strongly acid; clear, smooth boundary.

B1—7 to 12 inches, dark yellowish-brown (10YR 4/4) loam that has stains of dark grayish brown (10YR 4/2) along the surfaces of the peds; moderate, fine and medium, angular blocky structure; friable; very strongly acid; clear, smooth boundary.

B2—12 to 30 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, angular blocky structure; firm; very strongly acid; gradual, smooth boundary.

B3—30 to 34 inches, mottled yellowish-brown (10YR 5/6) and pale-yellow (2.5Y 7/4) silty clay loam; moderate, medium, angular blocky structure; firm; prominent black (10YR 2/1) stains along the surfaces of the peds; a few, fine, black concretions; very strongly acid; gradual, wavy boundary.

C—34 to 40 inches +, mottled dark yellowish-brown (10YR 4/4), yellowish-brown (10YR 5/8), and light-gray (10YR 7/1) fine sandy clay loam; moderate, medium to coarse, angular blocky structure; firm; a few, fine, black concretions; prominent clay skins; very strongly acid.

The texture of the surface layer ranges from fine sandy loam to silt loam, but it is commonly loam. In the B horizon the texture ranges from silty clay loam to fine sandy clay loam. The parent material is clay loam or sandy clay loam. Rounded quartzite pebbles occur throughout the profile in some places. In cultivated areas the A horizon is somewhat lighter colored than the one described, and in eroded areas mixing of the A and B horizons gives the surface layer a dark yellowish-brown (10YR 4/4) color. The solum ranges from about 30 to 50 inches in thickness, and the alluvium, from about 4 to 12 feet.

Armour Series

In the Armour series are soils formed in alluvium washed from soils derived from limestone high in phosphate. These soils are nearly level to sloping. They are on terraces and colluvial slopes in the Inner Bluegrass.

Armour soils are associated with the Braxton and Maury soils of the uplands. They have a younger, less well-developed profile than those soils.

[5] Symbols express Munsell color notations; unless otherwise stated, the color is that of a moist soil. These and other terms used are described in the Soil Survey Manual (*9*) or in the Glossary.

TABLE 8.—*Characteristics and genetic relationships of soil series*

ZONAL

Great soil group and soil series	Brief profile description	Position	Soil drainage	Slope range	Parent material	Degree of profile development [1]
Gray-Brown Podzolic soils:						
Representative [2]—						
Armour	Dark-brown silt loam over brown silty clay loam.	Terraces	Well drained	Percent 0 to 12	Alluvium from phosphatic limestone.	Moderate.
Beasley	Brown silt loam over yellowish-brown silty clay; underlain at a depth of about 30 inches by a marly substratum	Uplands	Well drained	2 to 12	Residuum from limestone underlain by marl.	Strong.
Brashear	Dark grayish-brown heavy silt loam over yellowish-brown silty clay.	Foot slopes	Well drained to moderately well drained.	2 to 20	Colluvium from calcareous shale, siltstone, and limestone.	Moderate.
Culleoka	Dark-brown silt loam over dark yellowish-brown to brown light silty clay loam.	Uplands	Somewhat excessively drained.	2 to 30	Residuum and colluvium from calcareous siltstone.	Weak.
Hampshire	Dark grayish-brown silt loam over yellowish-brown silty clay that is mottled with strong brown; underlain by massive, plastic, mottled clay.	Uplands	Well drained to moderately well drained.	2 to 20	Residuum from high-grade limestone.	Moderate.
Loradale	Dark-brown silt loam over brown silty clay; at a depth of about 30 inches is yellowish-brown clay mottled with gray.	Uplands	Well drained	2 to 12	Residuum from high-grade limestone.	Moderate.
Lowell	Dark-brown silt loam over dark yellowish-brown silty clay; at a depth of about 27 inches is light olive-brown, plastic clay or bedrock.	Uplands	Well drained	2 to 30	Residuum from limestone and calcareous shale.	Moderate.
Shelbyville	Dark-brown silt loam over brown silty clay loam; there is a concretionary zone at a depth below about 27 inches.	Uplands	Well drained	2 to 12	Residuum from high-grade limestone.	Moderate.
Woolper	Very dark grayish-brown silty clay loam over dark-brown silty clay that is mottled with gray at a depth below about 28 inches.	Foot slopes	Well drained to moderately well drained.	6 to 12	Colluvium from limestone and clayey, calcareous shale.	Moderate to weak.
Intergrades toward Alluvial soils—						
Ashton	Dark-brown silt loam; at a depth of about 36 inches is brown silty clay loam.	Terraces and foot slopes.	Well drained	0 to 20	Alluvium and colluvium from limestone.	Weak.
Intergrades toward Lithosols—						
Eden	Dark grayish-brown silt loam over yellowish-brown silty clay; variegated with grayish brown and light yellowish brown; very firm.	Uplands	Somewhat excessively drained.	6 to 30	Residuum from interbedded calcareous shale, siltstone, and limestone.	Weak.
Salvisa	Very dark grayish-brown heavy silt loam over dark yellowish-brown clay.	Uplands	Well drained to somewhat excessively drained.	6 to 30	Residuum from high-grade limestone.	Weak to moderate.

See footnotes at end of table.

TABLE 8.—*Characteristics and genetic relationships of soil series*—Continued

ZONAL—Continued

Great soil group and soil series	Brief profile description	Position	Soil drainage	Slope range	Parent material	Degree of profile development [1]
Gray-Brown Podzolic soils—Continued						
Intergrades toward Red-Yellow Podzolic soils—						
Allegheny	Dark-brown material that is chiefly loam over brown clay loam; strongly acid; friable; 24 to 40 inches or more thick over stratified sand, silt, and clay that is gravelly in places.	Terraces	Well drained	Percent 6 to 20	Alluvium from acid sandstone and shale.	Moderate.
Reddish-Brown Lateritic soils:						
Intergrades toward Gray-Brown Podzolic soils—						
Hagerstown	Dark-brown silt loam over reddish-brown to yellowish-red silty clay.	Uplands	Well drained	0 to 12	Residuum from high-grade limestone.	Moderate.
Intergrades toward Lithosols—						
McAfee	Dark-brown silt loam over reddish-brown silty clay that grades to clay at a depth of about 18 inches; underlain at a depth of about 28 inches by bedrock.	Uplands	Well drained to somewhat excessively drained.	2 to 30	Residuum from phosphatic limestone.	Weak to moderate.
Red-Yellow Podzolic soils:						
Representative—						
Braxton	Dark-brown silt loam over yellowish-red cherty silty clay loam; underlain at a depth of about 36 inches by plastic, mottled, yellowish and red clay.	Uplands	Well drained	2 to 12	Residuum from cherty, phosphatic limestone.	Moderate.
Fleming	Dark reddish-brown silt loam over yellowish-red clay; underlain at a depth of about 27 inches by greenish-gray clay.	Uplands	Well drained	6 to 30	Residuum from limestone that overlies clay shale.	Moderate.
Maury	Dark-brown silt loam over silty clay loam that is brown but grades to yellowish brown.	Uplands	Well drained	0 to 12	Residuum from phosphatic limestone.	Moderate.
Muse	Brown silt loam over strong-brown silty clay.	Foot slopes	Well drained	6 to 30	Colluvium from acid shale.	Moderate.
Trappist	Brown silt loam over yellowish-red silty clay.	Uplands	Well drained	2 to 12	Residuum from black fissile shale.	Moderate.
With a fragipan—						
Bedford	Brown silt loam over yellowish-brown silty clay loam; gray mottles begin at a depth of 23 inches; a compact fragipan is at a depth of 30 inches.	Uplands	Moderately well drained.	0 to 12	Limestone and calcareous clay shale.	Strong.
Captina	Brown silt loam over yellowish-brown silty clay loam that is mottled with light gray; a firm and compact pan is at a depth below 30 to 42 inches.	Terraces	Moderately well drained.	0 to 6	Alluvium from limestone.	Strong.

See footnote at end of table.

TABLE 8.—*Characteristics and genetic relationships of soil series*—Continued

ZONAL—Continued

Great soil group and soil series	Brief profile description	Position	Soil drainage	Slope range	Parent material	Degree of profile development [1]
Red-Yellow Podzolic soils—Continued						
With a Fragipan—Continued						
Mercer	Brown silt loam over yellowish-brown silty clay loam that is mottled with gray; a firm, compact fragipan is at a depth of about 24 inches.	Uplands	Moderately well drained.	Percent 2 to 12	Residuum from high-grade limestone.	Strong.
Monongahela	Grayish-brown loam over brownish-yellow silt loam that is mottled with gray below a depth of 23 inches; a compact fragipan is at a depth of about 23 inches.	Terraces	Moderately well drained.	2 to 12	Alluvium from acid shale and sandstone.	Strong.
Tilsit	Dark grayish-brown silt loam over yellowish-brown silty clay that is mottled with gray below a depth of 20 inches; a compact fragipan is at a depth of about 20 inches.	Uplands	Moderately well drained.	2 to 6	Residuum from black, acid shale.	Strong.
INTRAZONAL						
Humic Gley soils:						
Burgin	Black to very dark gray silty clay loam over mottled light olive-brown and dark grayish-brown silty clay.	Depressions	Very poorly drained.	0 to 2	Residuum or alluvium from limestone.	Moderate to weak.
Dunning	Very dark gray to black silty clay loam over dark gray silty clay that is mottled with light olive brown.	Bottoms	Very poorly drained.	0 to 2	Alluvium from limestone.	Little or none.
Low-Humic Gley soils:						
Melvin	Grayish-brown silt loam over light-gray silt loam that is mottled with yellowish brown and light gray.	Bottoms	Poorly drained.	0 to 2	Alluvium chiefly from limestone.	Little or none.
Planosols:						
Robertsville	Grayish-brown silt loam over light brownish-gray silty clay loam that is mottled with yellowish brown; somewhat compact at a depth of about 15 inches.	Terraces	Poorly drained.	0 to 2	Alluvium chiefly from limestone.	Strong.
Taft	Grayish-brown silt loam over pale-olive silty clay loam that is mottled with gray and strong brown; somewhat compact at a depth of about 20 inches.	Terraces	Somewhat poorly drained.	0 to 2	Alluvium chiefly from limestone.	Strong.
Rendzinas:						
Ashwood	Black silty clay loam over dark grayish-brown silty clay; underlain by bedrock at a depth of about 15 inches.	Uplands	Somewhat excessively drained.	6 to 30	Residuum from phosphatic limestone.	Weak.
Fairmount	Very dark gray silty clay loam over olive-brown silty clay; underlain at a depth of about 18 inches by bedrock.	Uplands	Somewhat excessively drained.	20 to 50	Residuum from limestone.	Weak.

See footnote at end of table.

TABLE 8.—*Characteristics and genetic relationships of soil series*—Continued

INTRAZONAL—Continued

Great soil group and soil series	Brief profile description	Position	Soil drainage	Slope range	Parent material	Degree of profile development [1]
Rendzinas—Con.				*Percent*		
Otway	Very dark grayish-brown silty clay loam over light olive-brown silty clay; underlain at a depth of about 15 inches by marl.	Uplands	Somewhat excessively drained.	6 to 50	Residuum from soft calcareous shale (marl).	Weak.
Solodized-Solonetz soils:						
Shrouts	Grayish-brown silty clay loam over olive-gray clay that is mottled with olive; underlain at a depth of about 20 inches by greenish-gray, alkaline shale.	Uplands	Somewhat excessively drained.	6 to 30	Residuum from alkaline clay shale.	Moderate.
AZONAL						
Alluvial soils:						
Bruno	Dark-brown loamy fine sand over brown loamy sand; depth to the unconforming substratum is 48 inches or more.	Bottoms	Excessively drained.	0 to 2	Sandy alluvium	Little or none.
Egam	Dark-brown silt loam over very dark gray silty clay loam; firm.	Bottoms	Well drained to moderately well drained.	0 to 2	Alluvium from limestone and calcareous clay shale.	None to weak.
Huntington	Dark-brown silt loam; depth to the unconforming substratum is 40 inches or more.	Bottoms	Well drained	0 to 2	Alluvium chiefly from limestone.	Little or none.
Lindside	Brown silt loam over dark grayish-brown silt loam that is mottled with gray and grades to light brownish gray at a depth of 26 inches.	Bottoms	Moderately well-drained.	0 to 2	Alluvium chiefly from limestone.	Little or none.
Newark	Dark grayish-brown silt loam over grayish-brown silt loam that is mottled with light gray.	Bottoms	Somewhat poorly drained.	0 to 2	Alluvium chiefly from limestone.	Little or none.
Intergrades toward Humic Gley soils—						
Lanton	Black silty clay loam over very dark gray silty clay that is mottled with gray and yellowish brown.	Bottoms	Somewhat poorly drained to moderately well drained.	0 to 2	Alluvium from limestone.	Little or none.
Lithosols:						
Colyer	Brown silt loam over variegated red, brown, and gray silty clay loam; underlain at a depth of about 14 inches by black fissile shale.	Uplands	Somewhat excessively drained.	6 to 50	Residuum from fissile, black shale.	Little or none.

[1] As measured by the number of important genetic horizons and the degree of contrast between them.

[2] The descriptions are of soils that have little or no erosion.

The native vegetation was hardwood forests. Oak, hickory, and elm were the chief trees.

Typical profile:

A1—0 to 3 inches, dark-brown (10YR 3/3) silt loam; weak, fine, granular structure; friable; slightly acid; gradual, smooth boundary.

A2—3 to 15 inches, brown (10YR 4/3) silt loam; weak, fine, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

B1—15 to 26 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable; medium acid; gradual, smooth boundary.

B2—26 to 48 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; slightly firm; a few concretions; a few, fine, faint mottles of yellowish brown; medium acid; clear, smooth boundary.

B3—48 inches +, reddish-brown (5YR 4/4) silty clay; moderate, medium, subangular blocky structure; firm; common concretions; clay skins on the surfaces of the peds; medium acid.

The thickness of the solum ranges from 24 to 48 inches, depending mostly on the depth of the parent sediments. The color of the B horizon ranges from strong brown (7.5YR 5/6) to reddish brown (5YR 4/4). Chert is in the profile in some places, but the amount varies from place to place depending on the nearness of the soils to associated soils on the uplands.

Ashton Series

In the Ashton series are deep, well-drained soils on terraces and colluvial slopes. These soils formed in sediments washed from soils of the uplands that were derived from limestone and calcareous shale. Ashton soils are most nearly like Gray-Brown Podzolic soils, but they have some characteristics of Alluvial soils. Thus, they are classified as Gray-Brown Podzolic soils that intergrade toward Alluvial soils.

Ashton soils are associated with the well drained Huntington soils and the moderately well drained Lindside soils of the bottoms and with medium-textured soils of the uplands that were derived from limestone. Their profile is moderately developed, in contrast to the weakly developed profile of soils of the bottoms and the well-developed profile of the soils of the uplands. They have a surface layer of dark-brown, friable silt loam and a subsoil of brown silty clay loam.

The original vegetation was hardwood forests, made up mainly of oak, maple, sycamore, and yellow-poplar. In places there were canebrakes.

Most of the acreage is in the Inner Bluegrass, but some is in the Hills of the Bluegrass and in the Outer Bluegrass. The areas have mostly been cleared and are used for corn, tobacco, and hay crops.

Typical profile:

Ap—0 to 9 inches, dark-brown (10YR 3/3) silt loam; weak, fine, subangular blocky and granular structure; friable; neutral; abrupt, smooth boundary.

A3—9 to 14 inches, brown to dark-brown (10YR 4/3) silt loam; moderate, medium, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

B2—14 to 30 inches, brown (10YR 4/3) silty clay loam; a few, fine, faint mottles of pale brown (10YR 6/3) to light yellowish brown (10YR 6/4); moderate, medium, subangular blocky structure; firm; strongly acid; gradual, smooth boundary.

B3—30 to 38 inches, brown (10YR 4/3) silty clay loam; common, fine, faint mottles of pale brown (10YR 6/3) to light yellowish brown (10YR 6/4); weak, fine, angular blocky structure; firm, numerous concretions that become more numerous with increasing depth; very strongly acid; clear, smooth boundary.

C1—38 inches +, yellowish-brown (10YR 5/6) silty clay; weak, coarse, angular blocky structure; firm; very strongly acid.

Generally, the gently sloping soils are deeper than the steep ones. Depth to the substratum of silty clay or clay ranges from 26 to 40 inches. The substratum ranges from yellowish brown (10YR 5/6) to variegated yellowish red (5YR 4/6), strong brown (7.5YR 5/6), and grayish brown (10YR 5/2). The soils that are mottled in the lower part are near heavier textured soils of the uplands, or there is residual material at that depth.

Beasley Series

The Beasley series is made up of deep, well-drained soils of the uplands. The upper part of the solum formed in material from hard limestone, and the lower part, in material from calcareous shale, known locally as marl. These soils are on sloping ridgetops.

Beasley soils are closely associated with the Otway soils, which formed in material from marl, and with the Hagerstown soils, which formed in material from limestone. Beasley soils are deeper than the Otway soils, and they have a thicker, better developed B horizon. In contrast to the Hagerstown soils, the Beasley soils have a plastic, brownish, mottled subsoil.

The native vegetation was a forest of hardwoods. The trees were mainly oak, elm, black walnut, hickory, and ash.

Typical profile:

Ap—0 to 8 inches, dark-brown (10YR 4/3 to 3/3) silt loam; weak, medium, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

B1—8 to 14 inches, brown to dark-brown (7.5YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B21—14 to 25 inches, brown to dark-brown (7.5YR 4/4) silty clay; moderate, medium, subangular blocky structure; firm; slightly sticky when wet; many, small, black concretions; slightly acid; gradual, smooth boundary.

B22—25 to 30 inches, dark yellowish-brown (10YR 4/4) clay; moderate, medium, angular blocky structure; firm; slightly sticky when wet; many, small, black concretions; slightly acid; clear, smooth boundary.

B3—30 to 39 inches, yellowish-brown (10YR 5/6) clay; massive; a few, fine, distinct mottles of light brownish gray (10YR 6/2); neutral; clear, smooth boundary.

C—39 to 54 inches +, variegated olive-yellow (2.5Y 6/6), yellowish-brown (10YR 5/6), and light-gray (2.5Y 7/2) clay; massive; very firm; very sticky and very plastic when wet; very hard when dry; some soft, black concretionary material; calcareous.

The surface layer is silty clay loam in places. Its color ranges from dark brown (10YR 3/3) to dark yellowish brown (10YR 4/4) in places. The color of the B horizon is yellowish brown (10YR 5/6) or brown (10YR 5/3). Depth to the calcareous parent material ranges from 20 to 40 inches.

Brashear Series

In the Brashear series are deep, well drained to moderately well drained soils. These soils formed in colluvium washed from upland soils that developed in residuum from limestone and calcareous shale.

Brashear soils are associated with the Hampshire, Eden, Lowell, and Salvisa soils of the uplands. They are also near the Woolper and Ashton soils, which formed from similar material. The Brashear soils have a lighter colored and coarser textured surface layer than the Woolper soils. Their subsoil is finer textured and better developed than that of the Ashton soils.

The original vegetation was hardwood forests. Oak, hickory, and maple were the chief trees.

Typical profile:

Ap—0 to 7 inches, dark-brown (10YR 3/3) silt loam; moderate, fine, granular structure; friable; roots are abundant; pH 5.8; abrupt, irregular boundary.

B1—7 to 13 inches, brown (7.5YR 4/4) silty clay loam; weak, medium, subangular blocky structure; a few clay films; firm to friable; slightly sticky and slightly plastic when wet; abundant roots; small, round, dark-brown concretions are common; a few small pores; pH 5.3; clear, smooth boundary.

B2—13 to 22 inches, dark, yellowish-brown (10YR 4/4) silty clay; a few, medium, faint variegations of brown (7.5YR 4/4); moderate, medium, subangular blocky structure; clay films continuous in most places; firm; sticky and plastic when wet; plentiful roots; small, round, dark-brown concretions are common to abundant; pH 5.3; gradual, smooth boundary.

B3—22 to 31 inches, dark, yellowish-brown (10YR 4/4) clay; a few, medium, faint variegations of yellowish brown (10YR 5/6) and light olive brown (2.5Y 5/4); weak, medium, blocky structure; patchy clay films; very firm; sticky and very plastic when wet; a few roots; soft, black concretionary material and small, very dark brown concretions are abundant; pH 5.8; gradual, smooth boundary.

C—31 to 36 inches, variegated clay; variegations are many, fine, and distinct and are light olive brown (2.5Y 5/4), pale olive (5Y 6/3), and strong brown (7.5YR 5/6); massive; very sticky and very plastic when wet; a few roots; abundant, soft, black and dark-brown concretions; pH 6.8; clear, smooth boundary.

Dr—36 inches +, limestone bedrock of the Cynthiana formation.

The subsoil ranges to dark brown (10YR 4/3). Depth of colluvial material over residuum ranges from 30 to 40 inches. Depth to bedrock ranges from 36 inches to several feet.

Culleoka Series

The Culleoka series is made up of deep to shallow, well-drained to somewhat excessively drained soils formed in residuum from calcareous siltstone of the Garrard formation. These soils are on ridgetops and side slopes in areas where the ridges are long and narrow and the valleys are narrow and steep sided. The deep soils are in areas where the topography is gentle, and the shallow soils are in the more rugged areas.

Culleoka soils are associated with the Lowell, Shelbyville, and Eden soils, but those soils were derived from clay shale and limestone. The Culleoka soils are much coarser textured than the Lowell and Eden soils, and they are browner throughout the profile. They are similar to the Shelbyville soils, but their profile is more weakly developed and lacks a concretionary layer.

The native vegetation was forests made up of various kinds of hardwoods.

Typical profile:

A1—0 to 2 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, crumb structure; friable; medium acid; clear, smooth boundary.

A2—2 to 9 inches, brown to dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; medium acid; clear, smooth boundary.

A3—9 to 12 inches, dark-brown (10YR 4/3) to yellowish-brown (10YR 5/4) silt loam; weak, fine, angular blocky structure; friable; common, weathered fragments of calcareous Garrard siltstone; medium acid; boundary clear and smooth.

B21—12 to 17 inches, yellowish-brown (10YR 5/4) silty clay loam; moderate, medium, angular blocky structure; friable; a few, dark-brown concretions and fragments of Garrard siltstone; medium acid; gradual, smooth boundary.

B22—17 to 36 inches, yellowish-brown (10YR 5/6) silty clay loam; moderate, medium, angular blocky structure; friable; numerous, dark brownish-black, round concretions and fragments of weathered Garrard siltstone that are 1 to 3 inches in diameter; slightly acid; clear, smooth boundary.

C—36 inches +, variegated yellowish-brown (10YR 5/6), yellowish-red (5YR 4/8), and strong-brown (7.5YR 5/6) weathered Garrard siltstone; single grain; loose.

In places there are loose, weathered fragments of siltstone on the surface, and the soil is flaggy. The siltstone throughout the profile ranges from almost none to a fairly large amount. In places in the subsoil, there is 3 or 4 inches of plastic clay just above the bedrock.

Eden Series

The soils in the Eden series are moderately deep and somewhat excessively drained. They formed in material derived from calcareous shale, siltstone, and thin-bedded limestone. These soils are on long, winding ridges and on the sides of steep, narrow valleys. Eden soils are most nearly like Gray-Brown Podzolic soils, but they have some characteristics of Lithosols. Thus, they are classified as Gray-Brown Podzolic soils that intergrade toward Lithosols.

Eden soils are associated with the Hampshire, Lowell, Salvisa, and Culleoka soils. They have a thinner B horizon than the deep Hampshire and Lowell soils, and they are neutral in the upper part of the solum. They are similar to the Salvisa soils, but their surface layer is lighter colored and has slabs of rock scattered on it, rather than having protruding limestone ledges. In contrast to the shallow Lowell soils, which formed in material derived from massive limestone, the Eden solum is alkaline. It is also less well developed. Eden soils lie just below the Culleoka soils, and unlike those soils, they have a subsoil of yellowish, plastic clay.

The native vegetation was mostly oak, hickory, elm, and walnut, but redcedar grew in places.

Typical profile:

Ap—0 to 6 inches, dark, grayish-brown (2.5Y 4/2) silty clay loam; weak, fine, subangular blocky structure; firm to friable; roots are abundant; pH 7.0; abrupt, irregular boundary.

B2—6 to 12 inches, clay; the exteriors of the peds are dark yellowish brown (10YR 4/4), and the interiors are yellowish brown (10YR 5/6); a few, fine, faint variegations of light olive brown (2.5Y 5/4); moderate, medium, angular and subangular blocky structure; clay films are continuous in most places; very firm; sticky and plastic when wet; abundant roots; dark-colored silty clay loam intrusions from the Ap horizon are common; pH 7.0; gradual, smooth boundary.

B3—12 to 21 inches, yellowish-brown (10YR 5/4 to 5/6) clay; moderate, medium, blocky structure; patchy clay films; very firm; sticky and very plastic when wet; plentiful roots; very dark brown concretionary material is abundant; pH 7.0; gradual, smooth boundary.

C1—21 to 33 inches, yellowish-brown (10YR 5/6) clay; common, fine, distinct variegations of light olive brown (2.5Y 5/4); massive; very firm; very sticky and very plastic when wet; a few roots; very dark brown concretionary material is common; pH 7.0; weakly calcareous; clear, irregular boundary.

The proportion of siltstone and limestone in the parent rock influences the texture and reaction of the surface layer. Where there is more siltstone than limestone in the parent material, the surface layer is thin silt loam that is medium acid. The number of rock slabs on the surface ranges from few to many. The color of the subsoil ranges from dark yellowish brown (10YR 4/4) to light olive brown (2.5Y 5/4).

Hampshire Series

In the Hampshire series are deep to moderately deep, well drained to moderately well drained soils. These soils formed in residuum from high-grade limestone and calcareous shale. They are on broad, gently sloping ridgetops and on strongly sloping hillsides.

These soils are closely associated with the Mercer and Salvisa soils. They are also associated with the Maury, Hagerstown, McAfee, Loradale, and Eden soils. The Hampshire soils have a yellower, more mottled subsoil than the Maury, Hagerstown, and Loradale soils. They are deeper, have a better developed profile, and are more acid than the McAfee, Eden, and Salvisa soils. Unlike the Mercer soils, the Hampshire soils have a tough, plastic, clayey subsoil and lack a fragipan.

The native vegetation was mostly hardwood forests. Oak, walnut, hickory, and ash were the chief trees.

Typical profile:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular and weak, fine, subangular blocky structure; friable; slightly acid; abrupt, smooth boundary.

B1—6 to 13 inches, brown to dark-brown (7.5YR 4/4) silty clay loam; moderate, medium, angular blocky structure; friable; a few, small, dark concretions; medium acid; gradual, smooth boundary.

B2—13 to 19 inches, yellowish-brown (10YR 5/4) silty clay; common, fine, faint mottles of dark yellowish brown (10YR 4/4); moderate, medium, angular blocky structure; firm; common, small, round, dark concretions and some soft concretionary material; medium acid; gradual, smooth boundary.

B3—19 to 36 inches, mottled clay; mottles are fine and distinct and are pale brown (10YR 6/3), pale yellow (2.5Y 7/4), and yellowish brown (10YR 5/4); weak, medium, angular blocky structure; firm; abundant concretions and soft, irregularly shaped concretionary material; strongly acid; gradual, smooth boundary.

C1—36 to 60 inches +, mottled yellowish-brown (10YR 5/6) and light olive-gray (5Y 6/2) clay; massive; very firm; a few, small, black concretions and some soft, irregularly shaped concretionary material; medium acid.

Depth of the solum ranges from 24 to 36 inches. Depth to bedrock is 48 inches to several feet. In some places the upper part of the B horizon is strong brown (7.5YR 5/6).

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Loradale Series

The Loradale series is made up of deep, well-drained soils that formed in residuum from high-grade limestone. These soils are on ridgetops and side slopes in undulating areas in the Inner Bluegrass.

The Loradale soils are associated with the Maury, Hampshire, Mercer, Salvisa, and McAfee soils, which are also in the Inner Bluegrass. Their surface layer is brownish and mellow like that of the Maury soils, but the upper part of the subsoil is high in clay. Their subsoil is deeper and more friable than that of the Salvisa and McAfee soils. It is more plastic than that in the Mercer soils, but the Loradale soils lack a fragipan. The subsoil is similar to that in the Hampshire soils, but it is less mottled and the lower part is yellowish like the lower part of the Hampshire subsoil.

The native vegetation was mostly forests. Oak, hickory, elm, hackberry, and black walnut were the main trees.

Typical profile:

A1—0 to 8 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; very friable; gradual, smooth boundary; pH 6.5.

A3—8 to 12 inches, dark-brown (10YR 3/3) silt loam; weak, fine and medium, subangular blocky structure; friable; pH 6.0; clear, smooth boundary.

B1—12 to 16 inches, dark-brown (7.5YR 4/4) silty clay loam; weak, fine and medium, angular blocky structure; friable; pH 5.5; clear, smooth boundary.

B2—16 to 27 inches, dark-brown (7.5YR 4/4 to 3/2) silty clay; strong, medium, angular blocky structure; sticky and slightly plastic when wet; pH 5.5; clear, smooth boundary.

B3—27 to 37 inches, yellowish-brown (10YR 5/4 to 5/6) silty clay; moderate, fine, angular blocky structure; sticky and slightly plastic when wet; numerous, small, black concretions 1 to 3 millimeters in diameter and soft, irregularly shaped concretionary material; strongly acid; clear, smooth boundary.

C—37 inches +, yellowish-brown (10YR 5/6) clay; a few, fine, faint mottles of light brownish gray (2.5Y 6/2) and light olive brown (2.5Y 5/4); massive; sticky and plastic when wet; hard when dry; abundant, black, soft, irregularly shaped concretionary material; pH 5.5.

The color of the surface layer ranges from very dark grayish brown (10YR 3/2) to brown (10YR 4/3), and that of the upper part of the subsoil, from strong brown (7.5YR 5/6) to dark brown (7.5YR 4/4).

Lowell Series

In the Lowell series are deep to moderately deep soils that are underlain by bedrock at a depth between 1½ feet and 6 or more feet. The underlying rock is mainly interbedded limestone and calcareous shale, but in places it is fairly pure limestone.

These soils are associated with the Shelbyville, Culleoka, and Eden soils. They are finer textured in the lower part of the B horizon than the Shelbyville soils, and they lack a prominent concretionary zone. Their B horizon is more yellowish and is finer textured than that of the Culleoka soils, which were derived from siltstone. Lowell soils have a lighter colored plow layer than the Eden soils, but they are acid in the upper part of the solum.

The native vegetation was mostly hardwood forests made up of oak, maple, black walnut, hickory, and elm.

Redcedar was the chief softwood. In places there were open parklike glades.

Typical profile:

Ap—0 to 9 inches, very dark grayish-brown (10YR 3/2) to brown (10YR 4/3) silt loam; moderate, fine, granular structure; friable; roots are abundant; pH 5.5; abrupt, smooth boundary.

B2—9 to 15 inches, light silty clay; the peds have yellowish-brown (10YR 5/4) exteriors and yellowish-brown (10YR 5/6) interiors; strong, medium, subangular blocky structure; continuous clay films; firm; sticky and plastic when wet; roots are abundant; a few, small pieces of partly weathered siltstone; a few, very small, black concretions; pH 5.6; clear, smooth boundary.

B3—15 to 20 inches, silty clay; the exteriors of the peds are yellowish brown (10YR 5/4), and the interiors have many, fine, distinct variegations of yellowish brown (10YR 5/6), yellowish red (5YR 5/6), and light olive gray (5Y 6/2); moderate, medium, subangular blocky structure; patchy clay films; firm; sticky and plastic when wet; a few roots; common, yellowish-brown (10YR 5/8) pieces of siltstone that range in size from very small fragments to pieces 1½ inches across; pH 5.6; clear, wavy boundary.

C1—20 to 34 inches, variegated clay; the variegations are medium and distinct and are gray (5Y 6/1), gray (N 6/0), and dark brown (7.5YR 4/4); weak, coarse, blocky structure; massive; very firm; very sticky and very plastic when wet; yellowish-brown, partly weathered fragments of siltstone ranging from small to channery size; these fragments make up about 30 percent of the volume; a few, black stains of manganese; pH 5.6; diffuse, smooth boundary.

C2—34 to 44 inches, interbedded, gray (5Y 6/1), somewhat brittle clay and yellowish-brown siltstone; dark-red (2.5YR 3/6) stains of iron are common; pH 5.6; clear, irregular boundary.

Dr—44 inches, yellowish-brown (10YR 5/6) siltstone; pH 4.0.

In most places the surface layer is silt loam, but generally, in the severely eroded areas and in the shallow areas it is silty clay loam. Where the profile is shallow and the soil is severely eroded, the surface layer is silty clay. Where the soil is formed in residuum dominantly from siltstone, there are fragments of weathered siltstone throughout the profile.

Salvisa Series

In the Salvisa series are shallow to moderately deep, somewhat excessively drained, and sloping to moderately steep soils. These soils formed in residuum from high-grade limestone. Salvisa soils are most nearly like Gray-Brown Podzolic soils, but they have some characteristics of Lithosols. Thus, they are classified as Gray-Brown Podzolic soils that intergrade toward Lithosols.

The Salvisa soils are associated with the Maury, Braxton, Loradale, Hampshire, McAfee, and Ashwood soils. They have a thinner, more rocky solum than the Maury, Braxton, and Loradale soils, and their B horizon is firmer and more clayey. They are similar to the Hampshire soils, but they have a thinner solum, and stiff, plastic clay is nearer the surface. Salvisa soils are yellower than the McAfee soils. They have a thicker solum than the Ashwood soils, a lighter colored surface layer, and fewer rock outcrops.

The native vegetation was a forest made up mainly of hardwoods that grow well on soils high in lime. Elm, redbud, black locust, honey locust, black walnut, and the Kentucky coffeetree were the main trees, but redcedar grew in places.

Typical profile:

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) silty clay loam; moderate, medium, subangular blocky structure; firm; a few, small, dark concretions; neutral; clear smooth boundary.

B2—7 to 11 inches, dark yellowish-brown (10YR 4/4) silty clay; moderate, medium, angular blocky structure; firm; noticeable clay skins on the surfaces of the peds; many, small, dark-brown and black concretions, and some light-colored flecks of disintegrated limestone; neutral; gradual, smooth boundary.

B3—11 to 18 inches, yellowish-brown (10YR 5/6) clay; common, fine, distinct mottles of grayish brown (2.5Y 5/2); weak, coarse, angular blocky structure; very firm; many dark concretions up to 4 millimeters in diameter, more numerous dark concretions that are smaller than 4 millimeters in diameter, and some soft concretionary material; prominent flecks of limestone; neutral; gradual, smooth boundary.

C1—18 to 40 inches, mottled clay; the mottles are fine and distinct and are light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6); massive; very firm; some small, black concretions, and much soft, irregular concretionary material; mildly alkaline.

Dr—40 inches +, limestone.

Depth to bedrock ranges from 18 inches to about 4 feet. The texture of the surface layer ranges from silty clay loam to clay, depending on the degree of erosion and depth to bedrock. In places the surface layer is very dark grayish brown (10YR 3/2) or dark yellowish brown (10YR 4/4). The soils are mildly alkaline to medium acid in the A and B horizons.

Shelbyville Series

The soils in the Shelbyville series are deep, well drained, and gently sloping to sloping, and they are on uplands. These soils formed in materials weathered from high-grade limestone.

Shelbyville soils are closely associated with the Lowell, Culleoka, and Fairmount soils. They have a coarser textured, more friable B horizon than the Lowell soils and a distinctive, well-developed, fairly firm, mottled layer that is rich in dark concretionary material. Typically, the Shelbyville soils have more gentle slopes than the Fairmount soils. Their slopes are also more gentle than those of the Culleoka soils, which formed chiefly in residuum from siltstone. Shelbyville soils are much deeper than the shallow, rocky Fairmount soils.

The native vegetation was mostly hardwood forests. Oak, black walnut, hickory, and ash were the chief trees. There were probably open, grassy, parklike glades in places.

Typical profile:

Ap—0 to 5 inches, dark-brown (10YR 3/3) silt loam; weak, fine, granular structure; friable; medium acid; abrupt, smooth boundary.

B1—5 to 12 inches, brown to dark-brown (7.5YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; friable; a few small, dark, round concretions that are 2.8 millimeters in diameter; medium acid; clear, smooth boundary.

B21—12 to 22 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, angular blocky structure; friable; many, small, dark, round concretions that are 2.8 millimeters in diameter, and some soft, irregular concretionary material; medium acid; gradual, smooth boundary.

B22—22 to 30 inches, yellowish-brown (10YR 5/6) silty clay loam; strong, medium, angular blocky structure; firm; many, small, dark, round concretions that are 2.8 millimeters in diameter, and some soft, irregularly shaped concretionary material; noticeable clay skins along the surfaces of the peds; medium acid; gradual, smooth boundary.

B3cn—30 to 42 inches, like the B22 layer but contains more concretions and more soft concretionary material; medium acid; clear, smooth boundary.

C1—42 inches +, mottled yellowish-brown (10YR 5/6), brownish-yellow (10YR 6/6), and pale-olive (5Y 6/3) clay; very firm; massive; contains much soft concretionary material; very strongly acid.

In some places the B21 and B22 horizons are dark brown (7.5YR 4/4). The B3cn horizon is mottled with strong brown (7.5YR 5/6) and light olive gray (5Y 6/2) in places. Depth to the concretionary zone ranges from 24 to 36 inches. The concretions vary in prominence.

Woolper Series

In the Woolper series are deep, moderately well drained to well drained soils. These soils formed in colluvium washed from upland soils derived from limestone. They occupy sloping areas at the base of steep hills.

These soils are generally associated with Lowell, Otway, Fairmount, and other finer textured soils formed in residual limestone. They are also associated with the Brashear soils which are on toe slopes and formed in similar materials. The Woolper soils have a finer textured surface layer than the Brashear soils and are darker colored throughout.

The native vegetation was hardwood forests. Oak, hickory, beech, and ash were the main trees.

Typical profile:

Ap—0 to 4 inches, very dark grayish-brown (10YR 3/2) silty clay loam; moderate, fine, subangular blocky structure; friable; neutral; clear, smooth boundary.

A12—4 to 9 inches, very dark grayish-brown (10YR 3/2) silty clay loam; moderate, medium, angular blocky structure; firm; neutral; clear, smooth boundary.

B1—9 to 15 inches, very dark grayish-brown (10YR 3/2) silty clay; moderate, medium, subangular blocky structure; firm; a few, small, round, dark concretions; neutral; gradual, smooth boundary.

B2—15 to 23 inches, brown to dark-brown (10YR 4/3) clay; moderate, medium, angular blocky structure; firm; a few, small, dark concretions; mildly alkaline; gradual, smooth boundary.

B3—23 to 32 inches, mottled clay; the mottles are many, fine, and faint and are yellowish brown (10YR 5/6) and brownish yellow (10YR 6/6); weak, fine, angular blocky structure to massive; very firm; many, small concretions and some soft, concretionary material; clay skins noticeable; mildly alkaline; clear, smooth boundary.

C1—32 inches +, light olive-brown (2.5Y 5/4) clay; many, fine, distinct mottles of yellowish brown (10YR 5/8) and olive (5Y 5/3); massive; very firm; some small, dark concretions and some soft, irregular concretionary material.

The soils vary considerably, depending on the nature of the colluvium and the character of the underlying, nonconforming, buried soil material. In places the B2 horizon ranges to very dark grayish brown (10YR 3/2), and the B3 horizon to olive brown (2.5Y 4/4).

Reddish-Brown Lateritic soils

These soils have a dark-colored A horizon and a dark reddish-brown to yellowish-red, fairly clayey B horizon that is medium to high in free iron oxide. They are strongly and deeply weathered. Base saturation is low to medium.

The Reddish-Brown Lateritic soils in this county formed under a deciduous forest in a temperate, moist climate. The Hagerstown and McAfee soils are in this great soil group, but they are not representative. Hagerstown soils are intergrading toward Gray-Brown Podzolic soils and McAfee soils are intergrading toward Lithosols.

Hagerstown Series

In the Hagerstown series are deep, well-drained soils that formed in material derived from high-grade limestone. The soils occupy broad flats and undulating ridgetops. Hagerstown soils are most nearly like Reddish-Brown Lateritic soils, but they have some characteristics of Gray-Brown Podzolic soils. Thus, they are classified as Reddish-Brown Lateritic soils that intergrade toward Gray-Brown Podzolic soils.

Hagerstown soils are associated with the Beasley, Otway, and Fleming soils, which formed in material from calcareous clay shale and siltstone. They are also associated with some soils that have restricted drainage, but because of their reddish subsoil, they are easily distinguished from these more poorly drained associates. Hagerstown soils are deeper than the Otway soils and lack the substratum of tough, plastic, calcareous gray clay that is typical of the Beasley and Fleming soils.

The native vegetation was mostly hardwood forests. Oak, elm, ash, maple, hickory, and black walnut were the chief trees.

Typical profile:

Ap—0 to 4 inches, dark-brown (7.5YR 3/2) silt loam; weak, fine, granular structure; friable; medium acid; abrupt, smooth boundary.

B1—4 to 10 inches, reddish-brown (5YR 4/4) heavy silt loam; moderate, medium, subangular blocky structure; friable; a few, small, dark concretions; medium acid; clear, smooth boundary.

B21—10 to 16 inches, yellowish-red (5YR 4/6) silty clay loam; moderate, medium, subangular blocky and weak, fine, angular blocky structure; slightly firm; common, small, dark concretions; medium acid; gradual, smooth boundary.

B22—16 to 24 inches, yellowish-red (5YR 5/6) silty clay; moderate, fine and medium, angular blocky structure; firm; many, small, dark concretions, and much soft, irregular concretionary material; medium acid; gradual, smooth boundary.

B3—24 to 40 inches, strong-brown (7.5YR 5/8) silty clay; strong, fine and medium, angular blocky structure; firm; many, small, dark concretions, and some soft, irregular concretionary material; medium acid; gradual, smooth boundary.

C1—40 to 50 inches +, reddish-yellow (5YR 6/8) clay; massive; very firm; a few, small, dark concretions, and some soft concretionary material; medium acid.

Where limestone of the Duffin layer is part of the parent rock, the profile has a thin, black layer of shale in the lower part of the subsoil.

McAfee Series

In the McAfee series are moderately deep, well-drained, gently sloping to moderately steep soils. These soils formed residuum from high-grade, phosphatic limestone. McAfee soils are most nearly like Reddish-Brown Lateritic soils, but they have some characteristics

of Lithosols. Thus, they are classified as Reddish-Brown Lateritic soils that intergrade toward Lithosols.

McAfee soils are closely associated with the Maury, Braxton, Loradale, Ashwood, and Salvisa soils. They have a thinner, more rocky solum than the Maury, Braxton, and Loradale soils, their horizons are more weakly developed, and their B horizon is firmer and more clayey. McAfee soils are redder than the Salvisa soils, and their surface layer is not so dark as that of the Ashwood soils. They have a thicker, less rocky solum than the Ashwood soils.

The native vegetation was mostly hardwood forests. Elm, oak, ash, hickory, and black walnut were the chief trees, but redcedar grew in places.

Typical profile:

Ap—0 to 7 inches, (10YR 3/3) silt loam; weak, fine and medium, granular structure; very friable; abundant roots; slightly acid; abrupt, smooth boundary.

B1—7 to 10 inches, yellowish-red (5YR 4/6) silty clay loam; small pockets of dark-brown (10YR 3/3) silt loam; weak, fine, subangular and weak, fine, granular structure; friable; slightly sticky and plastic when wet; abundant roots; medium acid; clear, smooth boundary.

B21—10 to 16 inches, yellowish-red (5YR 4/6) silty clay; moderate, fine, angular and subangular blocky structure; firm; sticky and slightly plastic when wet; many roots; medium acid; clear, smooth boundary.

B22—16 to 24 inches, yellowish-red (5YR 4/8) silty clay or clay; moderate, fine and medium, angular blocky structure; very firm; sticky and plastic when wet; a few roots; a few clay films; medium acid; clear, smooth boundary.

C—24 to 29 inches, reddish-brown (10YR 4/3) clay; moderate, fine and medium, angular blocky structure; very firm; very sticky and plastic when wet; a few roots; a few clay films; a few, small fragments of rock; neutral; abrupt, smooth boundary.

Dr—29 inches +, limestone.

The B1 horizon, or the B22 horizon, or both, are lacking in some places. The B2 horizon is dark reddish brown (5YR 3/4) in places. In places the color of the C horizon ranges to strong brown (7.5YR 5/6). Depth to bedrock ranges from 18 to 30 inches.

Red-Yellow Podzolic soils

These soils are well developed and acid. They have a thin organic A0 horizon that overlies an organic-mineral A1 horizon. Just below is a light-colored, leached A2 horizon that rests upon a more clayey, red, yellowish-red, or yellow B horizon. The parent materials are all more or less siliceous. Coarse, reticulate streaks or mottles of red, yellow, brown, and light gray are characteristic of deep horizons of Red-Yellow Podzolic soils where the parent materials are thick.

The Bedford, Braxton, Captina, Fleming, Maury, Mercer, Monongahela, Muse, Tilsit, and Trappist soils are Red-Yellow Podzolic soils.

Bedford Series

In the Bedford series are moderately deep, moderately well drained soils of the uplans. These soils formed in material from limestone and calcareous shale. They are mostly in the Outer Bluegrass, but a small acreage is in the section known as the Knobs.

Bedford soils are associated with the Shelbyville, Lowell, and Hagerstown soils. Unlike those soils, which are well drained. Bedford soils have a fragipan in the lower part of the subsoil. Their subsoil is yellowish brown, in contrast to that of the Shelbyville soils, which is brown, and that of Hagerstown soils, which is yellowish red. Their subsoil is similar in color to that of the Lowell soils, but it is coarser textured.

The native vegetation was mostly hardwood forests. Oak, hickory, and maple were the main trees.

Typical profile:

Ap—0 to 10 inches, brown to dark-brown (10YR 4/3) silt loam; moderate, fine, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B1—10 to 18 inches, yellowish-brown (10YR 5/4) to dark yellowish-brown (10YR 4/4) silty clay loam; moderate, fine, subangular blocky structure; friable; a very few, small, round, dark concretions; strongly acid; clear, smooth boundary.

B2—18 to 28 inches, yellowish-brown (10YR 5/4) silty clay loam; moderate, fine, angular blocky structure; friable; a few, fine, faint mottles of light yellowish brown (10YR 6/4) and light brownish gray (10YR 6/2); a few, small, round, dark concretions; very strongly acid; clear, smooth boundary.

B3m1—28 to 35 inches, light yellowish-brown (2.5Y 6/4) silt loam; common, fine, faint mottles of light brownish gray (10YR 6/2) and a few, fine, faint mottles of dark yellowish brown (10YR 4/4); strong, fine, angular blocky structure; compact and brittle; a few splotches of soft, irregular concretionary material; very strongly acid; gradual, smooth boundary.

B3m2—35 to 43 inches, pale-yellow (5Y 7/3) to pale-olive (5Y 6/3) silty clay loam; a few, fine, distinct mottles of olive brown (2.5Y 4/4) and prominent mottles of yellowish brown (10YR 5/6); moderate, fine and medium, angular blocky structure; compact and brittle; a few, small, dark concretions; very strongly acid; clear, smooth boundary.

C—43 to 60 inches, mottled light-gray (2.5Y 7/2), light yellowish-brown (2.5Y 6/4), and dark-brown (10YR 3/3) silty clay; massive to weak, coarse, angular blocky structure; firm; many pockets of soft, black concretionary material; aggregates loosely cemented with concretionary material; very strongly acid; abrupt, smooth boundary.

Dr—60 inches, limestone interbedded with shale.

The color of the surface layer ranges to dark grayish brown (10YR 4/2) in places. The B1 horizon is pale brown (10YR 6/3) in places.

Braxton Series

In the Braxton series are deep, well-drained soils of the uplands. These soils formed in material derived from cherty, phosphatic limestone. They are in the Inner Bluegrass section.

Braxton soils are associated with other soils in the Inner Bluegrass section derived from phosphatic material. They are finer textured than the Maury soils in the upper part of the subsoil and, unlike those soils, have chert throughout the profile. They are deeper than the McAfee and Salvisa soils and are not so fine textured in the upper part of the subsoil.

The native vegetation was hardwood forests. Oak, ash, hickory, and black walnut were the main trees.

Typical profile:

Ap—0 to 8 inches, dark-brown (7.5YR 3/2) cherty silt loam; weak, fine, granular and weak, medium, subangular blocky structure; friable; medium acid; abrupt, smooth boundary.

B1—8 to 22 inches, reddish-brown (5YR 4/3) cherty silt loam; moderate, medium, subangular blocky structure; friable; many fragments of chert in the lower

5 inches of this horizon; medium acid; clear, smooth boundary.

B21—22 to 26 inches, reddish-brown (5YR 4/3) cherty silty clay; moderate, medium, subangular blocky structure; firm; slightly sticky and plastic when wet; many, light-colored, weathered fragments of chert; many, small, round, very dark brown concretions; strongly acid; gradual, smooth boundary.

B22—26 to 32 inches, yellowish-red (5YR 4/6) cherty silty clay; strong, medium, angular blocky structure; firm; sticky and slightly plastic when wet; many, light-colored, weathered fragments of chert, and many, small, round, very dark brown concretions; strongly acid; gradual, smooth boundary.

C1—32 to 50 inches, yellowish-red (5YR 5/6) cherty silty clay; moderate, medium, angular blocky structure; firm; sticky and plastic when wet; large pockets of light yellowish-brown silt loam; medium acid.

Dr—50 inches +, cherty, phosphatic limestone.

The amount of chert on the surface of the Braxton soils ranges from nearly none to about 50 percent by volume. The chert is concentrated in horizontal layers or is evenly distributed throughout the profile. In most places the subsoil is reddish brown (5YR 4/3), but in some places the upper part of the subsoil is strong brown (7.5YR 5/6).

Captina Series

The Captina series is made up of moderately deep, moderately well drained soils of the terraces. These soils formed in sediments washed from soils derived from limestone.

Captina soils are closely associated with the well-drained Ashton soils, but, unlike those soils, they have a fragipan in the lower part of the subsoil. In drainage they are similar to the Monongahela soils, but they are finer textured and less acid.

Typical profile:

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

B1—8 to 12 inches, brown to dark-brown (10YR 4/3) silt loam; weak, fine, subangular blocky structure; friable; strongly acid; gradual, smooth boundary.

B2—12 to 16 inches, dark yellowish-brown (10YR 4/4) silty clay loam; weak, fine, subangular blocky structure; friable; strongly acid; clear, wavy boundary.

B3m—16 to 36 inches, pale-brown (10YR 6/3) silt loam; common, fine, faint mottles of yellowish brown (10YR 5/6) and a few, fine, distinct mottles of strong brown (7.5YR 5/6); weak, thin, platy structure; compact and brittle, but friable when crushed; abundant, small, dark concretions, and much soft concretionary material; very strongly acid; clear, smooth boundary.

C—36 to 45 inches +, light brownish-gray (10YR 6/2) clay; common, fine, faint mottles of yellowish brown (10YR 5/6); massive; many, small, dark concretions, and much soft concretionary material.

In the upper part of the B horizon, the color ranges from brown (10YR 4/3) to yellowish brown (10YR 5/6). Depth to the pan ranges from 16 to 24 inches. In places the pan is weakly expressed and the subsoil is finer textured than the one in the profile described.

Fleming Series

The Fleming series is made up of moderately deep, well-drained soils of the uplands. These soils formed in residuum from limestone and from plastic, greenish clay shale.

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Fleming soils are closely associated with the Colyer, Muse, Trappist, Fairmount, Otway, and Shrouts soils. In contrast to the Shrouts soils, they have a well-developed, reddish-brown B horizon. The B horizon is thicker than that of the Shrouts soils because the parent material contains more limestone. Fleming soils have a deeper, more highly developed profile than the Otway, Fairmount, and Colyer soils. Their subsoil is reddish like that of the Trappist and Muse soils, but those soils formed in material from black shale and are extremely acid throughout.

The native vegetation was mostly various kinds of hardwoods. Oak, elm, black walnut, black locust, and honey locust were the chief trees, but redcedar grew in some places.

Typical profile:

Ap—0 to 6 inches, reddish-brown (5YR 4/4) or dark reddish-brown (5YR 3/4) silt loam; weak, fine, granular structure; friable; medium acid; abrupt, smooth boundary.

B21—6 to 15 inches, reddish-brown (5YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; friable; patchy clay skins; medium acid; gradual, smooth boundary.

B22—15 to 30 inches, brown (7.5YR 4/4) silty clay; moderate, medium, subangular blocky structure; firm; medium acid; abrupt, smooth boundary.

C1—30 inches +, light greenish-gray (5GY 6/1) clay variegated with olive brown, light olive brown, and dark brown; common, very dark brown concretions; strongly acid in the upper 12 inches, but calcareous below.

Depth to parent material ranges from 15 to 30 inches. The deep soils are reddish brown (5YR 4/4), but the shallow ones are yellowish brown (10YR 5/6).

Maury Series

In the Maury series are deep, well-drained, gently sloping to sloping soils. These soils formed in materials weathered from high-grade, phosphatic limestone. In places there are prominent sinkholes and other holes at the surface that cause underground drainage.

The Maury soils are closely associated with the McAfee, Salvisa, Braxton, Loradale, and Hampshire soils. They are deeper than the McAfee and Salvisa soils and have a more friable subsoil. In contrast to the Braxton soils, they contain little or no chert and the lower part of the B horizon is less plastic. They are similar to the Loradale soils in the upper part of the profile, but they are browner and less plastic in the lower part. Maury soils have a redder, more friable subsoil than the Hampshire soils.

The native vegetation was mostly forests made up of oak, maple, ash, hickory, black walnut, beech, and other kinds of hardwoods. These forests were interspersed with open grassy glades that were like parks.

Typical profile:

A1—0 to 6 inches, dark-brown (10YR 3/3) silt loam; weak, fine, granular structure; friable; medium acid; clear, smooth boundary.

A3—6 to 11 inches, dark yellowish-brown (10YR 3/4) silt loam; weak, fine, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B1—11 to 16 inches, reddish-brown (5YR 4/4) silty clay loam; moderate, fine, angular blocky structure; friable; medium acid; gradual, smooth boundary.

B21—16 to 23 inches, yellowish-red (5YR 4/6) silty clay loam; moderate, medium, angular blocky structure; firm; medium acid; gradual, smooth boundary.

B22—23 to 32 inches, yellowish-red (5YR 4/8) silty clay; strong, medium, angular blocky structure; firm; common, small, round, dark concretions; medium acid; clear, smooth boundary.

B3—32 to 46 inches, dark reddish-brown (5YR 3/4) clay; strong, medium and coarse, angular blocky structure; firm; many, small, dark, round concretions; noticeable clay films on the surfaces of the peds; medium acid; clear, smooth boundary.

C1—46 inches +, reddish-brown (5YR 4/4) clay; strong, medium, angular blocky structure; firm; medium acid.

The lower part of the A horizon and the upper part of the B horizon are dark brown (7.5YR 4/4) in some places. In places the B21 and the B22 horizons are dark reddish brown (5YR 3/4). The C1 horizon is mottled reddish brown (5YR 4/4) and yellowish red (5YR 4/8) in places.

Mercer Series

The Mercer series is made up of moderately well drained soils that are gently sloping to sloping. These soils formed in material weathered from limestone and calcareous shale. They have a yellowish-brown B2 horizon underlain by a well-developed fragipan.

Mercer soils are closely associated with the Hampshire, Loradale, and Eden soils. They are less well drained than the Loradale and Maury soils, and their subsoil is yellowish, rather than brown or reddish brown. They are similar to the Hampshire soils, but they have a coarser textured, more friable B2 horizon.

The native vegetation was hardwood forests. Oak, ash, hickory, elm, and maple were the chief trees.

Typical profile:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; medium acid; clear, smooth boundary.

B2—7 to 15 inches, yellowish-brown (10YR 5/4) silty clay loam; weak, fine and medium, angular blocky structure; friable; medium acid; clear, smooth boundary.

B3m1—15 to 20 inches, yellowish-brown (10YR 5/6) heavy silt loam; many, medium, faint mottles of dark brown (10YR 4/3) and light brownish gray (10YR 6/2); moderate, fine and medium, angular blocky structure; firm, compact, and brittle; many, small, round, dark concretions; strongly acid; diffuse, smooth boundary.

B3m2—20 to 26 inches, light brownish-gray (10YR 6/2) heavy silt loam; many, fine and medium, faint mottles of brown to dark brown (10YR 4/3) and yellowish brown (10YR 5/4); weak, medium and coarse, angular blocky structure; firm, compact, and brittle; many, small, round, dark concretions; strongly acid; gradual, smooth boundary.

B3m3—26 to 30 inches, yellowish-brown (10YR 5/4) silty clay; many, fine and medium, faint mottles of light brownish gray (10YR 6/2) and brown to dark brown (7.5YR 4/4); massive or weak, angular blocky structure; firm and compact; much black, irregularly shaped concretionary material; strongly acid; clear, smooth boundary.

C1—30 to 35 inches, strong-brown (7.5YR 5/6) clay; many, fine, faint mottles of brown to dark brown (7.5YR 4/4) and many, medium, prominent mottles of light olive gray (5Y 6/2); massive; very firm; common, small, round, dark concretions; very strongly acid; clear, smooth boundary.

C2—35 to 46 inches +, light olive-gray (5Y 6/2) clay; many, fine and medium, distinct mottles of strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6); massive; very firm; a few, small, round, black concretions; very strongly acid.

In some places the surface layer is brown (10YR 4/3), and the B2 layer is dark yellowish brown (10YR 4/4). Depth to the fragipan is as much as 30 inches in places. The thickness of the fragipan ranges from 10 to 20 inches.

Monongahela Series

In the Monongahela series are moderately well drained, gently sloping to sloping soils on terraces. These soils formed in old alluvium that was washed from soils that were underlain mainly by acid sandstone and shale. They have a well-developed fragipan in the lower part of the subsoil.

Monongahela soils occur at many different elevations and are associated with the soils of many different series. They are less well drained than the Allegheny soils with which they are most closely associated. In general, the Monongahela soils have a coarser textured surface layer than any of the associated soils formed in residuum.

The native vegetation was mostly hardwood forests. Oak, beech, and poplar were the chief trees.

Typical profile:

Ap—0 to 5 inches, grayish-brown (2.5Y 5/2) loam; weak, fine, subangular blocky structure; friable; very strongly acid; abrupt, smooth boundary.

B21—5 to 17 inches, light yellowish-brown (2.5Y 6/4) loam; weak, fine, subangular blocky structure; friable; very strongly acid; clear, smooth boundary.

B22—17 to 19 inches, light olive-brown (2.5Y 5/4) loam; moderate, fine, subangular blocky structure; friable; very strongly acid; clear, smooth boundary.

B3m1—19 to 26 inches, light olive-brown (2.5Y 5/4) silty clay loam; a few, fine, faint mottles of brownish gray (2.5Y 6/2); weak, fine, angular blocky structure; friable; very strongly acid; clear, smooth boundary.

B3m2—26 to 34 inches, light olive-brown (2.5Y 5/4) silty clay loam; a few, fine, faint mottles of light brownish gray (2.5Y 6/2) and many, medium, faint mottles of olive (5Y 5/3); strong, medium, angular blocky structure; friable to compact and brittle; very strongly acid; clear, smooth boundary.

C—34 inches +, variegated strong-brown (7.5YR 5/6), dark-gray (N 4/0), and olive (5Y 5/3) fine sandy clay loam; weak, medium, angular blocky structure; firm; very strongly acid.

The texture of the surface layer ranges from silt loam to fine sandy loam. The B horizon is light yellowish brown (10YR 6/4) in some places. Depth to the compact fragipan ranges from 18 to 28 inches. The C horizon ranges from 30 to 40 inches in thickness, and it is fine sandy clay in places.

Muse Series

In the Muse series are deep to moderately deep, well-drained, sloping to moderately steep soils on toe slopes. These soils formed in colluvium washed from upland soils derived from acid shale.

Muse soils are associated with the Colyer, Shrouts, Fleming, Trappist, and Tilsit soils. They are deeper, redder, and coarser textured than the Colyer, Shrouts, and Fleming soils. They are similar to the Trappist soils, but they are generally deeper. Also, they are redder and better drained than the Tilsit soils and lack a fragipan, which is typical of those soils.

The native vegetation was mostly forests of mixed hardwood and pine. Oak, hickory, Virginia pine, and shortleaf pine were the chief trees.

Typical profile:

A00—1½ inches to ½ inch of leaves and dead twigs.
A0—½ inch or less of black duff from decayed and partly decayed leaves and twigs.
A1—0 to 2 inches, dark-brown (10YR 3/3) to brown (10YR 4/3) silt loam; moderate, fine, granular structure; friable; a few, small pieces of partly weathered shale; abundant roots; pH 4.8; clear, smooth boundary.
A3—2 to 6 inches, brown (7.5YR 5/4) heavy silt loam; weak, medium, subangular blocky structure; friable; abundant roots; a few small pores; pieces of partly weathered shale are common; pH 4.5; abrupt, smooth boundary.
B21—6 to 18 inches, brown (7.5YR 4/4) silty clay loam; a few, medium, distinct variegations of gray (5Y 5/1); weak to moderate, medium, subangular blocky structure; discontinuous clay films on the surfaces of the larger peds; firm; slightly sticky and slightly plastic when wet; abundant roots; pieces of partly weathered shale are common; a few, soft, black concretions; pH 4.5; gradual, smooth boundary.
B22—18 to 31 inches, reddish-brown (5YR 4/4) silty clay; common, medium, distinct variegations of gray (N 6/0) and light olive gray (5Y 6/2); moderate, medium, subangular blocky structure; patchy clay films; firm; sticky and plastic when wet; plentiful roots; pieces of partly weathered, reddish shale are common; a few, fine pores; a few, small, very dark brown concretions; pH 4.5; diffuse, smooth boundary.
B3—31 to 46 inches, reddish-brown (5YR 5/4) clay; common, medium, distinct variegations of gray (10YR 5/1) and olive gray (5Y 5/2); moderate, coarse, subangular blocky structure that breaks to weak, medium, angular blocky; patchy clay films; firm; sticky and plastic when wet; a few roots; pieces of partly weathered, red shale are common to abundant; pH 4.5; gradual, irregular boundary.
C1—46 to 73 inches, variegated clay; variegations are medium and distinct and are red (2.5YR 4/6), gray (10YR 5/1), and yellowish brown (10YR 5/4); massive; firm; sticky and plastic when wet; interbedded, partly weathered, black and gray shale; pH 4.5.
Dr—73 inches +, partly weathered, gray and black shale that has interstices filled with yellowish-brown, clayey material; pH 4.5.

In places there is a brown (10YR 4/3) to dark-brown (10YR 5/3) A2 horizon. In some places the B2 horizon is strong brown (7.5YR 5/6) or reddish brown (5YR 4/4). There is a B3 horizon of reddish-brown (5YR 5/4) or yellowish-red (5YR 4/6) silty clay or clay that is mottled with brown (10YR 4/3) and light olive brown (2.5Y 5/4) in some places. The colluvium ranges from 24 to 60 inches in thickness.

Tilsit Series

In the Tilsit series are moderately deep, moderately well drained, gently sloping soils on upland ridges. These soils formed in residuum from acid shale. They have a fragipan.

Tilsit soils are closely associated with the Colyer, Trappist, and Muse soils. They are deeper and better developed than the Colyer soils. In contrast to the Trappist and Muse soils, they are yellowish brown instead of reddish, and they are less well drained.

The native vegetation was mixed hardwood and pine forests. Low-grade oak, hickory, ash, Virginia pine, and shortleaf pine were the chief trees.

Typical profile:

Ap—0 to 7 inches, brown (10YR 5/3) to grayish-brown (10YR 5/2) silt loam; weak, fine, granular structure; very friable; abundant fine roots; pH 5.5; abrupt, smooth boundary.
B1—7 to 12 inches, pale-brown (10YR 6/3) heavy silt loam; weak, medium, subangular blocky structure; friable; a few, dark reddish-brown concretions; common fine roots; pH 4.5; clear, smooth boundary.
B2—12 to 21 inches, brownish-yellow (10YR 6/6) silty clay loam; streaks of strong brown (7.5YR 5/6); moderate, medium, subangular blocky structure; patchy yellowish-brown (10YR 5/4) clay films; firm; a few, small, dark-brown concretions; common fine roots; pH 4.5; clear, smooth boundary.
B3m—21 to 27 inches, olive (5Y 5/3) silty clay; common, fine, distinct to prominent mottles of strong brown, yellowish brown, and yellowish red; moderate, medium, prismatic structure; the prisms break along vertical axes to coarse plates; very firm; plastic; pale-brown silt coats on vertical faces; roots extend vertically between the peds; pH 4.5; gradual, smooth boundary.
C1—27 to 33 inches, olive-gray to light olive-gray clay; common, medium, prominent variegations of strong brown; massive; many partly weathered fragments of olive-gray shale that have yellowish-brown, broken surfaces.
C2—33 to 36 inches, highly weathered shale and olive-gray silty clay.
Dr—36 inches +, black fissile shale.

The Ap layer is dark grayish brown (10YR 4/2) in some places. The B1 horizon ranges from light yellowish brown (10YR 6/4) to yellowish brown (10YR 5/4). Depth to the compact fragipan ranges from 12 to 22 inches.

Trappist Series

In the Trappist series are moderately deep, well-drained, gently sloping to sloping soils of the uplands. These soils formed in material weathered from highly fissile, black, acid shale.

Trappist soils are closely associated with the Colyer, Tilsit, and Muse soils. They have a better developed profile than the Colyer soils, and they are better drained than the Tilsit soils. They are similar to the Muse soils, but they are generally not so deep as those soils, which formed in colluvium.

The native vegetation was mixed hardwood and pine forests. Oak, hickory, ash, Virginia pine, and shortleaf pine were the chief trees.

Typical profile:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, subangular blocky structure; friable; extremely acid; clear, smooth boundary.
A2—6 to 9 inches, brown (10YR 5/3) silt loam; weak, fine, subangular blocky structure; friable; extremely acid; gradual, smooth boundary.
B1—9 to 14 inches, brown to dark-brown (7.5YR 4/4) heavy silt loam; weak, fine, angular blocky structure; friable; a few, small flecks of black shale; extremely acid; clear, smooth boundary.
B2—14 to 24 inches, reddish-brown (5YR 4/4) silty clay; a few, fine, distinct mottles of olive gray (5Y 5/2); moderate, medium, subangular blocky structure; slightly firm; a few, small, black concretions and a few small fragments of black shale; extremely acid; clear, smooth boundary.
B3—24 to 27 inches, reddish-brown (5YR 4/4) clay; a few, fine, distinct mottles of gray (5Y 5/1); massive to weak, fine, angular blocky structure; firm; contains interbedded layers of soft, brown (10YR 5/6), partly weathered shale; extremely acid; clear, smooth boundary.

Dr—27 inches +, dark reddish-brown (5YR 3/2 to 3/4), highly fissile, partly weathered shale of the Devonian period; extremely acid.

The surface layer in some places is very dark grayish brown (10YR 3/2), and in places the B1 horizon is strong brown (7.5YR 5/6). The B2 and B3 horizons are yellowish red (5YR 5/6 to 4/8) in places. Depth to the partly weathered bedrock ranges from 20 to 36 inches.

Humic Gley soils

Humic Gley soils formed mainly in marshes and swamps. They are very poorly drained and contain much organic matter. The soils have a thick, dark-colored mineral surface layer and a gray, gleyed subsoil with contrasting mottles.

The Burgin and the Dunning soils in this county are classified as Humic Gley soils.

Burgin Series

The soils in the Burgin series are deep and very poorly drained, and they formed in residuum from limestone. They occupy slight depressions and flat areas in gently sloping uplands. Burgin soils are associated with well-drained soils of the uplands derived from limestone and with poorly drained soils on old high terraces. Unlike any of these soils, the Burgin soils have a thick, black A horizon. Their subsoil is finer textured than that of the associated poorly drained soils and lacks the fragipan typical of those soils.

Typical profile:

Ap—0 to 10 inches, black (10YR 2/1) silty clay loam; weak, fine, granular and weak, medium, subangular blocky structure; friable; slightly acid; abrupt, smooth boundary.

Bg—10 to 12 inches, dark grayish-brown (2.5Y 4/2) silty clay; common, fine, faint mottles of olive brown (2.5Y 4/4); moderate, medium, angular blocky structure; firm; prominent clay skins on the surfaces of peds; neutral; clear, smooth boundary.

Cg1—12 to 36 inches, mottled clay; the mottles are fine and distinct and are dark grayish brown (10YR 4/2), strong brown (7.5YR 5/6), and light olive brown (2.5Y 5/4) to grayish brown (2.5Y 5/2); weak, coarse, angular blocky structure; firm; neutral; gradual, smooth boundary.

Cg2—36 to 40 inches +, olive-gray (5Y 5/2) clay; common, medium, distinct mottles of strong brown (7.5YR 5/6) and dark gray (5Y 4/1); massive; firm; abundant, soft, black concretions that are 10 to 15 millimeters in diameter.

The surface layer ranges from black (10YR 2/1) to very dark gray (10YR 3/1). The B horizon ranges in thickness from 3 to 15 inches and in color from dark grayish brown (2.5Y 4/2) to light olive brown (2.5Y 5/4). Mottling in the subsoil varies in degree and in color from place to place. In places outwash from hilly soils underlain by acid, black shale has accumulated, and there the soils range to acid, rather than neutral.

Low-Humic Gley soils

Low-Humic Gley soils formed in swamps where drainage was poor. They have a thin surface layer and a gray subsoil. The subsoil is similar to the surface layer in texture but has contrasting mottles. Low-Humic Gley soils lack the thick, dark surface layer of the Humic Gley soils and the fragipan or argipan of the Planosols.

Only the Melvin soils in Clark County are classified as Low-Humic Gley soils.

Melvin Series

The Melvin series is made up of deep, poorly drained soils on first bottoms. These soils formed in young alluvium washed from upland soils derived mainly from limestone but partly from acid shale and sandstone.

Melvin soils are closely associated with the Newark and Dunning soils of the bottom lands, but they are also associated with Robertsville and Taft soils of stream terraces. They are more poorly drained and grayer than the Newark soils, and they lack the thick, very dark A1 horizon typical of the Dunning soils. Melvin soils do not have as many horizons as the Robertsville or Taft soils, and they lack the fragipan, which is typical of those soils.

The native vegetation was mostly oak, red maple, elm, sycamore, poplar, willow, alder, gum, and other water-tolerant trees. There were canebrakes in places.

Typical profile:

Ap—0 to 6 inches, dark grayish-brown (2.5Y 4/2) silt loam; moderate, medium, subangular blocky structure; friable; many roots; a few, dark concretions; medium acid; gradual, smooth boundary.

C1—6 to 16 inches, grayish-brown (2.5Y 5/2) silty clay loam; common, fine, distinct mottles of yellowish brown; moderate, medium, angular blocky structure; friable; a few roots; common, dark concretions; clay skins are noticeable; slightly acid; gradual, smooth boundary.

C21—16 to 44 inches, gray (N 5/0) clay; common, medium, distinct mottles of yellowish brown; strong, medium and coarse, angular blocky structure; sticky and plastic when wet; firm; a few roots; many, small, dark concretions; a few water-rounded stones; clay skins are prominent; neutral; gradual, smooth blundary.

C3cn—44 to 48 inches, dark yellowish-brown (10YR 4/4) clay; common, fine, distinct mottles of gray; weak, fine, angular blocky structure; firm; many, small, dark concretions, and much soft concretionary material; neutral; gradual, smooth boundary.

C4—48 to 52 inches, light-gray to gray (N 6/0) clay; common, fine, distinct mottles of olive brown; massive; firm; neutral.

In some places the A horizon is lighter colored than the one in the profile described, the C1 horizon is browner, and the C21 horizon is grayer. In those places the A horizon is grayish brown (2.5Y 5/2) and the C21 horizon is light gray (N 7/0). The texture in some profiles is somewhat coarser than that in the profile described. The C horizon ranges to silt loam and silty clay loam.

Planosols

Planosols have one or more horizons that are abruptly separated from, and contrast sharply to, an adjacent horizon. The contrast may result from high clay content, cementation, or compactness. Some Planosols have B horizons that are very high in clay beneath A horizons that are low in clay, the two being separated by an abrupt boundary. Other Planosols have a fragipan—a compact, or brittle, seemingly cemented horizon—below a B horizon that has some clay accumulation.

The Planosols are poorly drained or somewhat poorly drained soils. In Clark County they formed in flat areas or depressions. The Robertsville and Taft soils in this county are classified as Planosols.

Robertsville Series

In the Robertsville series are poorly drained, nearly level soils on terraces. These soils formed in old alluvium washed mainly from soils underlain by limestone but partly from soils underlain by acid shale and sandstone. They have a shallow root zone.

Robertsville soils are closely associated with the Taft soils, which formed in similar materials and occupy similar positions. They have a grayer surface layer and subsoil than the Taft soils. Also, depth to the compact zone is less.

The native vegetation was water-tolerant hardwoods. Willow, oak, sweetgum, beech, sycamore, and red maple were the chief trees.

Typical profile:

Ap—0 to 8 inches, light-gray (5Y 7/2) silt loam; a few, fine, distinct mottles of yellowish brown (10YR 5/6); weak, fine, subangular blocky structure; friable; a few concretions; very strongly acid; clear, smooth boundary.

A2—8 to 15 inches, light-gray (2.5Y 7/2) silt loam; a few, fine, distinct mottles of yellowish brown (10YR 5/6); common, fine, faint mottles of light reddish brown (2.5YR 7/4); weak, fine, angular blocky structure; friable; a few, small, dark concretions; very strongly acid; gradual, smooth boundary.

Bg1—15 to 26 inches, light-gray (2.5Y 7/2) silt loam; a few, fine, distinct mottles of yellowish brown (10YR 5/6) and common, fine, faint mottles of light yellowish brown (2.5Y 6/4); weak, fine, angular blocky structure; friable; a few concretions somewhat larger than those in the A2 horizon; very strongly acid; gradual, smooth boundary.

Bg2—26 to 32 inches, light-gray (2.5Y 7/2) silty clay loam; a few, fine, faint mottles of light olive brown (2.5Y 4/2); weak, fine, angular blocky structure; friable; concretions more numerous than in the Bg1 horizon; medium acid; gradual, smooth boundary.

B3cn—32 to 45 inches, light-gray (5Y 7/1) silty clay loam; common, fine, distinct mottles of yellow (10YR 7/6); weak, fine angular blocky structure; firm; many, small to medium, dark concretions and much soft, irregularly shaped concretionary material; very strongly acid; gradual, smooth boundary.

C1—45 to 54 inches +, light-gray (5Y 7/1) clay; common, fine, distinct mottles of brownish yellow (10YR 6/6) and yellowish brown (10YR 5/6); moderate, medium, angular blocky structure; firm; many, small, dark concretions and some soft, irregularly shaped concretionary material; mildly alkaline.

Depth to the fragipan ranges from a few inches to as much as 30 inches. In some places the fragipan is not strongly expressed.

Taft Series

In the Taft series are somewhat poorly drained, nearly level soils on terraces. These soils formed in old alluvium washed from soils that were derived mainly from limestone but partly from acid shale and sandstone. They are moderately deep to the fragipan.

Taft soils are closely associated with the Robertsville soils, which formed in like material and in similar positions. They are not so gray as those soils in the surface layer and in the subsoil. Also, depth to the compact zone is greater.

The native vegetation was chiefly water-tolerant hardwoods. Maple, willow, gum, beech, and sycamore were the main trees.

Typical profile:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; a few, fine, faint mottles of yellowish brown (10YR 5/6); weak, fine, subangular blocky structure; friable; very strongly acid; abrupt, smooth boundary; 5 to 9 inches thick.

B1—8 to 12 inches, light brownish-gray (10YR 6/2) silt loam; a few, fine, faint mottles of yellowish brown (10YR 5/6); weak, fine subangular blocky structure; friable; very strongly acid; clear, smooth boundary.

B2—12 to 24 inches, grayish-brown (2.5Y 5/2) silty clay loam; a few, fine, distinct mottles of yellowish brown (10YR 5/6) and common, medium, faint mottles of light olive gray (5Y 6/2); moderate, fine, angular blocky structure; friable; a few concretions; very strongly acid; clear, smooth boundary.

B3mg—24 to 36 inches, light-gray (2.5Y 7/2) silty clay loam; common, medium, distinct, olive (5Y 5/3) mottles; weak, coarse, angular blocky structure; slightly firm; many concretions and much soft, irregularly shaped concretionary material; strongly acid; gradual, smooth boundary.

C—36 to 50 inches, light-gray (5Y 7/1) clay; common, medium, prominent mottles of yellowish brown (10YR 5/6); massive; very firm; much soft, concretionary material; strongly acid.

The color of the surface layer ranges to grayish brown (10YR 5/2). The B1 and B2 horizons are pale brown (10YR 6/3) in some places. Depth to the pan ranges from 15 to 30 inches. The pan is weakly developed to strongly developed.

Rendzinas

Rendzinas are dark-colored soils, high in humus, that are underlain by soft, limy material. They have a thick, dark A horizon and a structural B horizon. The texture is generally clayey, the pH value is high, and the solum is thin. Rendzinas in this county are commonly rolling to steep and contain fragments of limestone.

The Ashwood, Fairmount, and Otway soils in Clark County are classified as Rendzinas.

Ashwood Series

The Ashwood series consists of somewhat excessively drained, shallow, sloping to steep soils on uplands. These soils formed in material from high-grade limestone.

The Ashwood soils are closely associated with the Maury, Braxton, McAfee, and Salvisa soils. They are shallower than the Maury, Braxton, and McAfee soils. The Maury and Braxton soils are deep and have a browner subsoil than the McAfee soils, which are moderately deep. Ashwood soils are similar to the Salvisa soils, but they are shallower, are less well developed, and have a darker surface layer.

The native vegetation was mostly mixed hardwoods, but it included some cedar. Black walnut, hackberry, black locust, and honey locust were the main trees. Such trees grow well on soils high in lime.

Typical profile:

A1—0 to 5 inches, black (10YR 2/1) silty clay loam; moderate, medium, subangular blocky and weak, fine, granular structure; friable; slightly acid; clear, smooth boundary.

B1—5 to 13 inches, dark yellowish-brown (10YR 4/3) clay; moderate, fine, angular blocky structure; firm; neutral; clear, smooth boundary.
C1—13 to 21 inches, yellowish-brown (10YR 5/6) clay; common, fine, distinct mottles of strong brown (7.5YR 5/8) and grayish brown (2.5Y 5/2); weak, fine, angular blocky structure; firm; a few, small, dark concretions; alkaline; gradual, smooth boundary.
C2—21 to 26 inches, dark yellowish-brown (10YR 3/4) clay; massive; firm; a few, small, dark concretions and a few small fragments of limestone; alkaline.

The color of the surface layer ranges from black (10YR 2/1) to very dark grayish brown (10YR 3/2), and that of the subsoil, from dark yellowish brown (10YR 4/3) to olive brown (2.5Y 4/4). Depth of the solum ranges from a few inches to 30 inches. Ledges of rock are common.

Fairmount Series

In the Fairmount series are shallow, excessively drained soils that formed in residuum from thin-bedded limestone. The soils occupy steep slopes in the Outer Bluegrass.

Fairmount soils are closely associated with the Otway soils. They are on the same slopes, but generally the Fairmount soils are on the lower slope and the Otway are just above. The Fairmount soils are underlain by hard limestone, and the Otway, by soft, calcareous shale. Also associated with the Fairmount soils are the Lowell, Shelbyville, Beasley, and other deep residual soils on the uplands. These soils are not nearly so steep as the Fairmount soils.

The native vegetation was mostly mixed hardwoods of oak, hickory, and walnut. Redcedar grew in some places.

Typical profile:

A1—0 to 8 inches, very dark grayish-brown (10YR 3/2) silty clay loam; strong, medium, subangular and fine, granular structure; friable; neutral; clear, smooth boundary.
C1—8 to 24 inches, yellowish-brown (10YR 5/4) clay; strong, medium, angular blocky structure; firm; very strongly alkaline; abrupt, wavy boundary.
Dr—24 inches +, thin-bedded, hard, rubbly limestone.

The Fairmount soils range from 4 to 30 inches in thickness and from silty clay loam to clay in texture. In uneroded areas the surface layer is very dark grayish brown (10YR 3/2), but in eroded areas it is brown (10YR 4/3). The color of the substratum ranges from yellowish brown (10YR 5/6) to olive brown (2.5YR 4/4).

Otway Series

In the Otway series are shallow to very shallow, somewhat excessively drained, gently sloping to steep soils. These soils formed in residuum from soft, calcareous shale; limestone contributed very little to their development. The soils have a thin B horizon or none.

Otway soils are closely associated with the Hagerstown, Beasley, Fleming, Shrouts, and Fairmount soils. Their surface layer is darker and generally finer textured than that of the Hagerstown and Beasley soils, and their solum is thinner. The Otway soils have a looser, coarser substratum than the Fleming and Shrouts soils. They are better developed than the Fairmount soils, which were derived chiefly from hard limestone and commonly have slabs and ledges of limestone on the surface.

The native vegetation was probably made up of grasses, canes, and legumes in large, open areas that had trees scattered throughout. The trees were mostly black locust, honey locust, black walnut, the Kentucky coffeetree, and redcedar.

Typical profile:

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) silty clay loam; strong, fine and medium, subangular blocky structure; firm; moderately alkaline; abrupt, smooth boundary.
B2—6 to 10 inches, olive (5Y 5/4) silty clay; strong, medium to coarse, angular blocky structure; very firm; a few, small, round, dark concretions; noticeable clay skins and stains from organic matter on the peds; strongly alkaline; gradual, smooth boundary.
C—10 to 18 inches, light olive-brown (2.5Y 5/4) clay loam; weak, coarse, angular blocky structure; very firm; many weathered pieces of calcareous, sandy shale; calcareous; gradual, smooth boundary.
Dr1—18 to 42 inches +, olive-gray (5Y 5/2), weathered, calcareous, sandy shale streaked with pale olive (5Y 5/3); breaks to loam or clay loam; calcareous.

The texture of the surface layer ranges from silty clay loam to clay, depending on the nature of the parent rock and the degree of erosion. In some places the B horizon is yellowish brown (10YR 5/6). The C horizon ranges from clay to clay loam, depending on the amount of sandy shale in the parent material. In uneroded areas the A1 horizon is very dark brown (10YR 3/2). There are some thin slabs of limestone and fragments of shale on the surface in places.

Solodized-Solonetz soils

Solodized-Solonetz soils formed in parent materials that were originally high in salts. The salts have been gradually reduced by leaching, but the soils are still high in magnesium. These soils have a bleached A horizon and a clayey B horizon. The B horizon has prismatic structure, and the prisms are coated with dark-gray clay. The Shrouts soils in this county are classified as solodized-Solonetz soils.

Shrouts Series

In the Shrouts series are shallow, somewhat excessively drained, sloping to moderately steep soils of the uplands. These soils formed in materials weathered from greenish-gray, moderately alkaline, soft, clayey shale that was calcareous in many places.

Shrouts soils are closely associated with the Colyer, Fleming, Trappist, Muse, and Otway soils. They are more clayey and alkaline than the Colyer soils. They lack the thick, reddish B horizon of the Trappist and Muse soils and also of the Fleming soils, which are underlain by greenish shale. The Shrouts soils have a lighter colored A horizon than the Otway soils, and their parent material is more plastic, more olive, and contains more clay. The B horizon of the Shrouts soils has prismatic structure and is high in exchangeable magnesium.

The native vegetation was largely forests of low-grade hardwoods. Scrub oak, elm, hackberry, and ash were the main trees, but redcedar grew in places.

Typical profile:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silty clay loam; moderate, medium, subangular blocky structure; slightly firm; slightly acid; clear, smooth boundary.

B2—7 to 13 inches, light olive-brown (2.5Y 5/4) clay; many, fine, faint mottles of light gray (2.5Y 7/1) and many fine, prominent mottles of yellowish brown (10YR 5/8); strong, prismatic structure that breaks to coarse, angular blocky; very firm; sticky and plastic when wet; moderately alkaline; clear, smooth boundary.

C—13 to 24 inches, pale-olive (5Y 6/3) clay; a few, fine, faint mottles of olive (5Y 5/4); weak, coarse, angular blocky structure; extremely firm; thin layers of almost decomposed fragments of olive-gray shale that are not more than 1 inch thick; moderately alkaline; clear, smooth boundary.

Dr—24 to 36 inches, greenish-gray (5GY 5/1), soft, clayey shale; calcareous.

In some places the surface layer is very dark grayish brown (10YR 3/2). The B2 horizon is olive gray (5Y 5/2) in places. The C horizon ranges from gray (5Y 5/1) to olive (5Y 5/6) and commonly is mottled. In severely eroded areas the surface layer is clay and is less gray than described. The A and B horizons range to strongly acid. In some places the surface layer is neutral or mildly alkaline.

Alluvial soils

Alluvial soils formed in geologically recent alluvium. They do not have evident horizons in their profiles, even though the surface layer may have gained some organic matter. The alluvium is stratified in most places. The soils range from wet to extremely dry. The Bruno, Egam, Huntington, Lindside, and Newark soils in this county are classified as Alluvial soils. Lanton soils are classified as Alluvial soils intergrading toward Humic Gley soils.

Bruno Series

In the Bruno series are deep, sandy, excessively drained soils of bottom lands. These soils formed in sediments washed from upland soils derived mainly from sandstone and shale but partly from limestone. Consequently, they are medium acid to neutral. The soils have a brown surface layer and subsoil. They occupy low-lying areas along the Kentucky River.

Bruno soils are associated with the Huntington, Newark, Allegheny, and Monongahela soils. They are coarser textured than the well-drained Huntington soils and the somewhat poorly drained Newark soils. Bruno soils are younger and coarser textured than the Allegheny and Monongahela soils, and their profile is less well developed.

The native vegetation was mostly forests. Oak, beech, birch, willows, and cottonwoods were the chief trees.

Typical profile:

Ap—0 to 8 inches, dark-brown (10YR 3/3) loamy fine sand; single grain; loose; medium acid; abrupt, smooth boundary.

C1—8 to 28 inches, brown (10YR 4/3) loamy fine sand; weak, fine, subangular blocky structure; very friable; medium acid; gradual, smooth boundary.

C2—28 to 36 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, fine, angular blocky structure; friable; strongly acid.

The surface layer ranges to dark grayish brown (10YR 4/2) in places, and the subsoil ranges from dark brown (10YR 3/3) and brown (10YR 4/3) to yellowish brown (10YR 5/6). In places the profile is poorly developed, and in other places it is somewhat better developed. The better developed profiles have a finer textured substratum.

Egam Series

In the Egam series are deep, well-drained soils of the bottom lands. These soils formed in sediments washed from soils developed in residuum from clayey limestone and calcareous shale.

Egam soils are associated with the Huntington and Lindside soils, but they have a darker surface layer and a more compact and finer textured substratum. They have a less permeable subsoil than the Huntington soils and better drainage than the Lindside soils. Egam soils are also closely associated with several soils on the terraces, but they have less profile development than those soils, a generally higher pH value, and finer texture.

The native vegetation was hardwood forests. Oak, gum, sycamore, willow, poplar, and ash were the chief trees.

Typical profile:

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

C1—8 to 20 inches, dark-brown (10YR 3/3) silty clay loam; weak, fine, subangular blocky structure; slightly firm; a few, fine, faint mottles of brown (10YR 5/3); neutral; gradual, smooth boundary; 10 to 15 inches thick.

C2—20 to 40 inches, brown (10YR 4/3) silty clay; weak, medium, angular blocky structure to massive; very firm; common, medium, distinct mottles of grayish brown (2.5Y 5/2) and a few, fine, faint mottles of yellowish brown (10YR 5/6); neutral.

The surface layer of these soils ranges to silty clay loam.

Huntington Series

The Huntington series is made up of deep, well-drained soils on bottoms. These soils formed in recent alluvium washed from soils developed mainly from limestone but partly from sandstone. Except for a few places where the sediments are from sandstone, and the soils therefore are slightly acid, Huntington soils are neutral. Huntington soils lack a well-developed profile, but they are stratified in places because alluvial materials of different texture were deposited at various times when the soils were forming.

These soils are closely associated with the Lindside, Newark, and Egam soils, which formed in sediments from similar parent material. They are better drained than the Lindside and Newark soils. They have the same drainage as the Egam soils, but their surface layer is not so dark and their substratum is not so compact. Huntington soils are better drained than the Melvin soils, which formed in similar parent materials and are grayish and mottled.

The native vegetation was mostly hardwood forest. Maple, oak, sycamore, elm, poplar, and ash were the chief trees.

Typical profile:

Ap—0 to 4 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, fine, granular structure; very friable; slightly acid; abrupt boundary.
A1—4 to 14 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, fine, granular structure; friable; neutral; gradual boundary.
C1—14 to 26 inches, brown to dark-brown (10YR 4/3) silt loam; weak, medium, granular structure; friable; neutral; gradual boundary.
C12—25 inches +, yellowish-brown (10YR 5/6) silty clay loam; a few, fine, faint mottles of pale brown (10YR 6/3); weak, medium, subangular blocky structure; slightly firm; a few, small, dark, round concretions; mildly alkaline.

In a few places the surface layer is fine sandy loam. The profile ranges from dark yellowish brown (10YR 4/4) to dark brown (10YR 4/3). Depth to the underlying rock ranges from 20 inches to several feet.

Lanton Series

In the Lanton series are somewhat poorly drained soils on first bottoms. These soils formed in recent alluvium washed from upland soils that formed in residuum from limestone. Their surface layer is dark colored, and their subsoil is gray, mottled, gleyed clay. The soils are neutral.

Lanton soils are closely associated with the Dunning soils, but they are better drained than those soils, have a thicker A horizon, and fewer concretions in the C horizon. They are also associated with the Egam, Huntington, Lindside, Newark, and Melvin soils. Lanton soils have about the same drainage as the Newark and Melvin soils, but they are better drained than the Egam, Huntington, and Lindside soils. Also, their surface layer is black (10YR 2/1), rather than very dark grayish brown (10YR 3/2) to grayish brown (2.5Y 4/2).

The native vegetation was mostly oak, red maple, boxelder, willow, and other water-tolerant hardwoods.

Typical profile:

A1—0 to 7 inches, black (10YR 2/1) silty clay loam; moderate, fine and medium, angular blocky structure; slightly firm; neutral; gradual, smooth boundary.
A2—7 to 18 inches, black (10YR 2/1) silty clay; weak, fine and medium, angular blocky structure; firm; neutral; clear, smooth boundary.
Cg1—18 to 30 inches, dark-gray (2.5Y 4/0) silty clay; a few, faint mottles of light olive brown (2.5Y 5/4); massive; very firm; neutral; gradual, smooth boundary.
Cg2—30 inches +, light brownish-gray (2.5Y 6/2) clay; massive; very firm; neutral.

The thickness of the A horizon ranges from 12 to 18 inches. Depth to bedrock ranges from 3 to 6 feet.

Lindside Series

In the Lindside series are moderately well drained, fertile, neutral soils on bottoms. These soils formed in recent alluvium washed from upland soils derived from limestone residuum.

Lindside soils are closely associated with the Huntington, Newark, and Melvin soils. They are less well drained than the Huntington soils and are mottled nearer their surface. They are better drained than the Newark soils, their surface layer is less gray, and gray mottling is at a greater depth.

The native vegetation was mainly oak, maple, sycamore, poplar, willow, ash, and other water-tolerant trees. There were canebrakes in places.

Typical profile:

Ap—0 to 7 inches, dark-brown (10YR 3/3) silt loam; moderate to fine, granular structure; friable; medium acid; abrupt, smooth boundary.
C1—7 to 17 inches, brown (10YR 4/3) silt loam; moderate, medium, subangular blocky structure; friable; many, small, dark concretions; medium acid; gradual, smooth boundary.
C2—17 to 23 inches, dark grayish-brown (10YR 4/2) silt loam; a few, fine, faint mottles of light yellowish brown (10YR 6/4); weak, coarse, subangular blocky structure; friable; mildly alkaline; gradual, smooth boundary.
Cg—23 to 36 inches, grayish-brown (2.5Y 5/2) silt loam; common, fine, distinct mottles of yellowish brown (10YR 5/6) and common, fine, faint mottles of light yellowish brown (2.5Y 6/4); moderate, medium, angular blocky structure; firm; many small concretions and prominent clay skins on the surfaces of the peds; strongly alkaline.

The surface layer and the upper part of the substratum range from very dark grayish brown (10YR 3/2) to dark brown (10YR 3/3) or brown (10YR 4/3). In some places the lower part of the substratum is gleyed.

Newark Series

The Newark series is made up of deep, somewhat poorly drained soils on first bottoms. These soils formed in young alluvium washed mainly from soils underlain by limestone but partly from soils derived from acid shale and sandstone.

Newark soils are closely associated with the Lindside and Melvin soils, which are also on bottoms. They have poorer drainage than the Lindside soils and are more mottled and gray nearer the surface. They are better drained and less gray than the Melvin soils, particularly in the upper part of the profile.

The native vegetation was mostly hardwood forest made up mainly of water-tolerant oak, maple, sycamore, poplar, willow, and ash. There were canebrakes in places.

Typical profile:

Ap—0 to 8 inches, very dark brown (10YR 3/3) silt loam; moderate, fine and medium, granular structure; very friable; medium acid; abrupt, smooth boundary.
C1—8 to 14 inches, dark grayish-brown (10YR 4/2) silt loam; a few, fine, faint mottles of dark yellowish brown (10YR 3/4) and distinct mottles of reddish brown (5YR 4/4); weak, fine, granular structure; very friable; medium acid; gradual, smooth boundary.
C2g—14 to 24 inches, grayish-brown (2.5Y 5/2) silt loam; many, medium, distinct mottles of dark yellowish brown (10YR 3/4); massive; friable; many, soft, black concretions and also concretionary material; mildly alkaline; gradual, smooth boundary.
C3g—24 to 36 inches +, dark grayish-brown (2.5Y 4/2 to 10YR 4/2) heavy silt loam; massive; friable; common, small, black concretions; mildly alkaline; gradual, smooth boundary.

In some places the Ap horizon is dark grayish brown (10YR 4/2).

Lithosols

Lithosols are a group of soils that do not have genetically related horizons. They formed in materials that are shallow or very shallow to bedrock. Many are

stony or contain fragments of hard rock. They are generally in steeply sloping areas. The Colyer soils are the only soils in Clark County classified as Lithosols.

Colyer Series

The Colyer series is made up of shallow, extremely acid soils. These soils formed in residuum from black, highly fissile shale. They are on ridges and side slopes in terrain that is rough and broken.

Colyer soils are closely associated with the Tilsit and Trappist soils. They are shallower than those soils. They lack the reddish B horizon of the Trappist soils and the fragipan of the Tilsit soils.

Originally, the vegetation was mixed hardwoods and pine. Oak, hickory, beech, Virginia pine, and shortleaf pine were the chief trees.

Typical profile:

A1—0 to 1 inch, brown (10YR 5/3) silt loam; weak, medium, subangular blocky and moderate, fine, granular structure; friable; very strongly acid; gradual, smooth boundary.

A3—1 to 6 inches, brown (7.5YR 5/4) silty clay loam; moderate, medium, subangular blocky structure; firm; contains a few, small pieces of reddish-yellow (7.5YR 6/6) and reddish-brown (5YR 5/4), weathered fissile shale; very strongly acid; clear smooth boundary.

C—6 to 10 inches, variegated yellowish-red (5YR 5/6), brown (7.5YR 5/4), and light brownish-gray (2.5Y 6/2) silty clay loam; weak, medium, angular blocky structure; firm; numerous, small, yellowish-red (5YR 4/6) fragments of weathered fissile shale; very strongly acid; abrupt, smooth boundary.

Dr—10 inches +, slightly weathered, highly fissile, black shale; outer surfaces are brown (7.5YR 5/4), and freshly broken surfaces are dark reddish brown (5YR 2/2).

The number of fragments of shale in the surface layer varies. The steeper and more eroded soils have more shale on the surface than the other soils. Depth to shale bedrock ranges from 4 to 24 inches. The deep soils are on the broadest and flattest ridges, and they have a surface layer of silt loam.

Soil Characterization Data [6]

Table 9 lists chemical and physical characteristics of some representative soils in Clark County. Two profiles of each of four soil types were sampled for analysis.

The analyses show facts about the parent material of the soils and the climate under which the soils formed. They also suggest responses of the soils to use and management.

Silty clay loam or finer textured material was at the surface or only as deep as 8 inches in the first profile of the Muse series. This indicates that the parent material was clayey. Except in the Muse soils, calcium was the major extractable metallic cation. The Muse soils were low in extractable calcium, which would be expected, inasmuch as these soils formed in parent material from acid shale. Assuming that the relative proportions of the various sand sizes would remain fairly constant throughout soils formed from uniform parent material, the analyses indicate that, of the soils sampled, only the Brashear formed from heterogeneous parent material.

Because the soils formed in a humid, temperate climate, they are moist much of the time and are highly leached. In the soils sampled, base saturation was lowest and hydrogen ion concentration was highest in the Muse soils.

The percent of clay in and close to the surface of the soils indicates that the A horizon has been altered by moderate erosion. Organic matter was fairly low in the Brashear and Lowell soils sampled, but the content of organic matter in the Eden and Muse soils was fairly high. The carbon-nitrogen ratio of one Muse soil was fairly high in the surface layer. The sample was taken in a forested area, and therefore, the surface layer contained raw organic matter. In the other soils sampled, a lower carbon-nitrogen ratio indicated that the organic matter was well decomposed.

Examination of the data in table 9 indicates that broad interpretations about management of these soils can be made. The capacity of soils to hold exchangeable cations, termed cation-exchange capacity, affects the fertility of the soils. Table 9 indicates that the Brashear and Muse soils are about average in fertility, as compared to other Kentucky soils, and that the Eden and Lowell soils are considerably above average. Generally, a base saturation of 75 percent or more is desirable, and all but the Muse soils have a moderately high to high value. Therefore, on the Muse soils, large amounts of lime and fertilizer are required to improve them for plant growth. Because of the fairly high bulk density in the B horizon of most of the soils, movement of water through the soil is restricted. Drainage through the soil can be improved if plants with roots that can penetrate the tight subsoil are grown, and if practices are used that control runoff.

General Nature of the County

This section gives facts about the geology, physiography, relief, drainage, and climate of the county. Information is also given about the settlement and development and about the agriculture.

Geology, Physiography, Relief, and Drainage

Clark County is in four major physiographic sections of Kentucky. Most of the county is in the Inner Bluegrass, the Hills of the Bluegrass, and the Outer Bluegrass sections, but some areas along the eastern edge of the county extend into the section known as the Knobs (*4*).

The geologic formations of the county are mainly of the Ordovician period. Devonian, Silurian, and Tertiary rocks occur in many areas, and a few rocks of the Mississippian period are exposed along the Montgomery County line (*3*).

The Ordovician rocks that underlie the Inner Bluegrass are limestones of the Cynthiana, Lexington, and Highbridge formations. Those that underlie the Hills of the Bluegrass are shales of the Eden formation, which are easily eroded. The Outer Bluegrass is underlain by Ordovician soft limestones and shales of the Maysville

[6] Interpretations of the data were supplied by Dr. H. H. Bailey, associate professor of agronomy, University of Kentucky.

and Richmond formations and by Silurian rocks of the Brassfield formation. The Brassfield formation occurs mostly as an escarpment, and the top of it marks the beginning of the section known as the Knobs. The Knobs are erosion remnants of the eastern Kentucky mountain escarpment. The areas are underlain by Silurian rocks of the Crab Orchard formation and by Devonian rocks of the Duffin, Boyle, and Ohio formations. A geologic cross section of the county, showing some of the principal soils and their relation to the rock formations, is shown in figure 16.

The relief of the county ranges from level to very steep. It is closely related to the geologic formations and to the kinds of soils. Most of the Inner Bluegrass is gently undulating, but the areas near large streams have steep slopes and narrow divides. Along the gorge of the Kentucky River, where the soils are underlain by massive limestone of the Highbridge formation, the landscape is rugged. In the Hills of the Bluegrass are narrow, V-shaped valleys and long, narrow ridges. The Outer Bluegrass is undulating and steep. The areas are rough and broken and are highly dissected by streams. Here the soils are underlain by shale and limestone. The Knobs consist mostly of narrow, winding ridges, of steep side slopes, and of narrow valley floors. Also in the Knobs is a small acreage of a broad, flat valley floor that lies on the outward fringes of the Knobs. In this valley the soils formed in deposits generally considered to be old and to have been laid down in slack water. There is little karst topography in the county, and it is in the southwestern part.

Except for the small area of karst topography where there is subterranean drainage, Clark County is drained by surface streams. The northern third of the county is within the watershed of the Licking River. It is drained mainly by Strodes and Stoner Creeks. The remainder of the county is drained by tributaries of the Kentucky and Red Rivers. Clark County is within the Ohio River basin, and all streams that drain the county eventually reach that river. The general relief of the county and location of the streams are shown in figure 17.

Climate [7]

Clark County has a wide range in temperature, rainfall, wind, and humidity, but the range is within limits suitable for varied plant and animal life. Table 10 gives temperature and precipitation data for the county.

Occasional hot spells in summer and cold spells in winter cause the greatest extremes in temperature, but there is considerable variability in all seasons. The temperature rises to 90° F. or higher on about 29 days in an average year. A temperature of 100° or more is likely to be reached about once each year in June, July, August, or September.

Freezing temperatures occur on about 97 nights in an average winter, but the temperature rises above 32° on all but 20 of the days. Therefore, a daily freeze-thaw cycle is normal for much of the cold weather. The temperature drops below zero perhaps once each winter.

The average length of the growing season—from the last light freeze in spring to the first light freeze in fall—is 190 days. In about 5 years out of 10, the growing season is 179 to 201 days long, and in 8 years out of 10, the growing season ranges from 169 to 211 days.

Clark County has an average annual rainfall of 43 inches, which is sufficient for agricultural production. During an ordinary year, the heaviest 1-hour rainfall is

[7] By O. K. Anderson, meteorologist, and staff, U.S. Weather Bureau, Louisville, Ky.

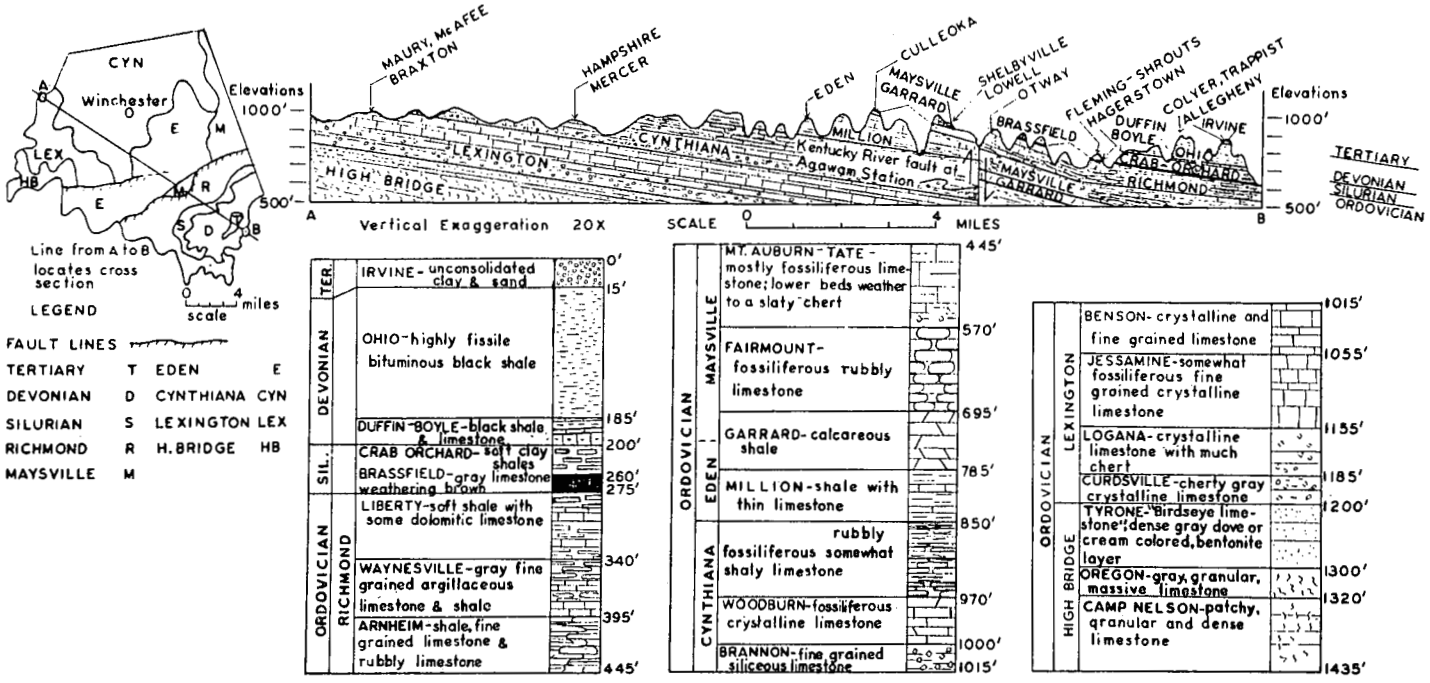

Figure 16.—Geologic cross section of Clark County, showing some of the principal soils and their relation to the rock formations.

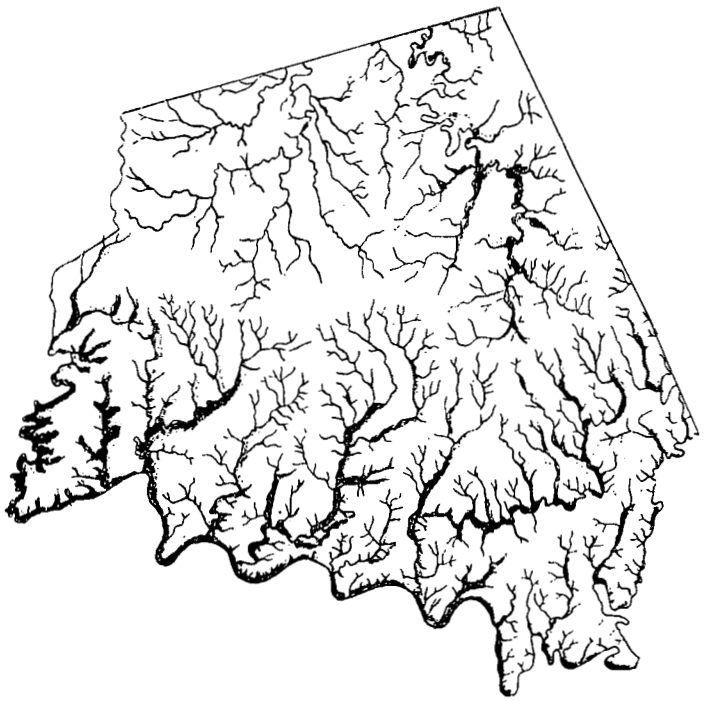

Figure 17.—General relief of the county and location of the streams.

about 1.15 inches. There is a 35-percent chance that such a 1-hour rain will occur in July, a 30-percent chance that it will come in August, and less than a 1-percent chance that it will happen in November through January. Once in 10 years, a 24-hour total of 4.25 inches of rain can be expected. There is about a 5-percent chance that this amount of rain will fall in any July, about a 3½-percent chance that this will happen in March, and even less of a chance that it will occur in other months.

Thunderstorms occur on an average of 47 days per year. They are most frequent from May through August, but they may occur in any month. Thunderstorms bring most of the short, intense rainfall during the summer. Less intense rainfall that lasts for several days sometimes occurs late in spring and delays early tillage. These long, slow rains are the ones that are the most likely to cause local floods, since they occur when soils are frozen, snow covered, or saturated. Measurable amounts of precipitation occur on an average of 131 days each year in this county. In fall, however, when harvesting needs to be done, long periods of mild, sunny weather are typical.

Normally, snowfalls of 1 inch or more occur about five times a year. The average yearly snowfall is 19 inches, but the ground is seldom covered with snow for more than a few days.

Relative humidity depends on the temperature, as well as on the moisture content of the air, and it therefore is extremely variable. The average for the early morning hours is 83 percent, and for early afternoon, 58 percent. Early morning readings can range from 55 to 100 percent, and afternoon readings range from 25 to 80 percent.

Prevailing winds, from the south average about 11 miles per hour. Calm periods that generally last less than 24 hours occur frequently. High, gusty winds, ranging from 50 to 70 miles per hour, generally occur at the beginning of heavy thunderstorms.

The probable risk of frost damage to various crops can be determined with the help of table 11. Critical temperatures for individual crops must, of course, be known. Probabilities of light, moderate, and severe freezes after various dates in spring and before specified dates in fall are given in the table.

Settlement and Development

Clark County was organized by an act of the Kentucky Legislature in December 1792 out of parts of Fayette and Bourbon Counties. The county was named for General George Rogers Clark. Later, Montgomery, Estill, and Powell Counties were formed from acreage that had originally been part of Clark County.

In 1751 John Findley came from Lancaster, Pa., and established a trading post at Eskippakithiki, a Shawnee Indian village, now known as Indian Fields. Some of the trading goods, which Findley brought to the post, were packed in straw from English grass that had been brought to Pennsylvania by early settlers from England. The straw was cast out on the land. Seed from it germinated and flourished in the rich limestone soil. It is from this grass that the bluegrass of modern Kentucky comes.

Daniel Boone, who spent some time in the vicinity of Findley's trading post in the year 1769, passed on the story of how well English grass grew in the area, and the "Bluegrass of Kentucky" became world renowned. Many settlers followed Findley and Boone into the area, and in 1792 Winchester was made the county seat. The present population of the city of Winchester is more than 10,000.

There are many industries in Winchester that provide employment for residents of the county. In recent years metal fabricating and electrical plants have been established in this city. Among long-established enterprises are manufacturers of clothing for men, of machines that harvest bluegrass, and of walnut lumber products. Other industries are plants for mixing fertilizer and for processing and packing turkeys.

There are some limestone quarries in the county. Here limestone for building purposes is quarried or limestone is processed for agricultural use.

Winchester has many grade schools and high schools, and it is the site of Southeastern Christian College. Consolidated schools and other schools provide grade school and high school education throughout the county.

Agriculture

Agriculture has always been important in Clark County. The area is part of the Bluegrass region of Kentucky, and the growing of pasture crops and the raising of livestock have always been the chief farm enterprises.

Around the turn of the century, there were many work animals on the farms of the county. In addition, much livestock was raised for market. As a result, considerable feed was required, and much corn and small grain were grown. The livestock now on the farms are fed mainly on grass, and the acreage in corn and small grains has decreased.

TABLE 10.—*Temperature and*

[Temperature and rainfall data based on a 67-

Month	Temperature						
	Average	Average maximum	Average minimum	Highest on record		Lowest on record	
	°F	°F	°F	°F	Date	°F	Date
January	33. 9	41. 8	26. 0	80	Jan. 24, 1943	−15	Jan. 23, 1936
February	34. 9	43. 4	26. 7	[1] 76	Feb. 15, 1945	−20	Feb. 13, 1899
March	44. 0	53. 3	34. 7	86	Mar. 25, 1929	−1	Mar. 4, 1873
April	54. 0	63. 7	44. 2	91	Apr. 30, 1942	15	Apr. 18, 1875
May	64. 0	73. 9	54. 2	96	May 22, 1941	30	May 1, 1876
June	72. 9	82. 6	63. 3	104	June 29, 1936	40	June 3, 1910
July	76. 1	85. 6	66. 6	108	July 10, 1936	[2] 47	July 23, 1945
August	74. 8	84. 3	65. 2	105	Aug. 19, 1936	45	Aug. 31, 1946
September	69. 2	79. 3	59. 1	[3] 101	Sept. 14, 1936	32	Sept. 30, 1899
October	57. 5	67. 6	47. 5	93	Oct. 6, 1941	21	Oct. 29, 1925
November	44. 7	53. 2	36. 2	[4] 80	Nov. 1, 1950	[5] −3	Nov. 25, 1950
December	36. 0	43. 6	28. 4	[6] 71	Dec. 26, 1942	−9	Dec. 1 and 10, 1917
Annual	55. 2	64. 4	46. 0	108		−20	

[1] Also in 1944. [2] Also in 1937. [3] Also in 1939. [4] Also in 1938 and 1945. [5] Also in 1929. [6] Also in 1875.

TABLE 11.—*Probabilities of last freeze in spring and first freeze in fall*

[During a light freeze, the temperature ranges from 28° through 32° F., and generally only the tenderest plants are killed. During a moderate freeze, the temperature ranges from 24° to 28°, and most plants are damaged to some extent. During a severe freeze the temperature is 24° or lower and most cultivated plants are killed or heavily damaged]

Probability [1]	Dates for given probability		
	Light freeze	Moderate freeze	Severe freeze
Spring:			
5 years in 10, after	Apr. 20	Apr. 5	Mar. 21.
2 years in 10, after	Apr. 29	Apr. 16	Apr. 2.
1 year in 10, after	May 5	Apr. 22	Apr. 8.
Fall:			
5 years in 10, before	Oct. 22	Nov. 2	Nov. 14.
2 years in 10, before	Oct. 12	Oct. 24	Nov. 3.
1 year in 10, before	Oct. 7	Oct. 19	Oct. 28.

[1] Number of chances in 10 that a freeze will occur. For example, the last light freeze in spring will occur after Apr. 20 in 5 years out of 10; after Apr. 29 in 2 years out of 10; and after May 5 in 1 year out of 10. The first light freeze in fall will occur before Oct. 22 in 5 years out of 10; before Oct. 12 in 2 years out of 10; and before Oct. 7 in 1 year out of 10.

Beef cattle, sheep, and turkeys account for most of the livestock now on the farms, but hogs are raised on a few farms. The hogs are fed to market size on the farm, or they are sent outside the county to areas where much corn is grown and are there fed to market size. There are many small dairy farms worked mostly by the farm operator, but there are no large commercial dairy farms. Horses are raised on some of the farms, and some of them are thoroughbreds.

Burley tobacco has been the most important cash crop in the county since it was first introduced into the State. In 1959 there were 3,204 acres of burley tobacco grown in the county.

There were 1,356 farms in the county in 1954, and 1,183 [8] in 1959. Many farm operators, especially those on the small farms, work off the farm part time.

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[8] The statistics used were taken from records of the U.S. Bureau of the Census.

precipitation, Clark County, Ky.

year record; snowfall data based on a 63-year record]

Precipitation									
Average	Greatest amount on record		Lowest amount on record		Greatest amount in 24-hour period		Average snowfall	Greatest snowfall on record	
Inches	*Inches*	*Year*	*Inches*	*Year*	*Inches*	*Date*	*Inches*	*Inches*	*Year*
4. 39	16. 65	1950	0. 77	1931	3. 50	Jan. 11, 1913	6. 2	21. 7	1918
3. 18	11. 06	1883	. 52	1895	3. 04	Feb. 24, 1909	4. 6	14. 7	1894
4. 46	9. 91	1890	. 46	1910	3. 61	Mar. 26, 1913	3. 1	16. 3	1896
3. 57	7. 50	1948	. 40	1896	4. 39	Apr. 12 and 13, 1948	. 4	4. 0	1901
3. 65	11. 03	1882	. 60	1932	2. 77	May 13 and 14, 1935	. 1	6. 0	1894
4. 08	10. 62	1928	1. 05	1864	5. 50	June 29, 1928	0	0	
4. 32	11. 24	1875	. 42	1930	4. 02	July 12, 1875	0	0	
3. 37	8. 96	1932	. 62	1875	8. 06	Aug. 2, 1932	0	0	
2. 78	7. 92	1910	. 33	1895	5. 45	Sept. 3, 1922	0	0	
2. 44	7. 95	1919	. 11	1924	2. 78	Oct. 16 and 17, 1925	. 1	2. 8	1925
3. 16	8. 50	1919	. 53	1904	3. 95	Nov. 26, 1919	1. 1	9. 7	1950
3. 60	9. 02	1899	. 80	1925	2. 63	Dec. 6, 1919	4. 0	19. 4	1917
43. 00			. 11		8. 06		19. 6		

Glossary

Acidity. See Reaction.

Aggregate, soil. A single mass or cluster of many individual fine particles held together, such as a prism, crumb, granule, or block.

Alluvium. Soil or rock material, such as gravel, silt, or clay, deposited on land by streams.

Available water capacity. The difference between the amount of water in a soil at field capacity and the amount in the same soil at the permanent wilting point. Commonly expressed as inches of water per inch depth of soil.

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

Bottom land. Nearly level land on the bottom of a valley that has a stream flowing through it. Subject to flooding and often referred to as a flood plain.

Chert. Irregularly shaped, angular fragments of crystalline quartz rock weathered from cherty limestone.

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 clay on the surface of a soil aggregate. Also called clay coat, or clay skin.

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

Consistence soil. The property of soil material that is expressed by the resistance of the individual particles to separating from one another (cohesion) or by the ability of a soil mass to undergo a change in shape without breaking (plasticity). The consistence varies with the content of moisture. Thus, a soil aggregate or clod may be hard when dry and plastic when wet. Terms used to describe consistence are—

Friable. When moist, easily crushed by hand and coheres when pressed together. Friable soils are easily tilled.

Firm. When moist, crushes under moderate pressure, but resistance is distinctly noticeable. Firm soils are likely to be difficult to till.

Hard. When dry, is moderately resistant to pressure; can be broken in the hands without difficulty but is barely breakable between thumb and forefinger.

Loose. Noncoherent when moist or dry. Loose soils are generally coarse textured and are easily tilled.

Plastic. When wet, retains an impressed shape and resists being deformed; plastic soils are high in clay and are difficult to till.

Soft. Weakly coherent and fragile; when dry, breaks to powder or individual grains under slight pressure.

Fragipan. A dense and brittle pan or layer in soils that is very low in organic matter and clay but rich in silt or very fine sand. The layer is seemingly cemented when dry, has a hard or very hard consistence, and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan has a tendency to rupture suddenly if pressure is applied, rather than to undergo slow deformation. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick and generally occur below the B horizon at a depth of 15 to 40 inches from the surface.

Horizon, soil. A layer of soil, approximately parallel to the soil surface, with characteristics produced by soil-forming processes. The relative positions of the several soil horizons in the soil profile and their nomenclature follow:

A horizon. The master horizon consisting of (1) one or more mineral horizons of maximum organic accumulation; or (2) surface or subsurface horizons that are lighter in color than the underlying horizon and that have lost clay minerals, iron, and aluminum with resultant concentration of the more resistant minerals; or (3) horizons belonging to both of these categories.

B horizon. The master horizon of altered material characterized by (1) an accumulation of clay, iron, or aluminum, with accessory organic materials; or (2) blocky or prismatic structure together with other characteristics, such as stronger colors, unlike those of the A horizon or the underlying horizons of nearly unchanged material; or (3) characteristics of both these categories. Commonly, the lower limit of the B horizon corresponds to the lower limit of the solum.

C horizon. A layer of unconsolidated material, relatively little affected by the influence of organisms and presumed to be similar in chemical, physical, and mineralogical composition to the material from which at least a part of the overlying solum has formed.

D horizon. Any stratum underlying the C, or the B if no C is present, which is unlike the C, or unlike the material from which the solum has formed.

Internal drainage. The movement of water through the soil profile.

Leaching, soil. The removal of materials in solution by the movement of water through the soil.

Moisture-supplying capacity. The relative capacity of the soil to take in and supply moisture in amounts favorable to most plants. It is related to the amount of runoff, the rate of infiltration, the available water capacity, the depth of the root zone, the depth of the soil, and the moisture-extraction pat-

tern. Relative moisture-supplying capacity is expressed as *very high, high, medium, low,* or *very low.*

Morphology, soil. The physical constitution of the soil, including the texture, structure, consistence, color, and other physical and chemical properties of the various soil horizons that make up the soil profile.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils generally indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* contrast—*faint, distinct,* and *prominent.*

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the elaboration of food and tissue. Among the elements obtained from the soil are nitrogen, phosphorus, calcium, potassium, magnesium, sulfur, iron, manganese, copper, boron, and zinc. Plant nutrients obtained largely from the air and water are carbon, hydrogen, and oxygen.

Parent material. The unconsolidated mass or rock material from which the soil profile forms. See also Horizon, soil; Profile, soil; Substratum.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block, in contrast to a clod.

Permeability. The quality of a soil that enables it to transmit water or air. Terms used to describe permeability are *very slow, slow, moderately slow, moderate, moderately rapid, rapid, very rapid.*

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

Reaction. The degree of acidity or alkalinity of soil expressed in pH values or in words, as follows:

	pH		*pH*
Extremely acid	Below 4.5	Mildly alkaline	7.4 to 7.8
Very strongly acid	4.5 to 5.0	Moderately alkaline	7.9 to 8.4
Strongly acid	5.1 to 5.5	Strongly alkaline	8.5 to 9.0
Medium acid	5.6 to 6.0	Very strongly alkaline	9.1 and higher
Slightly acid	6.1 to 6.5		
Neutral	6.6 to 7.3		

Relief. Elevations and inequalities of the land surface, considered collectively.

Residuum. Unconsolidated, partly weathered mineral material that accumulates over disintegrating solid rock. Residuum is not soil but is frequently the material in which a soil has formed.

Root zone, depth. The depth of the soil that is penetrated, or can be penetrated, by plant roots. The height of the water table, content of clay, presence of a fragipan, and the bedrock are features that limit depth of the root zone. Terms used to indicate root zone in this report are—

	Inches		*Inches*
Very shallow	Less than 10	Moderately deep	20 to 36
Shallow	10 to 20	Deep	36 or more

Sand. Individual fragments of rocks or minerals that have diameters that range from 0.05 millimeter (0.002 inch) to 2.0 millimeters (0.079 inch). The term "sand" is also applied to a soil that contains 85 percent or more of sand and not more than 10 percent of clay.

Silt. Individual mineral particles of soil that range from 0.002 millimeter (0.000079 inch) to 0.05 millimeter (0.002 inch) in diameter. The term silt is also applied to a soil that contains 80 percent or more of silt and less than 12 percent of clay.

Soil. The natural medium for the growth of land plants on the surface of the earth; it is composed of organic and mineral materials.

Solum, soil. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soils consists of the A and B horizons.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of structure are *platy, prismatic, columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular.* Structureless soils are (1) *single grain*—each grain by itself, as in dune sand, or (2) *massive*—the particles adhere without any regular cleavage, as in many claypans or hardpans.

Subsoil. Technically, the B horizon; roughly, that part of the profile below plow depth in which roots normally grow.

Substratum. Any layer beneath the solum, or true soil. The term is applied to both parent material and to other layers unlike the parent material, below the B horizon or the subsoil.

Surface soil. That part of the soil ordinarily moved in tillage, or its equivalent in uncultivated soil; about 5 to 8 inches in thickness. The surface layer.

Terrace. (1). *Agricultural:* An embankment or ridge of earth constructed on the contour or at a slight angle to the contour. The terrace intercepts or retards runoff so that the water will infiltrate into the soil and so that any excess can flow slowly to a prepared outlet without causing erosion.
(2) *Geologic:* An old alluvial plain, generally flat or undulating, that borders a river, lake or sea; frequently called second bottom as contrasted with flood plain; seldom subject to overflow.

Texture, soil. The relative proportions of the various size groups of individual soil grains in a mass of soil. Specifically, it refers to the proportions of sand, silt, and clay in the soil. The basic classes in order of increasing proportions of the fine separates, are *sand, loamy sand, fine sandy loam, loam, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.*

Topsoil. Soil or soil material, presumably fertile, that is ordinarily rich in organic matter and is suitable as a surface for roadbanks, embankments, and ditches.

Upland (geologic). Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace Land above the lowlands along rivers.

GUIDE TO MAPPING UNITS

See table 1, p. 11, for the approximate acreage and proportionate extent of the soils; see table 2, p. 60, for the estimated average acre yields. For facts about woodland, see the section beginning on p. 63, and for facts about wildlife, see the section beginning p. 70. For information significant to engineering, see the section beginning on p. 74. Dashes show that Made land was not placed in a capability unit, because it is not suited to crops]

Map symbol	Soil name	Page	Capability unit		Woodland suitability group		Wildlife suitability group	
			Symbol	Page	Number	Page	Number	Page
AfD2	Allegheny fine sandy loam, 12 to 20 percent slopes, eroded	12	IVe-1	54	3	67	2	73
AgB	Allegheny loam, 2 to 6 percent slopes	10	IIe-1	49	3	67	1	72
AgC2	Allegheny loam, 6 to 12 percent slopes, eroded	12	IIIe-1	51	3	67	1	72
ArA	Armour silt loam, 0 to 2 percent slopes	13	I-3	48	3	67	1	72
ArB	Armour silt loam, 2 to 6 percent slopes	13	IIe-1	49	3	67	1	72
ArC	Armour silt loam, 6 to 12 percent slopes	13	IIIe-1	51	3	67	1	72
AsA	Ashton silt loam, 0 to 2 percent slopes	13	I-3	48	1	67	1	72
AsB	Ashton silt loam, 2 to 6 percent slopes	14	IIe-1	49	3	67	1	72
AsC	Ashton silt loam, 6 to 12 percent slopes	14	IIIe-1	51	3	67	1	72
AsC2	Ashton silt loam, 6 to 12 percent slopes, eroded	14	IIIe-1	51	3	67	1	72
AsD2	Ashton silt loam, 12 to 20 percent slopes, eroded	14	IVe-1	54	3	67	2	73
AvC3	Ashwood very rocky clay, 6 to 12 percent slopes, severely eroded	15	VIs-2	58	13	69	3	73
AvD3	Ashwood very rocky clay, 12 to 20 percent slopes, severely eroded	15	VIIs-2	59	13	69	3	73
AvE3	Ashwood very rocky clay, 20 to 30 percent slopes, severely eroded	15	VIIs-2	59	13	69	3	73
AwC	Ashwood very rocky silty clay loam, 6 to 12 percent slopes	14	VIs-1	57	13	69	3	73
AwD	Ashwood very rocky silty clay loam, 12 to 20 percent slopes	14	VIs-1	57	13	69	3	73
AwE	Ashwood very rocky silty clay loam, 20 to 30 percent slopes	15	VIIs-2	59	13	69	3	73
BaB2	Beasley silt loam, 2 to 6 percent slopes, eroded	15	IIe-2	49	8	68	2	73
BaC2	Beasley silt loam, 6 to 12 percent slopes, eroded	16	IIIe-2	51	8	68	2	73
BfA	Bedford silt loam, 0 to 2 percent slopes	16	IIw-1	50	6	68	2	73
BfB	Bedford silt loam, 2 to 6 percent slopes	16	IIe-6	49	6	68	2	73
BfC	Bedford silt loam, 6 to 12 percent slopes	16	IIIe-8	52	6	68	2	73
BhB	Brashear silt loam, 2 to 6 percent slopes	17	IIe-2	49	4	67	2	73
BhC2	Brashear silt loam, 6 to 12 percent slopes, eroded	17	IIIe-2	51	4	67	2	73
BhD2	Brashear silt loam, 12 to 20 percent slopes, eroded	17	IVe-3	54	4	67	2	73
BoB	Braxton silt loam, 2 to 6 percent slopes	17	IIe-2	49	5	67	1	72
BoC2	Braxton silt loam, 6 to 12 percent slopes, eroded	17	IIIe-2	51	5	67	1	72
Br	Bruno loamy fine sand	18	IIIs-1	54	1	67	2	73
Bu	Burgin silty clay loam	18	IIIw-2	53	2	67	3	73
CaA	Captina silt loam, 0 to 2 percent slopes	18	IIw-1	50	6	68	2	73
CaB	Captina silt loam, 2 to 6 percent slopes	19	IIe-6	49	6	68	2	73
CsC3	Colyer shaly silty clay loam, 6 to 12 percent slopes, severely eroded	19	VIIs-3	59	11	69	3	73
CsD3	Colyer shaly silty clay loam, 12 to 20 percent slopes, severely eroded	19	VIIs-3	59	11	69	3	73
CsE3	Colyer shaly silty clay loam, 20 to 50 percent slopes, severely eroded	20	VIIs-3	59	11	69	3	73
CtC	Colyer silt loam, 6 to 12 percent slopes	19	VIs-3	58	10	69	3	73
CtE	Colyer silt loam, 20 to 50 percent slopes	19	VIIs-1	59	10	69	3	73
CuE2	Culleoka flaggy silt loam, 20 to 30 percent slopes, eroded	21	VIe-1	56	14	70	2	73
CuF2	Culleoka flaggy silt loam, 30 to 50 percent slopes, eroded	21	VIIe-1	58	14	70	3	73
CvB	Culleoka silt loam, 2 to 6 percent slopes	20	IIe-1	49	14	70	1	72
CvC2	Culleoka silt loam, 6 to 12 percent slopes, eroded	20	IIIe-1	51	14	70	1	72
CvD2	Culleoka silt loam, 12 to 20 percent slopes, eroded	20	IVe-1	54	14	70	2	73
CvE2	Culleoka silt loam, 20 to 30 percent slopes, eroded	20	VIe-1	56	14	70	2	73
EcC3	Eden clay, 6 to 12 percent slopes, severely eroded	22	IVe-10	55	13	69	2	73
EcD3	Eden clay, 12 to 20 percent slopes, severley eroded	22	VIe-3	57	13	69	2	73
EcE3	Eden clay, 20 to 30 percent slopes, severely eroded	22	VIe-3	57	13	69	2	73
EfD3	Eden flaggy clay, 12 to 20 percent slopes, severely eroded	22	VIe-3	57	13	69	2	73
EfE3	Eden flaggy clay, 20 to 30 percent slopes, severely eroded	22	VIe-3	57	13	69	2	73
EhC2	Eden silty clay loam, 6 to 12 percent slopes, eroded	21	IIIe-4	51	12	69	2	73
EhD2	Eden silty clay loam, 12 to 20 percent slopes, eroded	21	IVe-4	55	12	69	2	73
EhE2	Eden silty clay loam, 20 to 30 percent slopes, eroded	22	VIe-1	56	12	69	2	73
Em	Egam silt loam	23	I-1	48	1	67	1	72
FaE3	Fairmount flaggy clay, 20 to 30 percent slopes, severely eroded	23	VIIe-2	58	13	69	3	73
FaF3	Fairmount flaggy clay, 30 to 50 percent slopes, severely eroded	23	VIIe-2	58	13	69	3	73
FfE	Fairmount flaggy silty clay loam, 20 to 30 percent slopes	23	VIe-1	56	12	69	3	73
FlC2	Fleming silt loam, 6 to 12 percent slopes, eroded	24	IIIe-2	51	8	68	2	73
FpC	Fleming-Shrouts complex, 6 to 12 percent slopes	24	IVe-6	55	8	68	2	73
FpD	Fleming-Shrouts complex, 12 to 20 percent slopes	24	VIe-8	57	8	68	2	73
FpD3	Fleming-Shrouts complex, 12 to 20 percent slopes, severely eroded	24	VIIs-3	59	13	69	3	73
FpE	Fleming-Shrouts complex, 20 to 30 percent slopes	24	VIIe-2	58	8	68	3	73
FpE3	Fleming-Shrouts complex, 20 to 30 percent slopes, severely eroded	25	VIIs-3	59	13	69	3	73
Gu	Gullied land	25	VIIe-4	59	15	70	3	73
HgA	Hagerstown silt loam, 0 to 2 percent slopes	25	I-3	48	5	67	1	72
HgB	Hagerstown silt loam, 2 to 6 percent slopes	25	IIe-1	49	5	67	1	72
HgC2	Hagerstown silt loam, 6 to 12 percent slopes, eroded	26	IIIe-1	51	5	67	1	72
HmB	Hampshire silt loam, 2 to 6 percent slopes	26	IIe-2	49	4	67	1	72
HmB2	Hampshire silt loam, 2 to 6 percent slopes, eroded	26	IIe-2	49	4	67	1	72
HmC	Hampshire silt loam, 6 to 12 percent slopes	26	IIIe-2	51	4	67	1	72
HmC2	Hampshire silt loam, 6 to 12 percent slopes, eroded	26	IIIe-2	51	4	67	1	72
HmD2	Hampshire silt loam, 12 to 20 percent slopes, eroded	26	IVe-3	54	4	67	2	73
HpC3	Hampshire silty clay loam, 6 to 12 percent slopes, severely eroded	27	IVe-11	56	12	69	2	73

GUIDE TO MAPPING UNITS—Continued

Map symbol	Soil name	Page	Capability unit		Woodland suitability group		Wildlife suitability group	
			Symbol	Page	Number	Page	Number	Page
Hs	Huntington silt loam	27	I–1	48	1	67	1	72
Hu	Huntington silt loam, shallow	27	IIs–5	50	1	67	2	73
La	Lanton and Dunning silty clay loams	28	IIIw–7	54	2	67	3	73
Ld	Lindside silt loam	28	I–2	48	1	67	1	72
LeB	Loradale silt loam, 2 to 6 percent slopes	28	IIe–2	49	5	67	1	72
LeC	Loradale silt loam, 6 to 12 percent slopes	29	IIIe–2	51	5	67	1	72
LeC2	Loradale silt loam, 6 to 12 percent slopes, eroded	29	IIIe–2	51	5	67	1	72
LoB	Lowell silt loam, 2 to 6 percent slopes	29	IIe–2	49	4	67	1	72
LoB2	Lowell silt loam, 2 to 6 percent slopes, eroded	29	IIe–2	49	4	67	1	72
LoC	Lowell silt loam, 6 to 12 percent slopes	29	IIIe–2	51	4	67	1	72
LoC2	Lowell silt loam, 6 to 12 percent slopes, eroded	30	IIIe–2	51	4	67	1	72
LoD2	Lowell silt loam, 12 to 20 percent slopes, eroded	30	IVe–3	54	4	67	2	73
LoE2	Lowell silt loam, 20 to 30 percent slopes, eroded	30	VIe–1	56	4	67	2	73
LsC3	Lowell silty clay, shallow, 6 to 12 percent slopes, severely eroded	30	VIe–4	57	13	69	2	73
LsD3	Lowell silty clay, shallow, 12 to 20 percent slopes, severely eroded	30	VIe–4	57	13	69	2	73
LsE3	Lowell silty clay, shallow, 20 to 30 percent slopes, severely eroded	30	VIIe–1	58	13	69	3	73
LvC3	Lowell silty clay loam, 6 to 12 percent slopes, severely eroded	31	IVe–11	56	12	69	2	73
LvD3	Lowell silty clay loam, 12 to 20 percent slopes, severely eroded	31	VIe–2	56	12	69	2	73
LvE3	Lowell silty clay loam, 20 to 30 percent slopes, severely eroded	31	VIe–2	56	12	69	2	73
LwC2	Lowell silty clay loam, shallow, 6 to 12 percent slopes, eroded	31	IVe–6	55	12	69	2	73
LwD2	Lowell silty clay loam, shallow, 12 to 20 percent slopes, eroded	31	VIe–1	56	12	69	2	73
LwE2	Lowell silty clay loam, shallow, 20 to 30 percent slopes, eroded	31	VIe–1	56	12	69	2	73
Ma	Made land	32			15	70	3	73
MbA	Maury silt loam, 0 to 2 percent slopes	32	I–3	48	5	67	1	72
MbB	Maury silt loam, 2 to 6 percent slopes	32	IIe–1	49	5	67	1	72
MbB2	Maury silt loam, 2 to 6 percent slopes, eroded	32	IIe–1	49	5	67	1	72
MbC	Maury silt loam, 6 to 12 percent slopes	32	IIIe–1	51	5	67	1	72
MbC2	Maury silt loam, 6 to 12 percent slopes, eroded	33	IIIe–1	51	5	67	1	72
McB	McAfee silt loam, 2 to 6 percent slopes	33	IIIe–10	52	4	67	2	73
McC	McAfee silt loam, 6 to 12 percent slopes	33	IVe–6	55	4	67	2	73
MeD3	McAfee silty clay, 12 to 20 percent slopes, severely eroded	33	VIe–4	57	13	69	2	73
MfB2	McAfee silty clay loam, 2 to 6 percent slopes, eroded	33	IIIe–10	52	12	69	2	73
MfC2	McAfee silty clay loam, 6 to 12 percent slopes, eroded	34	IVe–6	55	12	69	2	73
MfD2	McAfee silty clay loam, 12 to 20 percent slopes, eroded	34	VIe–1	56	12	69	2	73
MfE2	McAfee silty clay loam, 20 to 30 percent slopes, eroded	34	VIe–1	56	12	69	2	73
MhD2	McAfee very rocky silty clay loam, 12 to 20 percent slopes, eroded	34	VIs–1	57	12	69	3	73
MhE2	McAfee very rocky silty clay loam, 20 to 30 percent slopes, eroded	34	VIIs–2	59	12	69	3	73
Ml	Melvin silt loam	35	IIIw–5	53	2	67	3	73
MmB	Mercer silt loam, 2 to 6 percent slopes	35	IIe–6	49	6	68	2	73
MmB2	Mercer silt loam, 2 to 6 percent slopes, eroded	35	IIe–6	49	6	68	2	73
MmC	Mercer silt loam, 6 to 12 percent slopes	36	IIIe–8	52	6	68	2	73
MmC2	Mercer silt loam, 6 to 12 percent slopes, eroded	36	IIIe–8	52	6	68	2	73
MoB	Monongahela loam, 2 to 6 percent slopes	36	IIe–7	49	7	68	2	73
MoC2	Monongahela loam, 6 to 12 percent slopes, eroded	36	IIIe–9	52	7	68	2	73
MuC2	Muse silt loam, 6 to 12 percent slopes, eroded	37	IIIe–2	51	9	68	2	73
MuD2	Muse silt loam, 12 to 20 percent slopes, eroded	37	IVe–3	54	9	68	2	73
MuE2	Muse silt loam, 20 to 30 percent slopes, eroded	37	VIe–1	56	9	68	2	73
Ne	Newark silt loam	38	IIw–4	50	2	67	2	73
OsC3	Otway silty clay, 6 to 12 percent slopes, severely eroded	38	VIs–5	58	13	69	3	73
OtC	Otway silty clay loam, 6 to 12 percent slopes	38	IVe–6	55	13	69	2	73
OwE3	Otway soils, 20 to 30 percent slopes, severely eroded	38	VIIs–3	59	13	69	3	73
OwF	Otway soils, 30 to 50 percent slopes	39	VIIs–3	59	13	69	3	73
Rb	Robertsville silt loam	39	IVw–1	56	2	67	3	73
Ro	Rock land	39	VIIs–5	60	13	69	3	73
SaC3	Salvisa clay, 6 to 12 percent slopes, severely eroded	40	VIe–4	57	13	69	2	73
SaD3	Salvisa clay, 12 to 20 percent slopes, severely eroded	40	VIe–4	57	13	69	2	73
SaE3	Salvisa clay, 20 to 30 percent slopes, severely eroded	40	VIIe–1	58	13	69	3	73
ScB2	Salvisa silty clay loam, 2 to 6 percent slopes, eroded	40	IIIe–10	52	12	69	2	73
ScC2	Salvisa silty clay loam, 6 to 12 percent slopes, eroded	40	IVe–6	55	12	69	2	73
ScD2	Salvisa silty clay loam, 12 to 20 percent slopes, eroded	41	VIe–1	56	12	69	2	73
ScE2	Salvisa silty clay loam, 20 to 30 percent slopes, eroded	41	VIe–1	56	12	69	2	73
SeB	Shelbyville silt loam, 2 to 6 percent slopes	41	IIe–1	49	5	67	1	72
SeB2	Shelbyville silt loam, 2 to 6 percent slopes, eroded	41	IIe–1	49	5	67	1	72
SeC	Shelbyville silt loam, 6 to 12 percent slopes	42	IIIe–1	51	5	67	1	72
SeC2	Shelbyville silt loam, 6 to 12 percent slopes, eroded	42	IIIe–1	51	5	67	1	72
Ta	Taft silt loam	42	IIIw–1	53	2	67	2	73
TsB	Tilsit silt loam, 2 to 6 percent slopes	43	IIe–7	49	7	68	2	73
TtB	Trappist silt loam, 2 to 6 percent slopes	43	IIe–1	49	9	68	1	72
TtC2	Trappist silt loam, 6 to 12 percent slopes, eroded	43	IIIe–7	52	9	68	2	73
WoC	Woolper silty clay loam, 6 to 12 percent slopes	44	IIIe–4	51	8	68	2	73

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