Series 1947, No. 7 Issued August 1958

# SOIL SURVEY

# Greene County Tennessee


UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
TENNESSEE AGRICULTURAL EXPERIMENT STATION
TENNESSEE VALLEY AUTHORITY

# *How to Use* THE SOIL SURVEY REPORT

THIS SURVEY of Greene County will help you plan the kind of farming that will protect your soils and provide good yields. It describes the soils; shows their location on a map; and tells what they will do under different kinds of management.

### Find Your Farm on the Map

In using this survey, start with the soil map, which consists of the 78 sheets bound in the back of this report. These sheets, if laid together, make a large photographic map of the county as it looks from an airplane. You can see woods, fields, roads, rivers, and many other landmarks on this map.

To find your farm on the large map, use the index to map sheets. This 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 you have found the map sheet for your farm, you will notice that boundaries of the soils have been outlined in red 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 appear on the map.

Suppose you have found on your farm an area marked with symbol Cb. You learn the name of the soil this symbol represents by looking at the map legend. The symbol Cb identifies Chewacla silt loam.

### Learn About the Soils on Your Farm

Chewacla silt loam and all the other soils mapped are described in the section, Descriptions of Mapping Units. Soil scientists described and mapped the soils as they walked over the fields and through the woodlands; dug holes and examined surface soils and subsoils; measured slopes with a hand level; noted differences in growth of crops, weeds, brush, or trees; and, in fact, recorded all the things about the soils that they believed might affect their suitability for farming.

After they mapped and studied the soils, the scientists judged what use and management each soil should have, and then they placed it in a management group. A management group is a group of similar soils that need and respond to about the same kind of management.

Chewacla silt loam is in management group 1–A. Turn to the section, Use and Management of Soils, and read what is said about soils of group 1–A. You will want to study the table, which tells you how much you can expect to harvest from Chewacla silt loam under two levels of management. In columns A are yields to be expected under the prevailing management, and in columns B are yields to be expected under improved management.

### Make a Farm Plan

For the soils on your farm, compare your yields and farm practices with those given in this report. Look at your fields for signs of runoff and erosion. Then decide whether or not you need to change your methods. The choice, of course, must be yours. This survey will aid you in planning new methods, but it is not a plan of management for your farm or any other farm in the county.

If you find that you need help in farm planning, consult the supervisor of your Soil Conservation District, the local representative of the Soil Conservation Service, or the county agricultural agent. Members of the staff of your State experiment station and others familiar with farming in your county will also be glad to help you.

Fieldwork for this survey was completed in 1947. Unless otherwise specifically mentioned, statements in this report refer to conditions in the county at the time fieldwork was completed.

For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

# Contents

Series 1947, No. 7

Issued August 1958

# SOIL SURVEY OF GREENE COUNTY, TENNESSEE

By MAX J. EDWARDS, Soil Survey[1]; soils surveyed by BEN L. MATZEK, in Charge, FRANKLIN R. AUSTIN, Tennessee Agricultural Experiment Station, and S. R. BACON, A. C. ANDERSON, and ROBERT WILDERMUTH, United States Department of Agriculture.

Correlation by M. J. EDWARDS, Soil Scientist

United States Department of Agriculture in cooperation with Tennessee Agricultural Experiment Station and Tennessee Valley Authority

## *General Nature of the Area*

### Location and Extent

GREENE COUNTY is in the northeastern part of Tennessee (fig. 1). Greeneville, the county seat, is

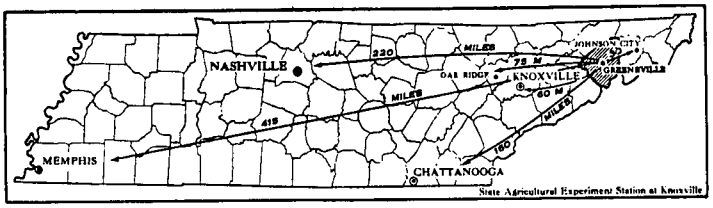



*Figure 1.*—Location of Greene County in Tennessee.

60 miles northeast of Knoxville, 75 miles east of Oak Ridge, and 220 miles east of Nashville. The total area of the county is 399,330 acres, or approximately 624 square miles, of which 3,212 acres is under water. According to the 1950 cenus, the population of the county was 41,048, and the population of Greeneville was 8,721.

About 1778, the first settlements were made along the Nolichucky River and Lick Creek. The county was formed in 1783 from a part of Washington County (*4*)[2]. Most of the early settlers came from North Carolina and Virginia, but there were a few Quakers from Pennsylvania. These pioneers were largely of Scotch, Irish, and English descent, and the present population consists largely of their descendants.

### Physiography

About four-fifths of Greene County is in the Great Valley, and the rest is in the Appalachian upland (fig. 2) (*3*). The Appalachian upland is rugged and mountainous. It is underlain chiefly by quartzite and slate of the pre-Cambrian Age. The crest of the main range is 2,500 to 4,838 feet above sea level and 1,000 to 3,300 feet above the average elevation of the Great Valley.

The part of the county in the Great Valley consists of

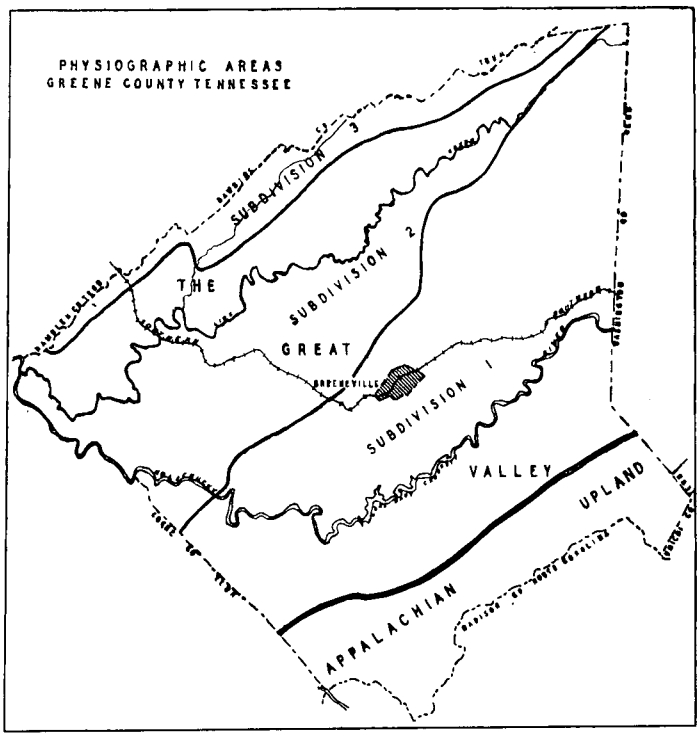



*Figure 2.*—Physiographic areas of Greene County, Tenn. showing the Great Valley and its subdivisions and the Appalachian upland.

parallel ridges and valleys, formed during a long period of geologic erosion that followed the folding and faulting of the underlying rocks. The rocks now exposed, chiefly shale and dolomitic limestone, are of the Cambrian. Ordovician, and Silurian geologic systems (*5*), (*8*), (*9*). Limestone and shale are interbedded in places. Interbedded sandstone and shale and interbedded sandstone, shale, and limestone occur in other places.

The part of the county that is in the Great Valley consists of three subdivisions. The first, next to the Smoky Mountains, is a broad, rolling to hilly ridgeland underlain chiefly by dolomitic limestone. Parts of it have a karst relief, and the part immediately adjacent to the Smoky Mountains is covered by deposits of colluvium or local alluvium. A few narrow, steep, shale ridges also occur. Much of the soil in this subdivision rests on a thick layer of residuum from dolomitic limestone.

[1] Fieldwork for this survey was done while the Division of Soil Survey was a part of the Bureau of Plant Industry, Soils, and Agricultural Engineering. The Division of Soil Survey was transferred to the Soil Conservation Service on November 15, 1952.

[2] Numbers in parentheses refer to Literature Cited, page 78.

The second subdivision, commonly known as the Slate Hills, is a broad area underlain by calcareous shale. It is northwest of the area underlain by dolomitic limestone. Much of this section consists of hilly to steep ridgelands and narrow valley floors; however, some areas of the upland are undulating to rolling. The relief within this belt ranges from 50 to 300 feet, and the predominant soils are shallow.

The third subdivision consists of a steep, rugged ridge known as Bays Mountains. It consists of shales and sandstones interbedded with widely spaced strata of limestone. The ridge is capped in many places by light-gray, massive, acid sandstone. The crest of the ridge is 1,300 to 3,118 feet above sea level and rises as much as 1,200 feet above the adjacent shale belt.

The Nolichucky River is the major stream in the county. The bottom lands along the river are narrow and irregular. In places they are from ⅓ to ½ mile wide; in other places the upland begins almost at the river channel. An irregular belt of high terraces borders the river; some of the terraces are 2 miles from the present stream channel. This old alluvial plain is strongly dissected. The higher parts are 175 feet above the present river channel.

## Drainage

The Nolichucky River and its tributaries form a mature drainage system that reaches practically all of the county. Drainage for some small areas in the section underlain by dolomitic limestone is to sinkholes. The bottom lands are generally imperfectly drained; some small areas in the bottom lands and on low terraces are poorly drained. There are practically no poorly drained areas in the uplands.

## Climate

In the part of the county that is in the Great Valley summers are warm and moderately long, and winters are cool and moderately short. Temperature and precipitation data from records compiled at the United States Weather Bureau Station at Greeneville are given in table 1. In the Appalachian upland, the climate is colder and more humid.

Rainfall is ample during most of the growing season. Normally, the driest weather occurs in August and September. This is favorable for the harvesting of crops that mature late in summer, but it is damaging to pastures and unfavorable for crops seeded in the fall. There is considerable excess moisture during the winter.

The highest temperature that has been recorded by the Weather Bureau at Greeneville is 97° F., and the lowest is —20° F. The ground may freeze to a depth of a few inches during the winter, but it does not stay frozen for long at a time. The alternate freezing and thawing that take place during the winter improve the tilth of fields that are plowed in the fall but damage crops sown in the fall.

The frost-free season is 185 days, on the average. The average date of the last frost in spring is April 17, and of the first in fall, October 19. May 15 is the latest date in spring on which a killing frost has been recorded, and September 30 the earliest date in fall. Late-spring frosts are a hazard to fruit crops. Fall frosts are less likely to damage crops because most crops are harvested before killing frosts occur. Spring fieldwork is ordinarily begun about March 1. Fall seeding of crops may be done as late as October 15.

TABLE 1.—*Normal temperature and precipitation at Greeneville, Greene County, Tenn.*
[Elevation, 1,320 feet]

| Month | Temperature [1] | | | Precipitation [2] | | | |
|---|---|---|---|---|---|---|---|
| | Average | Absolute maximum | Absolute minimum | Average | Driest year (1925) | Wettest year (1886) | Average snowfall |
| | °F. | °F. | °F. | *Inches* | *Inches* | *Inches* | *Inches* |
| December | 39.4 | 69 | − 8 | 3.32 | 0.76 | 3.39 | 3.5 |
| January | 40.2 | 73 | −20 | 3.94 | 3.56 | 2.13 | 4.1 |
| February | 40.8 | 78 | −14 | 3.68 | 2.89 | .79 | 3.8 |
| Winter | 40.1 | 78 | −20 | 10.94 | 7.21 | 6.31 | 11.4 |
| March | 48.6 | 82 | 3 | 4.26 | 1.52 | 6.53 | 1.6 |
| April | 56.8 | 88 | 21 | 3.14 | 3.81 | 6.25 | 1.2 |
| May | 66.2 | 91 | 31 | 3.32 | 1.26 | 7.80 | (3) |
| Spring | 57.2 | 91 | 3 | 10.72 | 6.59 | 20.58 | 2.8 |
| June | 74.2 | 95 | 35 | 3.38 | 2.92 | 12.20 | 0 |
| July | 76.6 | 97 | 51 | 5.17 | 1.06 | 8.12 | 0 |
| August | 75.6 | 97 | 49 | 3.90 | .86 | 2.10 | 0 |
| Summer | 75.4 | 97 | 35 | 12.45 | 4.84 | 22.42 | 0 |
| September | 69.9 | 96 | 28 | 2.78 | 1.22 | 1.30 | 0 |
| October | 58.9 | 90 | 24 | 2.40 | 4.22 | 3.90 | .1 |
| November | 47.0 | 78 | 10 | 2.43 | 1.91 | 4.90 | .9 |
| Fall | 58.6 | 96 | 10 | 7.61 | 7.35 | 10.10 | 1.0 |
| Year | 57.8 | 97 | −20 | 41.72 | 25.99 | 59.41 | 15.2 |

[1] Average temperature based on a 47-year record through 1955; highest temperature on a 23-year record through 1930; lowest temperature on a 26-year record through 1930.

[2] Average precipitation based on a 22-year record through 1955; wettest and driest years based on a 54-year record, in the period 1884–1955; snowfall based on a 30-year record through 1930.

[3] Trace.

## Transportation, Markets, and Industries

A main line of the Southern Railway provides transportation to Washington, D. C., to the northeast, and to Knoxville, Chattanooga, and New Orleans to the southwest. Buslines and trucklines serve the county over the main highway. The part of the county that is in the Great Valley is well supplied with highways.

Greeneville is an important center for marketing and shipping agricultural products. It serves a wide area as a market for burley tobacco. Industries include a radio and television factory, a milk plant, a fertilizer plant, a chair factory, and a hosiery mill. Most of the milk produced in the county is processed at the Greeneville plant.

## Water Supply

Springs are common throughout most of the county, and creeks in many places afford ample water for farm needs. Cisterns are used on a few farms where it is difficult to obtain water from springs or wells. In places, artificial ponds are used to supplement the water supply for livestock.

## *Agriculture*

Greene County is predominantly agricultural. Farms are small to moderate in size, and crops are fairly well diversified. Tobacco is the major cash crop. Livestock and dairy products are increasingly important sources of income. Some truck crops are grown, chiefly for sale to canning factories and for local use. Their value is small, however, compared to that of tobacco. Forest products are important, especially in the mountainous area, and woodlots throughout the valley are an important source of timber and wood for farm use (fig. 3).

*Figure 3.*—**One of the many portable sawmills in use throughout the county.**

## Land Use

According to the 1950 census, 338,353 acres, or 84.7 percent of the area of Greene County is land in farms. Most of the rest is in the Cherokee National Forest. Land in farms is distributed as follows:

| | *Acres* | *Percent* |
|---|---|---|
| Cropland | 211,000 | 62.3 |
| Harvested | 118,036 | 34.8 |
| Pastured | 80,796 | 23.9 |
| Not harvested or pastured | 12,168 | 3.6 |
| Woodland | 64,557 | 19.1 |
| Pastured | 23,512 | 7.0 |
| Not pastured | 41,045 | 12.1 |
| Other land in pasture | 46,968 | 13.9 |
| Wasteland and other farmland not cropped, pastured, or in woods | 15,828 | 4.7 |

## Size and Types of Farms

In 1950 there were 5,978 farms in Greene County. They are classified according to size in acres as follows:

| *Acres:* | *Number of farms* |
|---|---|
| Less than 3 | 132 |
| 3 to 9 | 630 |
| 10 to 29 | 1,664 |
| 30 to 49 | 1,076 |
| 50 to 69 | 851 |
| 70 to 99 | 751 |
| 100 to 139 | 431 |
| 140 to 179 | 206 |
| 180 to 219 | 108 |
| 220 to 259 | 42 |
| 260 to 499 | 76 |
| 500 to 999 | 8 |
| 1,000 and over | 3 |

The farms in Greene County are classified by type as follows:

| | *Number* |
|---|---|
| Field crop | 2,105 |
| Dairy | 800 |
| Poultry | 33 |
| Livestock other than dairy and poultry | 299 |
| General | 810 |
| Miscellaneous and unclassified | 1,931 |

## Farm Tenure

In 1950, 73.6 percent of the farms in Greene County were operated by owners, 26.3 percent by tenants, and 0.1 percent by managers.

The common rental agreement calls for the landlord to furnish the tenant a house, all work animals, and seed, and for the tenant to furnish the labor. Fertilizer costs are divided on the same basis as the crop. The tobacco crop is generally shared equally. Generally the landlord gets two-thirds of the corn, small grain, and hay, and the tenant one-third. Some contracts call for the tenant to furnish labor, work animals, implements, and seed, and to receive two-thirds of the corn, small grain, and hay and three-fourths of the tobacco. A small acreage of land is rented for cash.

## Livestock

The livestock population of the farms in Greene County is shown in table 2. Practically every farm has at least one or two milk cows, and dairying as a source of farm income has become increasingly important in the last few years. Most of the dairy cattle are Jerseys; there are some Guernseys and Holsteins. The herds of beef cattle consist mostly of Herefords and Angus.

TABLE 2.—*Number of livestock on farms in stated years*

| Livestock | 1930 | 1940 | 1950 |
|---|---|---|---|
| Horses | 6,580 | [1] 6,869 | 5,822 |
| Mules | 3,072 | [1] 3,053 | 2,243 |
| Cattle | 28,737 | [1] 27,090 | 48,613 |
| Sheep | 6,262 | [2] 2,748 | 2,245 |
| Goats | 365 | [3] 375 | ([4]) |
| Swine | 12,746 | [3] 13,918 | 16,771 |
| Chickens | [1] 295,765 | [3] 274,653 | [3] 259,492 |
| Other poultry | ([4]) | [3] 7,217 | [5] 1,232 |

[1] Over 3 months old.
[2] Over 6 months old.
[3] Over 4 months old.
[4] None reported.
[5] Only turkeys reported.

Generally beef herds are larger than dairy herds and are kept on the larger farms.

Hogs are not a major source of income but are raised on many farms for home use. Poland China, Duroc-Jersey, and Hampshire are the most common breeds.

Poultry, chiefly chickens, is an important supplementary source of income on many farms, although only 33 farms reported poultry as the major source of income in 1950.

## Crops

The chief crops are corn, wheat, tobacco, and hay. The acreage of the principal crops and the number of fruit trees of bearing age in Greene County for stated years is given in table 3.

TABLE 3.—*Acreage of principal crops and number of fruit trees of bearing age in stated years*

| Crops | 1929 | 1939 | 1949 |
|---|---|---|---|
| | *Acres* | *Acres* | *Acres* |
| Grain harvested: | | | |
| Corn for grain | 41,458 | 45,198 | 31,552 |
| Wheat | 21,742 | 24,691 | 11,814 |
| Oats | 959 | 1,039 | 3,923 |
| Rye | 324 | 655 | 127 |
| Barley | 1,955 | 2,988 | 565 |
| Hay | 38,358 | 44,670 | 61,815 |
| Timothy and clover alone or mixed | 28,856 | 22,053 | 20,504 |
| Lespedeza | (1) | 14,528 | 25,820 |
| Other annual legumes | 2,665 | 1,234 | 658 |
| Alfalfa | 155 | 1,139 | 4,537 |
| Small grains cut for hay | 82 | 757 | 1,454 |
| Other hay crops | 6,600 | 4,959 | 8,842 |
| Silage and forage | 756 | 764 | 676 |
| Tobacco | 7,632 | 8,377 | 7,286 |
| Potatoes | 640 | 482 | 111 |
| Sweetpotatoes | 213 | 247 | 29 |
| All other vegetables harvested for sale | 106 | 87 | 189 |
| | *Number* | *Number* | *Number* |
| Apple trees | 74,392 | 58,518 | 34,177 |
| Peach trees | 34,867 | 37,246 | 10,691 |

[1] Not reported.

Corn is grown on practically all farms; in the hilly sections of the county much of it is grown on soils not well suited to it. Average yields have increased, especially in recent years, probably because of heavy fertilization and increased use of hybrids. Much of the corn is grown on bottom lands and local alluvial areas. Most of it is raised for livestock feed, but some is milled for household use.

Wheat is the most important small grain, but its total acreage has decreased in recent years. All of it is seeded in the fall, and most of it is fertilized. Between 300 and 500 pounds of fertilizer is applied per acre. A topdressing of nitrate fertilizer is used on from 15 to 20 percent of the wheat acreage. Most of the wheat is shipped to outside markets. In Greene County it ranks second to tobacco as a cash crop.

Oats, barley, rye, and buckwheat are less important grain crops. Some of the acreage of these crops and of wheat is used for pasture. Most of the harvested grain is used for feed.

Burley tobacco is the big cash crop. It is grown on most farms, generally on the best soils (fig. 4). It

*Figure 4.*—**Research on culture of tobacco and improvement of varieties is conducted at the Tobacco Experiment Station of the University of Tennessee. The station, near Greeneville, is chiefly on rolling and hilly Dunmore, Cumberland, and Nolichucky soils.**

requires much labor, but cash value per acre is much greater than that of the other crops commonly grown. Average acre yields have increased in recent years, chiefly because improved varieties have been planted and better methods of cultivation introduced. Most of the crop is auctioned in Greeneville, but some of it is marketed outside the county at Morristown and Johnson City.

Lespedeza, timothy, and clover are the principal hay crops. The acreage in alfalfa has increased substantially in recent years, but this crop is suitable only for the better drained and more fertile soils. Alfalfa requires a carefully prepared seedbed and substantial amounts of fertilizer, but it is probably the most valuable hay crop. Red clover and lespedeza are commonly seeded with small grains. Practically all of the hay is used on the farm where it is grown to feed beef or dairy cattle.

A large acreage in Greene County is used for pasture. Much of this is permanent pasture (fig. 5); some

*Figure 5.*—**High-quality permanent pasture of legumes and grasses on Dunmore soils.**

is rotation pasture. The permanent pastures are mostly on the steep and hilly soils. The plants most common in permanent pastures are bluegrass, orchardgrass,

whiteclover, lespedeza, and redtop. Much of the pasture acreage is unimproved, but in recent years more attention has been given to improving pastures by liming and fertilizing and planting winter pasture crops.

## Cultivation Methods

Cultivation methods vary considerably within the county depending on the kind of soil, the lay of the land, and the size of farms. Modern machinery is commonly used on farms that have large acreages of level or nearly level cropland. In general, light horse-drawn implements are used (fig. 6) on farms in the more

*Figure 6.*—**Light one-horse implements are used on hilly Dandridge soils. Narrow cultivated strip along creek is Whitesburg silt loam.**

hilly sections, especially on those that have little cropland. Small grains are generally harvested by grain binders, but small combines are used on farms having large acreages of grain. Much of the corn is harvested by hand.

Practically all small grains are sown in the fall and harvested in June or July. Grasses and legumes may be sown either in fall or in spring. Most of the corn is planted in April and May. Tobacco is seeded in beds early in spring, transplanted by hand to the fields late in May or early in June, and harvested in the latter part of August and early in September.

Many kinds of crops are grown, and rotations vary. The most common rotation consists of corn or tobacco, a small grain, and hay or pasture. Short rotations are suitable for areas that are level or nearly level. On the hilly areas, rotations should be 5 to 7 years long, but shorter ones are used in many places. On the bottom lands, the same crop may be grown for several years in succession.

Mixed fertilizer is commonly applied to small grains and corn at a rate of between 300 and 500 pounds an acre. Small grains may be topdressed with nitrate fertilizer. To establish a stand of alfalfa, farmers use moderately heavy applications of mixed fertilizer and lime. Tobacco is commonly fertilized at the rate of 1,200 pounds of mixed fertilizer to the acre; in addition, barnyard manure is applied. Lime and phosphorus or, on some farms, a complete fertilizer are used on pastures.

## Farm Power and Other Equipment

Tractors and trucks have replaced work animals as the major source of farm power in Greene County

*Figure 7.*—**Tractors and heavy field implements are used extensively on soils such as Dunmore silty clay loam, eroded rolling phase. Steep wooded area consists of Litz silt loam, steep phase.**

(fig. 7), though horses and mules are still used in the hilly sections. In 1950, there were 1,960 tractors and 1,538 trucks on farms in the county.

In 1950, 3,110 farms had electricity and 357 had telephones.

## *Soil Survey Methods and Definitions*

The scientist who makes a soil survey examines soils in the field, classifies the soils in accordance with facts that he observes, and maps their boundaries on an aerial photograph or other map.

FIELD STUDY.—The soil surveyor bores or digs many holes to see what the soils are like. The holes are not spaced in a regular pattern, but are located according to the lay of the land. Usually they are not more than a quarter of a mile apart, and sometimes they are much closer. In most soils such a boring or hole reveals several distinct layers, called horizons, which collectively are known as the soil profile. Each layer is studied to see how it differs from others in the profile and to learn the things about this soil that influence its capacity to support plant growth.

*Color* is usually related to the amount of organic matter. The darker the surface soil, as a rule, the more organic matter it contains. Streaks and spots of gray, yellow, and brown in the lower layers generally indicate poor drainage and poor aeration.

*Texture*, or the content of sand, silt, and clay, is determined by the way the soil feels when rubbed between the fingers, and is later checked by laboratory analysis. Texture determines how well the soil retains moisture, plant nutrients, and fertilizer, and whether it is easy or difficult to cultivate.

*Structure,* which is the way the individual soil particles are arranged in larger grains and the amount of pore space between grains, gives us clues to the ease or difficulty with which the soil is penetrated by plant roots and by moisture.

*Consistence,* or the tendency of the soil to crumble or to stick together, indicates whether it is easy or difficult to keep the soil open and porous under cultivation.

*Other characteristics* observed in the course of the field study and considered in classifying the soil include the following: The depth of the soil over bedrock or compact layers; the presence of gravel or stones in amounts that will interfere with cultivation; the steepness and pattern of slopes; the degree of erosion; the nature of the underlying rocks or other parent material from which the soil has developed; and acidity or alkalinity of the soil as measured by chemical tests.

CLASSIFICATION.—On the basis of the characteristics observed by the survey team or determined by laboratory tests, soils are classified into phases, types, and series. The soil type is the basic classification unit. A soil type may consist of several phases. Types that resemble each other in most of their characteristics are grouped into soil series.

*Soil type.*—Soils similar in kind, thickness, and arrangement of soil layers are classified as one soil type.

*Soil phase.*—Because of differences other than those of kind, thickness, and arrangement of layers, some soil types are divided into two or more phases. Slope variations, frequency of rock outcrops, degree of erosion, depth of soil over the substratum, or natural drainage, are examples of characteristics that suggest dividing a soil type into phases.

The soil phase (or the soil type if it has not been subdivided) is the unit shown on the soil map. It is the unit that has the narrowest range of characteristics. Use and management practices, therefore, can be specified more easily than for soil series or yet broader groups that contain more variation.

*Soil series.*—Two or more soil types that differ in surface texture but are otherwise similar in kind, thickness, and arrangement of soil layers, are normally designated as a soil series. In a given area, however, it frequently happens that a soil series is represented by only one soil type. Each series is named for a place near which the soil was first mapped.

As an example of soil classification, consider the Dandridge series of Greene County. This series is made up of two soil types, which are subdivided into phases as follows:

| *Series* | *Type* | *Phase* |
|---|---|---|
| Dandridge | Silt loam | Hilly. |
| | | Rolling. |
| | | Steep. |
| | | Very steep. |
| | Shaly silt loam | Eroded hilly. |
| | | Eroded rolling. |
| | | Eroded steep. |

The complete name for a mapping unit is derived by combining words in the three columns; for example, Dandridge silt loam, hilly phase.

*Miscellaneous land types.*—Fresh stream deposits or rough, stony, and severely gullied land that has little true soil are not classified into types and series but are identified by descriptive names, such as Gullied land or Stony land.

*Soil complex.*—When two or more soils are so intricately associated in small areas that it is not feasible to show them separately on the soil map, they are mapped together and called a soil complex. This is the case with the Teas and Litz stony loams of Greene County.

## *The Soils of Greene County*

### General Nature

The soils of Greene County vary widely in color, texture, fertility, acidity, and other characteristics that affect their suitability for agriculture.

Colors range from gray through yellow, brown, and red. Grayish browns and brownish grays predominate in the surface soils, and reds and yellows in the subsoils. In texture and consistence the soils range from loose noncoherent sand to extremely firm clay. The surface soils, for the most part, are silt loams or silty clay loams; some are loams or fine sandy loams, and some contain chert or shale.

Relief ranges from nearly level to very steep (fig. 8).

***Figure 8.*—Hilly and steep Dandridge soils, which dominate the Dandridge-Whitesburg soil association, in background; less sloping Dunmore soils in foreground.**

About 9 percent of the county is nearly level, about 13 percent is undulating or gently sloping, 28 percent is rolling or sloping, 22 percent is hilly or strongly sloping, 14 percent is steeply sloping, and 14 percent is very steeply sloping.

About 38 percent of the total acreage of the county is moderately well drained to well drained. The only areas that are very poorly drained are depressions or sinkholes and a few spots on the low terraces and bottom lands; these areas total about 1.5 percent of the county. About 14 percent is imperfectly drained, and 46.5 percent is excessively drained.

Many of the soils are stony; some contain so many stones that they are unsuitable for either crops or pasture. About 51 percent of the total acreage of the county is practically free of stones, 35 percent is stony enough so that tillage is difficult, and 14 percent is so stony that tillage is impractical. The stone-free areas

are mostly in the uplands that are underlain by limestone and on the terraces and bottom lands.

The soils on the uplands and high terraces, especially the nearly level soils, have been severely leached; consequently, they are acid, contain little organic matter, and are low in fertility. Many of the soils on the low terraces, bottom lands, and local alluvial areas are moderately high in fertility and moderately well supplied with organic matter and lime. The soils on steep slopes are generally not high in fertility, and many have been leached of lime and organic matter.

Many cultivated areas, except local alluvium and soils on bottom lands, are appreciably eroded. About 41 percent of the acreage of the county is eroded to the extent that the plow layer is partly subsoil; about 9 percent is more severely eroded and has lost practically all the surface soil; and 1 percent is so badly eroded and gullied that reclamation would be impractical. Of the 49 percent of the area that is not eroded, about one-third consists of the bottom lands and depressions that are not subject to erosion, and the rest is under native forest.

The soils differ in suitability for agriculture. About 51.5 percent of the acreage is suitable for crops, 30 percent is suited to pasture but not to crops, and the remaining 18.5 percent is poor for either crops or pasture.

## Soil Series and Their Relations

In table 4 the names of the soil series are arranged to show which soils occur in the same kind of topographic position (uplands, terraces, colluvial lands, or bottom lands), which soils have developed from the same kind of parent material, and what conditions of drainage have affected the development of each series.

Table 5 shows the classification of the soil series into great soil groups and describes the degree of horizon differentiation in each series. Additional information on the development and classification of soils in this general area is in the soil survey report for Cocke County, Tenn., and in the Yearbook of Agriculture for 1938.

### *Soils on uplands*

Soils on the uplands have developed from materials weathered from the underlying parent rock. In general, though not always, they are higher than the associated soils of the terraces, local alluvium and colluvium, and bottom lands.

The Decatur, Dewey, Dunmore, Groseclose, and Bolton soils have developed from limestone and are moderately deep to deep over bedrock. All of these soils are well drained and have firm to very firm silty clay subsoils. Slopes are predominantly rolling to hilly, but some small areas are on undulating slopes and others are on steep slopes. The Decatur, Dewey, and Bolton soils are the most productive, and the Groseclose are the least fertile.

The Dandridge, Needmore, Armuchee, Litz, and Teas soils were derived chiefly from shaly material. They are shallow to bedrock and are not high in fertility. The Needmore soils are undulating to rolling, and the Dandridge, Armuchee, Litz, and Teas soils are predominantly hilly to steep.

The Ramsey soils are shallow and range from hilly to very steep. They were derived from material weathered from quartzite, slate, and other acid metamorphic rocks.

### *Soils on stream terraces*

Stream terraces are benches of general alluvium that were once bottom lands or flood plains but are now at too high an elevation to be flooded. The soils on the terraces have developed from parent material that has been transported by water or by water and gravity. Most of the material that is transported by water is mixed general alluvium. In general, well-drained soils that consist of this material are more friable than the soils of the uplands from which the alluvium was washed.

The Cumberland, Elk, and Tupelo soils consist of mixed materials; their fine texture indicates that most of the materials were derived from limestone. The Cumberland soils are more fertile than the Elk and Tupelo. The Tupelo soils have a plastic clayey subsoil.

The Waynesboro, Nolichucky, Sequatchie, Holston, Monongahela, and Tyler soils consist of mixed alluvium derived chiefly from shaly and sandy rock. The Waynesboro and Nolichucky soils generally occupy the highest terraces; the Monongahela and Tyler soils occupy nearly level flats or depressions, and the Sequatchie soils are on low terraces.

The Masada, Altavista, Roanoke, and State soils consist chiefly of material derived from granite, gneiss, and schist.

### *Soils on local alluvium and colluvium*

Local alluvium is material that has been carried a short distance from its source by water; colluvium is material that has been moved principally by the force of gravity. Consequently, alluvium occurs along drainageways and on alluvial fans, and colluvium accumulates at the bases of steep slopes.

The Hermitage and Pace soils are on old local alluvium and colluvium. They have some of the characteristics of the soils of the terraces.

The Emory, Greendale, and Ooltewah consist of more recent deposits of local alluvium and colluvium. The Emory soil generally is associated with Hermitage soils in strips along drainageways within areas of Decatur, Dewey, and Bolton soils. The Greendale soil occurs along drainageways in areas of Dunmore and Groseclose soils, and the Ooltewah occurs mostly in sinkholes in limestone.

The Camp soil is associated with the Teas soils of the uplands. The Leadvale, Whitesburg, and Hollywood soils are associated with Dandridge soils. The Leadvale soils occur on old local alluvium and colluvium, the Whitesburg on more recent alluvium along drainageways, and the Hollywood soil on areas of local alluvium associated with the Whitesburg soil and with the Hamblen soils of the bottom lands.

TABLE 4.—*Soil series grouped by topographic position, parent material, and drainage*

| Parent material | Excessively drained (Indistinct profile due to rapid geological erosion; runoff rapid to very rapid; internal drainage slow to very rapid) | Well drained (Brown or red to yellowish-brown soils; generally free of mottling to depth of about 30 inches) | Imperfectly drained (Pale-yellow soils and grayish-brown alluvial soils; mottled below depths of 15 to 20 inches) | Poorly drained (Gray soils; mottled below plow depth) |
|---|---|---|---|---|
| **Soils on Uplands** | | | | |
| High-grade limestone | | Decatur[1] | | |
| Fairly high grade limestone | | Dewey[2] | | |
| Dolomitic limestone (slightly argillaceous) | | Dunmore[3] | | |
| Shaly dolomitic limestone | | Groseclose[3] | | |
| Dolomitic limestone with lenses of sandstone | | Bolton | | |
| Interbedded limestone and shale | Armuchee[4] | | | |
| Calcareous shale | Dandridge[4] | Needmore[3] | | |
| Gray calcareous shale and sandstone containing lenses of limestone; acid shale that contains lenses of limestone. | Litz[4] | | | |
| Reddish shale and sandstone that contain thin lenses of limestone. | Teas[4] | | | |
| Quartzite, sandstone, slate, and shale | Ramsey | | | |
| **Soils on Stream Terraces** | | | | |
| Chiefly limestone | | Cumberland[5], Elk[6] | Tupelo[3 7] | |
| Chiefly sandstone and shale; influenced by limestone | | Nolichucky[8] | | |
| Chiefly sandstone and shale but some limestone | | Waynesboro, Holston[9] | Monongahela[3] | Tyler[10]. |
| Sandstone, quartzite, shale, and some limestone (low terraces). | | Sequatchie[4] | | |
| Granite, gneiss, schist, and other rocks | | Masada | Altavista[3] | Roanoke[10]. |
| Granite, gneiss, schist, and other rocks (low terraces) | | State | | |
| **Soils on Local Alluvium and Colluvium** | | | | |
| Old local alluvium or colluvium from— | | | | |
| Chiefly high-grade limestone | | Hermitage | | |
| Cherty limestone | | Pace[3] | | |
| Chiefly sandstone, quartzite, and shale; influenced by limestone. | | Allen[11] | | |
| Chiefly sandstone, quartzite, and shale | | Jefferson[12] | | |
| Old local alluvium from— | | | | |
| Chiefly gray shale | | | Leadvale[3] | |
| Calcareous shale, but limestone in places | | | Hollywood | |
| Moderately old local alluvium, chiefly from sandstone, quartzite, and shale, influenced by limestone. | | Hayter[13] | | |
| Young local alluvium from— | | | | |
| Chiefly reddish shale with some calcareous material | | Camp[14] | | |
| Chiefly high-grade limestone | | Emory[14] | | |
| Cherty limestone | | Greendale[14 15] | | |
| Calcareous shale | | | Whitesburg[14 16] | |
| Chiefly quartzite, sandstone, slate, and shale | | Barbourville[14] | | |
| Young local alluvium in sinkholes, chiefly from limestone | | | Ooltewah[14] | |
| **Soils on Bottom Lands** | | | | |
| Chiefly limestone | | | Lindside, Weaver[17] | Melvin[10]. |
| Calcareous shale, acid shale, sandstone, and limestone | | Staser[4] | Hamblen | Prader. |
| Chiefly granite, gneiss, and schist | Buncombe | Congaree[4] | Chewacla | |

[1] Dark red.
[2] Red.
[3] Ranges from well drained to imperfectly drained.
[4] Ranges from excessively drained to well drained.
[5] Firm; reddish in color.
[6] Firm; yellowish in color.
[7] Very firm.
[8] Reddish subsoil.
[9] Yellowish subsoil.
[10] Ranges from imperfectly drained to poorly drained.
[11] Reddish in color.
[12] Yellowish in color.
[13] Brownish in color.
[14] These soils do not have distinct profiles, because their parent materials have been in place only a short time.
[15] Ranges from excessively drained to imperfectly drained.
[16] Ranges from well drained to poorly drained.
[17] Marly subsoil.

TABLE 5.—*Soil series classified by soil orders and great soil groups, and factors that have contributed to differences in soil morphology*[1]

| Great soil group and series[2] | Relief | Parent material | Degree of horizon differentiation |
|---|---|---|---|
| **ZONAL SOILS** | | | |
| Red-Yellow Podzolic soils: | | | |
| Allen | Undulating to steep | Old local alluvium derived from sandy rock but some limestone. | Great. |
| Altavista | Undulating to rolling | Old general alluvium derived chiefly from granite, gneiss, and schist. | Very great. |
| Bolton[3] | Rolling to steep | Residuum from limestone that contains lenses of sand. | Great. |
| Cumberland[3] | Undulating to hilly | Old general alluvium derived chiefly from limestone, shale and sandy rock. | Great. |
| Decatur[3] | Rolling to hilly | Residuum from high-grade limestone | Great. |
| Dewey | Rolling to steep | Residuum from fairly high-grade limestone | Great. |
| Dunmore | Rolling to steep | Residuum from slightly clayey limestone | Very great. |
| Groseclose | Rolling to steep | Residuum from shaly limestone | Very great. |
| Hermitage | Undulating to rolling | Old local alluvium derived chiefly from high-grade limestone. | Great. |
| Holston | Undulating to rolling | Old general alluvium derived chiefly from sandy rock, shale, and limestone. | Very great. |
| Jefferson | Undulating to hilly | Old local alluvium derived chiefly from sandy rock. | Very great. |
| Masada | Undulating to rolling | Old general alluvium derived chiefly from granite, gneiss, and schist. | Great. |
| Needmore | Undulating to rolling | Residuum from calcareous shale | Very great. |
| Nolichucky | Undulating to hilly | Old general alluvium derived chiefly from sandy rock, shale, and limestone. | Very great. |
| Pace | Undulating to rolling | Old local alluvium derived chiefly from cherty limestone. | Very great. |
| Waynesboro | Undulating to hilly | Old general alluvium derived chiefly from sandy rock, shale, and limestone. | Great. |
| Gray-Brown Podzolic soils: | | | |
| Elk | Undulating to rolling | Moderately old general alluvium derived from limestone. | Medium. |
| Hayter | Undulating to hilly | Moderately old local alluvium derived from sandstone, shale and limestone. | Medium. |
| Sequatchie | Undulating | Old general alluvium derived chiefly from sandy rock, shale and limestone. | Medium. |
| State | Undulating to rolling | Moderately old general alluvium derived from granite, gneiss and schist. | Medium. |
| **INTRAZONAL SOILS** | | | |
| Planozols and Planosolic Red-Yellow Podzolic soils: | | | |
| Leadvale | Undulating to rolling | Old local alluvium derived chiefly from shale. | Great. |
| Monongahela | Nearly level to rolling | Old general alluvium derived chiefly from shale, limestone and some sandy rock. | Very great. |
| Tupelo | Undulating to rolling | Old general alluvium derived chiefly from limestone but some shale. | Medium. |
| Low-Humic Gley soils: | | | |
| Roanoke | Nearly level | Old general alluvium derived chiefly from granite, gneiss and schist. | Very great. |
| Tyler | Nearly level | Old general alluvium derived chiefly from shale, limestone, and some sandy rock. | Very great. |
| Rendzina soils: | | | |
| Hollywood | Nearly level to gently sloping | Old local alluvium derived chiefly from shale, but limestone in places. | Little. |
| **AZONAL SOILS** | | | |
| Lithosols: | | | |
| Armuchee | Rolling to very steep | Residuum from interbedded limestone and shale. | Little. |
| Dandridge | Rolling to very steep | Residuum from calcareous shale | Little. |
| Litz | Rolling to very steep | Residuum from grayish shale that contains thin lenses of limestone. | Little. |
| Ramsey | Hilly to very steep | Residuum from quartzite and other sandy rock. | Little. |
| Teas | Hilly to very steep | Residuum from reddish shale, some calcareous shale. | Little. |

TABLE 5.—*Soil series classified by soil orders and great soil groups, and factors that have contributed to differences in soil morphology*[1]—Continued

AZONAL SOILS—*Continued*

| Great soil group and series[2] | Relief | Parent material | Degree of horizon differentiation |
|---|---|---|---|
| Alluvial soils: | | | |
| Barbourville | Gently sloping | Young local alluvium derived chiefly from quartzite, sandstone, slate, and shale. | Very little. |
| Buncombe | Gently undulating | Young general alluvium derived chiefly from granite, gneiss, and schist. | Very little. |
| Camp | Gently sloping | Young local alluvium derived chiefly from reddish shale; some calcareous shale. | Medium to little. |
| Chewacla | Nearly level | Young general alluvium derived chiefly from granite, gneiss, and schist. | Little. |
| Congaree | Nearly level | Young general alluvium derived chiefly from granite, gneiss, and schist. | Very little. |
| Emory | Gently sloping | Young local alluvium derived chiefly from high-grade limestone. | Little to very little. |
| Greendale | Gently sloping | Young local alluvium derived chiefly from cherty limestone. | Very little. |
| Hamblen | Nearly level | Young general alluvium derived chiefly from calcareous shale, acid shale, sandstone, and limestone. | Little. |
| Lindside | Nearly level | Young general alluvium derived chiefly from limestone. | Little. |
| Melvin | Nearly level | Young general aluvium derived chiefly from limestone. | Little. |
| Ooltewah | Nearly level (in sinkholes) | Young local alluvium derived chiefly from limestone. | Little to very little. |
| Prader | Nearly level | Young general alluvium derived chiefly from calcareous shale, acid shale, sandstone, and limestone. | Little. |
| Staser | Nearly level | Young general alluvium derived chiefly from calcareous shale, acid shale, sandstone, and limestone. | Very little. |
| Weaver | Nearly level | Young general alluvium derived chiefly from limestone. | Little. |
| Whitesburg | Gently sloping | Young local alluvium derived chiefly from calcareous shale. | Little to very little. |

[1] Climate and vegetation are relatively uniform and do not account for broad differences in the soils.

[2] Classification of soils is discussed in the Soil Survey Report of Cocke County, Tenn., and in the 1938 Yearbook of Agriculture.

[3] These soils are similar in structure to the Reddish-Brown Lateritic soils, to which further investigation may indicate they belong.

The Allen and Jefferson soils occur on sandy, well-drained, old local alluvium and colluvium. The Allen soils are more fertile than the Jefferson. The Hayter soils have developed from deposits of more recent origin, and the Barbourville soil consists of young local alluvium.

### *Soils on bottom lands*

Soils of the bottom lands consist of young general alluvium that has accumulated on the flood plains along the larger streams. In general, such soils are more fertile than the older soils of the uplands, terraces, and areas of old local alluvium. All of these soils are nearly level to gently undulating.

## Descriptions of mapping units

In the following pages the soil types and phases and the miscellaneous land types mapped in Greene County are described in detail. The acreage and proportionate extent of the mapping units are shown in table 6, and the location and distribution of each are shown on the soil map in the back part of this report.

**Allen loam, eroded rolling phase** (5 to 15 percent slopes) (Ab).—This well-drained red soil occurs on older colluvial and local alluvial slopes. It consists of material derived from sandy rock, chiefly quartzite and slate. Practically all of it is in the Jefferson–Allen–Hayter soil association. It is associated with hilly soils of its own series and with rolling and hilly Jefferson soils. This soil differs from the Jefferson soils in that it has a browner surface soil and a red instead of a yellow subsoil. It is eroded to the extent that the plow layer consists of a mixture of surface soil and subsoil.

Profile description:

0 to 6 inches, reddish-brown or yellowish-brown loam.
6 to 15 inches, strong-brown friable sandy clay loam.
15 to 36 inches, yellowish-red to red firm sandy clay.
36 inches+, red firm sandy clay splotched with yellow; shale or limestone bedrock at depths of 2½ to 10 feet.

Included with this soil are small areas that are on slopes of less than 5 percent. Also included is a small acreage that is not appreciably eroded and that has an 8- to 10-inch surface layer of brown loam. Some areas

TABLE 6.—*Approximate acreage and proportionate extent of the soils*[1]

| Soils | Acres | Percent |
|---|---|---|
| Allen loam: | | |
| Eroded rolling phase | 1,084 | 0.3 |
| Eroded hilly phase | 484 | .1 |
| Allen stony loam: | | |
| Rolling phase | 172 | (2) |
| Eroded hilly phase | 516 | .1 |
| Steep phase | 248 | .1 |
| Altavista loam: | | |
| Undulating phase | 847 | .2 |
| Eroded rolling phase | 194 | (2) |
| Armuchee silt loam, hilly phase | 109 | (2) |
| Armuchee silty clay loam, eroded hilly phase | 411 | .1 |
| Armuchee silt loam, steep phase | 157 | (2) |
| Armuchee silty clay loam, eroded steep phase | 284 | .1 |
| Armuchee silt loam, very steep phase | 1,119 | .3 |
| Armuchee silty clay loam, eroded rolling phase | 503 | .1 |
| Barbourville fine sandy loam | 545 | .1 |
| Bolton loam: | | |
| Eroded hilly phase | 241 | .1 |
| Eroded rolling phase | 232 | .1 |
| Eroded steep phase | 287 | .1 |
| Buncombe loamy fine sand | 623 | .2 |
| Camp loam | 200 | .1 |
| Chewacla silt loam | 442 | .1 |
| Cobbly alluvium, Hamblen soil material | 1,476 | .4 |
| Congaree loam | 761 | .2 |
| Congaree fine sandy loam | 788 | .2 |
| Cumberland silt loam, undulating phase | 756 | .2 |
| Cumberland silty clay loam: | | |
| Eroded rolling phase | 1,348 | .3 |
| Eroded hilly phase | 194 | (2) |
| Dandridge silt loam, hilly phase | 1,761 | .4 |
| Dandridge shaly silt loam, eroded hilly phase | 18,220 | 4.6 |
| Dandridge silt loam, rolling phase | 2,311 | .6 |
| Dandridge shaly silt loam, eroded rolling phase | 18,236 | 4.6 |
| Dandridge silt loam, steep phase | 4,514 | 1.1 |
| Dandridge shaly silt loam, eroded steep phase | 21,376 | 5.4 |
| Dandridge silt loam, very steep phase | 7,654 | 2.0 |
| Decatur silty clay loam: | | |
| Eroded rolling phase | 147 | (2) |
| Eroded hilly phase | 87 | (2) |
| Decatur silty clay, severely eroded hilly phase | 97 | (2) |
| Dewey silty clay loam, eroded rolling phase | 1,360 | .3 |
| Dewey silty clay, severely eroded rolling phase | 90 | (2) |
| Dewey silty clay loam, eroded hilly phase | 981 | .2 |
| Dewey silty clay, severely eroded hilly phase | 593 | .1 |
| Dewey silty clay loam, eroded steep phase | 239 | .1 |
| Dunmore silt loam, rolling phase | 940 | .2 |
| Dunmore silty clay loam, eroded rolling phase | 21,384 | 5.4 |
| Dunmore silty clay, severely eroded rolling phase | 628 | .2 |
| Dunmore silt loam, hilly phase | 831 | .2 |
| Dunmore silty clay loam, eroded hilly phase | 10,806 | 2.7 |
| Dunmore silty clay, severely eroded hilly phase | 5,659 | 1.4 |
| Dunmore silt loam, steep phase | 151 | (2) |
| Dunmore silty clay loam, eroded steep phase | 501 | .1 |
| Dunmore silty clay, severely eroded steep phase | 455 | .1 |
| Dunmore cherty silt loam, rolling phase | 2,523 | .6 |
| Dunmore cherty silty clay loam, eroded rolling phase | 13,330 | 3.3 |
| Dunmore cherty silty clay, severely eroded rolling phase | 183 | (2) |
| Dunmore cherty silt loam, hilly phase | 3,359 | .8 |
| Dunmore cherty silty clay loam, eroded hilly phase | 13,541 | 3.4 |
| Dunmore cherty silty clay, severely eroded hilly phase | 2,679 | .7 |
| Dunmore cherty silt loam, steep phase | 1,373 | .3 |
| Dunmore cherty silty clay loam, eroded steep phase | 1,824 | .5 |
| Dunmore cherty silty clay, severely eroded steep phase | 673 | .2 |
| Dunmore loam: | | |
| Rolling phase | 351 | 0.1 |
| Eroded rolling phase | 3,745 | .9 |
| Hilly phase | 242 | .1 |
| Eroded hilly phase | 2,075 | .5 |
| Steep phase | 139 | (2) |
| Eroded steep phase | 200 | .1 |
| Dunmore stony loam: | | |
| Rolling phase | 260 | .1 |
| Eroded rolling phase | 805 | .2 |
| Hilly phase | 496 | .1 |
| Eroded hilly phase | 1,774 | .4 |
| Steep phase | 848 | .2 |
| Eroded steep phase | 1,162 | .3 |
| Elk and Tupelo silt loams: | | |
| Undulating phase | 459 | .1 |
| Eroded rolling phase | 417 | .1 |
| Emory silt loam | 1,374 | .3 |
| Greendale silt loam | 9,953 | 2.5 |
| Groseclose silt loam, rolling phase | 109 | (2) |
| Groseclose silty clay loam: | | |
| Eroded rolling phase | 1,258 | .3 |
| Eroded hilly phase | 770 | .2 |
| Groseclose silty clay, severely eroded hilly phase | 109 | (2) |
| Groseclose cherty silt loam: | | |
| Rolling phase | 502 | .1 |
| Eroded rolling phase | 1,210 | .3 |
| Hilly phase | 417 | .1 |
| Eroded hilly phase | 980 | .2 |
| Eroded steep phase | 339 | .1 |
| Gullied land, limestone material | 1,275 | .3 |
| Gullied land, shale material | 1,597 | .4 |
| Hamblen silt loam | 12,736 | 3.2 |
| Hamblen fine sandy loam | 2,041 | .5 |
| Hayter loam: | | |
| Undulating phase | 787 | .2 |
| Eroded rolling phase | 347 | .1 |
| Hayter stony loam: | | |
| Undulating phase | 569 | .1 |
| Eroded hilly phase | 188 | .1 |
| Hermitage silt loam: | | |
| Undulating phase | 335 | .1 |
| Eroded rolling phase | 914 | .2 |
| Hollywood silty clay loam | 86 | (2) |
| Holston loam: | | |
| Undulating phase | 346 | .1 |
| Eroded rolling phase | 231 | .1 |
| Jefferson loam: | | |
| Undulating phase | 1,936 | .5 |
| Rolling phase | 1,134 | .3 |
| Eroded rolling phase | 3,610 | .9 |
| Eroded hilly phase | 206 | .1 |
| Jefferson stony loam: | | |
| Undulating phase | 1,331 | .3 |
| Rolling phase | 2,158 | .5 |
| Eroded rolling phase | 1,918 | .5 |
| Hilly phase | 3,474 | .9 |
| Eroded hilly phase | 2,058 | .5 |
| Leadvale silt loam: | | |
| Undulating phase | 2,124 | .5 |
| Eroded rolling phase | 2,731 | .7 |
| Lindside silt loam | 4,731 | 1.2 |
| Litz loam: | | |
| Steep phase | 1,119 | .3 |
| Eroded steep phase | 944 | .2 |
| Very steep phase | 7,521 | 1.9 |
| Hilly phase | 659 | .2 |
| Eroded hilly phase | 363 | .1 |
| Rolling phase | 224 | .1 |
| Eroded rolling phase | 327 | .1 |
| Litz silt loam, steep phase | 1,452 | .4 |
| Litz shaly silt loam, eroded steep phase | 2,559 | .6 |

TABLE 6.—*Approximate acreage and proportionate extent of the soils*—Continued

| Soils | Acres | Percent |
|---|---|---|
| Litz silt loam: | | |
| Very steep phase | 1,609 | 0.4 |
| Hilly phase | 333 | .1 |
| Litz shaly silt loam, eroded hilly phase | 1,779 | .4 |
| Litz silt loam, rolling phase | 333 | .1 |
| Litz shaly silt loam, eroded rolling phase | 1,180 | .3 |
| Masada loam: | | |
| Undulating phase | 67 | (2) |
| Eroded rolling phase | 133 | (2) |
| Melvin silt loam | 696 | .2 |
| Monongahela silt loam: | | |
| Undulating phase | 9,303 | 2.3 |
| Eroded rolling phase | 1,102 | .3 |
| Needmore silt loam: | | |
| Undulating phase | 1,865 | .5 |
| Rolling phase | 860 | .2 |
| Needmore silty clay loam, eroded rolling phase | 5,004 | 1.3 |
| Nolichucky loam: | | |
| Undulating phase | 674 | .2 |
| Rolling phase | 157 | (2) |
| Eroded rolling phase | 2,051 | .5 |
| Eroded hilly phase | 298 | .1 |
| Nolichucky cobbly fine sandy loam: | | |
| Eroded rolling phase | 480 | .1 |
| Eroded hilly phase | 1,005 | .3 |
| Ooltewah silt loam | 1,018 | .3 |
| Pace silt loam: | | |
| Undulating phase | 3,280 | .8 |
| Eroded rolling phase | 3,449 | .9 |
| Pace cherty silt loam: | | |
| Undulating phase | 127 | (2) |
| Eroded rolling phase | 702 | .2 |
| Prader silt loam | 1,580 | .4 |
| Ramsey stony loam: | | |
| Steep phase | 6,038 | 1.5 |
| Very steep phase | 31,353 | 8.0 |
| Hilly phase | 509 | .1 |
| Roanoke loam | 564 | 0.1 |
| Sequatchie loam | 376 | .1 |
| Sequatchie cobbly fine sandy loam | 781 | .2 |
| Staser silt loam | 3,279 | .8 |
| Staser fine sandy loam | 805 | .2 |
| State loam | 412 | .1 |
| State loam, eroded rolling phase | 85 | (2) |
| Stony rolling land, Dunmore soil material | 2,899 | .7 |
| Stony hilly land, Dunmore soil material | 8,138 | 2.0 |
| Stony steep land, Dunmore soil material | 4,863 | 1.2 |
| Stony hilly land, Armuchee soil material | 338 | .1 |
| Stony steep land, Armuchee soil material | 255 | .1 |
| Stony very steep land, Ramsey and Muskingum soil materials | 4,542 | 1.1 |
| Stony colluvium, Jefferson soil material | 1,083 | .3 |
| Teas loam, steep phase | 309 | .1 |
| Teas shaly loam, eroded steep phase | 223 | .1 |
| Teas shaly loam, eroded hilly phase | 103 | (2) |
| Teas-Litz stony loams, steep phase | 1,089 | .3 |
| Teas-Litz stony loams, very steep phase | 1,161 | .3 |
| Teas-Litz stony loams, hilly phase | 605 | .2 |
| Tyler silt loam | 2,766 | .7 |
| Waynesboro loam: | | |
| Undulating phase | 1,087 | .3 |
| Eroded rolling phase | 2,953 | .7 |
| Eroded hilly phase | 520 | .1 |
| Waynesboro cobbly loam: | | |
| Eroded rolling phase | 242 | .1 |
| Eroded hilly phase | 585 | .1 |
| Weaver silt loam | 708 | .2 |
| Whitesburg silt loam | 11,810 | 3.0 |
| Water | 3,212 | .8 |
| Total | [1] 399,330 | 100.0 |

[1] Total acreage of the county as computed by the TVA.

[2] Less than 0.1 percent.

have cobblestones but not in numbers that interfere with cultivation.

This soil is fertile. The top layer contains a fair amount of organic matter. The soil is medium to strongly acid. It is permeable and has good moisture-supplying capacity.

*Use suitability* (1–G)[3].—Most of this soil has been in crops or pasture, but some of it is now idle. Corn, wheat, tobacco, lespedeza, red clover, orchardgrass, and other legumes and grasses are suitable crops. Because of the rolling relief and moderately firm subsoil, this soil is erodible when cultivated. Cultivation should be on the contour. The soil is easy to work and moderately productive. It responds well to proper management.

**Allen loam, eroded hilly phase** (15 to 30 percent slopes) (Aa).—This soil is generally more severely eroded than Allen loam, eroded rolling phase. The plow layer consists largely, and in places almost entirely, of subsoil. Practically all of this soil is in the Jefferson–Allen–Hayter soil association. It occupies the stronger slopes in association with the more gently sloping Allen and Jefferson soils.

In general, the uppermost 4 to 6 inches is reddish-brown loam or clay loam. This layer is underlain by strong-brown firm sandy clay that grades to yellowish red or red. Below this is a layer of red firm sandy clay, splotched with yellow. Shale or limestone bedrock begins at depths of 2 to 8 feet.

In the few areas where the native forest has not been cleared, the soil is brown loam to a depth of 6 inches. The loam is underlain to a depth of about 12 inches by strong-brown friable sandy clay loam. Cobblestones occur in a few places but not in numbers that interfere with cultivation.

This soil is moderately fertile. It has some organic matter in the surface layer, but little in many of the more severely eroded places. The soil is medium acid to strongly acid and is moderately permeable. The moisture-supplying capacity is normally fair, but it is poor where erosion has been most severe.

*Use suitability* (1–M).—A great part of this soil has been cultivated, but much of it is now idle or in unimproved permanent pasture. Corn, small grains, and hay are the chief crops. A small acreage is in tobacco.

This soil responds to fertilization, but because of the strong slopes it is highly erodible if cultivated and its suitability for crops is consequently limited. Hay, pasture crops, and fall-sown small grains are among the better suited crops. On farms that have enough

[3] Symbol in parentheses identifies the management group in which this soil has been placed. See section on Use and Management of Soils.

acreage of soils better suited to cultivation, this soil can best be used for permanent pasture.

**Allen stony loam, rolling phase** (5 to 15 percent slopes) (Ad).—This soil contains enough stones or cobblestones to interfere with cultivation. All of it is in the Jefferson–Allen–Hayter soil association.

The 8-inch surface layer is brown cobbly or stony loam. Below this layer, to a depth of 15 inches, is reddish-yellow friable stony sandy clay loam. From 15 to 36 inches is yellowish-red to red firm sandy clay. Shale or limestone bedrock begins at depths of 3 to 10 feet. The surface layer, in places, is stony fine sandy loam. Slopes are less than 5 percent in some areas.

This soil is moderately fertile, permeable, and medium to strongly acid. Internal drainage is good, and moisture-supplying capacity is good.

*Use suitability* (1–G).—About two-thirds of this soil is cultivated, and most of the rest is under cut-over deciduous forest. Much of the cleared part is in general farm crops, but some is used for pasture. This soil responds to fertilization. It is suitable for many kinds of crops, but the stones interfere with intensive cultivation or mowing.

**Allen stony loam, eroded hilly phase** (15 to 30 percent slopes) (Ac).—This soil contains stones or cobblestones in quantities that interfere with cultivation. Otherwise, it resembles Allen loam, eroded hilly phase. It occurs in strips below broader areas of rolling Allen and Jefferson soils throughout the Jefferson–Allen–Hayter soil association.

The plow layer generally consists of a mixture of surface soil and subsoil. In patches all of the surface soil has been lost through erosion and the plow layer consists of the reddish firm sandy clay subsoil material. The greater part of this soil has a 4– to 6–inch surface layer of reddish-brown stony or cobbly loam that grades to red firm sandy clay. In some places the surface layer is stony fine sandy loam. Shale or limestone bedrock begins at depths of 2 to 8 feet.

This soil is moderately fertile and is medium to strongly acid. Except where it is most severely eroded, it is moderately permeable. The moisture-supplying capacity ranges from moderate to fair; the more severely eroded patches tend to be droughty.

*Use suitability* (2–A).—A large part of this soil has been cleared and cropped, but much of it is now in unimproved permanent pasture. This soil is poor for crops. It can be cultivated if the acreage of better soils is limited but requires greater effort and more careful management than is ordinarily considered practical. If it is properly fertilized, the soil will provide good grazing.

**Allen stony loam, steep phase** (30 to 60 percent slopes) (Ae).—This soil is like Allen stony loam, rolling phase, except for having steeper slopes. It is in the Jefferson–Allen–Hayter soil association. Most areas lie next to the Ramsey–Stony land soil association.

In forested areas the 5– or 6–inch surface layer is brown stony loam. Below this is a layer of strong-brown friable sandy clay loam that grades, at a depth of about 12 inches, to yellowish-red to red firm sandy clay. Shale or limestone bedrock is at depths of 1½ to 6 feet.

In the small cultivated areas, the plow layer consists of a mixture of original surface soil and subsoil. In places all of the surface soil has eroded away and the plow layer consists of red firm sandy clay.

This moderately fertile permeable soil is medium to strongly acid. It contains a fair amount of organic matter. Its moisture-supplying capacity is generally fair but is poor in severely eroded spots.

*Use suitability* (3–A).—Most of this soil is still under native forest. A small part has been cleared and cropped. Practically all of the cleared acreage is in unimproved permanent pasture or is idle. This soil is very poor for crops and poor for pasture. It should be left in forest if that is possible.

**Altavista loam, undulating phase** (1 to 5 percent slopes) (Ag).—This is a moderately well drained yellow soil that occurs on moderately high stream terraces along the Nolichucky River. It consists chiefly of alluvium derived from granite, gneiss, and schist. Most of it is in the Congaree–Altavista soil association.

Profile description:

0 to 12 inches, dark yellowish-brown loam.
12 to 32 inches, yellowish-brown friable to firm clay loam; may contain a few dark concretions.
32 inches +, firm but crumbly sandy clay; mottled yellowish brown, yellow, and gray; depth to bedrock—shale in most places—is 6 to 20 feet.

The surface layer in places is lighter colored. Some of the stronger slopes have lost much of the original surface layer through erosion, and the plow layer now consists of a mixture of original surface soil and subsoil material.

This soil is moderate to low in organic matter. It is medium to strongly acid. It is permeable, and its moisture-supplying capacity is moderately high. Natural fertility is not high, but the soil responds to proper fertilization.

*Use suitability* (1–E).—This soil is well suited to corn, tobacco, truck crops, small grains, and most legumes and grasses. Heavy fertilization is needed to maintain productivity, and large amounts of lime are required for most legumes and grasses.

**Altavista loam, eroded rolling phase** (5 to 12 percent slopes) (Af).—Except that it is on stronger slopes and has been affected by erosion, this soil resembles Altavista loam, undulating phase. Most of it is on the slopes of stream terraces below areas of Altavista loam, undulating phase, but above the adjoining bottom lands.

In most places, the plow layer is yellowish-brown loam to clay loam, formed of a mixture of subsoil material and original surface soil. In spots, the plow layer consists entirely of firm clay loam subsoil. Bedrock—shale in most places—is at depths of about 4 to 16 feet.

The soil is low in organic matter and is medium to strongly acid. Fertility is moderate to low. Tilth is fair. Most of the soil is moderately permeable, but the more severely eroded areas are slowly permeable. The moisture-supplying capacity is normally good, but it is only fair in the more severely eroded spots.

*Use suitability* (1–I).—Practically all of this soil has been cultivated. Much of it is used for crops. Smaller areas are in unimproved pasture, and some

of it is idle. The soil is suited to many kinds of crops, but because of the rolling slopes, it is not advisable to grow row crops frequently. Moderately long rotations in which small grains and hay crops are on the soil three-fourths of the time, are suitable.

**Armuchee silt loam, hilly phase** (15 to 30 percent slopes) (Ah).—This soil, like others of its series, is underlain by interbedded limestone and shale and is shallow to bedrock. It occurs with the other Armuchee soils in a narrow strip along the southeastern edge of Bays Mountains, below the Teas-Litz soils to the northwest, and next to the Dandridge soils to the southeast.

Profile description:

0 to 6 inches, light yellowish-brown silt loam.
6 to 20 inches, reddish-yellow very firm silty clay; bedrock is at depths of 1 to 2½ feet; a few thin lenses of limestone are exposed.

This soil is moderately fertile and contains a moderate amount of organic matter. In most places it is medium acid, but in places adjacent to the limestone lenses it is only slightly acid. Internal drainage is adequate for most plants, but because the soil is shallow and the subsoil firm, runoff begins quickly. The moisture-supplying capacity is very poor.

*Use suitability* (2–C).—Much of this soil is still under native forest. It is poorly suited to crops. It can support good legume-grass pastures if fertility is maintained. Because most of the soil is on south-facing slopes, it is somewhat droughty.

**Armuchee silty clay loam, eroded hilly phase** (15 to 30 percent slopes) (Am).—Much of the original surface layer of this soil has been lost through erosion. This soil differs from Armuchee silt loam, hilly phase, in having a lighter colored, finer textured surface layer. It is associated with other Armuchee soils along the southeastern base of Bays Mountains.

In many places the plow layer consists of the reddish-yellow silty clay subsoil. The depth to bedrock is from 6 inches to 2 feet. Thin lenses of limestone are exposed in places.

Fertility is moderate to low. The soil is medium acid to slightly acid. The clayey plow layer is hard to till. Moisture percolates slowly; consequently, runoff begins quickly during rains. The moisture-supplying capacity is very poor.

*Use suitability* (2–C).—All of this soil has been cleared. Most of it is used for pasture or is idle. Some hay is grown. Little of this soil is used for row crops, and yields are low.

This soil is poorly suited to crops. Most areas will not support good legume-grass pastures unless the fertility is built up and the tilth improved.

**Armuchee silt loam, steep phase** (30 to 60 percent slopes) (Ak).—Except for slope this soil is like Armuchee silt loam, hilly phase. It is widely distributed in narrow strips throughout the belt of Armuchee soils that lies along the southeastern base of Bays Mountains.

The surface layer is light yellowish-brown silt loam to a depth of about 4 inches. Below this is a layer of reddish-yellow, very firm silty clay. Shale bedrock begins at depths of 6 inches to 2 feet. Lenses of limestone occur and in places outcrop.

The soil is moderately fertile. The surface layer is friable. Because the soil is shallow over very firm subsoil and bedrock, little water is absorbed and the moisture-supplying capacity is limited.

*Use suitability* (2–C).—Practically all of this soil is under cutover native forest. The soil is poorly suited to crops. Under good management, however, it can support a productive cover of legumes and grasses.

**Armuchee silty clay loam, eroded steep phase** (30 to 60 percent slopes) (Ao).—This soil is similar to Armuchee silt loam, steep phase, except for the effects of severe erosion. This soil occurs in narrow strips within the belt of Armuchee soils that lies along the base of Bays Mountains.

The plow layer of reddish-yellow, very firm silty clay is underlain by shale bedrock at depths of 3 to 18 inches. Outcrops of limestone lenses are common. Shallow gullies have formed in places.

This soil is moderate to low in fertility and is medium to slightly acid. The very firm, clayey, shallow soil is slowly permeable and absorbs little water; consequently, a considerable amount of water runs off. The moisture-supplying capacity is limited.

*Use suitability* (2–C).—All of this soil has been cultivated. Much of it is now in pasture, which generally is low in productivity; some areas are idle.

This soil is poorly suited to crops. Under careful management, however, a good stand of the better legumes and grasses for pasture can be established.

**Armuchee silt loam, very steep phase** (60+ percent slopes) (Al).—This soil is shallower to bedrock than Armuchee silt loam, steep phase, and has more exposed limestone lenses and outcrops of shaly material. It is associated with Teas-Litz soils on the steepest slopes of Bays Mountains.

*Use suitability* (3–A).—Practically all of this soil is under cutover native forest. It is poor for pasture and very poor for crops. Most of it should be used only for forest.

**Armuchee silty clay loam, eroded rolling phase** (5 to 15 percent slopes) (An).—This soil is eroded to the extent that the plow layer is now a mixture of surface soil and silty clay subsoil materials, most of which are moderately fine textured. Otherwise, except for slope, it resembles Armuchee silt loam, hilly phase. It occurs mostly on ridge crests in the narrow belt of hilly Armuchee soils along the southeastern base of Bays Mountains.

The plow layer varies from light yellowish-brown silt loam in less eroded areas to reddish-yellow firm silty clay where erosion has been most severe. Bedrock of shale that contains lenses of limestone is at depths of 6 inches to 3 feet.

This moderately fertile soil is medium acid. Internal drainage is medium. Percolation is moderately good except in the most severely eroded parts. The moisture-supplying capacity is only fair, and the soil tends to be droughty. In the less eroded places tilth is good, but in the more eroded spots, where the plow layer is silty clay, tilth is poor.

*Use suitability* (1–L).—Most of this soil has been cleared and cultivated at some time. A small part is still under native forest. The cleared areas are partly in crops and partly in unimproved pasture. The use

suitability of this soil is limited because it is shallow, clayey, and slowly permeable. If properly fertilized, however, the soil is suitable for crops in moderately long rotations that consist largely of small grains and legumes. It can support good permanent pastures.

**Barbourville fine sandy loam** (1 to 4 percent slopes) (Ba).—This well-drained brown soil is on local alluvium, most of which is derived from quartzite and slate. Much of this material has washed from the Ramsey soils of the Ramsey–Stony land soil association. This soil occurs in narrow strips along drainageways, mainly in the Jefferson–Allen–Hayter soil association.

Profile description:

0 to 18 inches, pale-brown or grayish-brown very friable fine sandy loam.
18 to 40 inches, yellowish-brown friable fine sandy loam or sandy clay loam; some gray mottles below depths of 24 to 30 inches.

The soil is underlain by bedrock or beds of gravel at depths of 2½ to 8 feet. Gravel or cobblestones occur in places but not in quantities that interfere with cultivation.

This permeable, moderately fertile soil is medium acid. The content of organic matter is not high. Internal drainage is medium, and the moisture-supplying capacity is good.

*Use suitability* (1–C).—Probably more than three-fourths of this soil is used for crops or pasture. Corn is the commonest crop. The small part that has not been cleared is chiefly along narrow drainageways and is associated with steep soils that are poor for cultivation. This soil is well suited to intensive use for row crops such as corn, tobacco, and truck crops.

**Bolton loam, eroded hilly phase** (12 to 25 percent slopes) (Bb).—This soil, like others of its series, has a brown surface layer and a red subsoil. It has developed over limestone that contains a considerable amount of sand. It occurs in small, widely distributed areas, in association with Dewey and Dunmore soils, in the Dunmore–Greendale soil association.

Profile description:

0 to 6 inches, brown to dark-brown friable loam.
6 to 24 inches, yellowish-red clay loam or clay that grades to red; friable to firm.
24 to 50 inches, red to yellowish-red clay loam or clay; friable to firm; a few small dark-brown concretions.
50 inches +, firm silty clay, splotched red and yellow, that crumbles fairly easily; bedrock of limestone at depths of 10 to 20 feet.

The small acreage that is not eroded has a surface layer that is about 10 inches thick. In a few patches, practically all of the surface layer has been lost through erosion and the plow layer consists of yellowish-red sandy clay or clay. In a few other places, the surface layer is silt loam rather than loam. A small amount of chert occurs in places, but not enough to interfere with cultivation. There are some shallow gullies in the more eroded places.

This soil is medium to strongly acid and is moderately high in fertility. It is permeable, and internal drainage is medium. The moisture-supplying capacity is fair. Tilth is moderately good, although the soil ordinarily is not scoured from tillage implements as well as many soils. Tilth is poor in the more eroded areas where the clayey subsoil is exposed.

*Use suitability* (1–M).—Most of this soil is used for crops. A small part is idle. Corn, small grains, and hay are the chief crops, but a small acreage is in tobacco. The soil responds well to proper fertilization, but its suitability for tillage is limited by the hilly relief and the erosion hazard. If properly fertilized, this soil will support good pastures of high carrying capacity.

**Bolton loam, eroded rolling phase** (5 to 12 percent slopes) (Bc).—This soil is similar to Bolton loam, eroded hilly phase, except that it has milder slopes. It is widely distributed throughout the Dunmore–Greendale soil association. Most of it lies on ridgetops in association with the hilly phases of Bolton, Dunmore, and Dewey soils.

The surface layer is brown to dark-brown loam, and the subsoil is yellowish-red to red, friable to firm silty clay loam to clay. Limestone bedrock is at depths of 10 to 25 feet.

This fertile soil is moderately high in organic matter. Tilth is fairly good, although in places the soil does not scour from tillage implements. The soil is permeable, and its internal drainage is medium. The moisture-supplying capacity is good.

*Use suitability* (1–G).—Practically all of this smoothly sloping soil has been used for crops and pasture. The soil responds well to fertilization and is suitable for cultivation if adequate measures are taken to prevent further erosion. It is well suited to practically all of the crops commonly grown in the area, including corn, tobacco, small grains, and legumes and grasses for either hay or pasture.

**Bolton loam, eroded steep phase** (25 to 60 percent slopes) (Bd).—This soil is more severely eroded than Bolton loam, eroded rolling phase, and shallow gullies are commoner. Most of it is associated with Dunmore and Dewey soils on steep slopes in the Dunmore–Greendale soil association. The plow layer, to a depth of about 5 inches, is dark brown to red. The surface texture is loam in places where erosion has been least severe, and clay in severely eroded spots. The subsoil is predominantly red or yellowish-red, friable to firm sandy clay loam or clay. Limestone bedrock begins at depths of 8 to 15 feet. A small acreage that has not been cleared has an 8- to 10-inch surface layer of brown to dark-brown loam or silt loam.

This is a fertile soil. It is moderate in organic-matter content and is medium to strongly acid. The soil is permeable, but its moisture-supplying capacity is very poor. Tilth is moderately good to poor, depending on the extent of erosion.

*Use suitability* (2–B).—Most of this soil has been cleared and cropped. Much of it is now used for pasture. Some areas are cultivated, chiefly to corn and hay, but the soil is poorly suited to crops because of the strong slopes. It will support good legume-grass pastures if adequately fertilized.

**Buncombe loamy fine sand** (1 to 3 percent slopes) (Be).—This soil consists of sandy material on bottom lands. It is derived from granite, gneiss, and schist. Most of it occurs in narrow strips next to the channel of the Nolichucky River. This soil is associated with Congaree, Chewacla, and State soils. It is subject to overflow.

Profile description:

0 to 10 inches, pale-brown loamy fine sand.
10 inches +, pale-yellow loose fine sand; bedrock is at widely variable depths that range in most places from 5 to 15 feet.

A few areas have a dark yellowish-brown loamy fine sand surface layer.

This gently undulating soil is low in fertility and is medium to strongly acid. Its sandy texture makes it very permeable. The moisture-holding capacity is limited, but, because the soil occurs near the river, most areas have an adequate water supply at a depth of several feet. This soil is subject to overflow.

*Use suitability* (1–B).—Most of this soil has been cultivated. Much of it is now used for corn, but a large acreage is in pasture. Crop suitability is limited somewhat by the sandy texture. The sandy texture also makes the use of heavy machinery difficult. This soil is suited to row crops and is especially well suited to certain truck crops. Droughtiness, however, limits yields. Legumes and grasses yield less on this soil than on finer textured soils.

Leaching is so rapid that it is impractical to try to build up fertility. Crops are likely to be damaged by floods.

**Camp loam** (1 to 4 percent slopes) (Ca).—This reddish soil is on young local alluvial slopes, the material of which was derived from reddish shale. In most places the shale contains lenses or beds of calcareous material. Areas of this soil occur in narrow strips along drainageways on the southwestern slope of Bays Mountains.

Profile description:

0 to 15 inches, reddish-brown loam.
15 to 28 inches, weak reddish-brown firm clay loam or silty clay loam.
28 inches +, weak reddish-brown to yellowish-brown firm clay loam or silty clay loam with some splotches of yellow and gray; beds of rock fragments or bedrock of shale at depths of 2 to 8 feet.

The surface layer varies in texture from loam to clay loam. A few rock fragments or cobblestones occur in places. The soil is medium acid to slightly acid. The organic-matter content is moderate. Fertility is fair to moderate. Moisture percolates well, internal drainage is medium, and the moisture-supplying capacity is good. Good tilth is easily maintained, and runoff is not a great hazard.

*Use suitability* (1–C).—Most of this soil is used for crops. Some cleared areas, mostly narrow strips associated with areas of soils unsuitable for cultivation, are in pasture. Much of this gently sloping soil is well suited to intensive use. Its productivity is easily maintained. It is suited to many row crops, chiefly corn and tobacco, and to small grains and legumes and grasses. Some areas that have a finer textured surface layer are unsuited to the intensive cultivation usually required for truck crops.

**Chewacla silt loam** (0 to 1 percent slopes) (Cb).—This imperfectly drained soil was derived chiefly from granite, gneiss, and schist. It occurs on the bottom lands along the Nolichucky River, in slightly lower positions than the Congaree soils with which it is associated. Most of it is in the Congaree–Altavista soil association. All of it is subject to overflow.

Profile description:

0 to 18 inches, dark brown to very dark brown silt loam; the lower 6 to 8 inches is lighter brown than the upper part.
18 inches +, firm clay loam or silty clay loam, mottled brown, yellowish brown, and gray; bedrock at depths of from 4 to 15 feet.

In places the surface layer is loam. In an area of about 40 acres that is poorly drained, the surface layer is gray silt loam or loam, underlain at a depth of about 10 inches by gray firm clay loam or silty clay mottled with yellow and brown. The subsoil, in some areas, is very firm silty clay mottled with very dark gray, gray, and yellowish brown. A few cobblestones occur in places but not in numbers that interfere with cultivation.

Chewacla silt loam contains an appreciable amount of mica flakes. It is medium to strongly acid and moderate to high in fertility. Moisture permeates the soil fairly easily in most places. The water table is high; consequently, internal drainage is slow and the soil may be too wet for crops during much of the growing season.

*Use suitability* (1–A).—All of this soil has been cleared, and most of it is cultivated. Corn is the chief crop. Some hay is grown, and some of the soil is used for pasture. The soil is level and fertile, but, because of restricted internal drainage and susceptibility to overflow, its use suitability is limited. Areas that can be artificially drained are productive of many kinds of crops, including some truck crops, if a high level of fertility is maintained.

**Cobbly alluvium, Hamblen soil material** (0 to 3 percent slopes) (Cc).—This land type consists of young gravelly or cobbly alluvium derived from acid sandy rock and slate mixed with a small amount of material derived from calcareous shale or limestone. It lies along the many streams in the mountainous southeastern part of the county. Most of the streams have shallow channels that overflow, and the material below a depth of 3 feet is waterlogged most of the time. This land type is chiefly in the Jefferson–Allen–Hayter soil association.

Profile description:

0 to 30 inches, grayish-brown loose cobbly sandy loam or cobbly loam; below depths of about 18 inches, the soil is more nearly yellowish brown and is mottled with gray and yellow in many places; the material at depths below 30 inches is a mass of cobblestones; depth to bedrock is from 2 to 10 feet.

Drainage conditions vary. In places the soil is well drained to a depth of 3 feet; in other places it is waterlogged to within 12 or 15 inches of the surface. Although subject to overflow, the soil remains flooded for only a short time because it is not far from the headwaters and the gradient of the streams is strong. The soil is medium to strongly acid, and fertility is low. In general, this soil is permeable to moisture.

*Use suitability* (2–A).—Much of this land type has been cleared and is used for pasture. A small acreage is in crops, but the soil is so cobbly that tillage is difficult and in some places impossible. On the less cobbly areas, some crops can be planted by hand. If fertilizer is applied, fairly good yields can be obtained. Most of the acreage will produce some pasture, and some areas provide very good grazing.

**Congaree loam** (0 to 3 percent slopes) (Ce).—This well-drained, brown soil, like others of its series, is on young general alluvium derived chiefly from granite, gneiss, and schist. It occurs along the Nolichucky River, in association with Chewacla and Buncombe soils. Much of the soil is in the Congaree–Altavista soil association. Some of it is on narrow bottom lands in the Nolichucky–Waynesboro–Cumberland soil association.

Profile description:

0 to 20 inches, dark-brown friable loam.
20 to 40 inches, dark yellowish-brown friable loam or clay loam.
40 inches +, yellowish-brown sandy loam to loamy sand with some gray and yellow mottles; bedrock is at depths of 4 to 15 feet.

In places the subsoil at depths of 12 to 22 inches is darker than the surface soil. This darker material probably represents an old surface layer that has been buried by more recent alluvium. A few cobblestones occur in places but not in numbers that interfere with cultivation.

Fine mica flakes are common throughout the entire depth of the soil. The soil is high in fertility and contains a moderate amount of organic matter. It is medium to strongly acid. Internal drainage is medium, moisture percolates well, and the moisture-supplying capacity is good. Erosion is no hazard, although rapidly flowing floodwaters occasionally scour this soil. Overflow is a hazard to crops. Sandy or stony debris is occasionally deposited on certain areas.

*Use suitability* (1–A).—Practically all of this soil is used for crops. A small part is in pasture. Corn is the commonest row crop. An appreciable acreage is used for vegetables. Because it is easily worked and conserved, this soil is suited to intensive use. It is highly productive of many kinds of crops under proper management.

**Congaree fine sandy loam** (0 to 3 percent slopes) (Cd).—This soil is like Congaree loam, except that the uppermost 18 to 30 inches consists of fine sandy loam. This soil occurs along the Nolichucky River, in association with Buncombe and Chewacla soils and with Congaree loam. Much of it is in the Congaree–Altavista soil association. All of it is subject to overflow.

The 10– to 12–inch surface layer is brown fine sandy loam. The subsoil, to a depth of about 30 inches, is dark yellowish-brown to yellowish-brown fine sandy loam. Below 30 inches, the material may be faintly mottled. Bedrock is at depths of 4 to 15 feet.

The soil is medium to strongly acid. It is lower in fertility and contains less organic matter than Congaree loam. Moisture permeates the soil easily. The moisture-supplying capacity is good but somewhat lower than that of Congaree loam.

*Use suitability* (1–A).—Practically all of this soil is used for crops, chiefly corn and vegetables. It is suitable for intensive cultivation and is good for truck crops that must be planted early. Weeds are easily controlled. Heavier fertilization is required than for Congaree loam; however, the soil responds well to proper fertilization. Many legumes and grasses, especially those for pasture, do not develop as good a sod on this soil as on some of the more fertile and finer textured soils. Nevertheless, fairly good stands of pasture can be produced.

**Cumberland silt loam, undulating phase** (2 to 5 percent slopes) (Cf).—This soil, like other Cumberland soils, has a brown surface soil and a red subsoil. It occurs on old high stream terraces consisting of mixed alluvium derived chiefly from limestone and shale. Practically all of it is in the Nolichucky–Waynesboro–Cumberland soil association. It occupies gently sloping areas on the higher parts of the stream terraces, above the rolling and hilly phases of Waynesboro and Cumberland soils. The Cumberland soils are darker brown than the Waynesboro soils, and the parent material contained more limestone.

Profile description:

0 to 10 inches, dark-brown silt loam.
10 to 14 inches, yellowish-red or reddish-brown friable silty clay loam.
14 to 60 inches, dark-red firm but crumbly silty clay.
60 inches +, red firm silty clay splotched with yellow and gray; bedrock, usually limestone, is at depths of 4 to 20 feet.

In some places, especially on the more sloping areas, the red silty clay subsoil is only 6 to 8 inches below the surface. A few cobblestones occur in places but not in numbers that interfere with cultivation.

Cumberland silt loam, undulating phase, is fertile and is moderately high in organic matter. It is medium acid. Although the firm subsoil somewhat retards percolation, internal drainage is medium and moisture infiltrates well. The moisture-supplying capacity is good. Good tilth is easily maintained.

*Use suitability* (1–D).—Practically all of this soil is used for many kinds of crops, including tobacco and alfalfa. Some of it is used for pasture. Little or none is idle.

This soil is very well suited to pasture and to many kinds of crops. It responds well to proper fertilization and is easily maintained in a state of high productivity.

**Cumberland silty clay loam, eroded rolling phase** (5 to 12 percent slopes) (Ch).—This soil has moderately fine textured surface soil, occurs on rolling slopes, and has lost part of its original surface layer. Otherwise, it is like Cumberland silt loam, undulating phase. This soil is on moderately high to high stream terraces along the Nolichucky River. It is in the Nolichucky–Waynesboro–Cumberland soil association, a large part of which consists of gently sloping soils well suited to cultivation.

From one-half to three-fourths of the original surface soil has been lost through erosion. In a few places the red firm subsoil is exposed. In most places the plow layer is brown to reddish-brown silty clay loam, underlain at a depth of about 5 inches by dark-red firm silty clay. Below a depth of about 50 inches is red firm silty clay splotched with yellow and gray. Bedrock, which in most places is limestone, is at depths of 3 to 15 feet.

Cobblestones occur in places but not in numbers that interfere with cultivation. This fertile soil is medium to strongly acid and contains some organic matter in the plow layer. Tilth is good but not as favorable as that of the undulating phase. Internal drainage is medium, and the moisture-supplying capacity is good.

*Use suitability* (1–G).—All of this soil has been in crops or pasture. At present, a small part is idle each year. This soil is well suited to common field crops. It is especially well suited to alfalfa and other desirable legumes and grasses. Because of the rolling slopes, however, erosion is a hazard and rotations should be moderately long.

**Cumberland silty clay loam, eroded hilly phase** (12 to 25 percent slopes) (Cg).—Except for degree of slope and the effects of erosion, this soil is like Cumberland silt loam, undulating phase. It is strongly sloping and occurs on moderately high to high terraces along the Nolichucky River. In most places more than half of the original surface soil has been lost by erosion, and the plow layer now consists of a mixture of surface soil and subsoil. This material is reddish-brown silty clay loam, 5 or 6 inches thick.

In many patches all of the original surface soil has been lost, and the plow layer now consists of dark-red firm silty clay. On the other hand, in some small areas little erosion has taken place; in these the 5- to 8-inch surface layer is dark-brown silt loam. All of this soil has a dark-red subsoil that grades to red firm silty clay splotched with yellow and gray. Bedrock, in most places limestone, is at depths of 2 to 10 feet.

Cobblestones occur in places but not in numbers that interfere with cultivation.

This moderately fertile soil is medium to strongly acid. Except in the most severely eroded parts, it has fair moisture-supplying capacity and good tilth.

*Use suitability* (1–M).—Practically all of this soil has been used for crops, but much of it is now in pasture. Corn and hay are the chief crops. The soil is fairly high in fertility and has fair moisture-supplying capacity. Nevertheless, it should not be intensively cultivated because of the strong slopes. Runoff creates an erosion hazard. In the more clayey areas, the soil clods and becomes very difficult to till. The soil is well suited to legume pasture and hay.

**Dandridge silt loam, hilly phase** (15 to 30 percent slopes) (Dd).—This soil is commonly called black slate land. Like other Dandridge soils, it is shallow over calcareous shale bedrock. Most of it occurs in small areas on ridge slopes. It is in the Dandridge–Whitesburg and Monongahela–Needmore–Dandridge soil associations.

Profile description:

0 to 3 inches, pale-brown friable silt loam.
3 to 12 inches, light yellowish-brown friable shaly silty clay loam; somewhat firmer than the surface layer.
12 to 20 inches, weathered shale fragments intermixed with some light yellowish-brown silty clay loam.

Depth to the shale bedrock ranges from 6 inches to 2½ feet. Where the bedrock is nearest the surface, the soil above it is either all silt loam or all shaly silt loam. In some patches shale fragments are scattered throughout the soil, and a few bedrock outcrops occur. The bedrock is calcareous shale in some areas and in others it is soft brownish leached shale underlain by calcareous shale at depths of 3 to 8 feet.

The color of the substratum ranges from light yellowish brown to strong brown or reddish yellow. Generally, where the bedrock is leached of lime, the subsoil is yellowish brown to strong brown and is of firmer consistence.

This is a moderately fertile soil, but its organic-matter content is low. It is neutral to alkaline where calcareous shale is near the surface but medium acid where the underlying shale is leached. The moisture-supplying capacity is very poor.

*Use suitability* (2–C).—Practically all of this soil is under cutover forest. It is poor for cultivated crops. It can support a good stand of legume-grass pasture, but the carrying capacity is limited by the very poor water-supplying capacity.

**Dandridge shaly silt loam, eroded hilly phase** (15 to 30 percent slopes) (Da).—This soil has lost much of its original surface layer by erosion; the present surface layer is shaly silt loam. Otherwise, this soil is like Dandridge silt loam, hilly phase. It occupies ridge slopes throughout the Dandridge–Whitesburg and the Monongahela–Needmore–Dandridge soil associations.

The 4- to 6-inch plow layer is pale-brown to yellowish-brown shaly silt loam. The subsoil is light yellowish-brown to yellowish-brown friable shaly silty clay loam.

Bedrock of calcareous shale, which normally is at depths of 6 inches to 2 feet, outcrops where erosion has been most severe.

The content of organic matter is low. The moisture-supplying capacity is limited. The soil is medium acid where it is deeper to bedrock but slightly alkaline where it is shallower. Tilth is good, although not so good as before the soil was eroded. Tillage is hindered by the shale in eroded areas.

*Use suitability* (2–C).—All of this soil has been cultivated (fig. 9). Much of it is now used for pasture; a small part is idle or reforested; and some acreage is cropped, chiefly to small grains and corn.

*Figure 9.*—**Cultivated field of Dandridge shaly silt loam, eroded hilly phase. High yields are difficult to maintain. Litz loam, steep phase, dominates reforested area.**

This soil is poor for cultivation. It will provide good grazing if it is seeded and fertilized, but the carrying capacity is limited by the very poor water-supplying capacity.

**Dandridge silt loam, rolling phase** (5 to 15 percent slopes) (De).—Except that it has milder slopes, this soil is like Dandridge silt loam, hilly phase. It occupies narrow ridgetops in association with steeper Dandridge soils. It is widely distributed throughout the Dan-

dridge–Whitesburg and Monongahela–Needmore–Dandridge soil associations. Depth to bedrock is 6 inches to 2½ feet.

*Use suitability* (1–L).—Practically all of this soil is under cutover native forest. Although this soil is considered suitable for cultivated crops, its productivity and suitability are limited by the shallow root zone and poor moisture supply. It is best suited to fall-sown small grains and to hay and pasture.

**Dandridge shaly silt loam, eroded rolling phase** (5 to 15 percent slopes) (Db).—This soil has lost much of its surface layer through erosion. Except that it has milder slopes, it resembles Dandridge shaly silt loam, eroded hilly phase. It is widely distributed throughout the Monongahela–Needmore–Dandridge soil association and occurs less extensively in the Dandridge–Whitesburg association. In the Dandridge–Whitesburg association, it occupies narrow ridgetops above slopes of hilly and steep Dandridge soils.

The plow layer, a mixture of surface soil and subsoil, ranges from pale-brown shaly silt loam to yellowish-brown shaly silty clay loam. Depth to the shale bedrock ranges from 3 inches to 2 feet. The bedrock outcrops in places.

*Use suitability* (1–L).—Practically all of this soil has been cultivated. About 35 percent is now cropped, chiefly to hay, small grains, and some corn; much of the rest is in unimproved pasture; a small part is idle. This soil is suited to cultivated crops. Its productivity and suitability, however, are limited by the shallow root zone and very poor moisture-supplying capacity. In places where fertility is moderately high, it is well suited to fall-sown small grains and legumes and grasses for hay and pasture. Where the soil is shallowest, the underlying shale can be easily disrupted by subsoiling so that it will form a thicker layer of material in which roots can develop.

**Dandridge silt loam, steep phase** (30 to 60 percent slopes) (Df).—This soil is shallower than the hilly phase and contains more shale fragments. Most of it occurs in the Dandridge–Whitesburg soil association on the steeper ridge slopes that have not been cleared and cultivated. Practically all of it is under a cutover forest of deciduous trees and pines.

The topmost 3 inches is pale-brown silt loam. This is underlain by light yellowish-brown to yellowish-brown shaly silt loam. Below a depth of about 10 inches, weathered shale fragments are mixed with light yellowish-brown silty clay loam.

Depth to bedrock ranges from 6 inches to 2 feet. Where the bedrock is nearest the surface, the soil above it is all silt loam or all shaly silt loam. In most places the bedrock is calcareous; in some places it is soft brownish shale that has been leached of lime to a depth of 2½ to 7 feet. The leached layer is underlain by the less weathered calcareous shale. The color of the substratum is strong brown or reddish yellow in places.

This soil is moderately fertile and has some organic matter in the uppermost 3 inches. It ranges from medium acid, where the soil is deeper over bedrock, to slightly alkaline, where it is shallower. Tilth is good in the surface layer, but the shale is so near the surface that it interferes with tillage and limits the root zone. The moisture-supplying capacity is very poor.

*Use suitability* (2–C).—Practically all of this soil is under cutover deciduous and pine forest. It is poorly suited to crops. If carefully managed, it can support good grazing, especially on the northerly slopes. Droughtiness, however, limits the carrying capacity. Much of the soil, especially those areas that are shallowest and most droughty, should be left in forest.

**Dandridge shaly silt loam, eroded steep phase** (30 to 60 percent slopes) (Dc).—This soil has lost a considerable amount of soil material through erosion; it has a surface layer of shaly silt loam. Otherwise, it resembles Dandridge silt loam, steep phase. It occurs principally on steep ridge slopes in the Dandridge–Whitesburg soil association.

The plow layer consists of light yellowish-brown shaly silt loam or shaly silty clay loam. Depth to shale bedrock ranges from 3 to 18 inches. Shallow gullies are common, and a few outcrops of bedrock occur.

*Use suitability* (2–C).—All of this soil has been cleared and cropped. Most of it is now in unimproved pasture. Small areas are idle or have reverted to forest.

This steep, shallow soil is poorly suited to crops. If it is adequately fertilized and otherwise carefully managed, it will provide good grazing, especially on the northerly slopes. Droughtiness, however, limits the carrying capacity. The shallower droughty areas are best used for forest.

**Dandridge silt loam, very steep phase** (60+ percent slopes) (Dg).—This soil, formed from the residuum of calcareous shale, is shallower than Dandridge silt loam, steep phase. All of it is in the Dandridge–Whitesburg soil association. It consists of yellowish-brown silty soil material. Small partially weathered shale fragments are scattered on the surface and mixed with the the soil material. Depth to bedrock is from 6 to 18 inches. Outcrops are common.

*Use suitability* (3–A).—More than 50 percent of this soil is in forest, and most of the rest is in pasture. It is so shallow and steep that it is poorly suited to either crops or pasture.

**Decatur silty clay loam, eroded rolling phase** (5 to 12 percent slopes) (Dl).—This dark-red soil, like the other Decatur soils, is underlain by high-grade limestone. It is distinguished from the associated Dewey soils by its browner surface soil and its darker red, finer textured subsoil. It is confined chiefly to a ridgeland about 3 miles south of Davy Crockett Lake Dam.

The surface layer generally consists of a mixture of the original surface soil and subsoil. In places, however, especially on the milder, less severely eroded slopes, the 6- to 8-inch surface layer consists almost entirely of the original dark-brown silt loam. In patches on the stronger slopes, the plow layer consists entirely of subsoil material.

Profile description:

0 to 6 inches, dark reddish-brown friable silty clay loam.
6 to 15 inches, weak reddish-brown silty clay, very firm when moist, sticky when wet.
15 to 60 inches +, dark-red silty clay, very firm when moist, plastic when wet; bedrock at depths of 7 to 20 feet.

Small dark concretions are common throughout the subsoil. The subsoil is very firm; it is crumbly when moderately moist but works into a plastic mass.

This fertile soil is one of the best soils of the county for crops. It has a moderate amount of organic mat-

ter and is medium acid. The moisture-supplying capacity is good. It is well drained, although percolation is slow through the subsoil. Because of slow percolation runoff begins quickly during rains. As a result, cultivated areas on the stronger slopes are subject to erosion.

*Use suitability* (1–H).—All of this soil has been cleared and is used for crops or pasture. It is well suited to corn, tobacco, small grains, legumes, and grasses. This firm soil is not easily worked and therefore is not well suited to truck crops. Root crops and potatoes do not develop as well as in more friable soils.

**Decatur silty clay loam, eroded hilly phase** (12 to 25 percent slopes) (Dk).—Except that it has stronger slopes, this soil is like the eroded rolling phase. It occurs in a small area of ridgeland south of Davy Crockett Lake Dam. The plow layer is dark reddish-brown silty clay loam. The subsoil is dark-red very firm silty clay. Limestone bedrock is at depths of 5 to 15 feet. In many places all the original surface soil has been removed by erosion, and the plow layer is dark-red very firm silty clay.

This moderately fertile soil has a moderate content of organic matter and is medium acid. Because of the firm subsoil, which retards percolation, and the strong slopes, water soon starts to run off during rains. Although the plow layer of this clayey soil is usually cloddy when dry and sticky when wet, tilth is moderately good.

*Use suitability* (1–N).—This soil responds to proper management and retains its fertility. Consequently, it is a good soil for most of the general farm crops, such as corn, small grains, legumes, and grasses. The soil is not suited to truck crops. It is advisable to follow a cropping system that will protect the soil from damage by runoff.

**Decatur silty clay, severely eroded hilly phase** (12 to 25 percent slopes) (Dh).—This soil is like Decatur silty clay loam, eroded rolling phase, except that it has a finer textured surface layer, is more strongly sloping, and has been more severely eroded. It occupies a small ridgeland area about 3 miles south of Davy Crockett Lake Dam. Practically all of the original surface soil has been lost by erosion. The present surface layer, to a depth of 50 inches, is dark-red very firm silty clay. Depth to bedrock ranges from 4 to 12 feet.

This medium acid soil is low in fertility and is low in organic-matter content. Its moisture-supplying capacity is poor. Tilth is poor.

*Use suitability* (2–A).—All of this soil has been cleared and cultivated. Much of it is now in permanent pasture. It is poorly suited to crops.

**Dewey silty clay loam, eroded rolling phase** (5 to 12 percent slopes) (Dp).—This well-drained red soil of the uplands has developed from fairly high grade limestone in the limestone valleys. Most of it is in the Dunmore–Greendale soil association. It is closely associated with the Decatur, Dunmore, Hermitage, Emory, and Lindside soils, and with other Dewey soils. This soil has a lighter brown surface soil and a lighter red, somewhat more friable subsoil than the Decatur soils. Also, it generally contains more sand and chert fragments. It has developed under a deciduous forest cover, chiefly oak, hickory, maple, and chestnut.

Profile description:

0 to 8 inches, brown to reddish-brown friable silty clay loam.
8 to 36 inches, red silty clay; firm when moist, hard when dry; medium blocky structure.
36 inches +, red very firm silty clay splotched with yellow and brown; bedrock of limestone is at depths of 8 to 23 feet in most of the areas.

Most of the soil has lost from 25 to 75 percent of the original surface soil through erosion. A few places are only slightly eroded. A few shallow gullies have formed. The soil is nearly stone free. A little angular chert is on the surface and in the profile in places but not enough to interfere with cultivation. Scattered rock outcrops and narrow limestone ledges occur.

Mapped with this soil are small areas of the Dunmore and Decatur soils and some spots that have a thin covering of brownish-red old alluvium.

The soil is medium to strongly acid. It has a moderate amount of organic matter and is relatively high in plant nutrients. The soil is permeable to roots, but percolation is somewhat retarded by the firm subsoil. Runoff and internal drainage are medium. The moisture-supplying capacity is good.

*Use suitability* (1–H).—Most of this soil is used for crops and pasture. It is well suited to the common crops of the county and is especially well suited to deep-rooted legumes such as alfalfa. Erosion has resulted in the loss of organic matter and plant nutrients and has increased the difficulty of maintaining good tilth. This soil is moderately susceptible to erosion, but it can be conserved in a moderately long rotation.

**Dewey silty clay, severely eroded rolling phase** (5 to 12 percent slopes) (Dn).—This soil is more eroded than Dewey silty clay loam, eroded rolling phase. It occurs in small areas in the Dunmore–Greendale and Stony land–Dunmore soil associations. All of the original surface soil and, in places, part of the subsoil have been eroded.

The plow layer consists mostly of red firm silty clay. The subsoil is red silty clay that is plastic when wet and firm when moist.

Shallow gullies have formed in many areas. Slow permeability increases the erosion hazard of this soil.

*Use suitability* (1–K).—All of this soil has been used for crops and pasture. Much of it is now idle or in unimproved pasture. Rotations should be long and should consist chiefly of close-growing crops or permanent pasture. The soil is well suited to deep-rooted legumes, especially to alfalfa. Tillage should be on the contour and should be kept to a minimum.

**Dewey silty clay loam, eroded hilly phase** (12 to 25 percent slopes) (Do).—Except for the difference in slope, this soil is similar to Dewey silty clay loam, eroded rolling phase. It is widely distributed in upland areas underlain by limestone. Most of it is in the Dunmore–Greendale soil association.

Much of the original surface layer has been lost by erosion. The present surface layer is brown to reddish-brown silty clay loam. The subsoil is red firm silty clay. A few areas that have remained in forest are virtually uneroded; in these places the 8- to 10-inch surface layer is brown silt loam.

This fertile soil has a moderate amount of organic matter in the surface layer. Although percolation is somewhat retarded by the firm subsoil, it is more rapid

than in the Decatur and Dunmore soils. The soil has fair moisture-supplying capacity. Tilth is moderate. Because of the intermixture of clay subsoil, the plow layer is somewhat cloddy.

*Use suitability* (1–N).—Most of this soil has been cropped, but much of it is now used for pasture. This deep soil, though moderately high in fertility, is susceptible to erosion if cultivated. It is more difficult to work than many of the less strongly sloping soils. The soil is especially suited to small grains and legumes and grasses for hay and pasture.

**Dewey silty clay, severely eroded hilly phase** (12 to 25 percent slopes) (Dm).—This soil is similar to Dewey silty clay loam, eroded hilly phase, except that it has been more severely affected by erosion and the present surface layer is fine textured and plastic. It occurs in small areas with other Dewey and Dunmore soils. All of it is in the Dunmore–Greendale and Stony land–Dunmore soil associations.

All of the original surface soil has been lost. The plow layer now consists almost entirely of the red very firm silty clay, which was formerly the upper subsoil material. Below depths of 20 to 35 inches, the subsoil is splotched with yellow and brown. Limestone bedrock is at depths of 6 to 15 feet. Shallow gullies have formed in places.

This soil is not high in fertility, and it contains very little organic matter. It is medium to strongly acid. The moisture-supplying capacity is poor. The slow permeability and strong slopes cause much of the rainfall to run off. Good tilth is difficult to maintain because, during the warmer part of the growing season, the plow layer becomes hard and intractable shortly after a rain. Internal drainage is slow.

*Use suitability* (2–A).—This soil is poorly suited to crops. Droughtiness limits pasture productivity during the drier part of the growing season. If the soil is adequately fertilized and if organic matter is added, good legume-grass pasture can be maintained during much of the grazing season.

**Dewey silty clay loam, eroded steep phase** (25 to 50 percent slopes) (Dr).—This soil has a shallower and finer textured surface layer than Dewey silty clay loam, eroded rolling phase. It is associated with Dunmore, Decatur, Hermitage, and Emory soils and with other Dewey soils in the Dunmore–Greendale soil association.

About 30 percent of this soil is so severely eroded that most or all of the original surface soil has been lost. The plow layer in these places consists of subsoil material. Where erosion has been less severe, the surface layer is reddish-brown firm silty clay loam. The subsoil is red very firm silty clay. Many shallow gullies and a few deep gullies have formed. Gullies are most numerous in the most severely eroded areas.

*Use suitability* (2–B).—All of this soil has been cleared. It is used mainly for pasture. Some is in crops, and some is idle. The soil is not suited to crops. It is only fairly well suited to pasture. Nevertheless, good pastures can be maintained if lime and phosphate are applied and grazing is regulated. The most severely eroded areas should be reforested.

**Dunmore silt loam, rolling phase** (5 to 12 percent slopes) (Dsb).—This soil, like other Dunmore silt loams, is underlain by limestone. It occurs in small, widely distributed areas in the Dunmore–Greendale and Stony land–Dunmore soil associations. Most of it is still under native forest. The Dunmore soils predominate in the Dunmore–Greendale association.

Profile description:

0 to 10 inches, silt loam; pale yellow when dry, brown when moist; the lower part of this layer is brownish yellow and finer textured.
10 to 36 inches, strong-brown to reddish-yellow very firm silty clay.
36 inches +, strong-brown or red very firm silty clay splotched with yellow; limestone bedrock at depths of 3 to 15 feet.

Dunmore silt loam, rolling phase, is moderately fertile and medium to strongly acid. The content of organic matter is low. Good tilth is easily maintained. Internal drainage is medium. The very firm subsoil retards percolation of moisture but can be penetrated by roots. The moisture-supplying capacity is good.

*Use suitability* (1–H).—This soil is well suited to most crops common to the area, especially legumes and grasses such as alfalfa, red clover, orchardgrass, and bluegrass. It is suitable for small grains. Corn and tobacco are among the best row crops. Truck crops grow better on more friable and permeable soils. A 3- to 4-year rotation is feasible if runoff is controlled and if management is otherwise good.

**Dunmore silty clay loam, eroded rolling phase** (5 to 12 percent slopes) (Dsh).—This is the most extensive of the Dunmore soils. It is like Dunmore silt loam, rolling phase, except that it is so eroded that the plow layer, which is silty clay loam in most places, is a mixture of surface soil and subsoil. This soil occupies large areas on the ridgelands of the Dunmore–Greendale soil association. It is also common in the Stony land–Dunmore association.

The 5- to 6-inch plow layer is pale-yellow to yellowish-brown silty clay loam. It is underlain by strong-brown very firm silty clay subsoil. On the stronger slopes, where erosion has been most severe, there are areas where all of the surface soil has been removed. The plow layer in these places consists of strong-brown very firm silty clay subsoil material. Depth to the limestone bedrock ranges from 2½ to 15 feet. A few areas have a thin layer of old general alluvium on the surface. Small chert fragments occur in many places but not in numbers that interfere materially with cultivation.

The soil is moderately fertile, but the content of organic matter is low. The reaction is medium to strongly acid. The moisture-supplying capacity is good. Good tilth is easy to maintain. Internal drainage is medium. Roots penetrate the soil, but percolation of moisture is retarded by the very firm subsoil.

*Use suitability* (1–H).—This soil is well suited to most crops common to the area, especially legumes and grasses such as alfalfa, red clover, orchardgrass, and bluegrass. It is well suited to the small grains. Of the row crops, it is best suited to corn and tobacco. It is not so well suited to truck crops as the more friable, well-drained soils. Runoff causes erosion when the soil is cultivated.

**Dunmore silty clay, severely eroded rolling phase** (5 to 12 percent slopes) (Dse).—This soil is like Dun-

more silt loam, rolling phase, except that it has lost practically all of its original surface soil. A few shallow gullies occur in places.

The plow layer consists almost entirely of strong-brown, very firm silty clay subsoil material. Depth to limestone bedrock ranges from 2 to 12 feet.

This soil is low in fertility and is medium to strongly acid. The organic-matter content is low. Good tilth is difficult to maintain. The plow layer is hard when dry and plastic when wet, and it is difficult to prepare a good seedbed. All tillage operations require considerable power. Much of the rainfall runs off, and the moisture-supplying capacity is only fair.

*Use suitability* (1–K).—The use suitability of this soil is limited. Early maturing crops, such as fall-sown small grains and certain legumes and grasses, are among the crops to which it is best suited. Productivity can be greatly increased by proper fertilization and additions of organic matter. Most of the acreage is probably best suited to permanent pasture.

**Dunmore silt loam, hilly phase** (12 to 25 percent slopes) (Dsa).—This soil is like Dunmore silt loam, rolling phase, except for the difference in slopes. It occurs in small, widely distributed areas throughout the Dunmore–Greendale and Stony land–Dunmore soil associations. It developed from the residuum of slightly clayey limestone.

The surface layer is pale-yellow to pale-brown friable silt loam. The subsoil is strong-brown silty clay, very firm when moist, plastic when wet. Angular chert fragments are mixed with the soil in most places, but they are too small and scattered to interfere with cultivation. Depth to the limestone bedrock ranges from 2 to 12 feet, and there are a few bedrock outcrops. Mapped with this soil are small areas of associated upland soils.

The soil is strongly acid. It has a moderate supply of organic matter and plant nutrients. Infiltration of moisture is somewhat slow, but the soil is permeable and has fair moisture-supplying capacity.

*Use suitability* (1–N).—This soil has not been cultivated. It is fairly well suited to crops and well suited to pasture, provided good management that includes moderate fertilizing and liming is practiced. A long rotation should be used. Among the crops to which it is best suited are small grains and legumes, and grasses such as alfalfa, red clover, orchardgrass, white clover, Ladino clover, and bluegrass. Corn and tobacco are the best row crops, but they should not be grown too frequently.

**Dunmore silty clay loam, eroded hilly phase** (12 to 25 percent slopes) (Dsq).—This soil is like Dunmore silty clay loam, hilly phase, except that it has lost a considerable part of the original surface layer by erosion; the present surface layer is finer textured and somewhat thinner (fig. 10). This soil occurs mostly in strips on ridge slopes, in association with rolling Dunmore soils, which occupy the ridgetops. It is in the Dunmore–Greendale and Stony land–Dunmore soil associations.

The yellowish-brown silty clay loam plow layer is a mixture of subsoil and original surface soil. The subsoil is strong-brown very firm silty clay that is splotched with yellow below a depth of about 28 inches.

*Figure 10.*—Freshly plowed field of Dunmore silty clay loam, eroded hilly phase. Light-colored areas consist almost wholly of original surface soil. Darker areas have lost practically all of their surface soil.

Depth to the limestone bedrock ranges from 2 to 11 feet. There are a few rock outcrops. Near the mountains in the southeastern part of the county, the surface layer of this soil contains some sandy material.

This moderately fertile soil is medium to strongly acid. It is low in organic matter. It is somewhat more difficult to maintain in good tilth than Dunmore silt loam, hilly phase. The moisture-supplying capacity is fair. Internal drainage is good. Roots penetrate the soil, but percolation of water is retarded by the very firm subsoil.

*Use suitability* (1–N).—All of this soil has been cleared and cultivated. About 50 percent of it is now used for pasture. Because of the strong slopes and very firm subsoil, it should not be used frequently for row crops. Among the crops to which it is best suited are small grains and legume-grass hay or pasture. The steeper, more eroded areas are best suited to permanent pasture.

**Dunmore silty clay, severely eroded hilly phase** (12 to 25 percent slopes) (Dsd)—This soil is like Dunmore silt loam, hilly phase, except that it is so severely eroded that it has lost practically all of its original surface soil. The soil is widely distributed throughout the Dunmore–Greendale soil association. Smaller acreages are included in the Stony land–Dunmore soil association.

The plow layer and subsoil, to a depth of about 24 inches, are strong-brown very firm silty clay. This is underlain by strong-brown or red very firm silty clay, splotched with yellow. Depth to the limestone bedrock ranges from 1½ to 9 feet. There are a few rock outcrops. Shallow gullies are common. A few gullies are too deep to cross with heavy machinery.

*Use suitability* (2–A).—All of this soil has been cultivated, but much of it is now in unimproved pasture or is idle. A part is still cropped, chiefly to hay, small grains, and corn.

This soil is poorly suited to crops. Adequately fertilized and properly seeded, it will support good legume-grass pasture. The carrying capacity, however, is limited by droughtiness.

**Dunmore silt loam, steep phase** (25 to 50 percent slopes) (Dsc).—This soil is like Dunmore silt loam, hilly phase, except that it is more strongly sloping, has more rock outcrops, and, in general, is shallower to

bedrock. It occurs in small areas in the Dunmore–Greendale and Stony land–Dunmore soil associations.

The surface layer is yellowish-brown friable silt loam. It is underlain by strong-brown very firm silty clay subsoil. Depth to bedrock ranges from 1½ to 9 feet.

Fertility is moderate, and some organic matter is present in the surface layer. The soil is medium to strongly acid. The surface soil is permeable. Roots penetrate the very firm subsoil, but percolation of moisture is retarded. The moisture-supplying capacity is poor. If the forest cover is removed, much of the rainfall runs off.

*Use suitability* (2–B).—The soil is difficult to work and highly erodible, because it is steep and slowly permeable. It is poor for crops, but if properly managed it is fairly well suited to pasture. Pasture yields would be lower than on the less strongly sloping Dunmore soils.

**Dunmore silty clay loam, eroded steep phase** (25 to 50 percent slopes) (Dsk).—Much of the original surface layer of this soil has been lost by erosion. The soil occurs in small areas on steep ridge slopes, below more gently sloping Dunmore soils. All of it is in the Dunmore–Greendale and Stony land–Dunmore soil associations.

The 4- to 5-inch plow layer is yellowish-brown silty clay loam. This is underlain by strong-brown very firm silty clay. Depth to the limestone bedrock ranges from 1½ to 8 feet.

Rock outcrops are common but do not prevent cultivation. Fertility is moderate, but the soil contains only a small amount of organic matter. The soil is medium to strongly acid. Tilth varies, depending on how much of the original friable surface soil still remains in the plow layer. Except where the plow layer consists mostly of subsoil, good tilth is fairly easy to maintain. The moisture-supplying capacity is very poor. Runoff begins quickly during rains.

*Use suitability* (2–B).—All of this soil has been cleared and cropped. Much of it is now used for pasture, some is idle, and a small part is cultivated.

Because of the very strong slopes and slowly permeable subsoil, this soil is poorly suited to cultivated crops. It can support good-quality pasture, but the carrying capacity is only medium.

**Dunmore silty clay, severely eroded steep phase** (25 to 50 percent slopes) (Dsf).—This soil has lost practically all of its original silt loam surface soil; in most places the present surface layer is silty clay. In this respect it differs from Dunmore silt loam, steep phase. It occurs in small areas on strong ridge slopes in the Dunmore–Greendale and Stony land–Dunmore soil associations.

The 5- to 6-inch plow layer and the subsoil, to a depth of about 20 inches, are strong-brown very firm silty clay. The plow layer, in most places, is silty clay subsoil material, but in small areas it is intermixed with some of the original silt loam surface soil. Depth to limestone bedrock ranges from 1½ to 7 feet. Rock crops out in places. Gullies are common, but most of them can be crossed by machinery.

Fertility is low, and the content of organic matter is very low. The soil is medium to strongly acid. Good tilth is difficult to maintain. The moisture-supplying capacity is very poor. Moisture percolates slowly; consequently, much of the rainfall runs off.

*Use suitability* (3–A).—All of this soil has been cropped. Much of it is now in pasture, but a part is idle.

This soil is very poorly suited to crops. It is of low value for pasture. Adequate fertilizing, liming, and careful reseeding of the soil to legumes and grasses are necessary to establish productive grazing vegetation. Reforestation would be the best use for most of this soil.

**Dunmore cherty silt loam, rolling phase** (5 to 12 percent slopes) (Dnb).—This well-drained cherty soil has developed from the residuum of cherty clayey limestone. Most of it is on low ridge crests in association with other Dunmore soils in the Dunmore–Greendale soil association. It is more cherty throughout and, in general, has a lighter colored surface layer than Dunmore silt loam, rolling phase.

Profile description:

0 to 10 inches, light yellowish-brown to pale-yellow friable cherty silt loam; the topmost 1 to 2 inches stained dark with organic matter.
10 to 16 inches, brownish-yellow friable cherty silty clay loam.
16 to 48 inches, strong-brown to reddish-yellow cherty silty clay; very firm when moist, plastic when wet.
48 inches +, very firm plastic cherty silty clay mottled with strong brown, yellowish red, and yellow; bedrock at depths of 3 to 15 feet.

Small areas of other Dunmore soils are included in the mapping unit.

The soil is strongly acid. It is moderately low in organic matter, except in the topmost 1 to 2 inches, and has a moderate supply of plant nutrients. Moisture is readily absorbed and moderately well retained. The soil is permeable to roots, air, and moisture, but percolation of moisture is retarded by the very firm subsoil. Runoff and internal drainage are medium. The moisture-supplying capacity is good. The amount of chert in the soil is variable; in some areas the surface layer contains enough large chert fragments to make tillage difficult.

*Use suitability* (1–H).—All of this soil is under cutover deciduous forest in which oaks predominate. The soil responds well to fertilization and other good management practices. Corn, tobacco, small grains, and legumes and grasses such as alfalfa, red clover, orchardgrass, Ladino clover, white clover, and bluegrass are suitable crops. Chert fragments interfere with cultivation and mowing. To produce yields comparable to those obtained on Dunmore silt loam, rolling phase, this soil must be more heavily fertilized.

**Dunmore cherty silty clay loam, eroded rolling phase** (5 to 12 percent slopes) (Dnh).—This soil has eroded to the extent that, in most places, the plow layer consists of subsoil mixed with remnants of the original surface soil. It occurs in large, irregular areas on broad ridgelands, chiefly in the Dunmore–Greendale soil association and to a lesser extent in the Stony land–Dunmore association.

The uppermost 5 to 6 inches is yellowish-brown cherty silty clay loam. The underlying layer is strong-brown or reddish-yellow very firm cherty silty clay that grades with depth to splotched strong brown and yel-

low. Depth to the cherty limestone bedrock ranges from 3 to 15 feet.

This soil is not high in fertility but it responds well to good management. It has a small amount of organic matter and is medium to strongly acid. Internal drainage is medium, and the moisture-supplying capacity is good. Percolation of moisture, however, is retarded by the very firm silty clay subsoil.

*Use suitability* (1–H).—All of this soil has been cultivated. More than 50 percent is now in crops. The rest of the soil is in pasture, some of which has been improved by fertilizing, liming, and seeding to legumes and grasses.

This soil responds to good management. It is suited to most of the common crops, such as corn, tobacco, small grains, and many legumes and grasses for hay and pasture. The chert fragments are numerous enough to interfere with tillage and mowing. This soil, especially the more cherty areas, needs somewhat heavier fertilization than the Dunmore silt loams and the Dunmore silty clay loams. The very firm subsoil makes this soil less suitable for truck crops than many of the more friable well-drained soils.

**Dunmore cherty silty clay, severely eroded rolling phase** (5 to 12 percent slopes) (Dne).—This soil has lost practically all of its original surface layer. It differs from Dunmore cherty silt loam, rolling phase, mainly in having a finer textured plow layer. It occurs in small areas in association with other rolling Dunmore soils. Most of it is in the Dunmore–Greendale soil association.

The 4- to 5-inch plow layer and the subsoil to a depth of about 30 inches are strong-brown to reddish-yellow very firm cherty silty clay. In the patches where some of the original surface soil remains, the plow layer is more friable. The limestone bedrock begins at depths of 2 to 12 feet. Gullies are common, but most of them can be crossed by machinery. Chert fragments are numerous enough to interfere with field operations.

This soil is low in fertility and is medium to strongly acid. It has very little organic matter. The very firm plow layer and the chert fragments make tillage difficult. Although roots penetrate the soil, moisture percolates very slowly, and a large part of the rainfall runs off. The soil is droughty because the moisture-supplying capacity is only fair.

*Use suitability* (1–K).—All of this soil has been cleared and cropped. Much of it is now in pasture, but some areas are still cultivated. This soil is poorly suited to crops. Good pastures can be established, if they are limed, seeded, and liberally fertilized. Droughtiness, however, limits carrying capacity during the drier parts of the growing season.

**Dunmore cherty silt loam, hilly phase** (12 to 25 percent slopes) (Dna).—This soil is like Dunmore cherty silt loam, rolling phase, except that it is more strongly sloping and the soil layers are thinner. Much of it occurs on ridge slopes, below the less strongly sloping Dunmore soils that occupy the ridge crests. It is widely distributed throughout the Dunmore–Greendale and Stony land–Dunmore soil associations.

The surface layer is light yellowish-brown to pale-yellow friable cherty silt loam, 6 to 8 inches thick, that grades to brownish-yellow cherty silty clay loam. Below depths of 12 to 14 inches, the subsoil is strong-brown to reddish-yellow cherty silty clay, very firm when moist, sticky when wet. Depth to bedrock ranges from 2 to 12 feet. There are a few bedrock outcrops.

The soil is medium to strongly acid. The content of organic matter is moderately low except in the surface layer. It is lower in plant nutrients than the redder soils, but higher than most of the light-colored sandy soils in the county. Fertility is moderate, but like other Dunmore soils that are not severely eroded, this soil responds well to fertilization. Good tilth is easily maintained, but chert interferes with cultivation. Internal drainage is medium. The surface layer absorbs and holds moisture well. The very firm subsoil, although permeable to roots, retards percolation. The moisture-supplying capacity is fair.

*Use suitability* (2–A).—All of this soil is under cutover native hardwood forest in which oaks predominate. It is poorly suited to cultivation. Small grains and hay can be grown if runoff is controlled and if the soil is adequately fertilized and otherwise well managed. The cultivation of corn and tobacco is difficult, and these crops cannot be grown frequently. If properly fertilized and seeded, good pastures can be maintained.

**Dunmore cherty silty clay loam, eroded hilly phase** (12 to 25 percent slopes) (Dng).—This soil has a finer textured surface layer than Dunmore cherty silt loam, hilly phase, having lost from 25 to 75 percent of its original surface layer through erosion. It is widely distributed throughout the Dunmore–Greendale and Stony land–Dunmore soil associations. Many of the areas are moderately large.

Tillage has mixed subsoil with the original surface soil. The present plow layer is mostly yellowish-brown cherty silty clay loam that is friable when moist and sticky when wet. The subsoil is strong-brown to reddish-yellow firm cherty silty clay. Shallow gullies are common, and a few deep gullies have formed.

The soil is strongly acid. It is moderately low in organic matter and plant nutrients. The plow layer is permeable, and internal drainage is medium. The subsoil, although permeable to roots, retards percolation of moisture. Runoff is rapid, and the moisture-supplying capacity is poor. In most places chert fragments are numerous enough to interfere with cultivation and to cause tillage implements to wear rapidly.

*Use suitability* (2–A).—All of this soil has been cleared and used for crops and pasture. About 50 percent of it is now in pasture, a considerable acreage is in crops, and some is idle. This soil is poorly suited to cultivated crops. On most farms it can best be used for permanent pasture. If it is used for crops, tillage should be on the contour and long rotations made up largely of close-growing crops should be followed.

**Dunmore cherty silty clay, severely eroded hilly phase** (12 to 25 percent slopes) (Dnd).—This soil is so severely eroded that the plow layer consists almost entirely of subsoil material. It is widely distributed throughout the Dunmore–Greendale and Stony land–Dunmore soil associations, mostly in small areas.

The 4- to 5-inch plow layer and the subsoil to a depth of about 24 inches are strong-brown very firm

cherty silty clay. This material grades to very firm cherty silty clay splotched with strong brown and yellow. The limestone bedrock is at depths of 1½ to 9 feet. There are some rock outcrops.

In the patches where some of the original surface soil remains and is mixed with subsoil in the plow layer, the soil is more friable and permeable than is typical. Gullies are common, but most of them can be crossed by farm machinery.

This soil is medium to strongly acid. It is low in fertility, and the content of organic matter is low. Chert fragments are numerous enough in most places to interfere with cultivation. Because of the very firm surface layer, good tilth is difficult to maintain, and absorption of moisture is impeded. The moisture-supplying capacity is poor.

*Use suitability* (2–A).—All of this soil has been cleared and cropped. A small part is still cropped, and some is idle. Most of it is in pasture, much of which is unimproved.

This soil responds to fertilization, but it is poorly suited to cultivation. If well managed it will support good pasture, but droughtiness limits the carrying capacity.

**Dunmore cherty silt loam, steep phase** (25 to 50 percent slopes) (Dnc).—Except for slope this soil resembles Dunmore cherty silt loam, hilly phase. It occurs on the steepest slopes of the highest cherty ridges in the Dunmore–Greendale and Stony land–Dunmore soil associations.

The uppermost 6 inches is pale-yellow to yellowish-brown cherty silt loam that grades to brownish-yellow or yellowish-brown cherty silty clay loam. This is underlain by strong-brown to reddish-yellow very firm cherty silty clay that grades to splotched strong-brown and yellow cherty silty clay. Depth to the limestone bedrock ranges from 18 inches to 9 feet. Rock outcrops are common.

This soil is medium to strongly acid. It is low in fertility, and the content of organic matter is moderate. The surface layer is friable, but chert fragments interfere with cultivation. Internal drainage is medium. Moisture easily penetrates the surface layer, but percolation is retarded by the very firm subsoil. Roots penetrate to bedrock. The moisture-supplying capacity is very poor.

*Use suitability* (2–B).—All of this soil is under cutover deciduous forest. It is poorly suited to cultivation. If properly fertilized it would provide good grazing. The south-facing slopes are drier, and therefore less productive of pasture, than north-facing slopes. Most of the soil should be left in forest.

**Dunmore cherty silty clay loam, eroded steep phase** (25 to 50 percent slopes) (Dnk).—This soil has been cultivated. As a result, it is eroded to the extent that the 5- to 6-inch plow layer now consists of a mixture of original surface soil and subsoil. Otherwise, it is like Dunmore cherty silt loam, steep phase. It occurs on the steepest slopes of the highest cherty ridges in the Dunmore–Greendale and Stony land–Dunmore soil associations. Normally the plow layer is yellowish-brown cherty silty clay loam. It is underlain by strong-brown very firm cherty silty clay subsoil.

Depth to the limestone bedrock ranges from 1 to 8 feet. Outcrops are common. In severely eroded areas on exposed slopes, the plow layer is very firm silty clay. Small gullies are common.

The soil is not high in fertility. It is medium to strongly acid. The organic-matter content is low. Good tilth is fairly easy to maintain, but chert fragments are numerous enough to interfere with cultivation. Moisture infiltrates the plow layer well, except in the severely eroded areas, but the very firm subsoil greatly retards percolation. In general, the moisture-supplying capacity is very poor. The moisture supply is usually more favorable on the north-facing slopes than on the south-facing, especially during the hot, dry, late-summer period.

*Use suitability* (2–B).—All of this soil has been cleared and cropped at some time. More than half is now in pasture. A small part is still cropped. The rest is idle and has a variable cover of briers, young trees, and broomsedge.

This soil is poorly suited to crops. It is not desirable for pasture but, if properly fertilized and seeded, it can provide good grazing. Because of the effects of erosion, it is more difficult to build up productivity and more difficult to control runoff than is the case with Dunmore cherty silt loam, steep phase.

**Dunmore cherty silty clay, severely eroded steep phase** (25 to 50 percent slopes) (Dnf).—This soil occurs in small areas, mainly on the steepest parts of the highest cherty ridges. It is in the Dunmore–Greendale and Stony land–Dunmore soil associations. It differs from Dunmore cherty silt loam, steep phase, in that it is so severely eroded that the plow layer consists almost entirely of the strong-brown to reddish-yellow very firm cherty silty clay subsoil. Depth to limestone bedrock ranges from 1 to 7 feet. Gullies are common, but they are not deep because the clay subsoil resists erosion.

This soil is medium to strongly acid. It is low in fertility, and the content of organic matter is low. Moisture infiltrates slowly, and much of the rainfall runs off. Good tilth is difficult to maintain. Chert fragments are numerous enough to interfere materially with cultivation. The moisture-supplying capacity is very poor; consequently the soil is droughty, especially on south-facing slopes.

*Use suitability* (3–A).—All of this soil has been cleared and cultivated. Most of it is now in unimproved pasture, but some is idle and under a growth of brush.

This soil is poor for either crops or pasture. Much effort and expense would be required to improve the tilth, fertility, and moisture supply enough to establish good pastures. Reforestation, preferably with pine, is the best use for this soil.

**Dunmore loam, rolling phase** (5 to 12 percent slopes) (Dnp).—This well-drained uneroded soil, like other Dunmore loams and Dunmore stony loams, has developed from materials weathered from dolomitic limestone containing lenses or interbeds of sandstone. It has formed under deciduous forest vegetation. It is associated with other Dunmore loams in irregular belts in the Dunmore–Greendale soil association. In general, this soil occurs on higher ridges than the Dunmore silt loams and Dunmore cherty silt loams. It is slightly

coarser textured throughout and more permeable than the silty Dunmore soils.

Profile description:

0 to 8 inches, pale-yellow or brownish-yellow very friable loam; the topmost 1 to 2 inches is stained dark with organic matter.
8 to 14 inches, brownish-yellow or yellowish-brown clay loam; friable when moist, sticky when wet.
14 to 30 inches, reddish-yellow or strong-brown sandy clay; firm to very firm when moist, plastic when wet.
30 inches +, plastic sandy clay; yellowish red variegated with yellow and brown splotches; bedrock of limestone or sandy rock normally is at depths of 3 to 15 feet, but in places sandy rock is near the surface.

Included with this soil, in many places, are small areas of other Dunmore soils.

The soil is strongly acid and has some organic matter in the surface layer. Chert and sandstone fragments are on the surface and throughout the profile but not in quantities that interfere with cultivation. Good tilth is easily maintained. The soil is permeable, especially in the 12- or 14-inch surface layer, and runoff is medium. The moisture-supplying capacity is good.

*Use suitability* (1–H).—This soil is well suited to pasture and to many kinds of crops. It is better than the Dunmore silt loams for truck crops that require a fine seedbed and intensive cultivation. The soil is not difficult to work or to conserve, and its productivity is easily built up to and maintained at a high level. Because of the rolling slopes, measures are needed to control runoff.

**Dunmore loam, eroded rolling phase** (5 to 12 percent slopes) (Dnm).—This soil is like Dunmore loam, rolling phase, except that it has lost a considerable part of its original surface soil through erosion. It is associated with other Dunmore loams in irregular belts in the Dunmore–Greendale and Stony land–Dunmore soil associations.

The surface layer is yellowish-brown friable loam to sandy clay loam. The subsoil is reddish-yellow to strong-brown clay loam or sandy clay that is firm to very firm when moist and plastic when wet. Depth to the bedrock of limestone or sandy rock ranges from 3 to 15 feet. Outcrops are uncommon. Mapped with this soil are a few severely eroded patches and a few areas in which the surface layer is sandy loam.

This moderately fertile soil is medium to strongly acid and low in organic matter. It responds well to fertilization. Roots penetrate the soil, but infiltration of moisture is retarded by the firm subsoil. The moisture-supplying capacity is good, except in severely eroded areas. Good tilth is easily maintained.

*Use suitability* (1–H).—All of this soil has been cleared and cropped. Some of it is still cultivated, and most of the rest is in permanent pasture. It is suited to many kinds of crops but, because of rolling slopes and somewhat slowly permeable subsoil, it is not well suited to crops that require intensive cultivation. Moderately long rotations that consist of general farm crops, such as corn, tobacco, small grains, and legumes and grasses, are well suited. Good pasture of high carrying capacity can be maintained under proper management.

**Dunmore loam, hilly phase** (12 to 25 percent slopes) (Dno).—This soil is like Dunmore loam, rolling phase, except that it is shallower and has a few outcrops of bedrock. It is associated with the other Dunmore loam soils in irregular belts in the Dunmore–Greendale soil association.

The surface layer is yellowish-brown very friable loam. The subsoil is reddish-yellow to strong-brown clay loam or sandy clay that is firm to very firm when moist and plastic when wet. Limestone bedrock or sandy rock is at depths of 2 to 12 feet.

The chert and sandstone fragments on the surface and throughout the soil are too small or too scattered to interfere with tillage. This soil is strongly acid and has a moderate amount of organic matter and plant nutrients. The 8- to 12-inch surface layer is permeable, and moisture-supplying capacity is fair. Runoff, however, is rapid.

*Use suitability* (1–N).—The use suitability of this soil is limited chiefly by the strong slopes. The soil should be well suited to small grains and legumes and grasses, such as alfalfa, red clover, orchardgrass, Ladino clover, white clover, and bluegrass. Corn and tobacco should produce well if adequately fertilized. They should not be grown frequently, because runoff would be difficult to control if the soil were cultivated. Good pastures of fairly high carrying capacity can be established and maintained.

**Dunmore loam, eroded hilly phase** (12 to 25 percent slopes) (Dnl).—This soil has eroded to such an extent that the plow layer consists of a mixture of subsoil and original surface soil. Otherwise, it is like Dunmore loam, hilly phase. It is associated with other Dunmore loams in irregular belts in the Dunmore–Greendale soil association.

The 4- to 5-inch plow layer is yellowish-brown loam or clay loam. The subsoil is reddish-yellow or strong-brown very firm clay loam to sandy clay. The limestone or sandy rock bedrock occurs at depths of 2 to 11 feet. Where all the original surface soil has been lost, the plow layer is reddish-yellow firm to very firm sandy clay. Gullies occur in places. Chert and sandstone fragments are common in some areas but are not numerous enough to interfere much with cultivation.

This soil is medium to strongly acid. It is not high in fertility or in organic-matter content, but it responds well to good management. Roots penetrate the soil to great depths. Internal drainage is medium; the firm subsoil retards infiltration of moisture but generally less than in the Dunmore silt loams and Dunmore silty clay loams. The moisture-supplying capacity is fair.

*Use suitability* (1–N).—All of this soil has been cultivated. Over 50 percent is now used for pasture, a small part is idle, and the rest is in general farm crops. The soil is well suited to corn and tobacco but, because of the strong slopes, it is difficult to work and cannot be cultivated regularly to row crops. It is well suited to small grains and to legumes and grasses if it is well managed.

**Dunmore loam, steep phase** (25 to 50 percent slopes) (Dnr).—This soil generally has a thinner surface layer and a shallower profile than Dunmore loam, hilly phase. It occupies narrow belts on the steepest slopes. It is associated with other Dunmore loams, mainly in the Dunmore–Greendale soil association.

The surface layer is yellowish-brown loam. It is underlain by reddish-yellow to strong-brown firm to very firm clay loam or sandy clay. Below a depth of about 22 inches, the soil is splotched.

Bedrock of limestone or sandy rock normally occurs at depths of 1½ to 9 feet. Rock outcrops are commoner than on the less strongly sloping Dunmore loams but are not numerous enough to prohibit tillage.

This soil is moderately fertile and is medium to strongly acid. There is some organic matter in the surface layer. Internal drainage is medium, and moisture infiltrates well to depths of 12 to 14 inches. Although the firm subsoil noticeably impedes infiltration, it is more permeable than the subsoil of the Dunmore silt loams and Dunmore silty clay loams. The entire profile is permeable to roots. The moisture-supplying capacity is very poor. The south-facing slopes are more droughty than the north-facing slopes.

*Use suitability* (2–B).—Practically all of this soil is under cutover deciduous forest, chiefly oak. It is poorly suited to crops. Tilth is poor. Because of runoff, the soil is likely to erode. Good-quality pastures of grasses and legumes can be established, but the carrying capacity is not so good as that of pastures on less strongly sloping and generally less droughty Dunmore soils.

**Dunmore loam, eroded steep phase** (25 to 50 percent slopes) (Dnn).—This soil is like Dunmore loam, steep phase, except that it has been cleared and cultivated and has, as a result, lost much of its surface layer through erosion. It occupies the steepest slopes in the narrow belts of Dunmore loams in the Dunmore–Greendale soil association. Generally it is on ridges higher than those on which the Dunmore silt loams occur.

The plow layer consists of a mixture of surface soil and subsoil. The topmost 4 or 5 inches is yellowish-brown loam or clay loam. It is underlain by reddish-yellow to strong-brown sandy clay loam or sandy clay. In patches where all of the surface soil has been lost, the plow layer is strong-brown very firm clay loam or sandy clay. Bedrock of limestone or sandy rock normally occurs at depths of 1 to 8 feet. Outcrops are fairly common but are not numerous enough to prevent cultivation. Gullies are common, but most of them can be crossed by machinery.

*Use suitability* (2–B).—All of this soil has been cultivated. Most of it is now in pasture. It is poorly suited to crops. The most severely eroded areas are droughty and poorly suited to pasture. A small area of pasture has been improved by fertilizing and proper seeding. Much of the remaining pasture could likewise be improved, but the carrying capacity would be less than that of pastures on less strongly sloping Dunmore soils.

**Dunmore stony loam, rolling phase** (5 to 12 percent slopes) (Due).—This soil is like Dunmore loam, rolling phase, except that it contains enough sandstone fragments and chert to interfere materially with cultivation. It occurs in narrow belts on smooth ridgetops in association with Dunmore loams and other Dunmore stony loams. It is widely distributed in the Dunmore–Greendale and the Stony land–Dunmore soil associations. The limestone or sandy rock bedrock normally occurs at depths of 2 to 10 feet, but it crops out in a few places.

Profile description:

0 to 8 inches, brownish-gray or pale-yellow friable stony loam that contains numerous sandy rock fragments.
8 to 14 inches, brownish-yellow or yellowish-brown clay loam or sandy clay loam; friable when moist, sticky when wet; contains many stones and, in places, chert fragments.
14 to 30 inches, reddish-yellow to strong-brown firm to very firm stony sandy clay.
30 inches +, splotched or variegated reddish-yellow, strong-brown, and yellow very firm sandy clay.

This soil is moderately fertile—generally a little less fertile than the Dunmore silt loams. The surface layer contains some organic matter, most of which disappears after a period of cultivation if it is not replenished. Internal drainage is medium. Moisture infiltrates readily to a depth of about 14 inches. Below that it is retarded by the firm subsoil, but percolation is generally more rapid than in the Dunmore silt loams and Dunmore silty clay loams. The moisture-supplying capacity is good.

*Use suitability* (1–H).—All of this soil is under cutover deciduous or hardwood forest. It responds to good management and would be suited to the crops commonly grown in the county, except that the stones interfere with tillage. Good stands of grasses and legumes for hay or pasture could be established if the fertility were maintained. Crops could be grown in a 3- to 4-year rotation if fertility were maintained and runoff controlled.

**Dunmore stony loam, eroded rolling phase** (5 to 12 percent slopes) (Dub).—This soil is like Dunmore stony loam, rolling phase, except that it has been cleared and cultivated and, as a result, is eroded to the extent that the plow layer consists of a mixture of orginal surface soil and subsoil. It occurs in narrow belts on the smoother and broader high ridgetops in the Dunmore–Greendale and Stony land–Dunmore soil associations. It is associated with Dunmore loams and Dunmore stony loams.

The topmost 4 to 5 inches is yellowish-brown stony loam or stony clay loam. It is underlain by reddish-yellow to strong-brown firm to very firm clay loam or sandy clay. Bedrock of limestone or sandy rock occurs at depths of 2 to 10 feet.

The firm or very firm sandy clay subsoil is exposed in places. In others, the subsoil begins at depths of 6 to 8 inches.

Internal drainage is medium. In the places where the subsoil is exposed, infiltration is slow; where it begins at a depth of 6 inches or more, infiltration is good to that depth but retarded below. Runoff begins quickly during heavy rains. Good tilth is easily maintained where there is more than 4 or 5 inches of surface soil, but it is very difficult to maintain where subsoil is exposed. The moisture-supplying capacity is normally good, but the places where the subsoil is exposed are droughty.

*Use suitability* (1–H).—All of this soil has been cleared, and much of it is in crops, chiefly corn, tobacco, small grains, and legume-grass hay. The rest is used for pasture.

This soil is suited to the crops commonly grown in the county, but the stones interfere with many field

operations, especially with cultivation. The soil responds well to good management. Provided high fertility is maintained, the soil is productive of legumes and grasses. For crops, a 3- or 4-year rotation is suitable if fertility is maintained and runoff controlled.

**Dunmore stony loam, hilly phase** (12 to 25 percent slopes) (Dud).—Except for slope, this soil is like Dunmore stony loam, rolling phase. It is associated with other Dunmore stony loams and Dunmore loams that occur in narrow belts throughout much of the Dunmore–Greendale and Stony land–Dunmore soil associations.

The 6- to 8-inch surface layer is pale-yellow or brownish-gray loam or fine sandy loam. It is underlain by brownish-yellow or yellowish-brown friable to somewhat firm clay loam or sandy clay loam. Sandstone fragments are common throughout these surface layers. Reddish-yellow to strong-brown firm to very firm stony sandy clay begins at a depth of about 12 inches. This material is splotched with reddish yellow, strong brown, and yellow below a depth of about 26 inches.

Bedrock of limestone or sandy rock normally occurs at depths of 2 to 8 feet. Outcrops, chiefly of sandstone material, are not uncommon. This soil is less fertile than the Dunmore silt loams, but it responds well to proper fertilization. Tilth is good. Internal drainage is medium; the soil is permeable to roots and moisture to a depth of at least 12 or 14 inches. Below that the subsoil is firm enough to impede percolation somewhat. As a result, runoff begins quickly during rains. The moisture-supplying capacity is fair.

*Use suitability* (2–A).—Practically all of this soil is under cutover native deciduous forest. It is poorly suited to cultivated crops. On farms that have limited acreages of better cropland, this soil may be used in a moderately long rotation. Generally, however, most of it can better be used for permanent pasture. It will support a good grass-legume cover if fertility is maintained at a high level.

**Dunmore stony loam, eroded hilly phase** (12 to 25 percent slopes) (Dua).—This soil has been cleared and cultivated. As a result it has lost much of its original surface soil through erosion. Otherwise, it is like Dunmore stony loam, hilly phase. It occurs in narrow belts throughout the Dunmore–Greendale soil association and in a few small areas in the Stony land–Dunmore association.

The 4- to 5-inch plow layer is yellowish-brown loam or clay loam. It contains enough sandstone fragments to interfere with cultivation. In small patches from which all the surface soil has been removed by erosion, the plow layer consists of reddish-yellow to strong-brown very firm sandy clay. The limestone or sandstone bedrock normally occurs at depths of 2 to 7 feet. Outcrops are fairly common. Shallow gullies are numerous in places.

This soil is somewhat less fertile than the Dunmore silt loams. It is permeable to roots and moisture, although the firm subsoil retards percolation. Runoff begins quickly during rains and creates an erosion hazard. Normally, tilth is fairly good, and the moisture-supplying capacity is fair. The most severely eroded spots are droughty and have poor tilth.

*Use suitability* (2–A).—All of this soil has been cultivated. Much of it is now in pasture, some of it is idle, and a small part is in crops. Generally yields are low.

This soil, especially the more eroded parts, is poor for cultivated crops. On farms that have limited acreages of better cropland, it may be used in long rotations that consist predominantly of small grains and hay crops. Corn and tobacco can be grown occasionally under careful management. If well managed this soil will support good stands of legumes and grasses for hay or pasture.

**Dunmore stony loam, steep phase** (25 to 50 percent slopes) (Duf).—This soil is like Dunmore stony loam, rolling phase, except that it has a thinner surface layer and a shallower profile and is more strongly sloping. It occupies the steepest slopes in the narrow belts of Dunmore loams and Dunmore stony loams that occur throughout the Dunmore–Greendale soil association.

The 5- to 6-inch surface layer is pale-yellow or brownish-yellow stony loam or stony fine sandy loam. This layer grades to brownish-yellow or yellowish-brown firm clay loam or sandy clay loam that contains many sandstone fragments. The subsoil is reddish-yellow or strong-brown firm to very firm stony sandy clay. Bedrock normally occurs at depths of 1½ to 6 feet. Outcrops, mostly sandstone, are common.

This soil is moderately fertile and is medium to strongly acid. The surface layer contains a small amount of organic matter. Tilth is good. Internal drainage is medium. The soil is permeable to roots and moisture to a depth of about 12 inches. The very firm subsoil retards infiltration and causes runoff to begin quickly during rains. The moisture-supplying capacity is very poor. The south-facing slopes are more droughty than the north-facing slopes.

*Use suitability* (2–B).—All of this soil is under cutover native forest. It is poorly suited to cultivated crops. It is difficult to work and likely to erode. Although much of the area would support a good cover of legumes and grasses, most of this soil is best left in forest.

**Dunmore stony loam, eroded steep phase** (25 to 50 percent slopes) (Duc).—This soil has been cleared and cultivated and, as a result, has lost much of its surface layer through erosion. Otherwise, it is like Dunmore stony loam, steep phase. It occupies the strongest slopes in the narrow belts of Dunmore loams and Dunmore stony loams that occur throughout the Dunmore–Greendale soil association.

The 4- to 5-inch plow layer is a mixture of original surface soil and subsoil. It is yellowish-brown stony loam or stony clay loam. Below this layer is reddish-yellow to strong-brown firm to a very firm sandy clay. The limestone or sandstone bedrock normally occurs at depths of 1 to 5 feet. Outcrops are fairly common.

In patches from which all of the surface soil has been removed by erosion, the plow layer consists of strong-brown very firm sandy clay subsoil.

*Use suitability* (2–B).—All of this soil has been cultivated. Most of it is now in pasture, but some is idle, and a small part is in crops. It is poorly suited to cultivation. Crop yields are low. The most severely eroded areas, especially those on the south-facing

slopes, are too droughty to be good for pasture. Areas that are less severely eroded can be improved for pasture by liming, fertilizing, and proper seeding.

**Elk and Tupelo silt loams, undulating phase** (2 to 5 percent slopes) (Eb).—This mapping unit is comprised chiefly of intermixed areas of Elk and Tupelo soils. A few areas consist chiefly of one soil or the other. The unit is in the Dunmore–Greendale soil association and occupies small areas on low stream terraces along the larger creeks in the county. Some parts are low enough to be flooded occasionally.

These soils consist of general alluvium or stream-terrace material, derived chiefly from limestone. In places some of the material was derived from shale and sandy rock.

Profile description of Elk silt loam:

0 to 10 inches, brown friable silt loam.
10 to 40 inches, yellowish-brown friable to firm silty clay loam.
40 inches +, yellowish-brown silty clay loam mottled with yellow and gray; in places this material contains an appreciable amount of sand; gravelly and sandy lenses are common; limestone bedrock at depths of 3 to 7 feet.

Profile description of Tupelo silt loam:

0 to 8 inches, grayish-brown friable silt loam.
8 to 18 inches, pale-yellow friable to firm silty clay loam.
18 to 36 inches, pale-yellow to yellowish-brown very firm silty clay mottled with gray and brown.
36 inches +, plastic very tough silty clay mottled with gray, yellow, and brown; limestone bedrock at depths of 2½ to 5 feet.

These soils are moderately high in fertility and are medium to strongly acid. They contain a fair amount of organic matter, especially the Elk silt loam. Internal drainage is medium in the Elk soil but slow in the Tupelo soil. The Elk soil is permeable to moisture and roots to a considerable depth, but the plastic silty clay subsoil of the Tupelo soil is very slowly permeable to roots and moisture. The moisture-supplying capacity is good in the Elk soil and fair in the Tupelo soil.

*Use suitability* (1–D).—Practically all of this mapping unit has been cleared and cultivated. Some is now in pasture, but little of it is idle. The Elk soil is suited to many kinds of crops. The Tupelo soil, because of its very firm subsoil, is less well suited to root crops and alfalfa. Both soils are productive. Since they respond to fertilization, it is not difficult to maintain the high level of productivity. Most of the acreage is easy to work. Good grass-legume pastures are easily maintained. The Elk soil particularly is well supplied with moisture and provides good pasture during the dry part of the growing season.

**Elk and Tupelo silt loams, eroded rolling phase** (5 to 12 percent slopes) (Ea).—This mapping unit is like Elk and Tupelo silt loams, undulating phase, except that it is more strongly sloping and is eroded to the extent that subsoil material is mixed with the original surface soil in the plow layer. In patches on the stronger slopes, the plow layer is almost entirely subsoil material. This mapping unit is associated with the undulating phases. It occurs on the more strongly sloping parts of low stream terraces along the larger creeks in the county. It is in the Dunmore–Greendale soil association.

The topmost 5 or 6 inches of the Elk soil is yellowish-brown friable silt loam. This is underlain by yellowish-brown silty clay loam subsoil. The 5- or 6-inch surface layer of the Tupelo soil is grayish-brown or brownish-yellow silty clay loam. This is underlain by pale-yellow or yellowish-brown very firm silty clay subsoil. This mapping unit is shallower than the undulating phase. A few outcrops of limestone occur on the Tupelo soil.

In general, the soils in this phase are less fertile and contain less organic matter than the soils in the undulating phase. Tilth is not so good as for the undulating phase, but it is difficult only in the very severely eroded areas where the Tupelo subsoil is exposed. Permeability to moisture and roots is moderate, and the moisture-supplying capacity is good to fair.

*Use suitability* (1–H).—Almost all of this mapping unit is in crops or pasture. Practically none of it is idle. The soils are well suited to the crops commonly grown in the county, but because they are steep and eroded they need particularly careful management. The most severely eroded areas of Tupelo soils have poor tilth, and runoff creates an erosion hazard on both soils. Nevertheless, crop yields are generally high, and permanent pastures of legumes and grasses do well.

**Emory silt loam (1 to 4 percent slopes)** (Ec).—This soil consists of young local alluvium derived chiefly from high-grade limestone. It occurs on gentle foot slopes and in sinkholes and narrow strips along local drainageways, below areas of Dewey, Cumberland, and Waynesboro soils. It is widely distributed in the Dunmore–Greendale and the Nolichucky–Waynesboro–Cumberland soil associations.

Profile description:

0 to 18 inches, brown to dark-brown friable silt loam.
18 to 40 inches, brown silt loam that grades to yellowish brown and becomes somewhat firmer and finer textured with depth; gray and yellow mottlings are common below a depth of 30 inches; limestone bedrock at depths of 3 to 10 feet.

In a few places runoff water has deposited a 6- to 14-inch covering of red very firm silty clay material derived from the subsoil of adjacent areas of Dewey and Dunmore soils. In other areas the original surface layer is covered by 15 to 30 inches of recent alluvium consisting of yellowish-brown silt loam.

This soil is high in fertility and is medium acid. In most places the organic-matter content is fairly high. The soil has good tilth and is permeable to moisture and plant roots. The moisture-supplying capacity is good.

*Use suitability* (1–C).—Most of this soil is used for row crops. Some is in pasture. Corn and tobacco are the principal crops. Crop yields are high, and the carrying capacity of the pastures is high. Fertility is easily maintained, and there is little risk of erosion; consequently, this soil can be intensively cultivated. It is well suited to all the general farm crops commonly grown in the county and to many truck crops. Because it has good moisture-supplying capacity, this soil is especially good for late-season crops. It provides good pasture during the drier parts of the growing season.

**Greendale silt loam** (1 to 4 percent slopes) (Ga).—This moderately well drained to well drained soil has developed from local colluvium and alluvium, most

of which was washed from Dunmore and Groseclose soils. It occurs at the bases of slopes occupied by the Dunmore and Groseclose soils. It is widely distributed in the Dunmore–Greendale and the Stony land–Dunmore soil associations.

Profile description:

0 to 15 inches, light yellowish-brown to pale-brown very friable silt loam.
15 to 36 inches, light yellowish-brown to yellowish-brown friable silt loam or silty clay loam; the lower part of this layer is lightly splotched, or mottled, with yellow and gray.
36 inches +, silty clay loam mottled brownish yellow, yellow, and gray; limestone bedrock at depths of 3 to 10 feet; beds of cherty material below depths of 2 or 3 feet in many areas.

This soil is moderately high in fertility and is medium to strongly acid. It contains a fair amount of organic matter. Tilth is good. There are a few chert fragments in most areas, but not enough to interfere with cultivation. The soil is permeable to roots and moisture. Runoff is slow, and the moisture-supplying capacity is good. Some of this soil is on slopes as steep as 7 percent.

*Use suitability* (1–C).—Practically all of this soil has been cultivated. Part of it is now used intensively for crops, and part of it is in permanent pasture. Yields are moderately high. This soil responds well to fertilization. It can be cultivated regularly without danger of erosion. It is suited to tobacco and many other crops, and to grasses and legumes, including alfalfa, for hay or pasture. Because it has good moisture-supplying capacity, it provides good pasture during the drier parts of the growing season.

**Groseclose silt loam, rolling phase** (5 to 12 percent slopes) (Gg).—This moderately well drained upland soil has developed from material weathered from shaly limestone. It occurs on the broader ridge crests in the Groseclose–Dunmore soil association. The limestone bedrock or shaly material occurs at depths of 2 to 8 feet. Shaly limestone crops out in a few places.

Profile description:

0 to 8 inches, light yellowish-brown friable silt loam; the uppermost inch of soil is stained dark gray with organic matter.
8 to 14 inches, pale-yellow or brownish-yellow silty clay or clay; firm when moist, plastic when wet.
14 to 20 inches, yellow or brownish-yellow dense silty clay or clay, very firm when moist, plastic when wet; moderately developed coarse blocky structure.
20 inches +, splotched or variegated yellow, pale-yellow, and olive-yellow silty clay; very firm when moist, plastic when wet.

This soil is medium acid and is rather low in plant nutrients and organic matter. Good tilth is easily maintained. Fine chert occurs throughout the soil but not in amounts that interfere with cultivation. The surface layer is permeable to moisture and roots, but because of the very firm subsoil, runoff begins quickly during rains. The moisture-supplying capacity is good.

*Use suitability* (1–H).—Most of this soil has not been cleared. It would be fairly well suited to cultivated crops but would be likely to erode and would require heavy fertilization for good yields. It is not suited to truck crops, but small grains, legumes and grasses, and an occasional crop of corn or tobacco could be grown. If adequately fertilized and seeded, the soil will support good legume-grass pastures.

**Groseclose silty clay loam, eroded rolling phase** (5 to 12 percent slopes) (Gl).—This soil has been cleared and cultivated and, as a result, has lost much of its original surface soil through erosion. It differs from Groseclose silt loam, rolling phase, mainly in having a thinner, finer textured surface layer. It occurs on the broader parts of the ridgetops in the Groseclose–Dunmore soil association.

The 4- to 5-inch plow layer consists of a mixture of original surface soil and subsoil material. It is light yellowish-brown to yellowish-brown silty clay loam. The subsoil is yellow or yellowish-brown silty clay that is very firm when moist and plastic when wet. Limestone or shaly limestone bedrock normally occurs at depths of 1½ to 7 feet.

In many areas on the stronger slopes, all of the surface soil has been lost and the plow layer consists of very firm yellow silty clay subsoil. Chert fragments occur throughout this soil but not in numbers that interfere with cultivation. There are a very few rock outcrops.

This soil is low in plant nutrients and organic matter. It is medium to strongly acid. Moisture infiltrates rather slowly. Good tilth is difficult to maintain. In the most severely eroded patches tilth is very poor because the plow layer is very firm and plastic. The moisture-supplying capacity is generally good. In the most severely eroded patches it is very poor, and the soils in these areas are droughty.

*Use suitability* (1–H).—All of this soil has been cultivated. It is now used mostly for crops, but a substantial area is in pasture, and a small part is idle. The soil is well suited to small grains, hay, pasture crops, and an occasional crop of corn or tobacco. It is not well suited to truck crops. If it is seeded and adequately fertilized, it will support good legume-grass pastures, but the carrying capacity is limited because the moisture-supplying capacity is only fair.

**Groseclose silty clay loam, eroded hilly phase** (12 to 25 percent slopes) (Gk).—This soil has strong slopes and has lost much of its original surface soil through erosion. Practically all of it lies on ridge slopes in association with other Groseclose soils that are on the ridgetops. It is in the Groseclose–Dunmore soil association. The 4- to 5-inch plow layer is light yellowish-brown silty clay loam. The subsoil is yellow silty clay that is very firm when moist and plastic when wet; it is mottled with gray below a depth of about 20 inches. Limestone or shaly limestone bedrock normally occurs at depths of 1 to 5 feet. There are a few limestone outcrops but not enough to prevent cultivation.

In the few uneroded areas, the 6-inch surface layer is light yellowish-brown friable silt loam.

This soil is low in fertility and is medium to strongly acid. The content of organic matter is low. Moisture infiltrates the surface layer fairly well in the areas where there has been the least erosion. The subsoil is only slowly permeable to roots and moisture; consequently, runoff begins quickly during rains. The moisture-supplying capacity is fair. Good tilth is somewhat difficult to maintain.

*Use suitability* (1–N).—All of this soil has been

cleared and cropped, but only a small acreage is still cultivated. At present about 50 percent of it is in pasture, and a large part is idle. Its suitability for crops is limited by the strong slopes, slow infiltration of moisture, and low fertility. Small grains and legumes and grasses can be grown. Most of this soil can best be used for permanent pasture.

**Groseclose silty clay, severely eroded hilly phase** (12 to 25 percent slopes) (Gh).—This soil has lost all of its original surface layer through erosion. Most of it occurs in small areas in association with Groseclose silty clay loam, eroded hilly phase. It is in the Groseclose–Dunmore soil association.

The plow layer is yellow to yellowish-brown silty clay that is very firm when moist and plastic when wet. The subsoil is similar but is mottled with gray at a depth of about 20 inches. The limestone or shaly limestone bedrock normally occurs at depths of 1 to 5 feet. Shallow gullies are common and there are some rock outcrops.

This soil is very low in plant nutrients and organic matter and is medium to strongly acid. Good tilth is difficult to maintain. Moisture infiltrates very slowly, and runoff begins quickly during rains. The moisture-supplying capacity is poor; consequently, this soil is droughty, especially during the drier periods of the growing season.

*Use suitability* (2–A).—All of this soil has been cropped, but much of it is now idle. Some is in unimproved pasture. It is poorly suited to crops. Properly fertilized and seeded, it can support fairly good legume-grass pastures. Carrying capacity, however, is limited by the poor moisture-supplying capacity. Consequently, even under the most favorable conditions, this soil does not provide good grazing during dry periods.

**Groseclose cherty silt loam, rolling phase** (5 to 12 percent slopes) (Gf).—This soil is like Groseclose silt loam, rolling phase, except that there is enough chert in the plow layer to interfere with cultivation. It occupies the broader ridgetops in the Groseclose–Dunmore soil association. Limestone bedrock occurs at depths of 2 to 8 feet.

Profile description:

0 to 8 inches, light yellowish-brown cherty silt loam; the uppermost inch or so is stained dark with organic matter.
8 to 12 inches, pale-yellow silty clay or clay; plastic when wet, very firm when moist.
12 to 20 inches, yellowish-brown to olive-yellow dense very firm silty clay or clay; well-developed coarse blocky structure.
20 inches +, mottled yellow, pale-yellow, and olive-yellow silty clay or clay; very firm when moist, plastic when wet.

This soil is low in fertility and is strongly acid. The surface layer contains little organic matter. The soil is permeable to moisture and roots to a depth of about 12 inches. The very firm clay subsoil is very slowly permeable to moisture. The moisture-supplying capacity is good.

*Use suitability* (1–H).—Practically all of this soil is under cutover forest, chiefly oak with which some pine is intermixed. The soil is moderately well suited to general farm crops, but its use is limited by chertiness and low fertility. It is unsuited to truck crops and is not well suited to alfalfa. For most crops heavy fertilization is needed and runoff should be controlled, particularly on the stronger slopes.

**Groseclose cherty silt loam, eroded rolling phase** (5 to 12 percent slopes) (Gc).—This soil is like Groseclose cherty slit loam, rolling phase, except that it has lost much of its original surface soil through erosion. It occupies the broader ridge crests in the Groseclose–Dunmore soil association, in association with the hilly phases of Groseclose soils.

The 4- to 6-inch surface layer is light yellowish-brown cherty silt loam. Below this layer, the material grades to very firm or plastic pale-yellow silty clay or clay that is mottled below a depth of 18 to 20 inches. Limestone bedrock occurs at depths of 1½ to 7 feet.

In the areas from which practically all the surface soil has eroded, the plow layer consists of yellow or pale-yellow silty clay that is very firm when moist and plastic when wet.

This soil is strongly acid and of low fertility. The organic-matter content is low. Moisture infiltrates the shallow surface layer, but the subsoil is very slowly permeable to moisture. The moisture-supplying capacity is generally good, but in the most severely eroded areas it is only fair.

*Use suitability* (1–H).—All of this soil has been cultivated, but only a small area is now in crops. It is now used largely for pasture. A substantial acreage is idle. The suitability of this soil for crops is limited, but corn or tobacco can be grown occasionally in a moderately long rotation in which small grains and hay crops predominate. To get good yields, crops must be heavily fertilized and runoff must be controlled. The soil is too shallow to be suited to truck crops. If it is fertilized and seeded, it will support good pastures.

**Groseclose cherty silt loam, hilly phase** (12 to 25 percent slopes) (Ge).—This soil is like Groseclose cherty silt loam, rolling phase, except that it is on stronger slopes. Most of it lies on slopes below ridgetops occupied by rolling phases of Groseclose soils. All of this soil is in the Groseclose–Dunmore soil association.

The 6- or 8-inch surface layer is light yellowish-brown cherty silt loam. It is underlain by pale-yellow to light yellowish-brown silty clay or clay that is very firm when moist and plastic when wet. Below a depth of about 18 inches, the soil is splotched or mottled yellow, pale yellow, and gray silty clay that is very firm when moist and plastic when wet. The limestone bedrock occurs at depths of 1 to 5 feet. There are some outcrops.

This soil is low in organic matter and of low fertility. It is medium to strongly acid. The 6- or 8-inch surface layer is permeable to roots and moisture, and good tilth is fairly easy to maintain. The heavy clay subsoil is slowly permeable to moisture. The moisture-supplying capacity is fair.

*Use suitability* (2–A).—Practically all of this soil is under cutover native forest, chiefly oak intermixed with some pine. This soil is not well suited to cultivated crops. Nevertheless, if it is properly fertilized and seeded, it can support legume-grass pastures. Areas that must be cultivated should be used only in long rotations, and particular care should be taken to maintain high fertility and to control runoff.

**Groseclose cherty silt loam, eroded hilly phase** (12 to 25 percent slopes) (Gb).—This soil is like Groseclose cherty silt loam, hilly phase, except that it is eroded to the extent that the plow layer now consists of a mixture of surface soil and subsoil material. It occurs on the stronger slopes in the Groseclose–Dunmore soil association.

The 4- or 5-inch plow layer is light yellowish-brown cherty silt loam or silty clay loam. Below this layer is pale-yellow to yellow silty clay to clay that is very firm when moist and plastic when wet. At a depth of about 16 inches is splotched or mottled yellow, pale-yellow, and gray very firm silty clay or clay. The shaly limestone bedrock occurs at depths of 1 to 5 feet. There are a few outcrops.

In the most severely eroded areas all of the surface soil has eroded, and the plow layer consists of pale-yellow silty clay that is very firm when moist and plastic when wet. Shallow gullies are common, but most of them can either be filled in by heavy tillage implements or crossed by farm machinery.

This soil is low to very low in fertility and medium to strongly acid. The organic-matter content is low to very low. Chert interferes with cultivation. Good tilth is fairly easy to maintain in the less eroded places. It is difficult to maintain in the more severely eroded places because of the clayey plow layer. The moisture-supplying capacity is fair in the less eroded areas but poor in the severely eroded areas.

*Use suitability* (2–A).—All of this soil has been cropped. Much of it is now in unimproved pasture, some is idle, and a small part is cultivated.

This soil is poor for cultivated crops. Adequately fertilized and properly seeded, it can support legume-grass pasture, but the carrying capacity, especially in the more severely eroded places, is limited by the fair to poor moisture-supplying capacity. Cropped areas should be used only in long rotations, and the surface should be covered most of the time by close-growing small grains or by legumes and grasses.

**Groseclose cherty silt loam, eroded steep phase** (25 to 60 percent slopes) (Gd).—This soil is like Groseclose cherty silt loam, hilly phase, except that it is more strongly sloping and shallower and rock outcrops are commoner. It occurs on the steepest slopes in the Groseclose–Dunmore soil association, and it is associated with other Groseclose soils.

The uppermost 4 or 5 inches is light yellowish-brown cherty silt loam, which grades to very firm or plastic, yellow or pale-yellow silty clay or clay. Below a depth of about 16 inches, the soil is mottled with yellow or gray. Much of the acreage that has been cultivated is so severely eroded that the plow layer consists of the yellow or pale-yellow silty clay or clay subsoil. In moderately eroded areas, the plow layer is a mixture of surface soil and subsoil material. The shaly limestone bedrock occurs at depths of 1 to 4 feet and crops out in some places. A few gullies have formed in places, but most of them are shallow and can be filled in by heavy farm machinery. Chert fragments are numerous enough to interfere with cultivation.

This soil is low in organic-matter content and of low fertility. Moisture percolates slowly, and the moisture-supplying capacity is poor.

*Use suitability* (3–A).—About half of this soil is under cutover forest consisting of oaks and some pine. The other half is largely in unimproved pasture, and a small acreage is idle. This soil is poorly suited to crops or pasture. It is difficult to work, and runoff is very difficult to control if the soil is cultivated. The soil tends to be droughty, especially on south-facing slopes. There are some areas, particularly on north-facing slopes, that are suitable for pasture if adequately fertilized and properly seeded.

**Gullied land, limestone material** (5 to 40 percent slopes) (Gm).—This mapping unit consists of Dunmore, Dewey, and Groseclose soils that have been so severely eroded and gullied that reclamation would be a long and expensive process. Most of the unit occurs in small areas in association with Dunmore, Dewey, and Groseclose soils. It is in the Dunmore–Greendale, Stony land–Dunmore, and Groseclose–Dunmore soil associations.

Practically all of the original silt loam surface soil has been removed by erosion, and an intricate pattern of gullies from 1½ to 4 feet deep has formed. The soil material is reddish-yellow, strong-brown, or pale-yellow to yellowish-brown very firm silty clay. Depth to the limestone bedrock is as much as 8 feet in places, but in most places the bedrock is much nearer the surface. There are some outcrops.

Fertility is low. The surface layer contains little, if any, organic matter. Tilth is extremely difficult to maintain. Moisture infiltrates slowly, and runoff begins quickly during rains. The moisture-supplying capacity is very poor.

*Use suitability* (3–A).—All of this land type has been cropped, but none of it is under cultivation now. Some of it has reverted to shortleaf pine or Virginia pine. The rest is covered by a brushy growth of sassafras, blackberry, and persimmon sprouts.

This land type is very low in productivity and very difficult to work and conserve. It is very poor for crops or pasture and is probably best suited to trees. Some areas that are not too deeply gullied might be reclaimed if heavy machinery were avaliable to fill the gullies. The cost of reclamation, including fertilization and seeding, would be high, and crop productivity and pasture carrying capacity would be limited because of the poor moisture-supplying capacity.

**Gullied land, shale material** (5 to 50 percent slopes) (Gn).—This land type consists of soils that developed over shale and that are so severely gullied that reclamation is not economically feasible. Most of it occurs in small tracts widely distributed in the Dandridge–Whitesburg soil association. Other areas are in the Monongahela–Needmore–Dandridge association and in the Litz soil association.

Most of this mapping unit has lost all of the original surface soil through erosion. Gullies that are 1½ to 3 feet deep form an intricate pattern over most of the area. In many places the gullies have been cut down to, or into, the partly disintegrated shale bedrock. Most of the soil material now exposed is yellow or pale-yellow shaly silty clay loam or partly disintegrated beds of shale. The areas that are associated with Dandridge soils are calcareous; those that are associated with Litz soils are medium acid.

Infiltration of moisture is slow, and the moisture-supplying capacity is very poor. Tilth is somewhat difficult to maintain, though not so difficult as on Gullied land, limestone material.

*Use suitability* (3–A).—Although all of this land has been cultivated, none of it is used for crops or pasture at present. Most of it is covered by an irregular growth of sassafras, blackberry, persimmon, and other shrubs. Fair stands of pine have been established by natural revegetation in some areas.

In its present condition, this land is unsuitable for either crops or pasture. Nevertheless, many areas might be reclaimed and used for pasture because the soil is friable and the shale is easily broken up by heavy machinery. Reclamation would be expensive; it would require heavy fertilization, proper seeding, and careful management while the sod was being established. Because of the very poor moisture-supplying capacity, the carrying capacity would be limited. This soil is probably best suited to trees.

**Hamblen silt loam** (0 to 3 percent slopes) (Hb).—This imperfectly drained soil of the first bottoms consists of mixed alluvium. Most of the alluvium was washed from uplands underlain by calcareous shale, but some originated from mixed limestone, sandstone, and quartzite.

This soil is in the Dandridge–Whitesburg and Monongahela–Needmore–Dandridge soil associations. It occurs most extensively along Lick Creek; some areas are on the bottom lands of small creeks. In the Dandridge–Whitesburg soil association, it is associated with hilly and steep soils that are not suitable for crops; consequently, this soil is highly valued as cropland.

Profile description:

0 to 14 inches, grayish-brown or brown friable silt loam.
14 inches +, brown friable silty clay loam, mottled with gray and brownish yellow, grading at about 20 inches to predominantly gray silty clay loam mottled with yellow and brownish yellow; shale bedrock is at depths of 3 to 10 feet.

In places a dark-brown layer occurs at depths of 6 to 14 inches. This was once the surface layer, but it has been buried by more recent deposits of alluvium. In a few areas there is gravel throughout the soil, or lenses of gravel in the subsoil, or both.

This soil is frequently flooded. Internal drainage is slow, the water table is high during the wetter parts of the growing season, and the subsoil below depths of 18 to 24 inches remains moist during most of the dry weather. Fertility is moderately high, and the organic-matter content is fair. The soil is medium acid to slightly alkaline. Good tilth is easily maintained, but the time during which the soil can be worked is somewhat limited by flooding and prolonged wet-soil conditions. The moisture-supplying capacity is good.

*Use suitability* (1–A).—Practically all of this soil is cleared. It is used chiefly for corn, hay, and pasture. Yields are high, and pasture carrying capacity is high.

This soil is suited to intensive cultivation. It is too wet, however, to be suited to alfalfa, tobacco, or truck crops, and many areas are not well suited to small grains. Because of the ample moisture supply, corn and other late-season crops do well and the pastures provide good grazing in midsummer and fall.

**Hamblen fine sandy loam** (0 to 3 percent slopes) (Ha).—This imperfectly drained sandy soil consists of alluvium derived from shale, sandstone, and quartzite mixed with a little material that originated from limestone. Practically all of this soil occurs in narrow strips on the bottom lands of creeks that have their sources in the Smoky Mountains. A few areas are along streams that originate in Bays Mountains on the western edge of the county.

Profile description:

0 to 12 inches, yellowish-brown to brown very friable or loose fine sandy loam or loam.
12 to 20 inches, brown or yellowish-brown friable fine sandy loam or sandy clay loam mottled with gray.
20 inches +, gray moderately sticky sandy loam or slightly plastic sandy clay loam mottled with yellow and brownish yellow; pebbles or cobblestones common in most areas; bedrock of shale or sandy rock at depths of 3 to 10 feet.

This soil is moderately fertile and contains a moderate amount of organic matter. It is medium to strongly acid. All of it is subject to overflow. Internal drainage is slow. During the wetter parts of the year, the water table is near the surface. During much of the growing season, the subsoil is moist and the water table is at depths of 2 to 4 feet. The soil is permeable to moisture and roots and has good moisture-supplying capacity. The surface layer is easily worked.

*Use suitability* (1–A).—Practically all of this soil is cultivated, chiefly to corn and hay. A considerable acreage is used for pasture, and some areas that are flooded only infrequently are used for small grains. Crop yields vary but are generally moderately high.

This soil is well suited to corn and to legumes and grasses for hay or pasture. The higher and better drained areas are fairly well suited to small grains. Nevertheless, yields are generally not as good as on other soils that are better drained. This soil is not suited to tobacco, truck crops, or other high-value crops, because of the flood hazard. Little of it is suited to alfalfa. It is well suited to permanent pasture, but pastures are not so good as on Hamblen silt loam, which has somewhat better moisture-supplying capacity.

**Hayter loam, undulating phase** (2 to 5 percent slopes) (Hd).—This well-drained brown soil consists of mixed local alluvium derived from sandy and shaly rock and limestone. In many places soil material that appears to have originated chiefly from sandy rock has been influenced by lime-bearing water. Much of the parent material was washed from the Ramsey soils in the mountains.

This soil occurs on gentle foot slopes or valley slopes at the bases of the mountains in the southeastern part of the county. It is associated with Jefferson, Allen, and Barbourville soils and is in the Jefferson–Allen–Hayter soil association.

Profile description:

0 to 12 inches, dark-brown to brown very friable loam.
12 to 30 inches, yellowish-brown or strong-brown grading to reddish-brown friable clay loam; weak medium blocky structure.
30 inches +, yellowish-red friable to firm fine sandy clay; yellowish or grayish splotches may occur below a depth of 40 inches; limestone bedrock at depths of 3 to 10 feet.

This soil is high in plant nutrients and appears to be well supplied with organic matter. It is medium acid.

Good tilth is easily maintained, but sandstone rock fragments are numerous enough in places to interfere with cultivation. The soil is permeable to water and roots and has good moisture-supplying capacity. Runoff does not begin quickly during rains.

*Use suitability* (1–D).—This is one of the best soils in the county for crops. It is very productive and is easily worked and conserved. Practically all of it has been cultivated. At present it is used extensively for row crops. A small acreage is in pasture. Little, if any, is idle. Corn, tobacco, small grains, and hay are the chief crops. The soil is also well suited to truck crops and alfalfa. Good legume-grass pastures are easily maintained.

**Hayter loam, eroded rolling phase** (5 to 15 percent slopes) (Hc).—This soil is like Hayter loam, undulating phase, except that it has stronger slopes and has lost an appreciable amount of its surface layer through erosion. It occurs in narrow strips, in association with Hayter loam, undulating phase, and with Jefferson and Allen soils. It is widely distributed in the Jefferson–Allen–Hayter soil association in the southeastern part of the county.

The uppermost 5 inches of soil is dark-brown loam or friable clay loam. This is underlain by strong-brown friable to firm clay loam. Depth to bedrock ranges from 2 to 8 feet. A few areas are stony; these are shown on the map by appropriate symbols.

This well-drained soil is moderate to high in fertility and contains at least a moderate amount of organic matter. It responds well to fertilization. Most of it is medium acid, but some is slightly acid. The soil is permeable to moisture, and the moisture-supplying capacity is good. Good tilth is easily maintained.

*Use suitability* (1–G).—Practically all of this soil has been cleared and cultivated. At present it is used intensively for corn, small grains, tobacco, and hay. Yields are generally high.

This soil is well suited to both crops and pasture. It is a little less suitable for intensive use than Hayter loam, undulating phase, because it is erodible, but if a 3- or 4-year rotation is used and management is otherwise good, the erosion hazard is not serious. Permanent pastures of high carrying capacity can be maintained. The moisture supply is favorable for grasses and legumes during most of the growing season.

**Hayter stony loam, undulating phase** (2 to 5 percent slopes) (Hf).—This soil contains sandstone fragments in numbers that interfere with cultivation. Otherwise, it is like Hayter loam, undulating phase. It occurs in small areas and is associated with Jefferson, Allen, Sequatchie, and with other Hayter soils. Practically all of it is in the Jefferson–Allen–Hayter soil association in the southeastern part of the county.

The 10- to 12-inch surface layer is brown to dark-brown friable stony loam. Below this is a layer of strong-brown to yellowish-red firm sandy clay loam or clay loam. Yellowish-red firm clay loam begins at a depth of 30 inches. Bedrock, in most places sandy rock or shale, is at depths of 3 to 10 feet.

This is a fertile well-drained soil that is permeable to roots and moisture. The moisture-supplying capacity is good. Except for the stones, the soil is easy to work.

*Use suitability* (1–D).—Most of this soil is used to grow corn, tobacco, small grains, and hay. Some is in pasture. Yields in general are moderately high.

This soil is fairly well suited to crops, but less so than Hayter loam, undulating phase, because the stones interfere with many field operations. It is suited to many kinds of crops such as alfalfa, tobacco, corn, truck crops, and small grains. It is well suited to legumes and grasses. The stoniest areas can best be used for pasture.

**Hayter stony loam, eroded hilly phase** (15 to 30 percent slopes) (He).—This soil consists of local alluvium or colluvium derived from sandy and shaly rock and limestone. It is like Hayter stony loam, undulating phase, except that it has stronger slopes and is somewhat eroded. It occurs in small areas and is associated with the less strongly sloping Hayter soils. All of it is in the Jefferson–Allen–Hayter soil association in the southeastern part of the county.

The 6- to 8-inch surface layer is brown to dark-brown stony loam or stony clay loam. Below this is a layer of strong-brown to yellowish-red firm sandy clay loam or clay loam. Depth to bedrock ranges from 2 to 8 feet.

Erosion has removed practically all of the surface soil from some of the more exposed slopes.

This is a moderately fertile soil that is permeable to moisture and roots. It is medium acid to strongly acid. The moisture-supplying capacity is fair. Good tilth is easily maintained, but the strong slopes and the stones make cultivation difficult. Tilth has deteriorated somewhat in the most severely eroded spots.

*Use suitability* (2–A).—Practically all of this soil has been cultivated. At present most of it is either cropped or in pasture; very little is idle. Corn, small grains, and hay are the chief crops.

This soil is not well suited to crops, but it will support good legume-grass pastures. If it is cropped, it should be used in a long rotation consisting mainly of small grains and hay. Further erosion is likely if the soil is cultivated.

**Hermitage silt loam, undulating phase** (2 to 5 percent slopes) (Hh).—This well-drained brown soil consists of local alluvium or colluvium derived chiefly from limestone. It occurs in small areas throughout the Dunmore–Greendale and the Nolichucky–Waynesboro–Cumberland soil associations. It occupies foot slopes directly below the reddish Decatur, Dewey, Waynesboro, and Cumberland soils of the uplands and stream terraces.

Profile description:

0 to 10 inches, brown to dark-brown friable silt loam.
10 to 40 inches, strong-brown grading to yellowish-red firm silty clay loam; moderately well developed blocky structure.
40 inches +, predominantly yellowish red silty clay with some yellow and gray splotches; firm to very firm; limestone bedrock at depths of 3 to 10 feet.

This soil is medium acid to strongly acid. It is high in plant nutrients and appears to be well supplied with organic matter. It is sufficiently permeable for easy root penetration and good movement of moisture and air. The moisture-supplying capacity is good. Runoff does not develop rapidly during rains.

*Use suitability* (1–D).—Practically all of this soil has been cultivated. It is now used rather intensively for tobacco, corn, small grains, and legumes and grasses. Yields are moderately high.

This soil responds to proper fertilization. It is well suited to many kinds of crops such as alfalfa, tobacco, and some truck crops. Other soils that are more friable are better suited to truck crops. Good yields of red clover, alfalfa, and orchardgrass are obtained if fertility is maintained at a high level. This soil will support pastures of high carrying capacity.

**Hermitage silt loam, eroded rolling phase** (5 to 15 percent slopes) (Hg).—This soil is like Hermitage silt loam, undulating phase, except that it has stronger slopes and is more eroded. It occurs throughout the Dunmore–Greendale and the Nolichucky–Waynesboro–Cumberland soil associations, mostly in small areas that are closely associated with areas of Dewey, Waynesboro, Cumberland, and Dunmore soils.

In most places the 5- to 6-inch plow layer is dark-brown or reddish-brown silty clay loam or silt loam. The subsoil is yellowish-red firm to very firm silty clay loam that grades to silty clay. Depth to the limestone bedrock ranges from 2 to 8 feet.

In patches, all of the original surface soil has been lost as a result of erosion. In these places the plow layer consists of subsoil material.

This soil is fertile and contains a moderate amount of organic matter. It is medium acid to strongly acid. Good tilth is easily maintained in the less severely eroded places. It is difficult to maintain where erosion has been more severe. Moisture infiltrates well. The moisture-supplying capacity is good except in the more severely eroded areas, which are droughty. The soil is permeable to roots.

*Use suitability* (1–G).—Practically all of this soil has been cultivated. A large part of it is now used for tobacco, corn, small grains, and hay crops, and yields are generally moderately high. Only a little is in pasture.

This soil is well suited to cultivated crops as well as to pasture. Because of the erosion hazard, crop rotations should be fairly long.

**Hollywood silty clay loam** (1 to 3 percent slopes) (Hk).–This imperfectly drained dark-colored clayey soil consists of local alluvium derived from soils underlain by calcareous shale. It occurs in small areas on very gentle slopes, below areas of rolling and hilly phases of Dandridge, Needmore, and Monongahela soils. It is in the Monongahela–Needmore–Dandridge soil association. Practically all the soil is in the valley of Lick Creek. Most of the areas are seepage spots.

Profile description:

0 to 10 inches, very dark gray silty clay loam; sticky when wet, firm when moist.
10 to 20 inches, very dark gray silty clay; very firm when moist, hard when dry; some yellowish-brown mottlings.
20 inches +, mottled gray, brownish-yellow, and dark-brown clay; very firm when moist, plastic when wet; shale bedrock at depths of 3 to 6 feet.

This soil is high in fertility and contains a fairly large amount of organic matter. Most of it is slightly acid, but in a few places the reaction is neutral or alkaline. Both runoff and internal drainage are slow. Roots permeate the soil slowly. The firm, plastic plow layer makes it difficult to maintain good tilth. The soil puddles easily if it is plowed when it is too wet and breaks into hard lumps if it is plowed when it is too dry. The water table is high during much of the growing season. When the water table drops to a depth of 3 or 4 feet, the moisture-supplying capacity of this soil is limited.

*Use suitability* (1–F).—All of this soil has been cleared. About three-fourths of it is used for pasture; the rest is cropped, chiefly to corn and hay. Alfalfa is grown on a small acreage that has better drainage than is typical of this soil. Alfalfa stands are short lived, and yields of other crops are not high.

This soil is suitable for only a few crops. It is best suited to corn and legumes and grasses. Yields vary, depending on the moisture supply. The suitability of the soil for crops could be improved by installing artificial drainage systems to control seepage water and by adding organic matter to improve tilth. Much of the acreage can best be used for permanent pasture.

**Holston loam, undulating phase** (2 to 5 percent slopes) (Hm).—This moderately well drained to well drained soil has developed from old mixed alluvium derived chiefly from sandy rock, shale, and limestone. Most of this soil is on high stream terraces, but some of it is on low terraces. Most of the areas are along the Nolichucky River and in the Nolichucky–Waynesboro–Cumberland soil association. A few areas are along Lick Creek. This soil differs from the Nolichucky soils in having a yellowish rather than a reddish subsoil and in having somewhat slower internal drainage. It has better internal drainage and a more permeable and friable subsoil than the Monongahela soils.

Profile description:

0 to 8 inches, light yellowish-brown friable loam.
8 to 28 inches, yellow to yellowish-brown sandy clay loam or clay loam; moderately firm when moist, slightly sticky when wet; moderate medium blocky structure; in places the texture is silty clay loam.
28 to 40 inches, firm clay loam, variegated or faintly mottled with pale yellow and yellowish brown; below a depth of 40 inches the alluvial material is variable, but in general it is sandy and may contain cobblestones; in some places the texture is silty clay; bedrock, which in most places is shale or sandy rock, is at depths of 3 to 12 feet.

In a few patches there are enough cobblestones or pebbles to interfere with cultivation. Good tilth is easily maintained. This soil is strongly acid. It is low in fertility and in organic matter. The soil is permeable to roots and moisture and has good moisture-supplying capacity.

*Use suitability* (1–E).—Practically all of this soil is cultivated or used for pasture. Corn and tobacco are the chief row crops. Small grains and legumes and grasses, principally red clover, lespedeza, and orchardgrass, occupy most of the rest of the cropped acreage.

This soil is well suited to cultivation, but it requires large amounts of fertilizer and lime to maintain productivity. If it is well fertilized, it is suited to truck crops as well as to tobacco, corn, grain, and hay. Under good management it can be used intensively for row crops. Good pastures can be maintained if enough fertilizer is used.

**Holston loam, eroded rolling phase** (5 to 12 percent slopes) (Hl).—This soil is like Holston loam, undulating phase, except that it has stronger slopes and is eroded.

Most areas of this soil are on bench slopes in the valley of the Nolichucky River, directly below areas of less strongly sloping Holston soil. One small area is in the valley of Lick Creek. Most of this soil is in the Nolichucky–Waynesboro–Cumberland soil association.

The 4- to 6-inch plow layer is light yellowish-brown to yellowish-brown loam or clay loam. The subsoil is yellow or yellowish-brown firm clay loam or silty clay loam to a depth of about 24 inches. Below this depth, the material is somewhat mottled. Depth to bedrock, which is shale in most places, ranges from 2 to 10 feet.

In some areas all of the original surface layer has been removed by erosion and the plow layer consists of yellowish-brown clay loam. Pebbles and cobblestones are common. In some places they are numerous enough to interfere with cultivation. A few small gullies have formed in some of the more severely eroded and more strongly sloping areas, but practically all of them can be filled in by heavy tillage implements.

This soil is low in fertility, and the organic-matter content is small. The reaction is medium acid to strongly acid. Good tilth is fairly easy to maintain. The moisture-supplying capacity is good.

*Use suitability* (1–I).—Practically all of this soil has been cultivated. Some of it is still cropped, and the rest is in pasture. Occasionally a small acreage is left idle.

This soil is fair for crops and fair to good for pasture. It requires careful management to maintain fairly high productivity. The soil is best suited to small grains and hay. Of the row crops it is best suited to corn and tobacco, but these should be grown only infrequently because of the risk of erosion. Good pastures can be maintained if enough fertilizer is used.

**Jefferson loam, undulating phase** (2 to 5 percent slopes) (Jd).—This well-drained light-colored soil consists of local alluvium or colluvium derived chiefly from quartzite and sandstone. It occupies gentle upland slopes in the Jefferson–Allen–Hayter soil association. It resembles the Holston soils, but it occupies foot slopes rather than stream terraces and consists of local alluvium or colluvium instead of mixed general alluvium. In addition, this soil generally has better internal drainage than the Holston soils.

Profile description:

0 to 8 inches, light yellowish-brown loam; in places the texture is fine sandy loam.
8 to 30 inches, yellow to yellowish-brown firm or crumbly clay loam or sandy clay; moderate medium blocky structure; in places the color is strong brown.
30 inches +, firm or friable sandy clay or clay loam splotched or weakly mottled with reddish yellow and gray; bedrock, in most places quartzite or sandstone, is at depths of 3 to 15 feet.

Cobblestones occur in places but not in numbers that interfere with cultivation. Many of the more strongly sloping areas have been eroded but not enough to greatly alter the plow layer.

The soil is low in plant nutrients and organic matter. The reaction is medium acid to strongly acid. Good tilth is easily maintained. Moisture and roots penetrate the soil easily. The moisture-supplying capacity is good. This soil responds well to proper fertilization.

*Use suitability* (1–E).—A little of this soil is under forest, but most of it has been cultivated. At present about one-third is used for pasture. The rest is cropped, chiefly to corn, tobacco, small grains, and hay.

This soil is well suited to most of the crops commonly grown, especially truck crops and tobacco. It is not as productive of alfalfa and some other legumes and grasses as the Dunmore and Dewey soils.

**Jefferson loam, rolling phase** (5 to 15 percent slopes) (Jc).—This soil resembles Jefferson loam, undulating phase, except that it has stronger slopes. It occurs throughout the Jefferson–Allen–Hayter soil association, much of it in close association with Jefferson loam, undulating phase.

The 6- to 7-inch surface layer is light yellowish-brown loam. It is underlain by yellow to yellowish-brown firm clay loam that is weakly splotched or mottled below a depth of about 24 inches. Depth to the sandy or shaly bedrock ranges from 2½ to 13 feet. Cobblestones and pebbles occur throughout this soil but not in quantities that interfere with cultivation.

This soil is low in fertility and organic matter and is strongly acid. It is permeable to roots and moisture. The moisture-supplying capacity is good. Good tilth is easily maintained.

*Use suitability* (1–I).—Most of this soil is under native forest of deciduous trees with which a few pines are intermixed. It is suited to crops and pasture, but it requires heavy fertilization. Corn, tobacco, truck crops, small grains, and most of the legumes and grasses are suitable crops. Alfalfa stands are difficult to maintain because of the low fertility and strong acidity. Moderately long rotations should be followed to protect the soil against erosion.

**Jefferson loam, eroded rolling phase** (5 to 15 percent slopes) (Jb).—This soil is like Jefferson loam, rolling phase, except that much of the original surface layer has been removed by erosion. It is one of the more extensive soils in the Jefferson–Allen–Hayter soil association. It occurs in fairly large areas that range up to 50 acres in size.

The 4- to 5-inch plow layer is light yellowish-brown to yellowish-brown loam to clay loam. In most places some subsoil material is mixed with the original surface soil in the plow layer. In the most severely eroded places, the plow layer consists almost entirely of the clay loam subsoil. In a few places the surface layer is sandy loam to sandy clay loam. Pebbles and cobblestones are scattered through the profile but not in amounts that interfere with tillage. Depth to the limestone or shale bedrock ranges from 2 to 12 feet.

This soil is low in organic matter and is of low fertility. It is strongly acid. It is permeable to moisture except in the most severely eroded parts, where infiltration is retarded by the heavy subsoil. All of the soil is permeable to roots. The moisture-supplying capacity is generally good. It is only fair in the most severely eroded areas.

*Use suitability* (1–I).—All of this soil has been cleared and cultivated. At present much of it is used for crops, and the rest is permanent pasture. Small acreages may be idle at times.

This soil is suited to truck crops, tobacco, legumes and grasses, and other common crops. It is not so

well suited to alfalfa as some of the more fertile soils; red clover is a more suitable legume crop. Crop rotations should be at least moderately long, because the soil is likely to erode when it is cultivated.

**Jefferson loam, eroded hilly phase** (15 to 30 percent slopes) (Ja).—This soil is like Jefferson loam, rolling phase, except that it is on stronger slopes and has lost much of its original surface layer through erosion. Most of it occurs in narrow strips below areas of more gently sloping Jefferson soils. It is widely distributed throughout the Jefferson–Allen–Hayter soil association.

The 4- to 5-inch plow layer is light yellowish-brown to yellowish-brown loam or, in the most severely eroded places, clay loam. The subsoil is yellow to yellowish-brown firm or crumbly clay loam that is splotched and mottled with pale yellow and gray below a depth of about 25 inches. Depth to bedrock ranges from 1½ to 8 feet. The profile contains some pebbles and cobblestones, but not enough to interfere with cultivation.

This soil is low in organic matter and of low fertility. It is permeable to roots, and moisture infiltrates well except on the most severely eroded parts. The moisture-supplying capacity is fair. In general, the south-facing slopes are more droughty than the north-facing slopes. Good tilth is fairly easy to maintain, except where the soil is most seriously eroded.

*Use suitability* (1–M).—Practically all of this soil has been cultivated. Much of it is now used for pasture. A small part is in crops, chiefly corn and hay, and the rest is idle at least part of the time.

This soil is of limited suitability for crops. Under careful management, it is suitable for small grains, hay, and an occasional row crop. If it is adequately fertilized and seeded, it can support good pastures. However, it is harder to maintain pastures on this soil than on the more fertile Dunmore and Dewey soils.

**Jefferson stony loam, undulating phase** (2 to 5 percent slopes) (Jk).—This soil is like the Jefferson loams, except that it is sandier and more permeable in places and contains enough stones and cobblestones to interfere with tillage. It occupies the smoother parts of the uplands in the Jefferson–Allen–Hayter soil association, mostly where this association adjoins the Ramsey–Stony land soil association. The areas range up to 40 acres in size.

The 8-inch surface layer is light yellowish-brown stony loam. The subsoil is yellow to yellowish-brown firm or crumbly stony clay loam. Below a depth of about 28 inches, the soil is weakly mottled or splotched with gray and pale yellow. Depth to limestone or shale bedrock ranges from 3 to 12 feet.

This soil is low in organic matter and of low fertility. It is medium to strongly acid. Runoff does not begin quickly. The moisture-supplying capacity is good. Good tilth is easily maintained, but the stones impede tillage operations.

*Use suitability* (1–E).—Most of this soil has been cleared and cultivated, but at present only a small part is in crops. A substantial acreage is idle. Much of the rest is in unimproved pasture. Crop yields are generally low.

This soil is poor to fair for crops. Corn, tobacco, many truck crops, small grains, and hay can be grown. The risk of erosion is so slight that the soil can be cultivated for several years in succession. Pastures can be established by good management, but it is difficult to maintain pasture stands for long periods.

**Jefferson stony loam, rolling phase** (5 to 15 percent slopes) (Jh).—This soil resembles Jefferson stony loam, undulating phase, except that it has stronger slopes. It occurs throughout the Jefferson–Allen–Hayter soil association, much of it on the upper parts of slopes just above areas of the more strongly sloping Jefferson soils.

The 6- to 8-inch surface layer is light yellowish-brown stony loam. The subsoil is yellow to yellowish-brown firm or crumbly clay loam that contains many pebbles and cobblestones. Below a depth of about 26 inches, the soil is firm clay loam, faintly mottled or splotched with pale yellow and gray. Depth to the limestone or shale bedrock ranges from 2 to 10 feet.

This soil is low in organic matter and of low fertility. It is strongly acid. It is very permeable to moisture and roots; consequently runoff does not begin quickly and erosion is not active. The moisture-supplying capacity is good. Tilth is generally good.

*Use suitability* (1–I).—Some of this soil is in cutover native deciduous forest. A considerable acreage has been cleared and is used for crops and pasture. Small areas are idle at times.

This soil is poor to fair for crops and fair for pasture. Heavy fertilization is needed to maintain moderately high yields. Corn, tobacco, and truck crops can be grown on the less stony parts. Small grains and hay can also be grown, but the stones interfere with mowing and harvesting. Good pastures can be maintained if the soil is fertilized and seeded, but it is more difficult to maintain the stand from year to year than it is on more fertile soils.

**Jefferson stony loam, eroded rolling phase** (5 to 15 percent slopes) (Jf).—This soil is like Jefferson stony loam, rolling phase, except that it has lost part of its original surface layer through erosion. It occurs mostly on the higher slopes in the Jefferson–Allen–Hayter soil association in the southeastern part of the county. The areas range from 10 acres to 40 acres in size.

The 4- to 5-inch plow layer is light yellowish-brown to yellowish-brown stony loam or, in the most severely eroded places, stony clay loam. The subsoil is yellow to yellowish-brown firm or crumbly clay loam that contains a considerable number of stones. In some places the soil is so stony that it is practically nontillable. Depth to the limestone or shale bedrock ranges from 2 to 10 feet.

This soil is low in organic matter and of low fertility. It is strongly acid. It is permeable to roots and moisture; consequently, runoff does not begin quickly. The moisture-supplying capacity is good. Good tilth is easily maintained, but the stones interfere with tillage (fig. 11).

*Use suitability* (1–I).—All of this soil has been cleared and cultivated. At present much of it is in crops or pasture, but a large acreage is idle. Corn and lespedeza are the chief crops.

*Figure 11.*—Cobblestones and pebbles on Jefferson stony loam, eroded rolling phase.

This soil is poor to fair for crops. Stands of alfalfa and other legumes and grasses are difficult to maintain. Much of the acreage, especially the stonier areas, is best used as permanent pasture.

**Jefferson stony loam, hilly phase** (15 to 30 percent slopes) (Jg).—This soil is like Jefferson stony loam, rolling phase, except that it is more strongly sloping. It occurs throughout the Jefferson–Allen–Hayter soil association, on slopes below areas of more gently sloping Jefferson soils.

The 6-inch surface layer is light yellowish-brown stony loam that grades to yellow or yellowish-brown firm or crumbly stony clay loam. Depth to bedrock ranges from 1½ to 8 feet.

This soil is low in fertility. It is low in organic matter and is strongly acid. It is permeable to roots and moisture. The moisture-supplying capacity is fair. Stones interfere with cultivation, but good tilth is easily maintained.

*Use suitability* (2–A).—Most of this soil is under cutover deciduous forest consisting chiefly of oak and hickory. A few pines are mixed with the hardwoods.

This soil is poorly suited to cultivated crops. It can support fairly good pasture, if it is fertilized and seeded to suitable legumes and grasses. Areas that must be used for crops should be heavily fertilized and carefully managed to maintain productivity and check erosion.

**Jefferson stony loam, eroded hilly phase** (15 to 30 percent slopes) (Je).—This soil is like Jefferson stony loam, hilly phase, except that it is so eroded that subsoil material is mixed with the original surface soil in the plow layer. It occurs in the southeastern part of the county in the Jefferson–Allen–Hayter soil association. It is associated with the less strongly sloping soils.

In most places the 4- to 5-inch plow layer is light yellowish-brown to yellowish-brown stony loam or stony clay loam. The underlying subsoil is yellow to yellowish-brown firm or crumbly clay loam that is faintly mottled or splotched with pale yellow or gray below depths of 20 to 25 inches. Depth to bedrock ranges from 1½ to 7 feet.

In many areas on the stronger slopes, erosion has removed all the surface layer and the plow layer consists of subsoil material. A few gullies occur in places. In a few places the slope gradient is more than 30 percent.

This soil is low in fertility. It is low in organic-matter content and is strongly acid. It is moderately permeable to roots and moisture, although in the places where the clay loam subsoil is exposed infiltration is slower. The moisture-supplying capacity is fair in less severely eroded places but poor in severely eroded places. Pebbles and cobblestones are numerous enough on the surface and throughout the profile to interfere with, and in many places practically prohibit, cultivation.

*Use suitability* (2–A).—All of this soil has been cleared and cultivated. At present most of it is in unimproved permanent pasture. Some of it is idle and has an irregular growth of briers and other brushy plants. A small area is reverting to pine forests. A substantial acreage, however, is still cropped, chiefly to hay and corn. Yields are generally low.

This soil is poorly suited to crops. It will produce fairly good pasture if adequately fertilized and properly seeded.

**Leadvale silt loam, undulating phase** (2 to 5 percent slopes) (Lb).—This moderately well drained light-colored soil consists of local alluvium, most of which has washed from soils developed over shale. It occurs on the smoother parts of gentle foot slopes, below areas of the associated Dandridge soils. Most of it is in the Monongahela–Needmore–Dandridge soil association, but some areas are in the Dandridge–Whitesburg association. The parent material is similar to that of the Whitesburg soil, but the Leadvale soil is older and occurs higher on the valley slopes. The Leadvale soil resembles the Monongahela soil but has slightly better internal drainage.

Profile description:

0 to 8 inches, light yellowish-brown moderately friable silt loam.

8 to 24 inches, pale-yellow, yellow, or brownish-yellow firm silty clay loam; moderately well developed medium blocky structure.

24 inches +, very firm silty clay mottled pale yellow, light gray, and yellowish brown; in places this layer is nearer the surface; bedrock of shale is at depths of 2 to 8 feet.

The soil is low in fertility. It is medium to strongly acid. The organic-matter content is low. The surface layer and upper subsoil are permeable to moisture and roots, but the material below a depth of about 24 inches is very slowly permeable. Although the moisture-supplying capacity generally is good, crops may lack moisture during the driest parts of the growing season. Good tilth is easy to maintain, but excessive moisture following rain delays tillage more than on better drained soils.

*Use suitability* (1–F).—Most of this soil has been cleared. At present much of it is used for crops, some is in permanent pasture, and a small part is idle. A very small acreage is still under cutover deciduous forest. Corn, small grains, and hay are the chief crops. Tobacco is not extensively grown, but it is nevertheless the principal cash crop.

This soil is well suited to pasture. Its suitability for crops is limited by impaired drainage and low fertility. It is better suited to corn and tobacco than to other row crops. It is not so well suited to truck crops, particularly root crops, as the more friable well-

drained soils. If this soil is properly fertilized, it is suited to small grains, red clover, orchardgrass, lespedeza, and legumes and grasses. Alfalfa stands are difficult to maintain.

**Leadvale silt loam, eroded rolling phase** (5 to 15 percent slopes) (La).—This soil resembles Leadvale silt loam, undulating phase, except that it has lost part of the original surface layer through erosion. It occurs on the lower parts of slopes below areas of Leadvale silt loam, undulating phase. It is widely distributed throughout the Monongahela–Needmore–Dandridge soil association. A small acreage is in the Dandridge–Whitesburg soil association. Much of it is in the valley of Lick Creek.

The 4- to 5-inch plow layer is light yellowish-brown to yellowish-brown silt loam to silty clay loam. The subsoil, to a depth of about 20 inches, is pale-yellow, yellow, or brownish-yellow, very firm silty clay loam. Below this is a layer of mottled yellow, gray, and yellowish-brown, very firm silty clay. Depth to the shale bedrock ranges from 1½ to 6 feet.

In some areas on the stronger slopes, the subsoil material is exposed and the plow layer consists of yellow or yellowish-brown firm silty clay loam. A few areas that are associated with the Litz loams have a loam instead of a silt loam surface layer. In the more severely eroded areas, a few shallow gullies have developed.

This soil is low to very low in fertility. It is medium to strongly acid. The organic-matter content is low to very low. In the less seriously eroded parts, the plow layer and the upper subsoil are fairly permeable to moisture and roots, but the fine-textured silty clay in the lower subsoil impedes infiltration of moisture. Consequently, runoff begins quickly during rains. Areas in which the subsoil material is exposed are very slowly permeable to moisture and are droughty during dry weather. The moisture-supplying capacity is good to fair. Good tilth is fairly easy to maintain in the less severely eroded areas. The more severely eroded parts require careful tillage; the soil clods easily if cultivated when it is too wet and is very hard to work to a good seedbed when it is too dry.

*Use suitability* (1–J).—Most of this soil has been cleared and cultivated. At present it is used chiefly for corn, small grains, and hay. A substantial part of it is in permanent pasture, and a small acreage is idle at times.

The low fertility and inadequate water supply limit yields, but this soil is fair for both crops and pasture. It is best suited to small grains and hay, which mature before the driest part of the summer. It is not good for truck crops. It is fair for corn and tobacco, but these crops may be damaged by late-summer droughts in some years. Red clover and orchardgrass are suitable hay crops. Alfalfa stands can be maintained for 3 or 4 years if adequately fertilized, but yields may be limited in dry years. Good pastures can be maintained if liberal amounts of fertilizer are used, but the pastures are likely to dry up during the dry part of the growing season.

**Lindside silt loam** (0 to 2 percent slopes) (Lc).—This imperfectly drained brown or light-brown soil consists of general alluvium most of which has been derived from limestone. It occupies strips of bottom lands along creeks, chiefly in the Dunmore–Greendale and the Stony land–Dunmore soil associations. Except that its uppermost 10 or 12 inches is normally somewhat darker brown, this soil resembles the Hamblen soils, which were derived from shale.

Profile description:

0 to 16 inches, dark yellowish-brown or brown friable silt loam.
16 to 36 inches, yellowish-brown firm silty clay loam mottled with gray and dark brown.
36 inches +, predominantly gray firm silty clay or silty clay loam mottled with yellow and brown; limestone bedrock at depths of 2½ to 10 feet.

Some areas have a dark brown or very dark brown layer at depths of 6 to 14 inches. This is an old surface layer that has been buried by recent alluvium.

This soil is high in fertility. Most of it is slightly acid, but a few areas are neutral. The organic-matter content is moderate to high. Good tilth is fairly easy to maintain. The water table is at or near the surface during periods of wet weather and is at depths of 3 to 6 feet during dry periods. The soil is permeable, but the high water table impedes root growth and downward percolation of moisture. The moisture-supplying capacity is good. All of this soil is subject to overflow. Excess water drains off slowly. Consequently, tillage may have to be postponed, spring planting is delayed, and row crops may be inadequately cultivated because the soil is excessively wet.

*Use suitability* (1–A).—Practically all of this soil has been cleared. Much of it is now in pasture, but a fairly large acreage is cultivated. Corn is the chief crop; hay crops are also important, and some small grains and vegetables are grown. Yields of well-suited crops are high.

This is a very productive soil, but its suitability for crops is limited by impaired drainage and the flood hazard. It is particularly well suited to corn, hay, and pasture. It is too wet to be suitable for alfalfa and is not suited to small grains, which are likely to lodge. Tobacco and truck crops are likely to be damaged by floods. This soil is particularly good for permanent pasture because it supplies adequate moisture even during the driest part of the growing season. Fertilizer requirements are not high, and much of this soil needs no lime.

**Litz loam, steep phase** (30 to 60 percent slopes) (Lk).—This shallow soil consists of materials that have weathered from calcareous sandstone and shale and that contain widely spaced lenses of limestone or other calcareous rock. Practically all of it is in the Teas–Litz–Stony land soil association. It is a little deeper than the Dandridge soils, contains a little more sand, and has developed from materials that contained less lime.

Profile description:

0 to 5 inches, brownish-yellow or yellowish-brown loam.
5 to 10 inches, yellow or light reddish-yellow friable sandy clay loam that has a weak moderate blocky structure.
10 to 18 inches, splotched or variegated strong-brown, yellowish-red, or reddish-yellow firm silty clay loam or sandy clay loam, underlain by a mixture of soil material and weathered sandstone and shale.

In some places this soil has hardly any subsoil. Depth to bedrock ranges from 6 inches to 2 feet, and bedrock crops out in places. Fragments of shale and

sandstone occur on the surface and throughout the profile but not in numbers that interfere with cultivation.

This soil is moderate to low in plant nutrients and organic matter. It is medium to strongly acid. It is permeable to roots and moisture. Nevertheless, because the profile is very shallow, the root zone is restricted, and the moisture-supplying capacity of the soil is very poor. Good tilth is easy to maintain, but cultivation is difficult because of the shallow profile and the outcrops of bedrock.

*Use suitability* (2–C).—Practically all of this soil is under cutover native deciduous forest. It is not suitable for cultivation, but it will support fairly good pasture if it is seeded and well fertilized. A good pasture sod should be maintained because this soil is highly erodible. Most of it should be left in forest.

**Litz loam, eroded steep phase** (30 to 60 percent slopes) (Lt).—This soil is like Litz loam, steep phase, except for the effects of erosion. It occurs in association with other Litz loams, chiefly in the Teas–Litz–Stony land soil association.

The 3- to 4-inch plow layer is brownish-yellow or yellowish-brown friable loam. The subsoil is yellow to light reddish-yellow friable sandy clay loam. It is underlain by splotched material. Bedrock occurs at depths of 3 to 18 inches and crops out in places.

In the most severely eroded parts, the plow layer is yellowish-brown firm sandy clay loam. Gullies are common, but most of them can be crossed by farm machinery.

This soil is low in fertility and is medium acid. It is permeable to roots and moisture, but infiltration of moisture is somewhat retarded in the severely eroded areas. Because of the shallow profile, the moisture-supplying capacity is limited and the root zone is restricted. Fragments of sandstone are scattered on the surface and throughout the profile but not in quantities that will interfere with tillage.

*Use suitability* (2–C).—Although it is not suitable for crops, most of this soil has been cleared and cultivated at some time. Most of it is now in pasture, but a little is used to grow hay. A considerable part of it is idle and reverting to forest. If it is seeded and well fertilized, it will support good pasture. Much of the acreage, especially that on south-facing slopes, is droughty and could best be used for forest.

**Litz loam, very steep phase** (60+ percent slopes) (Ll).—This soil is similar to Litz loam, steep phase, but it is more strongly sloping, is shallower, and has more rock outcrops. Practically all of it is in the Teas–Litz–Stony land soil association. This soil occupies much of the southeastern slope of Bays Mountains.

The 3- to 4-inch surface layer is a light yellowish-brown loam that contains some sandstone fragments. This is underlain by yellow to light reddish-yellow firm sandy clay loam. Bedrock occurs at depths of 3 to 12 inches.

This soil is not high in fertility, but it has a small amount of organic matter in the uppermost 2 or 3 inches. It is medium acid. It is permeable to roots and moisture, but because the profile is shallow the moisture-supplying capacity is limited and the root zone is restricted.

*Use suitability* (3–A).—Practically all of this soil is under cutover deciduous forest. It is very poor for crops or pasture. It is suitable only for forest. Trees grow slowly because of the limited moisture supply.

**Litz loam, hilly phase** (15 to 30 percent slopes) (Lg).—Most of this soil occurs in inaccessible spots on narrow ridgetops. The ridge slopes are occupied by Litz loam, steep phase, and Litz loam, very steep phase. Some areas are on the tops of lower ridges, below the steeper soils. All of this soil is in the Teas–Litz–Stony land soil association.

Profile description:

0 to 7 inches, brownish-yellow or light yellowish-brown friable loam.
7 to 12 inches, yellow to light reddish-yellow firm sandy clay loam.
12 to 20 inches, splotched or variegated strong-brown, yellowish-red, and reddish-yellow firm sandy clay loam or silty clay loam underlain by a mixture of soil material and partly weathered shale; bedrock at depths of 6 inches to 2 feet.

This soil is low in fertility, and the supply of organic matter is low. The reaction is medium acid. The soil is permeable to roots and moisture. Nevertheless, because the profile is shallow, the moisture-supplying capacity is limited and the root zone is restricted. The soil is easily maintained in good tilth.

*Use suitability* (2–C).—Practically all of this soil is under cutover native deciduous forest. It is poorly suited to crops, but it will produce fairly good pasture if it is seeded and well fertilized. If any of this soil is needed for crops, it requires careful management to maintain the fertility and control erosion. Erosion is a serious hazard on this steep soil.

**Litz loam, eroded hilly phase** (15 to 30 percent slopes) (Ld).—This soil is like Litz loam, hilly phase, except for the effects of erosion. Most of it occurs in small areas along the base of Bays Mountains. It is in the Teas–Litz–Stony land soil association.

The 4- to 5-inch plow layer is light yellowish-brown or yellowish-brown loam or clay loam; the subsoil is brownish-yellow or yellowish-brown firm clay loam. Depth to the shale and sandstone bedrock ranges from 6 to 21 inches. Bedrock crops out in a few places. Shallow gullies are common on the steeper areas that are severely eroded.

This soil is not high in fertility. It is medium to strongly acid. It is permeable to roots and moisture, but because the profile is shallow the rooting zone is restricted and the moisture-supplying capacity is very poor. Good tilth is easy to maintain, but in places stone fragments interfere somewhat with cultivation.

*Use suitability* (2–C).—All of this soil has been cleared and used for crops or pasture. Much of it is now in unimproved pasture. A little of it is idle, and a small acreage is cropped. Crop yields are generally low.

This soil is rather poor for crops. It will support fairly good pasture if it is seeded and well fertilized, but the carrying capacity of the pasture is limited because of the inadequate moisture supply.

**Litz loam, rolling phase** (5 to 15 percent slopes) (Lh).—This soil is similar to Litz loam, hilly phase, except for the slope gradient. It occurs in small areas on ridge crests, below areas of steep and very steep

Litz loams on Bays Mountains. It is in the Teas–Litz–Stony land soil association.

The 5- to 6-inch surface layer is yellowish-brown or brownish-yellow friable loam. The subsoil is brownish-yellow or yellowish-brown to light reddish-yellow friable or firm sandy clay loam. Below a depth of about 12 inches, the soil is friable sandy clay loam or silty clay loam, splotched strong brown, yellowish red, and reddish yellow. Below this layer is a mixture of soil material and partly disintegrated shale and sandstone. Depth to the sandstone or shale bedrock ranges from 6 inches to 2 feet.

This soil is moderately low in fertility. It contains some organic matter, which disappears rapidly if the soil is cultivated. The reaction is medium to strongly acid. The soil is permeable to water and roots, but the moisture-supplying capacity is poor because the profile is shallow. Good tilth is easy to maintain.

*Use suitability* (1–L).—All of this soil is under cutover native deciduous forest. It is fair for crops and pasture, but its productivity is limited by the poor moisture-supplying capacity and low fertility. Hay and fall-sown small grains, which mature early, are the crops best suited to this soil. Heavy fertilization is necessary for moderately high yields. Under good management fairly good pastures can be established, but carrying capacity is limited because of the inadequate moisture supply.

**Litz loam, eroded rolling phase** (5 to 15 percent slopes) (Le).—This soil is like Litz loam, rolling phase, except that it has lost a considerable amount of its original surface layer through erosion. It occurs mostly in small areas on the lower slopes of Bays Mountains and is closely associated with the hilly phases of Litz loam. It is in the Teas–Litz–Stony land soil association.

The 4- to 5-inch plow layer is yellowish-brown or light yellowish-brown loam. In the more severely eroded areas, the yellowish-brown or reddish-yellow friable sandy clay loam or clay loam subsoil is exposed. At a depth of about 20 inches, the subsoil grades to a mixture of soil material and partly disintegrated shale and sandstone. Depth to bedrock ranges from 6 to 21 inches.

This soil is low in fertility. It is medium to strongly acid. The organic-matter content is low. The soil is permeable to roots and moisture, but because the profile is shallow, the moisture-supplying capacity is very poor and the rooting zone is restricted.

*Use suitability* (1–L).—All of this soil has been cleared. Much of it is in crops or pasture, but a small acreage is idle. Crop yields are generally low.

This soil is of limited suitability for crops. It is better suited to hay and fall-sown small grains, which mature early, than to other crops. Fairly good pastures can be maintained if they are seeded and well fertilized, but the carrying capacity is limited because of the inadequate moisture supply.

**Litz silt loam, steep phase** (30 to 60 percent slopes) (Ls).—This excessively drained shallow soil has developed from acid shale that contained widely spaced thin lenses of limestone and calcareous shale. The parent material contains less lime than that of the Dandridge soils, which this soil resembles.

This soil occurs in association with Litz shaly silt loams and with other Litz loams in the Litz soil association. It also occurs in narrow shale belts that are widely distributed in the Dunmore–Greendale soil association. It occupies higher and steeper slopes than the associated Dunmore soils. Some areas occur on Bays Mountains in association with Litz loams.

Profile description:

0 to 8 inches, pale-brown or light yellowish-brown silt loam that contains some small shale fragments; the topmost 1 or 2 inches contains an appreciable amount of organic matter that disappears rapidly under cultivation.
8 to 12 inches, yellowish-brown or yellow crumbly shaly silt loam or shaly silty clay loam.
12 inches +, light yellowish-brown or reddish-yellow soft noncalcareous shale intermixed with soil.

In many places the subsoil is lacking. The shale bedrock normally occurs at depths of 6 to 15 inches and crops out in many places. Shale fragments are on the surface and throughout the profile.

This soil is low in fertility. It is medium to strongly acid. The organic-matter content is low, except in the topmost 1 or 2 inches. The soil is permeable to roots and moisture, but the moisture-supplying capacity is poor and the rooting zone is limited because the profile is shallow. Runoff begins quickly during rains. Good tilth is easy to maintain, but the shale fragments interfere with cultivation.

*Use suitability* (2–C).—This soil is under cutover native deciduous forest. It is unsuited to cultivated crops, but fairly good pastures can be maintained if they are seeded and well fertilized. Carrying capacity is limited by the poor moisture-supplying capacity. South-facing slopes are especially likely to be droughty.

**Litz shaly silt loam, eroded steep phase** (30 to 60 percent slopes) (Lo).—This soil is like Litz silt loam, steep phase, except that a considerable part of the original surface soil has been lost through erosion, and as a result the present surface layer is shaly silt loam. It occurs in the narrow shale belts in the Litz soil association and in the Dunmore–Greendale soil association.

The 3- to 4-inch plow layer consists of light yellowish-brown shaly silt loam. This is underlain by yellowish-brown shaly silty clay loam or shaly silt loam. Depth to the shale bedrock ranges from 3 to 12 inches. In many patches the topmost layer is shaly, and outcrops of shale are common. Shallow gullies have formed in places, but most of them can be filled in by using heavy farm machinery.

This soil is very low in plant nutrients and organic matter. It is medium to strongly acid. It contains enough shale fragments to interfere with cultivation. Moisture and roots penetrate readily, but the rooting zone is restricted and the moisture-supplying capacity is limited because the profile is shallow. Runoff begins quickly during rains.

*Use suitability* (2–C).—All of this soil has been cleared and cultivated, but most of it is now in unimproved permanent pasture. A small acreage is in crops, chiefly hay; some is reverting to forest; and a little is idle. Crop yields are low.

This soil is not suited to cultivation. Under good management it will support good legume-grass pastures. The carrying capacity is limited by droughtiness, especially on south-facing slopes.

**Litz silt loam, very steep phase** (60+ percent slopes) (Lt).—This soil is like Litz silt loam, steep phase, except that it is steeper and shallower. It occurs in the Litz soil association in the central part of the county and in association with Litz shaly silt loams and other Litz silt loams in the narrow belts of steep shale ridges in the Dunmore–Greendale soil association.

The 4- to 5-inch surface layer is pale-brown or light yellowish-brown friable silt loam that contains shale fragments. This is underlain by yellowish-brown or yellow crumbly shaly silt loam or shaly silty clay loam. The shale bedrock normally occurs at depths of 4 to 12 inches and crops out in many places.

This soil is low in fertility and difficult to work. The uppermost 1 to 2 inches contains a small amount of organic matter. The reaction is medium acid to strongly acid. Moisture percolates readily, but the rooting zone is restricted and the moisture-supplying capacity is limited because the soil is very shallow. Runoff begins quickly during rains.

*Use suitability* (3–A).—Much of this soil is under cutover native forest consisting of oaks, hickories, tuliptrees, and a few pines.

This soil is very poor for crops and poor for pasture. It is best suited to forestry. Some areas will support pastures, but carrying capacity is limited because of the poor moisture-supplying capacity.

**Litz silt loam, hilly phase** (15 to 30 percent slopes) (Lp).—This soil is generally deeper over bedrock than Litz silt loam, steep phase. It is associated with Litz shaly silt loams and with other Litz silt loams in the Dunmore–Greendale soil association. It also occurs in 2 or 3 areas of the Litz soil association in the northeastern and central parts of the county. Most of it is on narrow ridge crests above steeper Litz soils; therefore, it is somewhat inaccessible for cultivation.

The 6- to 8-inch surface layer is pale-brown or light yellowish-brown friable silt loam. This is underlain, to a depth of 12 or 14 inches, by yellowish-brown or yellow friable crumbly shaly silt loam or shaly silty clay loam. This grades to a mixture of partly weathered shale fragments and soil material. Bedrock of acid shale is at depths of 6 to 18 inches. Shale outcrops and thin lenses of limestone occur in places.

In forested areas the uppermost 1 or 2 inches of this soil contains a considerable amount of organic matter. This is rapidly depleted if the soil is cultivated. In other places the organic-matter content is small. Natural fertility is low. The reaction is medium acid to strongly acid. Tilth is good. Moisture and roots penetrate readily, but the shallowness of the profile limits the moisture-supplying capacity and restricts the rooting zone.

*Use suitability* (2–C).—Practically all of this soil is under cutover native deciduous forest. It is not suited to cultivation. Under good management it will support good legume-grass pastures, but the carrying capacity is limited by the very poor moisture-supplying capacity.

**Litz shaly silt loam, eroded hilly phase** (15 to 30 percent slopes) (Lm).—This soil is like Litz silt loam, hilly phase, except that much of the original surface soil has been removed by erosion, and as a result the present surface layer is shaly silt loam. It occurs in association with Litz silt loams and with other Litz shaly silt loams on the narrow, steep, high shale ridges in the Litz soil association in the northeastern part of the county.

The 3- to 5-inch plow layer is light yellowish-brown or yellowish-brown friable shaly silt loam. This is underlain by a mixture of partly weathered shale fragments and soil material. Depth to the acid shale bedrock ranges from 3 to 15 inches. In many places cultivation is difficult because the plow layer contains a large amount of shale. Some shallow gullies have formed, but most of them can be filled in by heavy tillage implements.

This soil is low in fertility. It is medium acid to strongly acid. The organic-matter content is low. Roots and moisture permeate readily. The root zone is restricted and the moisture-supplying capacity limited, however, because the soil is shallow.

*Use suitability* (2–C).—All of this soil has been cleared and cropped, but only a small part is now cultivated. Corn and hay are the chief crops. Much of the soil is in unimproved pasture, and some is idle.

This soil is poor for crops. If it is fertilized and seeded, it will support good legume-grass pastures, but the carrying capacity is limited because of the poor moisture-supplying capacity. During the drier parts of the growing season, pastures on this soil are poor.

**Litz silt loam, rolling phase** (5 to 15 percent slopes) (Lr).—This soil is like Litz silt loam, hilly phase, except that it is less steep and, in general, a little deeper over bedrock. A larger acreage of this soil has a thickness of more than 12 inches to bedrock. The parent rock is acid shale that contains widely spaced thin lenses of limestone and calcareous shale. Much of this soil occurs in the Litz soil association, along with Litz shaly silt loams and other Litz silt loams, on narrow ridge crests in the northeastern part of the county.

Profile description:

0 to 8 inches, pale-brown to light yellowish-brown friable silt loam that contains some shale fragments; topmost 1 to 1½ inches is stained dark gray with organic matter; organic matter disappears rapidly under cultivation.
8 to 12 inches, yellowish-brown or yellow friable crumbly shaly silt loam or shaly silty clay loam.
12 inches +, light yellowish-brown or reddish-yellow soft noncalcareous shale intermixed with soil material; shale bedrock at depths of 9 to 18 inches.

This soil is low in fertility. It is medium acid to strongly acid. The organic-matter content is low except in the uppermost 1 or 2 inches. Moisture infiltrates well, and roots penetrate the soil easily. The rooting zone is restricted, however, and the moisture-supplying capacity is limited because the soil is shallow over bedrock. Good tilth is easily maintained, but in places the shale makes tillage difficult.

*Use suitability* (1–L).—Practically all of this soil is under cutover native deciduous forest. It is fairly well suited to crops and pasture, but much of it occurs on ridge crests that are somewhat inaccessible for cultivation.

This soil is not well suited to truck crops and crops that require moisture during drier periods. In general, it is best suited to early-maturing crops such as small grains and hay. Corn is probably the most suitable row crop. This soil will support alfalfa and other

legumes and grasses if adequately fertilized and seeded, but yields are limited by lack of moisture. Under proper management good pastures can be maintained, but carrying capacity is limited.

**Litz shaly silt loam, eroded rolling phase** (5 to 15 percent slopes) (Ln).—This soil is like Litz silt loam, rolling phase, except that much of the soil material has been lost through erosion. It is associated with Litz silt loams and other Litz shaly silt loams on the narrow steep belts of the Litz soil association. Much of it is on narrow ridge crests above slopes occupied by steeper Litz soils.

The 4- to 5-inch plow layer is light yellowish-brown friable shaly silt loam. This is underlain to a depth of 8 to 10 inches by yellowish-brown friable crumbly shaly silt loam or shaly silty clay loam. This grades to a mixture of light yellowish-brown to reddish-yellow soft noncalcareous shale and soil material. Shale bedrock is at depths of 6 to 15 inches.

In places where all the soil material has been lost through erosion, the plow layer consists of beds of partly weathered shale. A few shallow gullies occur, but they can be filled in by using heavy machinery.

This soil is low in fertility. It is medium acid to strongly acid. The organic-matter content is low. Good tilth is easily maintained, but shale fragments interfere with cultivation. Moisture and roots penetrate readily, but the root zone is limited and the moisture-supplying capacity is very poor because the profile is shallow.

*Use suitability* (1–L).—All of this soil has been cleared and cropped. Much of it is now unimproved pasture, and some is idle. Corn, small grains, and hay are the principal crops.

This soil is fairly well suited to cultivated crops and to pasture, but its productivity is limited. It occurs on high ridges, and much of it is inaccessible for cultivation.

Hay and early maturing small grains are the crops for which the soil is the most suitable. Corn is the best row crop to grow. If the soil is seeded and well fertilized, good stands of legumes and grasses can be developed, but yields are limited by droughtiness.

**Masada loam, undulating phase** (2 to 5 percent slopes) (Mb).—This is a well-drained soil that occurs on old stream terraces that rise 25 to 75 feet above the present flood plain of the Nolichucky River. The parent material was derived chiefly from granite, gneiss, and schist, but included some material derived from sandstone, quartzite, shale, and slate. This soil resembles the Waynesboro soils in color, texture, and consistence, but it was derived from different parent material and consequently differs in mineral content.

Profile description:

0 to 10 inches, brown to dark yellowish-brown very friable loam.

10 to 36 inches, strong-brown firm or crumbly clay loam or sandy clay that grades to reddish yellow or yellowish red; moderately developed medium blocky structure.

36 inches +, firm sandy clay or clay loam; splotched yellowish red, yellow, and some gray; stratified beds of sandy material, clayey material, and cobblestones may be below a depth of about 40 inches; bedrock, limestone in most places, is at depths of 4 to 20 feet.

Fine mica flakes are throughout the soil, and a few cobblestones or pebbles occur in places.

This soil is moderately fertile. The surface layer contains some organic matter. The reaction is medium acid to strongly acid. Good tilth is easily maintained. The soil is permeable to roots and moisture, and the moisture-supplying capacity is good.

*Use suitability* (1–D).—All of this soil has been cleared and cropped. It is now used chiefly for corn, small grains, and hay. It is well suited to all the crops commonly grown in the county, including tobacco, alfalfa, and truck crops. It can be intensively cultivated, is easy to work, and responds to good management. The erosion hazard is not serious, but some care should be taken to control runoff on the stronger slopes. Good pastures of high carrying capacity can be maintained if seeded and well fertilized.

**Masada loam, eroded rolling phase** (5 to 12 percent slopes) (Ma).—This soil is eroded to the extent that the plow layer now consists of a mixture of original surface soil and subsoil material. Otherwise, it is like Masada loam, undulating phase. This soil occupies small areas, some of which are along streams on terrace escarpments. It is associated with Masada loam, undulating phase, and with Altavista soils in the Congaree–Altavista soil association.

The 5- to 6-inch plow layer normally is dark yellowish-brown to light reddish-yellow moderately firm loam. In many severely eroded strongly sloping areas, the plow layer consists of reddish-yellow firm sandy clay loam from the subsoil. Below a depth of about 28 inches is firm sandy clay or clay loam splotched with yellowish red, yellow, and gray. This material may be underlain at depths of 36 to 40 inches by stratified sandy clays that contain lenses of pebbles and cobblestones. Bedrock, limestone in most places, is at depths of 3 to 15 feet.

A few small gullies occur in the most severely eroded areas, but most of these are easily filled in if heavy tillage implements are used. A few cobblestones occur in places.

Fertility is good on the less eroded parts and fair on the severely eroded parts. The moisture-supplying capacity also ranges from good to fair. The soil is medium to strongly acid. The organic-matter content is low. Good tilth is fairly easily maintained except on the most severely eroded places. Moisture and roots penetrate the soil easily except where the firm subsoil is at or near the surface. The severely eroded parts are droughty, especially during the drier parts of the growing season.

*Use suitability* (1–G).—Practically all of this soil has been cleared and cultivated. Much of it is now in pasture, but a considerable acreage is cropped, mainly to small grains and hay. This soil is moderately good for crops or pasture. It is suitable for most of the crops commonly grown and gives good yields if well managed. Productivity is reduced in the areas that are severely eroded. Some care is required to control runoff. If adequately fertilized and properly seeded, this soil will support good stands of legumes and grasses for hay or pasture.

**Melvin silt loam** (0 to 2 percent slopes) (Mc).—This poorly drained soil consists of young alluvium, most of which was washed from uplands underlain by limestone. The soil material was derived mostly from

Dunmore, Dewey, Groseclose, and Bolton soils; a little was derived from Litz and Dandridge soils. This soil occurs in slight depressions on the bottom lands along the creeks throughout the Dunmore–Greendale soil association. It is associated with the Lindside soil.

This soil resembles the Lindside soil, which was derived from the same kind of parent material but is better drained. It resembles the Prader soil in color and in drainage, but the parent material of the Prader soil was derived mostly from calcareous shale.

Profile description:

0 to 7 inches, dark yellowish-brown or yellowish-brown friable silt loam finely mottled with gray; much grayer or lighter colored when dry.
7 to 30 inches, predominantly gray silty clay loam or silty clay mottled with yellow and dark brown; very firm when moist, plastic when wet; limestone bedrock at depths of 2½ to 10 feet.

In places the surface layer is lighter gray and is a silty clay loam.

This soil is subject to overflow. During the wetter part of the growing season, the water table is at or very near the surface; during the drier part it may be at depths of 3 or 4 feet. Fertility is not high. The content of organic matter is moderately low to moderately high. The soil is generally slightly acid, but in places it is neutral or slightly alkaline. When not saturated with water, much of this soil is fairly permeable to roots and water. Spots where the subsoil is very firm silty clay loam or silty clay are very slowly permeable.

*Use suitability* (2–D).—Much of this soil is used for permanent pasture. A small acreage is cropped, and a few cleared areas have grown up to weeds, willows, and alders. Corn and hay are the chief crops. Yields vary because the moisture supply varies from year to year.

This soil is poor for crops. Artificial drainage would make it suitable for corn, soybeans, and some legumes and grasses. The quality of pastures varies; the better drained areas support fairly good stands of bluegrass and whiteclover and have moderately high carrying capacity, but in the more poorly drained areas the vegetation is of poor quality and the carrying capacity is low. Pastures could be improved by improving the drainage.

**Monongahela silt loam, undulating phase** (0 to 5 percent slopes) (Me).—This imperfectly drained to moderately well drained soil consists of old general alluvium. Most of the material was derived from sandy and shaly rocks; a little was derived from limestone. This soil occurs on low benches along Lick Creek and the other larger creeks in the county. A substantial acreage occurs in the Monongahela–Needmore–Dandridge soil association on the crests of low broad ridges above areas of Dandridge soils. A smaller acreage is in the Nolichucky–Waynesboro–Cumberland soil association.

This soil developed from the same kind of parent material as the Holston soils, but it is less well drained and consequently has a more mottled subsoil.

Profile description:

0 to 8 inches, pale-yellow or light yellowish-brown friable silt loam.
8 to 20 inches, yellow or olive-yellow moderately friable to firm silty clay loam with a moderately well developed medium blocky structure.
20 inches +, mottled yellow, brown, and gray silty clay; very firm or very hard.

In places the surface soil is fine sandy loam or loam. In other places there are cobblestones on the surface and throughout the profile, but not so many that they interfere with cultivation.

This soil is low in plant nutrients and organic matter and is medium acid to strongly acid. The 8- to 10-inch surface layer is permeable to roots and moisture, but the subsoil is very slowly permeable. Except during the drier parts of the growing season, the water table is ordinarily within 2 or 3 feet of the surface. Because of the high water table and the firm or very firm consistence of the subsoil, infiltration of moisture is retarded and the rooting zone is restricted. The moisture-supplying capacity is fair to good. Good tilth is fairly easy to maintain, but because of the slow internal drainage, it may be necessary to delay cultivation following a period of wet weather. Planting is likely to be delayed many days in the spring.

*Use suitability* (1–F).—Most of this soil has been cleared and is used for crops and pasture. Corn, small grains, and hay are the chief crops. Yields are moderate to low.

This soil is of limited suitability for crops. It responds fairly well to fertilization but not as well as better drained soils. For high yields very heavy fertilization is required. The soil is not suited to alfalfa nor to truck crops. Good yields of tobacco are obtained if conditions are favorable, but this crop may be damaged by excessive moisture. This soil tends to be droughty during midsummer; consequently, fall-sown small grains, which mature early, are one of the best suited crops. If seeded, fertilized, and otherwise well managed, good stands of legumes and grasses can be maintained. The carrying capacity of pastures may be limited by droughtiness during dry weather and by excess moisture during wet weather.

**Monongahela silt loam, eroded rolling phase** (5 to 12 percent slopes) (Md).—This soil resembles Monongahela silt loam, undulating phase, except for the effects of erosion. Most of it occurs on moderately strong slopes below areas of the undulating phase. Most of this soil is in the Monongahela–Needmore–Dandridge and the Hamblen–Staser soil associations. A smaller acreage is in the northern part of the Nolichucky–Waynesboro–Cumberland association.

The plow layer in most places consists of a mixture of surface soil and subsoil. The 4- to 5-inch plow layer is normally pale-yellow or yellow silt loam to silty clay loam. This is underlain to a depth of about 16 inches by yellow moderately firm silty clay loam. Below this is a layer of compact very firm silty clay, mottled yellow, gray, and brown. Bedrock of shale or limestone begins at depths of 2½ to 10 feet.

On the stronger slopes there are many patches from which all of the surface soil has been removed by erosion; in these spots the plow layer consists of yellow firm or very firm silty clay loam. Some areas in the eastern part of the county, near the mountains, have surface layers of fine sandy loam or loam.

This soil is low in fertility. It is medium acid to strongly acid. The organic-matter content is low. Good

tilth is somewhat difficult to maintain, especially in the more severely eroded parts. Moisture infiltrates well to depths of 6 or 8 inches in the less severely eroded areas, but percolation is very slow where erosion has been severe. Because of slow internal drainage and the very firm consistence of the subsoil, root development is impeded. The moisture-supplying capacity is fair to poor; much of the soil is droughty during the drier part of the growing season.

*Use suitability* (1–J).—Most of this soil has been cleared and is used for crops and pasture. A small acreage is idle.

This soil is fair for crops or pasture. It responds to fertilization, but it will not give yields comparable to those obtained from better drained and more fertile soils. The crops to which it is best suited are red clover, orchardgrass, other legumes and grasses, and small grains. It is not suited to alfalfa, truck crops, and tobacco.

**Needmore silt loam, undulating phase** (2 to 5 percent slopes) (Nb).—This well-drained soil is moderately deep over calcareous shale. It occurs on low ridgetops in association with Monongahela silt loam, undulating phase. Most of it is in the Monongahela–Needmore–Dandridge soil association; some is in the Dandridge–Whitesburg association. This soil is much like the Dandridge soils, except that it is deeper over bedrock.

Profile description:

0 to 7 inches, pale-yellow to yellowish-brown friable silt loam; the topmost 1 to 2 inches is stained dark with organic matter; a few shale fragments occur in places.
7 to 22 inches, strong-brown to yellowish-brown firm to very firm silty clay; moderately well developed medium blocky structure.
22 to 30 inches, silty clay variegated or splotched strong brown, reddish yellow, and gray; very firm when moist, plastic when wet; contains thin, soft, weathered shale fragments; olive-gray, yellow, and nearly black shale is at depths of 1¼ to 3½ feet.

In some places the underlying shale is calcareous, but in other places it is leached to depths of 3 to 5 feet. In cultivated patches on the stronger slopes, much of the original surface layer has been removed by erosion.

This soil is medium acid to strongly acid. It is moderately low in organic matter and plant nutrients. Internal drainage is slow, but it is adequate for the crops commonly grown. Moisture does not readily infiltrate the subsoil; as a result, runoff begins rather soon following rains. The moisture-supplying capacity is somewhat limited; consequently, the soil is rather droughty during the drier parts of the growing season. Good tilth is fairly easy to maintain.

*Use suitability* (1–L).—About 85 percent of this soil has been cleared. Much of it is used for crops or pasture. A small part is idle.

This soil is well suited to many kinds of crops. It is not so well suited to alfalfa and tobacco as are some of the deeper, more permeable soils. Productivity is somewhat limited by the limited moisture-supplying capacity. Under good management high yields of small grains and most legumes and grasses are obtained.

**Needmore silt loam, rolling phase** (5 to 12 percent slopes) (Na).—This soil resembles Needmore silt loam, undulating phase, but it is shallower over bedrock. Most of it occurs on the upper slopes of broad low ridges in the Monongahela–Needmore–Dandridge soil association. A small acreage occurs on narrow ridgetops in the Dandridge–Whitesburg association.

The 5- to 6-inch surface layer is pale-yellow to yellowish-brown friable silt loam. This is underlain, to a depth of about 16 inches, by yellowish-brown or yellow silty clay that is moderately firm to firm when moist and plastic when wet. Below this is a layer of very firm tough silty clay that contains thin fragments of soft weathered shale. This layer is variegated or splotched with strong brown, reddish yellow, and gray.

Depth to the shale bedrock ranges from 1 to 3 feet. In many places the shale is calcareous directly under the soil; in other places it is leached to depths of 3 or 4 feet and is medium acid.

This soil is moderately low in plant nutrients and low in organic matter. It is medium acid to strongly acid. The surface soil is permeable to roots and moisture, but the firm to very firm subsoil is slowly permeable, and runoff develops rather quickly during rains. Because the moisture-supplying capacity is limited, the soil is somewhat droughty during dry weather. Good tilth is fairly easy to maintain.

*Use suitability* (1–L).—Most of this soil is under cutover native deciduous forest. If cleared it would be fair for crops or pasture, but it would be suited to a limited number of crops. It responds well to fertilization, but the moisture-supplying capacity is only fair; consequently, productivity is limited. The soil is well suited to small grains and to legumes and grasses. If it is adequately fertilized and limed, it will support good pastures, but the carrying capacity is limited during dry weather.

**Needmore silty clay loam, eroded rolling phase** (5 to 12 percent slopes) (Nc).—This soil is like Needmore silt loam, rolling phase, except that a considerable amount of the original surface soil has been lost through erosion, and as a result the present surface layer is finer textured. It occurs in association with Monongahela soils and with other Needmore soils on broad low ridges in the Monongahela–Needmore–Dandridge soil association. Some areas occur in the Dandridge–Whitesburg association.

In most places the 4- to 5-inch plow layer consists of a mixture of original surface soil and subsoil and is yellowish-brown to strong-brown silt loam to firm silty clay loam. This is underlain by yellowish-brown or yellow silty clay that is very firm when moist and plastic when wet. Beginning at a depth of about 16 inches is a layer of splotched strong-brown, reddish-yellow, and gray silty clay that is very firm when moist and plastic when wet. This layer contains fragments of soft weathered shale.

Depth to the shale bedrock ranges from 1 to 3 feet. In some places the shale is calcareous directly below the soil; in others, it is leached and acid to a depth of 4 or 5 feet. Many exposed patches on the stronger slopes are severely eroded; in such places the plow layer consists of the silty clay subsoil. In some areas the subsoil is reddish yellow instead of yellow.

This soil is low in fertility. It is medium acid to strongly acid. The organic-matter content is low. Good tilth is fairly easy to maintain except on the severely eroded areas. The very firm subsoil impedes infiltra-

tion of moisture and causes runoff to begin quickly during rains. The moisture-supplying capacity is fair to poor.

*Use suitability* (1–L).—All of this soil has been cleared. Much of it is now in crops, chiefly corn, small grains, and lespedeza. Alfalfa and tobacco are also grown. A considerable acreage is used for pasture, and a little is idle.

This soil is fair for crops, but the productivity and the range of suitability are limited. Small grains and legumes and grasses are among the crops for which it is best suited. This soil is erodible if cultivated; it should be kept under a cover of close-growing vegetation as much of the time as possible, and row crops should be grown infrequently.

**Nolichucky loam, undulating phase** (2 to 5 percent slopes) (Nk).—This soil occurs on terraces that consist of old general alluvium. The material was derived chiefly from sandy and shaly rocks and to a small extent from limestone. Most of this soil is on the terraces along the Nolichucky River, in the Nolichucky–Waynesboro–Cumberland soil association. The terraces are 75 to 150 feet above the level of the stream.

This soil developed from the same kind of parent material as the Waynesboro and Holston soils. The Waynesboro soils have a darker colored surface layer and are more fertile; the Holston soils have light-red or yellowish-red subsoils and have slower internal drainage.

Profile description:

0 to 8 inches, light yellowish-brown to pale-brown very friable loam.
8 to 14 inches, yellowish-brown clay loam grading with depth to reddish yellow; friable to slightly firm.
14 to 36 inches, reddish-yellow to yellowish-red firm to friable clay loam; moderately well developed medium blocky structure.
36 inches +, splotched red and yellow fine sandy clay with some grayish streaks; firm to friable.

In some areas, especially where the soil is shallow, the subsoil is finer textured. Stratified sandy and clayey material containing lenses of cobblestones or pebbles occur below a depth of 3½ feet. Pebbles and cobblestones occur in places but not in amounts that interfere with cultivation.

This soil is low in fertility. It is strongly acid. The organic-matter content is low. Moisture and roots permeate the soil readily; consequently runoff does not begin quickly. The moisture-supplying capacity is good. Good tilth is easy to maintain. A good seedbed can be prepared more easily than in many finer textured soils, especially those that overlie limestone.

*Use suitability* (1–E).—Most of this soil is used for crops or pasture. Little of it is idle. It is good to very good for many kinds of crops. Under good management it produces high yields of all the crops commonly grown in the county. Fairly heavy fertilization is required for alfalfa, tobacco, and truck crops. Erosion is not a serious hazard. Under normal conditions this soil can be used in a moderately short rotation.

**Nolichucky loam, rolling phase** (5 to 12 percent slopes) (Nh).—This soil is like Nolichucky loam, undulating phase, except that it is on stronger slopes. Practically all of it is in the Nolichucky–Waynesboro–Cumberland soil association in the central part of the county.

The 6- to 8-inch surface layer is light yellowish-brown or pale-brown very friable loam. This is underlain to a depth of 12 or 14 inches by friable yellowish-brown clay loam grading with depth to reddish yellow. Below this is a layer of reddish-yellow to yellowish-red firm or friable clay loam of moderate medium blocky structure. This layer extends to a depth of about 30 inches and is underlain by splotched red and yellow fine sandy clay that is firm but crumbly. Bedrock, generally limestone, begins at depths of 2½ to 12 feet.

This soil is medium acid to strongly acid. It is moderately low in plant nutrients and organic matter. In forested areas the topmost 1 or 2 inches contains a considerable amount of organic matter, which disappears rapidly under cultivation. Moisture and roots permeate the soil readily. Runoff does not begin quickly, but because of the strong slope there is some risk of erosion. The moisture-supplying capacity is good, and good tilth is easy to maintain.

*Use suitability* (1–I).—All of this soil is under cutover native deciduous forest. It is fair to good for crops, but its productivity is limited. Good yields of tobacco, corn, and truck crops are obtained if the soil is adequately fertilized, but row crops should be grown only in moderately long rotations. Small grains, legumes, and grasses yield well under good management. This soil is not so well suited to alfalfa as the Dunmore soils.

**Nolichucky loam, eroded rolling phase** (5 to 12 percent slopes) (Ng).—This soil is like Nolichucky loam, rolling phase, except that it has lost a considerable amount of its surface soil through erosion. It is widely distributed on the high terraces along the Nolichucky River. It is in the Nolichucky–Waynesboro–Cumberland soil association.

The 5- to 6-inch plow layer is a loam in the less severely eroded areas and a friable clay loam where erosion has been more severe. It is light yellowish brown to reddish yellow. It is underlain by reddish-yellow to yellowish-red firm but crumbly clay loam of moderate medium blocky structure. Below this layer the soil is splotched. Bedrock, generally limestone, begins at depths of 1½ to 12 feet. There are a few patches from which all the surface soil has been removed; in these places the plow layer consists of yellowish-red firm clay loam from the subsoil. A few small gullies have formed in places, but most of these can be filled in by using heavy tillage implements.

This soil is moderately low in fertility. It is medium to strongly acid. The organic-matter content is very low. Except in the more severely eroded areas, this soil is permeable to moisture and roots and the moisture-supplying capacity is good. Although moisture infiltrates rather rapidly, the soil will erode if it is cultivated for a long period. Good tilth is easy to maintain except on the more severely eroded areas. In most places a good seedbed can easily be prepared.

*Use suitability* (1–I).—All of this soil is used for crops or pasture. It is moderately well suited to a wide variety of crops, including corn, tobacco, and truck crops. Good yields are obtained if the soil is heavily

fertilized and limed. Rotations should be moderately long. Alfalfa stands are more difficult to maintain than on the Dunmore soils.

**Nolichucky loam, eroded hilly phase** (12 to 25 percent slopes) (Nf).—This soil resembles Nolichucky loam, rolling phase, except that it is more strongly sloping and has lost much of its surface soil through erosion. It occurs on strong slopes on the edges of high terraces below areas of more gently sloping Nolichucky and Waynesboro soils. It is in the Nolichucky–Waynesboro–Cumberland soil association.

The 4- to 5-inch plow layer is yellowish-brown to reddish-yellow heavy loam or clay loam. This is underlain by reddish-yellow to yellowish-red firm to friable clay loam that grades to splotched red or yellow fine sandy clay. Bedrock, limestone in most places, begins at depths of 2 to 10 feet.

In the severely eroded areas, the plow layer consists of yellowish-red firm clay loam from the subsoil. Gullies have formed in some places, but most of them are easily filled in if heavy tillage implements are used. Cobblestones occur in some places but not in numbers that interfere with cultivation.

This soil is moderately low in natural fertility. It is medium acid to strongly acid. The organic-matter content is very low. Except in the more severely eroded places, the soil is permeable to moisture and roots and is easily maintained in good tilth. The moisture-supplying capacity is fair except where the soil is severely eroded or shallow over bedrock.

*Use suitability* (1–M).—All of this soil has been cleared and cropped. Most of it is used for pasture; a small area is in crops, and the rest is idle.

This soil is poor to fair for crops and fair to good for pasture. It is suited to a number of crops but is best used in long rotations in which close-growing small grains and hay predominate. If it is well fertilized, this soil will support good pastures, and for much of the acreage this is the best use.

Runoff creates an erosion hazard and interferes with fieldwork. The soil tends to be droughty, especially on the south-facing slopes.

**Nolichucky cobbly fine sandy loam, eroded rolling phase** (5 to 12 percent slopes) (Ne).—This soil differs from Nolichucky loam, undulating phase, mainly in that it has lost much of its original surface layer through erosion and now has a moderately coarse textured surface soil, is moderately sloping to strongly sloping, and contains enough gravel and cobblestones to interfere with tillage. It is in the Nolichucky–Waynesboro–Cumberland soil association. It occurs in widely distributed areas on high terraces along the Nolichucky River. The terraces are formed of materials derived chiefly from sandy rocks and shales and to a lesser extent from limestone.

The 6- to 8-inch surface layer is light yellowish-brown or pale-brown cobbly fine sandy loam. This is underlain by friable to somewhat firm cobbly clay loam that is yellowish brown and grades with depth to reddish yellow. Below this is reddish-yellow to yellowish-red firm to friable cobbly clay loam that extends from a depth of 15 inches to 40 inches. This layer rests on splotched red and yellow cobbly fine sandy clay that is firm to friable. Bedrock, limestone in most places, begins at depths of 2½ to 15 feet.

In the more severely eroded areas, the 5- to 6-inch surface layer is yellowish-brown to reddish-yellow fine sandy loam or fine sandy clay loam. There are a few patches from which all the surface soil has been removed by erosion; in these places the plow layer consists of reddish-yellow cobbly clay loam from the subsoil. Some of the less severely eroded areas are under cutover native deciduous forest.

Fertility is moderately low to low. There is little organic matter in the surface layer. The soil is strongly acid. It is readily permeable to moisture and roots; consequently, runoff does not begin quickly during rains. The moisture-supplying capacity is more limited than that of the Nolichucky loams, but it is adequate during much of the growing season. Good tilth is fairly easy to maintain, except in the more severely eroded areas. This soil is more difficult to cultivate, however, than the Nolichucky loams because of the strong slopes and the abundance of pebbles and cobblestones.

*Use suitability* (1–I).—More than three-fourths of this soil has been cleared and used for crops. Some of the soil is in pasture, and a small acreage is idle.

This soil is suited to a variety of crops, but its use suitability and productivity are limited by the strong slopes, cobblestones, and low fertility. Tobacco, corn, and many truck crops are grown. Good yields are obtained of small grains and legumes and grasses if a high level of fertility is maintained.

**Nolichucky cobbly fine sandy loam, eroded hilly phase** (12 to 25 percent slopes) (Nd).—This soil is shallower, more severely eroded, and more strongly sloping than Nolichucky cobbly fine sandy loam, eroded rolling phase. It occurs mostly on the escarpments of high terraces along streams in the Nolichucky–Waynesboro–Cumberland soil association. It lies below and next to less strongly sloping Nolichucky and Waynesboro soils.

There are patches from which all of the original surface soil has been removed by erosion; in such places the plow layer now consists of reddish-yellow firm cobbly sandy clay loam. A small acreage of this soil that is still under the native deciduous forest has a 6- or 7-inch surface layer of light yellowish-brown or pale-brown cobbly fine sandy loam. This is underlain by yellowish-brown friable cobbly clay loam that grades with depth to reddish yellow. Beginning at a depth of about 14 inches is a layer of reddish-yellow to yellowish-red firm but crumbly cobbly clay loam, underlain by splotched material. Bedrock, limestone in most places, begins at depths of 2 to 10 feet. Shallow gullies occur in the more severely eroded areas but most of them can be filled in if heavy tillage implements are used.

Fertility is moderately low, and the organic-matter content is low. The soil is medium acid to strongly acid. In the less severely eroded places, the soil is permeable to roots and moisture, tilth is moderately good, and the water-supplying capacity is fair. Where there has been more severe erosion, tilth is unfavorable and the moisture-supplying capacity is poor; the plow layer is composed of slowly permeable clay loam from the subsoil, and runoff begins quickly during rains.

*Use suitability* (2–A).—Most of this soil has been cleared and cultivated. Much of it is now used for pasture. A small acreage is still under native forest.

This soil is not well suited to cultivation. If any of it is used for crops, it needs careful management to conserve productivity. Rotations should be long and should consist mostly of small grains and hay and pasture crops. If it is well fertilized, most of this soil will support pastures of fair to good carrying capacity. Severely eroded areas, especially those on south-facing slopes, are droughty and have lower carrying capacity than other areas.

**Ooltewah silt loam** (0 to 2 percent slopes) (Oa).—This is an imperfectly drained soil of the uplands. It has developed from limestone. It occurs in depressions and sinkholes and along intermittent drainageways. Most of it is in the Dunmore–Greendale, the Stony land–Dunmore, and the Groseclose–Dunmore soil associations.

This soil resembles Lindside silt loam, but it consists of local alluvium and is sometimes temporarily covered by ponded water that runs off the adjacent uplands. Lindside silt loam consists of general alluvium and is often flooded by overflow from streams.

Profile description:

0 to 14 inches, yellowish-brown or dark yellowish-brown friable silt loam.
14 to 20 inches, dark yellowish-brown friable silty clay loam mottled with gray and yellow.
20 to 36 inches, mottled gray, yellow, and brown silty clay loam; firm but moderately friable; the soil may become firmer and more grayish with depth; bedrock of limestone at depths of 4 to 15 feet.

This is a fertile soil. It contains a moderate amount of organic matter and is medium acid to slightly acid. It is permeable to roots and moisture, but water stands in the sinkholes because there are no outlets for surface drainage, and internal drainage is impaired. The moisture-supplying capacity is good. Good tilth is easy to maintain.

*Use suitability* (1–C).—Nearly all of this soil has been cleared and is used for crops or pasture. Corn and hay are the principal crops.

This is a productive soil that is easy to work and conserve, but its use suitability is limited because of the impaired drainage. It is too wet for alfalfa. Small grains are likely to lodge. It is not well suited to potatoes and early truck crops, but it is suitable for truck crops that are planted late. The crops to which it is best suited are corn, soybeans, and hay. Red clover and orchardgrass are suitable hay crops. Because the moisture supply is good, pasture stands of legumes and grasses are good even during dry weather.

**Pace silt loam, undulating phase** (2 to 5 percent slopes) (Pd).—This is a moderately well drained soil that occurs on older colluvial or local alluvial slopes. The parent material was derived chiefly from limestone. This soil is widely distributed throughout the Dunmore–Greendale soil association; a little of it is in the Stony land–Dunmore and Groseclose–Dunmore associations. It is lighter colored and less fertile than the Hermitage silt loams, which occur in similar topographic positions. It is similar to Greendale silt loam but occurs at slightly higher elevations and has somewhat more distinct layers.

Profile description:

0 to 10 inches, yellowish-brown to dark yellowish-brown friable silt loam.
10 to 28 inches, yellowish-brown to yellow friable to firm silty clay loam; moderately well developed medium blocky structure; yellow or pale yellow when dry.
28 inches +, mottled or splotched yellow, gray, and reddish-yellow firm to very firm silty clay loam grading to silty clay; bedrock of limestone is at depths of 3 to 10 feet.

Fine chert occurs in small quantities throughout this soil but does not materially interfere with cultivation.

This soil is low in plant nutrients and organic matter. It is medium acid to strongly acid. The moisture-supplying capacity is good. Good tilth is easy to maintain. The deep subsoil is very firm but is permeable enough to permit root development for most crops. Many areas on the foot slopes receive runoff water from the higher slopes; in a few places this runoff is an erosion hazard, but in general it is beneficial because it provides moisture to plants during dry periods.

*Use suitability* (1–F).—Practically all of this soil has been cleared and cultivated. Much of it is now used to raise corn, tobacco, small grains, and hay.

This soil is easy to work and to conserve and responds to fertilization. It is suited to moderately intensive use, but it will not give high yields unless it is heavily fertilized. It is well suited to corn, tobacco, small grains, hay, and many truck crops. It is not so well suited to alfalfa as some of the more fertile and better drained soils. If properly seeded and well fertilized, this soil will support good pastures of high carrying capacity.

**Pace silt loam, eroded rolling phase** (5 to 12 percent slopes) (Pc).—This soil resembles Pace silt loam, undulating phase, but it is more strongly sloping and has lost some of its surface soil through erosion. It occurs on gentle foot slopes and along intermittent drainageways, just below areas of Dunmore and Groseclose soils. It is widely distributed throughout the Dunmore–Greendale, Groseclose–Dunmore, and Stony land–Dunmore soil associations.

The degree of erosion varies. In places very little surface soil has been lost; in other places as much as 50 percent has been lost; a few places are severely eroded. There are a few patches on the steeper, more exposed slopes from which all of the surface soil has been removed by erosion; in these places the plow layer consists of yellow firm silty clay loam or silty clay. In most places the 5- to 6-inch surface layer is yellowish-brown friable silt loam. This is underlain by yellowish-brown or yellow friable or firm silty clay loam. Beginning at a depth of about 24 inches is a layer of splotched yellow, gray, and reddish-yellow silty clay loam or silty clay that is firm to very firm. Depth to the limestone bedrock ranges from 2 to 8 feet.

This soil is low in organic matter and moderately low in plant nutrients. It is medium acid to strongly acid. The moisture-supplying capacity is good. Runoff creates more of an erosion hazard on this soil than on Pace silt loam, undulating phase. Except in the most severely eroded areas, the soil is permeable to roots and moisture.

*Use suitability* (1–J).—Most of this soil has been cleared and is now used for crops or pasture. It is

suited to many kinds of crops, but it requires more careful management than Pace silt loam, undulating phase. It will support pastures of moderately good carrying capacity.

**Pace cherty silt loam, undulating phase** (2 to 5 percent slopes) (Pb).—This soil resembles Pace silt loam, undulating phase, but it has a lighter colored surface soil, somewhat more rapid internal drainage, and contains chert fragments in amounts that interfere with cultivation. It is associated with cherty Dunmore soils in the Dunmore–Greendale and Stony land–Dunmore soil associations.

Profile description:

0 to 10 inches, brownish-gray to brownish-yellow friable cherty silt loam.
10 to 28 inches, yellow to yellowish-brown friable to moderately firm cherty silty clay loam.
28 inches +, mottled gray, yellow, and brown cherty silty clay loam or cherty silty clay; firm to very firm; bedrock of limestone is at depths of 3 to 10 feet.

This soil is low in plant nutrients and organic matter and is medium acid to strongly acid. It is permeable to roots and moisture, but the mottled layer impedes percolation. The moisture-supplying capacity is good, although it is more limited than that of the Pace silt loams. Good tilth generally is easy to maintain.

*Use suitability* (1–F).—Most of this soil has been cleared and is now used for crops or pasture. Corn, small grains, and hay are the principal crops.

This soil is suited to many kinds of crops, but the chert makes tillage difficult. Good yields are obtained only if the soil is heavily fertilized. Under good management good pastures of moderately high carrying capacity can be maintained.

**Pace cherty silt loam, eroded rolling phase** (5 to 12 percent slopes) (Pa).—This soil resembles Pace cherty silt loam, undulating phase, but has a somewhat shallower profile. It occurs in small areas on foot slopes and along intermittent drainageways just below areas of Dunmore and Groseclose soils. Most of it is in the Dunmore–Greendale soil association.

A considerable amount of the surface soil has been lost through erosion, and a few shallow gullies have formed on the stronger slopes. In areas that are only slightly eroded, the 6- to 8-inch surface layer is brownish-gray or brownish-yellow friable cherty silt loam. This is underlain by yellow or brownish-yellow cherty silty clay loam. Beginning at a depth of about 24 inches is a layer of mottled or splotched gray, yellow, and brown cherty silty clay loam or cherty silty clay that is firm to very firm. Depth to the limestone bedrock ranges from 2 to 8 feet.

In the most severely eroded areas, all of the surface soil has been removed by erosion and the plow layer consists of yellow firm cherty silty clay.

This soil is low in plant nutrients. It is medium acid to strongly acid. Fertility is low. Except in the more severely eroded parts, good tilth is easy to maintain, but the chert fragments interfere with tillage operations. Down to the mottled layer, the soil is permeable to roots and moisture.

*Use suitability* (1–J).—Practically all of this soil has been cleared and is used for crops or pasture. Corn, tobacco, small grains, hay, and other crops are grown.

This soil is fair for crops and fair to good for pasture, but its use suitability is limited because it is cherty and low in fertility. It responds well to fertilization.

**Prader silt loam** (0 to 2 percent slopes) (Pe).—This is a poorly drained soil that consists of young general alluvium derived from calcareous shale. A few small areas in the southeastern part of the county consist of alluvium derived from slate and quartzite. Most of this soil occurs in areas of 2 to 10 acres on the bottom lands along creeks, in association with Hamblen soils. It is in the Monongahela–Needmore–Dandridge and Hamblen–Staser soil associations.

This soil developed from the same kind of parent material as the Hamblen soils but is more poorly drained.

Profile description:

0 to 7 inches, dark yellowish-brown or yellowish-brown silt loam; fine, common mottles of gray and dark brown.
7 to 20 inches, gray to olive-gray silty clay or silty clay loam; very fine when moist, plastic when wet.
20 inches +, predominantly gray silty clay, very firm when moist, plastic when wet; bedrock, calcareous shale in most places, is at depths of 2½ to 10 feet.

In many places the surface layer is silty clay loam. The surface layer in a few areas is very dark brown or nearly black.

Practically all of this soil is on the lower parts of the bottom lands or in depressions in the bottom lands; consequently it is frequently flooded. The water table is at or near the surface during the wet part of the year; during dry periods it is at depths of 2 to 5 feet. When the water table is low, the moisture-supplying capacity of the soil is limited. Areas where the water table fluctuates are excessively wet part of the time and droughty part of the time. The uppermost 10 to 12 inches is permeable to roots and moisture, but the underlying material, in most places, is very slowly permeable.

The supply of plant nutrients is moderately low except in the areas that have darker colored surface soil; in these areas the plant-nutrient content is moderately high. Most of this soil is neutral to slightly acid; some areas, particularly in the southeastern part of the county, are medium acid.

*Use suitability* (2–D).—About 25 percent of this soil is still under native forest. Much of the rest is in pasture. A small acreage is in crops, chiefly corn and hay. Yields are low.

This soil is poorly suited to crops, because it is poorly drained and subject to flooding. The better drained parts support a good cover of whiteclover and bluegrass, but the vegetation on the more poorly drained areas does not provide good forage. Artificial drainage would improve the productivity of this soil, but it may be too expensive to be practical.

**Ramsey stony loam, steep phase** (25 to 50 percent slopes) (Rb).—This is an excessively drained shallow soil that occurs on mountains in the Ramsey–Stony land soil association. The parent material was derived from quartzite, sandstone, shale, and slate.

Profile description:

0 to 8 inches, light yellowish-brown to yellowish-brown loose very friable stony loam; the top 1 or 2 inches is stained dark with organic matter.
8 to 20 inches, brownish-yellow or yellow friable stony loam that grades to stony clay loam.

20 inches +, yellowish-brown gritty soil material mixed with soft partially decomposed quartzite, sandstone, and slate rock fragments.

Depth to bedrock ranges from 1 to 3 feet; rock outcrops are common.

This soil is moderately low in plant nutrients and organic matter. It is medium acid to strongly acid. It is permeable to roots and moisture but contains enough rock fragments to interfere with cultivation. Runoff is very rapid, and internal drainage is rapid. The moisture-supplying capacity is poor.

*Use suitability* (3–A).—Practically all of this soil is under native forest of mixed hardwoods and pines. A very small acreage is in pasture.

This soil is unsuited to crops or pasture. Much of it is inaccessible. Forestry is the best use for most of it.

**Ramsey stony loam, very steep phase** (50+ percent slopes) (Rc).—This soil resembles Ramsey stony loam, steep phase, but is shallower and more strongly sloping. It occupies a large area in the Ramsey–Stony land soil association.

The 5- to 6-inch surface layer is light yellowish-brown loose very friable stony loam; the uppermost 1 to 2 inches is stained dark by organic matter. This is underlain, to a depth of about 16 inches, by yellowish-brown or yellow friable stony loam or stony clay loam, that grades to a mixture of stone fragments and soil material. Depth to bedrock ranges from 6 inches to 2 feet. Rock outcrops are common.

*Use suitability* (3–A).—Practically all of this soil is under cutover native forest of deciduous trees and pines. It is unsuited to crops or pasture.

**Ramsey stony loam, hilly phase** (12 to 25 percent slopes) (Ra).—This soil resembles Ramsey stony loam, steep phase. In addition to having a lower slope gradient, it is a little deeper over bedrock, on the average, although the maximum depth is no greater. Practically all of this soil occurs on narrow ridgetops within areas of steeper Ramsey soils. It is in the Ramsey–Stony land soil association.

The 8-inch surface layer is light yellowish-brown loose very friable stony loam. This is underlain by yellowish-brown or yellow friable stony loam or stony clay loam that grades at depths of 18 to 22 inches to a mixture of yellowish-brown gritty soil material that contains fragments of sandstone, quartzite, and slate. Depth to bedrock ranges from 1½ to 3 feet. There are a few outcrops.

Slopes in some areas are of less than 12 percent gradient.

This soil is low in fertility and contains little organic matter except in the topmost 1 or 2 inches. The reaction is medium acid to strongly acid. The soil is permeable to roots and moisture, but the water-supplying capacity is poor.

*Use suitability* (3–A).—Practically all of this soil is under native forest. It is very poorly suited to crops. Most of it is inaccessible because it is surrounded by steep and very steep Ramsey soils.

**Roanoke loam** (0 to 2 percent slopes) (Rd).—This is a poorly drained soil that consists of moderately old general alluvium derived mainly from granite, gneiss, and schist. It occurs on low terraces along the Nolichucky River. Practically all of it is in the Congaree–Altavista soil association in the western part of the county.

The Altavista and Masada soils consist of the same kind of alluvium but are better drained than this soil.

Profile description:

0 to 10 inches, dark-gray friable loam; light gray when dry.
10 to 16 inches, mottled gray, brown, and yellow clay loam; firm or crumbly.
16 to 30 inches, mottled olive-gray and yellow very firm clay or silty clay; bedrock of shale or limestone at depths of 5 to 15 feet.

This soil is moderately low in plant nutrients and organic matter. It is medium acid to strongly acid. To depths of 10 to 15 inches, it is permeable to moisture and roots, but the underlying material is very slowly permeable. During the wetter parts of the year, the water table is at or near the surface and some areas are ponded at times. Much of the time the soil is too wet for optimum plant growth, but during the drier part of the year the water table drops to a depth of 3 or 4 feet and the soil is droughty.

*Use suitability* (2–D).—All of this soil has been cleared, and most of it is used for permanent pasture. A small acreage is cropped. Little of it is idle.

This soil is poor for crops. Much of it will support fairly good pastures. Areas in which the drainage is better than is typical afford good grazing and are suited to corn, sorghum, soybeans, and lespedeza. This soil would be better suited to both crops and pasture if it were artificially drained, but improvement by this means may not be feasible for some areas.

**Sequatchie loam** (1 to 5 percent slopes) (Sb).—This is a well-drained soil. It consists of material derived from sandy and shaly rocks, with which is mixed small amounts of alluvium derived from limestone. Practically all of it is in the Jefferson–Allen–Hayter soil association in the southeastern part of the county. It occurs on low benches along the larger creeks that rise in the mountains to the southeast. Some areas are flooded occasionally.

This soil differs from the Hayter soils, which consist of local alluvium and are slightly darker brown. It resembles the Staser soils, which occur on first bottoms and have less distinct layers.

Profile description:

0 to 10 inches, brown or light-brown friable loam; in many places dark brown when moist.
10 to 32 inches, yellowish-brown friable to firm clay loam or sandy clay loam; reddish yellow in places.
32 inches +, strong-brown to yellowish-brown friable gravelly clay loam or sandy clay in places; in other places firm sandy clay loam or sandy clay, moderately mottled or splotched with yellow, brown, and gray; the deeper subsoil generally consists of stratified sandy material, gravelly material, and clay beds; bedrock is at depths of 4 to 15 feet.

A few pebbles and cobblestones occur throughout this soil but not in numbers that interfere with cultivation. Slopes exceed 5 percent in a few places, but generally they are less than 3 percent.

Fertility is moderately high. The surface layer contains a fair amount of organic matter. The reaction is medium acid to strongly acid. The entire profile is permeable to roots and moisture. There is little or no runoff, but excess water drains through the soil rapidly. The moisture-supplying capacity is good. Good

tilth is easy to maintain, and a good seedbed is easily prepared. The soil can be cultivated early in the spring.

*Use suitability* (1–D).—Practically all of this soil has been cleared and is used for crops or pasture. Corn, tobacco, small grains, and hay are the principal crops. Yields are moderate to high.

This soil is well suited to many kinds of crops and especially to truck crops. It can be used intensively for row crops if a high level of fertility is maintained. It responds well to fertilization. Legumes and grasses yield well if the fertility of the soil is maintained. Alfalfa, red clover, and other deep-rooted crops yield well, but alfalfa stands cannot be maintained for as many years as on the Cumberland and Dunmore soils.

**Sequatchie cobbly fine sandy loam** (1 to 5 percent slopes) (Sa).—This soil is like Sequatchie loam except that it contains enough gravel and cobblestones to interfere materially with cultivation and has a surface soil moderately coarse textured. Practically all of it occurs in areas of 8 to 25 acres on low benches along the larger creeks that rise in the mountains in the southeastern part of the county. It is in the Jefferson–Allen–Hayter soil association.

The 10-inch surface layer is brown or light-brown cobbly fine sandy loam. This is underlain by yellowish-brown or reddish-yellow friable cobbly clay loam; this layer extends to a depth of about 32 inches and becomes more gravelly with depth. Beds of cobblestones and gravel occur below a depth of about 30 inches. Depth to the bedrock of shale or limestone ranges from 4 to 15 feet. In places the surface layer is gravelly loam and the subsoil is slightly firmer than that typical of this soil.

Fertility is moderate to moderately low. The soil is medium acid to strongly acid. The organic-matter content is moderate to moderately low. The soil is friable throughout. The moisture-supplying capacity is good to fair. The soil is very readily permeable, and the root zone is deep. Good tilth is easy to maintain, but the cobblestones and pebbles interfere with cultivation.

*Use suitability* (1–D).—Most of this soil has been cleared and is used for crops or pasture. Some of it is used intensively to raise corn and tobacco. Little of it is idle.

This soil is well suited to intensive cultivation to row crops. In many places the cobblestones interfere with mowing or harvesting small grains. The sandier areas are somewhat droughty for small grains, hay, and other shallow-rooted crops. This soil responds well to fertilization. Good stands of legumes and grasses can be established, but the carrying capacity of pastures varies, depending on the moisture-supplying capacity of the soil.

**Staser silt loam** (0 to 3 percent slopes) (Sd).—This is a well-drained soil of the bottom lands. It occurs along Lick Creek, in the Hamblen–Staser soil association. Almost all of the parent material was derived from calcareous shale; a little was derived from sandstone. This soil is associated with the Hamblen soils but generally occurs at slightly higher elevations or on natural levees close to the stream channel. The Hamblen soils are not so well drained and are consequently more mottled.

Profile description:

0 to 15 inches, brown to yellowish-brown friable silt loam.
15 to 36 inches, yellowish-brown silt loam or silty clay loam; somewhat firmer than the above layer.
36 inches +, yellowish-brown silty clay loam mottled with gray and yellow; firm; bedrock of shale is at depths of 3 to 10 feet.

In places a darker brown layer of firm silt loam occurs 6 to 12 inches below the surface; this layer was once at the surface but has been buried by more recent deposits. The subsoil may be friable to slightly firm and may contain lenses of sand.

This is a moderately productive soil. It contains some organic matter. The reaction is medium acid to neutral. Good tilth is easily maintained. The soil is permeable to roots and moisture. The water-supplying capacity is good. The areas are subject to flooding.

*Use suitability* (1–A).—Practically all of this soil has been cleared and is used intensively for cultivated crops. Corn is the principal crop. Hay and pasture are also important crops. Yields are moderately high.

This soil is suited to a limited number of crops, particularly corn and legumes and grasses. Although it is productive, it is not suited to high-value crops because of the flood hazard.

**Staser fine sandy loam** (0 to 3 percent slopes) (Sc).—This is a well-drained soil that occurs on the bottom lands of the larger creeks in the county. The areas along Lick Creek are in the Hamblen–Staser soil association; these areas have received deposits of material washed from the sandy soils on Bays Mountains. Other areas lie along the creeks that rise in the mountains in the southeastern part of the county. These areas are in the Jefferson–Allen–Hayter soil association. The soil in such places is gravelly and cobbly. The parent material of this soil was derived chiefly from sandstone, quartzite, and shale and contained a little lime.

The 10- to 12-inch surface layer is light-brown to brown fine sandy loam. The subsoil is brown or yellowish-brown friable fine sandy loam or clay loam somewhat finer textured than the surface soil. Below a depth of about 28 inches, the soil material is coarser; there may be beds of gravel and cobblestones. Depth to bedrock ranges from 3 to 10 feet.

This soil has a moderate supply of plant nutrients. The uppermost 8 to 10 inches contains a little organic matter. The reaction is slightly acid to medium acid. Internal drainage is rapid. The soil is permeable to roots and moisture. The moisture-supplying capacity is good, although the water table is 4 to 8 feet below the surface during most of the growing season.

*Use suitability* (1–A).—Much of this soil has been cleared and is used for crops, chiefly corn and hay. It is well suited to intensive cultivation. Its use suitability is restricted by the flood hazard, but flood-deposited material that is high in plant nutrients helps to maintain the fertility level. Corn is the crop for which it is most suitable; except for the danger of floods, it would be well suited to truck crops. Pasture and hay crops do well, but not as well as on Staser silt loam.

**State loam** (1 to 5 percent slopes) (Se).—This well-drained soil occurs on low terraces next to the bottom lands along the Nolichucky River. It is in the Noli-

chucky–Waynesboro–Cumberland and the Congaree–Altavista soil associations. The parent material was general alluvium. Most of it was derived from granite, gneiss, and schist; some was derived from sandstone, shale, quartzite, slate, and limestone.

This soil differs from the Sequatchie soils chiefly in mineral content; the parent material of the Sequatchie soils was predominantly sandstone and shale. State loam also contains mica flakes, which are lacking in the Sequatchie soils.

Profile description:

0 to 12 inches, brown or dark yellowish-brown very friable loam.
12 to 36 inches, yellowish-brown friable crumbly clay loam; weak to moderate medium blocky structure.
36 inches +, predominantly brownish-yellow clay loam, somewhat more friable than the above layer; this layer may be stratified sands and clays with some pebbles and cobblestones; beds of cobblestones occur below a depth of about 38 inches; bedrock is at depths of 4 to 15 feet.

Large amounts of mica flakes occur throughout this soil, and in most places a few pebbles and cobblestones are present. In places the subsoil has a reddish cast.

This fertile soil contains a moderate amount of organic matter. It is medium acid to strongly acid. Good tilth is easy to maintain. The soil is permeable to moisture and roots and has good moisture-supplying capacity.

*Use suitability* (1–D).—All of this soil is used for crops. Alfalfa, tobacco, and vegetables are important crops. A small acreage is used for pasture. Yields are generally high.

This soil is well suited to truck crops and to corn, tobacco, small grains, and legumes and grasses. The moisture supply is good even during the drier part of the growing season.

**State loam, eroded rolling phase** (5 to 12 percent slopes) (Sf).—This soil resembles State loam, but it is more strongly sloping and has lost much of its original surface layer through erosion. Practically all of it occurs on the slopes of stream terraces below areas of State loam.

The surface layer, in most places, is yellowish-brown loam or clay loam. This is underlain by yellowish-brown clay loam of firmer consistence. Below depths of 24 to 28 inches, the soil is more nearly brownish yellow and is generally more friable than the layer directly above. Depth to bedrock ranges from 4 to 15 feet.

This soil is fertile. It is medium acid to strongly acid. The surface layer contains some organic matter. The soil is slightly less permeable than State loam. The moisture-supplying capacity is good but not so good as that of State loam.

*Use suitability* (1–G).—Practically all of this soil is used for crops. It is suited to the same crops as State loam, but it requires longer crop rotations and more careful management to control runoff.

**Stony rolling land, Dunmore soil material** (2 to 12 percent slopes) (Sl).—This land type is characterized by numerous outcrops and ledges of limestone. Locally it is called "rock land," "limestone rock land," or "glady land." It occurs in small areas and is closely associated with other stony land types. Most of it is in the Stony land–Dunmore soil association; small areas are widely distributed in the Dunmore–Greendale soil association.

Outcrops and loose stones occupy at least 10 percent of the surface and in some areas as much as 75 to 80 percent. Between the rocks is Dunmore soil material—brownish-yellow to reddish-brown firm silty clay loam that grades, a few inches below the surface, to very firm silty clay or clay. Bedrock is nearer the surface than in the Dunmore soils, and the soil layers are indistinct.

The soil between the rocks is moderately fertile. The uppermost few inches contains some organic matter. The reaction is medium acid. Internal drainage is medium, but moisture infiltrates slowly, and runoff develops rather quickly during rains. The soil is permeable to roots, but it is difficult to keep in good tilth, and the stones interfere with tillage.

*Use suitability* (2–C).—About 80 percent of this land has been cleared. A small acreage is cultivated, and the rest is used for pasture. Small areas are suitable for limited cultivation. The soil is so stony that the use of heavy machinery is impractical; tillage is done largely by light field implements and by hand. About 25 percent of the total area is too stony to be of any value for pasture. The rest will support a good pasture stand of legumes and grasses (fig. 12), but the carrying capacity is limited by droughtiness.

*Figure 12.*—**Limestone outcrops on Stony rolling land, Dunmore soil material. High-quality pasture can be maintained on this soil.**

**Stony hilly land, Dunmore soil material** (12 to 30 percent slopes) (Sk).—This land type is locally called "rock land" or "limestone rock land." Much of it is in the Stony land–Dunmore soil association; it also occurs in the Dunmore–Greendale soil association.

Outcrops and loose stones occupy from 20 to 70 percent of the surface. The soil material between the rocks is similar to that of the Dunmore soils. The 3– to 4–inch surface layer is brownish-yellow silty clay loam that grades to reddish-brown very firm silty clay. In some cleared areas, much of the original surface soil has been removed by erosion, and the top layer consists of reddish-brown silty clay. The maximum depth to bedrock is 3 feet.

The soil material between the rocks is moderately fertile. It is medium acid to strongly acid. The upper part contains a small amount of organic matter. Moisture percolates very slowly, and the moisture-

supplying capacity is very poor. Good tilth is difficult to maintain, and the stones and outcrops interfere with, or prohibit, tillage.

*Use suitability* (2–C).—About half of this mapping unit is still in forest. Most of the cleared part is used for permanent pasture. A small acreage is in crops.

In general this land type is too stony to be suitable for cultivation. A few small areas that can be hand-tilled are suitable for crops. The less stony half of this mapping unit will support pastures of legumes and grasses, but the carrying capacity is limited by droughtiness.

**Stony steep land, Dunmore soil material** (30 to 60 percent slopes) (Sn).—Ledges and outcrops of limestone occupy 20 to 70 percent of the areas of this mapping unit, which is locally called "limestone land." Most of it is in the Stony land–Dunmore soil association; some is in the Dunmore–Greendale association.

The brownish-yellow to yellowish-red soil material between the rocks is normally shallow; the maximum depth is 3 feet. In a small area slopes exceed 60 percent. Precipitous bluffs of rock, 20 to 100 feet high, occur in places.

*Use suitability* (3–A).—At least 80 percent of this soil is under cutover deciduous forest. The rest has been cleared and is used for pasture. Little of it is productive enough to be of much value as pasture.

**Stony hilly land, Armuchee soil material** (5 to 30 percent slopes) (Sh).—This land type is characterized by numerous outcrops and ledges of limestone and some outcrops of shale. Most of it is at the base of Bays Mountains southwest of Bulls Gap. A few small areas occur elsewhere in the Teas–Litz–Stony land association.

From 15 to 50 percent of the surface of each area is rock. The soil material between the rocks is similar to the Armuchee soils. Much of this mapping unit consists of areas of Armuchee silt loam, hilly phase, that have been so severely eroded that bedrock is exposed; in these areas the soil material is predominantly reddish-yellow very firm silty clay. In other areas the soil material is light yellowish-brown silt loam, 4 to 5 inches deep. Gullies are common in some places. They cannot easily be filled in because there is not enough soil material.

*Use suitability* (2–C).—Most of this mapping unit is in forest. Much of it has been farmed, abandoned, and then reforested. Some is used for pasture. The stoniest and most severely eroded areas are not suited to crops or pasture. Much of the rest would support legume-grass pastures if seeded and well fertilized. The carrying capacity would be limited because the moisture-supplying capacity is very poor.

**Stony steep land, Armuchee soil material** (30 to 60 percent slopes) (Sm).—This land type is characterized by numerous ledges and outcrops of limestone and some outcrops of shale. Most of it is on the southeastern slope of Bays Mountains, southwest of Bulls Gap.

From 30 to 50 percent of the surface of each area is rock. The soil material between the rocks is predominantly reddish-yellow very firm silty clay, like the subsoil of the Armuchee soils. It is up to 18 inches thick. This soil material is low in organic matter and of low fertility. It is slowly permeable and has poor moisture-supplying capacity. The acidity ranges from very high to very low.

*Use suitability* (3–A).—Much of this mapping unit is in forest. Some of it has been reforested after being farmed and then abandoned. It is very poor for crops or pasture.

**Stony very steep land, Ramsey and Muskingum soil materials** (60+ percent slopes) (So).—This land type is characterized by loose rocks and massive bluffs and escarpments of sandstone and conglomerate. Most of it is on the highest parts of the ridges in the Ramsey–Stony land soil association; in these areas the parent rock and the outcrops are mostly quartzite, slate, and conglomerate. A smaller acreage is in the Teas–Litz–Stony land association in the northern part of the county; in this area the parent rock and outcrops are mostly sandstone and shale.

From 20 to 70 percent of the surface of each area is covered with loose boulders. The soil material is predominantly brownish-yellow fine sandy loam. In most places it is less than 18 inches thick. The uppermost 1 or 2 inches contains considerable organic matter, as well as partly disintegrated leaves and twigs. The soil material is low in plant nutrients and is strongly acid. The moisture-supplying capacity is poor, chiefly because bedrock is near the surface.

*Use suitability* (3–A).—Practically all of this mapping unit is under native forest of deciduous trees mixed with a few pines. It is unsuited to crops or pasture. Many of the areas are almost inaccessible. Trees grow slowly.

**Stony colluvium, Jefferson soil material** (3 to 15 percent slopes) (Sg).—This mapping unit consists of very stony colluvium that has accumulated on gentle alluvial fans or alluvial slopes below the high rough mountainous areas in the Ramsey–Stony land soil association. It occurs along drainageways that extend out from the base of the mountains, and on fairly broad alluvial fans at the head of some drainageways.

The colluvium consists of cobblestones and boulders of quartzite, sandstone, conglomerate, and other sandy rocks. Some limestone soil material is mixed with the rocks.

*Use suitability* (3-A).—Practically all of this mapping unit is in forest. It is poor for crops or pasture. A few areas could, if cleared of stones, be used for pasture or for hand-cultivated crops.

**Teas loam, steep phase** (30 to 60 percent slopes) (Td).—This is a shallow soil overlying reddish shale that is interbedded with sandstone and thin layers of limestone. Much of the shale is calcareous; the sandy material is acid. In many places the shale has been leached of carbonates to a considerable depth.

This soil occurs principally in the valley of Cove Creek, in the southern part of the county; a small acreage is in the Teas–Litz–Stony land soil association in the northwestern part of the county.

Profile description:

0 to 10 inches, purplish-red or weak-red friable loam to shaly silt loam.
10 to 16 inches, weak-red friable shaly loam or clay loam.

The underlying material is partly weathered shale or sandy rock. A few outcrops of limestone occur.

Fragments of shaly rock, numerous enough to interfere with cultivation, occur throughout the soil, especially on the steeper slopes.

This soil is generally medium acid to strongly acid; where limestone crops out, it is only slightly acid. It is low in organic matter and plant nutrients. Moisture percolates fairly well, but the moisture-supplying capacity is limited because the soil is so shallow. Because of the strong slopes, runoff begins quickly during rains.

*Use suitability* (3–A).—Practically all of this soil is in forest. It is unsuited to crops or pasture, except for a few small patches where the soil is deeper than normal and the slopes are milder; these areas will support fair pastures if seeded and well fertilized.

**Teas shaly loam, eroded steep phase** (30 to 60 percent slopes) (Tf).—This soil is like Teas loam, steep phase, except that it has been cleared and has eroded to the extent that the plow layer now consists almost wholly of subsoil. It occurs in small areas in the valley of Cove Creek, in the southern part of the county.

The soil material is predominantly weak-red or purplish-red friable shaly loam or shaly clay loam and is normally less than a foot thick over bedrock. It is medium acid to strongly acid. It is low in plant nutrients and organic matter. The water-supplying capacity is limited. Shallow gullies have formed in places.

*Use suitability* (3–A).—All of this soil has been cleared. Much of it is in unimproved pasture. A small part is cropped, and the rest is idle. This soil is poor for crops or pasture.

**Teas shaly loam, eroded hilly phase** (15 to 30 percent slopes) (Te).—This soil differs mainly from Teas loam, steep phase, in having stronger slopes and having lost a considerable amount of the original surface soil through erosion. The present surface layer is shaly loam. It occurs in small areas in the valley of Cove Creek in the southern part of the county and on Bays Mountains in the northwestern part.

The 8- to 10-inch surface layer is weak-red or purplish-red friable shaly loam. This is underlain to a depth of about 18 inches by weak-red friable shaly clay loam that contains more stones than the surface layer. Depth to the purplish shale bedrock ranges from 6 inches to 2 feet. Small gullies have formed on the steeper parts, and thin beds of limestone crop out here and there.

This soil is low in plant nutrients and organic matter. It is medium acid to strongly acid, except for a few spots that are slightly acid. Good tilth is fairly easy to maintain, but cultivation is difficult because the soil is shallow and shaly. The soil is permeable to roots and moisture, but the moisture-supplying capacity is limited because the soil is shallow over bedrock.

*Use suitability* (3–A).—All of this soil has been cleared. Most of it is used for pasture. Some is used to grow hay, chiefly lespedeza and native grasses. A small acreage is idle.

This soil is poor for crops and only fair for pasture. Most of it can best be used for forest. Fair pasture stands can be established by seeding and moderately heavy fertilization. The more severely eroded areas will afford little grazing because of poor moisture-supplying capacity.

**Teas-Litz stony loams, steep phase** (30 to 60 percent slopes) (Tb).—The soils in this complex are so intricately associated that they cannot be shown separately on the soils map. The Teas soil developed over reddish or purplish shale, some of which is calcareous; the Litz soil developed over acid shale that contains a few lenses of limestone. Included with these soils are areas of Muskingum soils, not mapped in the county, which developed over acid sandstone. Most areas of this complex are on the highest parts of Bays Mountains, in the Teas–Litz–Stony land soil association.

The Teas soil has a weak-red or purplish-red friable loam or stony loam surface layer that is about 10 inches thick. The uppermost 1 or 2 inches is darker colored because it contains more organic matter than the lower part of the layer. The underlying material, to a depth of about 18 inches, is dusky-red firm but moderately friable stony or shaly clay loam.

The Litz soil has an 8- to 10-inch surface layer of yellowish-brown shaly or stony loam. This is underlain by brownish-yellow very shaly silty clay loam. Depth to bedrock ranges from 6 to 18 inches. Outcrops are common.

The soils in this complex are low in organic matter and of low fertility. They are generally medium acid to strongly acid, but some areas are only slightly acid. Moisture and roots penetrate readily, but the moisture-supplying capacity is very poor because the profile is shallow. Almost all of this complex is so stony or shaly that tillage is difficult.

*Use suitability* (3–A).—Most of this complex is under native forest. A small acreage has been cleared but is now idle. These soils are poor for crops or pasture and are best used for forest.

**Teas-Litz stony loams, very steep phase** (60+ percent slopes) (Tc).—This complex is like the Teas–Litz stony loams, steep phase, except that it is steeper, shallower, and stonier. It occupies the highest and steepest parts of Bays Mountains.

The Teas areas are predominantly weak-red or purplish-red stony or shaly loam; the Litz areas are predominantly brownish-yellow or brownish-gray shaly loam or silt loam. Bedrock crops out in many places, and the soil material is generally not more than a foot deep. Fertility is only fair, and the moisture-supplying capacity is limited.

*Use suitability* (3–A).—Practically all of this complex is under cutover native forest of deciduous trees mixed with a few pines. These soils are very poor for crops or pasture and can best be used for forest.

**Teas-Litz stony loams, hilly phase** (15 to 30 percent slopes) (Ta).—These soils are somewhat deeper than those in the steeper phases of the Teas-Litz complex. They occur mostly as narrow strips on the crests of the high steep ridges of Bays Mountains.

To a depth of about 10 inches, the Teas soil consists of weak-red or purplish-red friable stony loam. This is underlain by friable stony clay loam. The maximum depth to bedrock is 1½ feet; in places bedrock is at the surface.

The Litz soil consists of yellowish-brown or brownish-gray stony or shaly loam or silt loam to a depth of 6 or 8 inches. Below this is a layer of brownish-yellow

friable stony clay loam. Depth to bedrock is generally less than 1½ feet.

These soils are low in organic matter. They are medium acid to strongly acid. Fertility is low. Roots and moisture penetrate the soils, but the moisture-holding capacity is limited because the soils are shallow. Good tilth is fairly easily maintained, but the stones and rock outcrops interfere with cultivation.

*Use suitability* (3–A).—All of this complex is under cutover native forest, chiefly oak and other hardwoods mixed with a little pine. The soils are poor for crops or pasture. Much of the acreage is in inaccessible areas on high ridges. Most of the complex can best be left in forest.

**Tyler silt loam** (0 to 2 percent slopes) (Tg).—This imperfectly drained to poorly drained soil consists of mixed general alluvium derived chiefly from limestone and sandy and shaly rock. Much of it occurs in association with Monongahela and Holston soils in gentle depressions on low terraces along Lick Creek. These areas are in the Hamblen–Staser soil association. One large area that is underlain by limestone is in the Nolichucky–Waynesboro–Cumberland soil association. This soil is more poorly drained and is grayer throughout its profile than the Monongahela soils.

Profile description:

0 to 10 inches, gray to grayish-brown friable silt loam; in wooded areas the topmost 1 or 2 inches is stained darker by organic matter.
10 to 15 inches, mottled yellow and gray, firm to very firm silty clay loam.
15 to 48 inches, gray silty clay or clay mottled with yellow; very firm when moist, plastic when wet; bedrock, shale in most places, is at depths of 3 to 15 feet.

In other areas that have been surveyed, this soil is recognized as a member of the Purdy series. Slopes exceed 2 percent in a few places.

This soil is low in plant nutrients and organic matter. It is medium acid to strongly acid. Runoff and internal drainage are very slow. Roots and moisture penetrate to a depth of about 10 inches, but the subsoil is very slowly permeable. During the wetter part of the growing season, the water table is at or above the surface, and for much of the growing season the soil is too wet to be suitable for many crops. During the driest part of the year, however, the water table drops to a depth of 3 or 4 feet, and the soil is somewhat droughty. Tilth is good, but the period during which the soil is dry enough to be cultivated is limited.

*Use suitability* (2–D).—About 50 percent of this soil is used for pasture. A substantial acreage is in corn, sorghum, and lespedeza, and a small acreage is in deciduous forest. Crop yields are low, and the pastures are generally of low quality and limited carrying capacity.

This soil is poor for cultivated crops. Pastures could be improved by seeding and fertilizing, but it is difficult to maintain good stands of grasses and legumes on the wetter areas. Artificial drainage would improve most of this soil, but the cost of this improvement might be excessive. If drained and well fertilized, the soil could be used intensively for some row crops, but its use suitability is limited by the shallowness of the profile. White clover, Ladino clover, fescue, and bluegrass would be suitable crops for drained areas. Small grains could be grown in some places. Alfalfa is unsuitable, as are tobacco and root crops.

**Waynesboro loam, undulating phase** (2 to 5 percent slopes) (We).—This is a well-drained soil that has developed from old general alluvium derived from sandy and shaly rocks and limestone. All of it occurs on high terraces, principally those along the Nolichucky River. Most of it is associated with Nolichucky, Cumberland, and Dunmore soils in the Nolichucky–Waynesboro–Cumberland soil association.

This soil resembles the Nolichucky soils but has a browner surface layer. It is sandier and more friable throughout than the Cumberland soils and has been less affected by limestone.

Profile description:

0 to 10 inches, brown friable loam.
10 to 40 inches, red or light-red firm clay loam or silty clay loam; moderate medium blocky structure.
40 inches +, red firm sandy clay loam or clay loam splotched with yellow, brown, and gray; stratified sandy and clayey material may occur below a depth of 50 or 60 inches, and there may be irregular beds of cobblestones or gravel; bedrock, generally limestone, is at depths of 3 to 15 feet.

This soil is moderately high in plant nutrients. The surface layer contains some organic matter. Roots and moisture penetrate the soil, but the firm subsoil retards percolation of moisture somewhat. Good tilth is easily maintained, except in a few patches where the firm subsoil is so near the surface that it is part of the plow layer. The moisture-supplying capacity is good. A few cobblestones occur in places but not in such quantities that they interfere with cultivation.

*Use suitability* (1–D).—Practically all of this soil is cultivated. Alfalfa, tobacco, truck crops, and other crops are grown. Little or none of the acreage is idle.

This soil is one of the best in the county for crops or pasture. It responds well to fertilization, and most of it has a friable plow layer that can be worked down to a fine seedbed. Small grains, corn, tobacco, potatoes, and cabbage and other truck crops yield well if the soil is fertilized and otherwise well managed. Practically all legumes and grasses do well, and pastures have a high carrying capacity throughout the drier part of the growing season. Bluegrass, clovers, and other shallow-rooted crops may occasionally be damaged by lack of moisture.

**Waynesboro loam, eroded rolling phase** (5 to 12 percent slopes) (Wd).—This soil resembles Waynesboro loam, undulating phase, but it is more strongly sloping and is eroded to the extent that the plow layer consists of a mixture of surface soil and subsoil. The soil is widely distributed throughout the Nolichucky–Waynesboro–Cumberland soil association. Much of it occurs on the slopes just below areas of Waynesboro loam, undulating phase.

The 5- to 6-inch surface layer is light reddish-brown loam or clay loam. This is underlain by red firm clay loam or sandy clay loam. Firm sandy clay loam, splotched red, yellow, and gray, occurs below depths of 32 to 36 inches. Bedrock, limestone in most places, is at depths of 2½ to 15 feet. In areas from which all the original surface soil has been removed by erosion, the plow layer consists of red firm clay loam or sandy clay loam. A few gullies have formed in the most

severely eroded areas, but they are not deep enough to prevent cultivation if heavy tillage implements are used.

This soil is moderately fertile. The plow layer contains some organic matter. The reaction is medium acid to strongly acid. Internal drainage is medium. The soil is permeable to roots and moisture, although the firm subsoil somewhat retards percolation of moisture. Runoff creates an erosion hazard if the soil is cultivated. The moisture-supplying capacity is generally good, but the most severely eroded places are droughty during the drier parts of the growing season.

*Use suitability* (1–G).—All of this soil is either cultivated or in pasture. It is well suited to both uses. Because of the strong slopes, this soil requires longer rotations and more care to control runoff than the undulating phase.

This soil is suited to alfalfa, tobacco, corn, small grains, truck crops, and many kinds of legumes and grasses. In the most severely eroded areas, it is difficult to prepare a good seedbed.

**Waynesboro loam, eroded hilly phase** (12 to 25 percent slopes) (Wc).—This soil resembles Waynesboro loam, undulating phase, but it has lost much of its original surface soil through erosion. It is associated with other Waynesboro soils. Most of it is on terrace escarpments, below areas of the undulating and rolling phases of Waynesboro loam. Practically all of it is in the Nolichucky–Waynesboro–Cumberland soil association.

In places the plow layer is light reddish-brown loam or clay loam, 5 to 6 inches deep; this is a mixture of subsoil and the remaining surface soil. In severely eroded places, all the original surface soil has been lost and the plow layer consists of red firm but crumbly clay loam. Splotched red, yellow, and gray firm crumbly clay loam occurs below a depth of about 24 inches. There are cobblestones in places but not enough to interfere with cultivation. Small gullies have formed in the most severely eroded areas, but few of them are deep enough to interfere with cultivation if heavy implements are used. Depth to the limestone bedrock ranges from 2 to 10 feet.

This soil is moderately fertile. It contains only a little organic matter. The reaction is medium acid to strongly acid. Good tilth is moderately easy to maintain in the less severely eroded areas but difficult to maintain where erosion has been severe. The soil is permeable to roots. Infiltration is moderately rapid through the uppermost 5 or 6 inches in the less severely eroded areas, but is slow where the soil is severely eroded. The most severely eroded areas are somewhat droughty.

*Use suitability* (1–M).—Practically all of this soil has been cleared and is used for pasture or crops. Some areas are idle. Yields are generally low.

This soil is fair for crops and fair to good for pasture. It is difficult to work and to conserve. If fertilized and well managed, it is well suited to small grain, hay, and permanent pasture. Row crops should be grown not oftener than once every 5 or 6 years. Severely eroded areas, especially those on south-facing slopes, are droughty.

**Waynesboro cobbly loam, eroded rolling phase** (5 to 12 percent slopes) (Wb).—This soil contains enough cobblestones and pebbles to interfere with cultivation. It is associated with Nolichucky and with other Waynesboro soils and is in the Nolichucky–Waynesboro–Cumberland soil association. Some areas are on slopes of less than 5 percent.

Much of this soil is so severely eroded that subsoil material is mixed with the original surface soil in the plow layer. In most places the plow layer is light reddish-brown loam to clay loam, 4 or 5 inches deep, containing many cobblestones and pebbles. It is underlain, to a depth of about 40 inches, by red or light-red firm but crumbly cobbly sandy clay loam or cobbly clay loam. Beneath this is a layer of splotched red, yellow, and gray cobbly clay loam. Depth to the limestone bedrock ranges from 2½ to 15 feet.

On some areas on exposed slopes all of the surface layer has been removed by erosion. Here, the plow layer consists of red firm cobbly clay loam from the subsoil.

This soil is moderately fertile. The plow layer contains some organic matter. The reaction is medium acid to strongly acid. The soil is permeable to roots and moisture. Internal drainage is medium, but the firm subsoil retards percolation of moisture somewhat. The moisture-supplying capacity is good. Good tilth is fairly easy to maintain, but cobblestones and pebbles interfere with cultivation.

*Use suitability* (1–G).—Much of this soil has been cleared and is used for crops and pasture. It is suitable for many kinds of crops and for pasture. It is not so well suited to cultivation as Waynesboro loam, undulating phase, because it is steep, stony, and erodible. Crop rotations should be long, and fertilizer and lime are needed to maintain productivity. Severely eroded areas are droughty and need especially careful management.

**Waynesboro cobbly loam, eroded hilly phase** (12 to 25 percent slopes) (Wa).—This soil resembles Waynesboro cobbly loam, eroded rolling phase, but it is more strongly sloping. It occurs on the steeper escarpments of the old high stream terraces on which Nolichucky and Waynesboro soils predominate. It is widely distributed throughout the Nolichucky–Waynesboro–Cumberland soil association.

About half the total acreage is eroded to such an extent that the plow layer consists of red firm but crumbly cobbly clay loam from the subsoil. On the other half, the 4- to 5-inch plow layer is light reddish-brown friable cobbly loam or cobbly clay loam. This is underlain by the red cobbly subsoil. Depth to the limestone bedrock ranges from 2 to 10 feet.

This soil is moderately fertile and contains a small amount of organic matter. It is medium acid to strongly acid. The soil is permeable to roots. Moisture percolates through the subsoil more slowly than through the surface soil. The moisture-supplying capacity is fair in the less severely eroded areas on north-facing slopes but is poor in severely eroded places on south-facing slopes.

*Use suitability* (2–A).—Practically all of this soil has been cleared. Much of it is used for pasture. Some is cropped, chiefly to corn and hay.

This soil is poor for cultivated crops. Good pastures can be maintained if the soil is seeded and well fertilized. Carrying capacity varies, depending on the moisture supply, but most of the pastures have high carrying capacity except during the drier parts of the growing season.

**Weaver silt loam** (0 to 3 percent slopes) (Wf).—This is an imperfectly drained soil of the bottom lands. It consists of general alluvium washed from upland soils, chiefly the Dunmore, Dewey, and Groseclose, that are underlain by limestone. It occurs in narrow strips along creeks that are fed by springs or by underground streams flowing from channels in the limestone. Much of it is in the Dunmore–Greendale soil association.

Profile description:

0 to 10 inches, dark grayish-brown or brown silt loam.
10 to 24 inches, yellowish-brown firm heavy silt loam or silty clay loam, mottled with light olive gray and pale yellow; lime nodules occur throughout this layer.
24 inches +, light olive-gray firm silty clay loam that contains large quantities of lime concentrations and marl; bedrock of limestone is at depths of 3 to 8 feet.

Some lime nodules and marl occur in the surface layer. In places the material below a depth of 10 inches is firm to very firm silty clay.

Practically all of this soil is subject to flooding. It is neutral to mildly alkaline. It appears to be moderately high in organic matter and plant nutrients. The surface soil is permeable to roots and moisture, but the subsoil is more slowly permeable. During the wetter part of the growing season, the water table is within 2 feet of the surface; in dry periods it is much lower. The moisture-supplying capacity is good. In some places the marl is excavated and used as a substitute for lime.

*Use suitability* (1–A).—Practically all of this soil has been cleared. More than half is now in permanent pasture. The rest is in crops, chiefly corn and hay.

This soil is fair for crops and good to very good for pasture. Its use suitability is limited because it is likely to be flooded and because it contains more lime than some crops will tolerate. Yields are somewhat lower than on Lindside silt loam. Good stands of alfalfa can be established on the better drained areas, but they cannot usually be maintained for more than 2 years. The soil is well suited to permanent pasture because the moisture supply is good even during dry periods.

**Whitesburg silt loam** (1 to 3 percent slopes) (Wg).—This is an imperfectly drained soil that consists of young local alluvium derived chiefly from calcareous shale. It resembles Lindside silt loam, but the Lindside soil was derived from general alluvium that had been deposited along the larger creeks. This soil occurs in narrow strips along drainageways throughout the Dandridge–Whitesburg and Monongahela–Needmore–Dandridge soil associations.

Profile description:

0 to 14 inches, yellowish-brown or brown friable silt loam.
14 to 28 inches, yellowish-brown firm silt loam or silty clay loam mottled with gray and dark brown.
28 inches +, mottled gray, olive and brown silty clay loam; firm to very firm when moist, plastic when wet; bedrock of shale is at depth of 2 to 6 feet.

This soil is fairly well supplied with plant nutrients and contains a small to moderate amount of organic matter. It is permeable to roots and moisture, although the subsoil is saturated during wet periods. The moisture-supplying capacity is adequate even during the drier parts of the growing season. Good tilth is easily maintained, but runoff is slow and, consequently, excess water may delay tillage operations.

*Use suitability* (1–C).—Practically all of this soil has been cleared. About half of it is now used for pasture and the rest for crops. Yields are moderately high.

This soil is moderately fertile and easy to manage. It responds well to good management. There is no erosion hazard. Because of the imperfect drainage, this soil is not suited to alfalfa or truck crops. Only the better drained areas are suited to tobacco. Small grains are likely to lodge. This soil is particularly well suited to corn, soybeans, and hay. Good permanent pastures can be maintained, because the moisture supply is good even during dry periods.

## *Use and Management of Soils*

Good soil management makes it possible to obtain consistently good yields and at the same time keep the soil in good condition. Crop selection, crop rotation, fertilization, suitable methods of cultivation, and control of weeds, diseases, and insects are basic management practices applicable to all soils. Individual soils, however, differ widely in use suitability and specific management needs. To simplify the discussion of management, the 174 soils mapped in Greene County have been arranged in 19 groups, each group consisting of soils that have similar management needs.

In the following pages, two levels of management are discussed for each group: A, the prevailing level and B, a higher level, equivalent to the practices used by the better practical farmers of the county, and feasible under present economic conditions. For each management group, there is a table showing the yields that can be expected under each of the two levels of management. These are average yields, each based on at least a 5-year period. Higher yields are possible in favorable seasons, especially with more liberal use of fertilizer. To raise yields from those in the A columns to those in the B columns will generally require at least two complete rotation cycles under the high level of management. New crop varieties, improved tillage methods, or better methods of controlling plant diseases and insects may make still higher yields possible in the future.

Detailed suggestions concerning crop rotations, application of fertilizer, and other management practices are not given in this report because conditions vary so much from farm to farm. The county agricultural agent or the local representative of the Soil Conservation Service will help farmers to work out the management problems of their particular farms. The county agent can also make arrangements to have soil samples tested to determine requirements for lime and fertilizer.

TABLE 7.—*Soils of management group 1–A and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management. Leaders indicate that, under the specified level of management, the soil is unsuited to the crop]

| Soil | Corn | | Wheat | | Oats | | Lespedeza | | Tobacco | | Pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Tons* | *Tons* | *Lb.* | *Lb.* | *Cow-acre-days*[1] | *Cow-acre-days*[1] |
| Chewacla silt loam [2] | 38 | 60 | ----- | 20 | ----- | 45 | 1.1 | 1.7 | ------ | ------ | 90 | 135 |
| Congaree loam | 45 | 70 | 15 | 20 | 35 | 50 | 1.2 | 1.7 | 1,500 | 1,900 | 110 | 135 |
| Congaree fine sandy loam | 40 | 60 | 12 | 18 | 30 | 45 | .9 | 1.6 | 1,350 | 1,700 | 90 | 115 |
| Hamblen silt loam [2] | 40 | 60 | ----- | 20 | ----- | ----- | 1.0 | 1.7 | ------ | ------ | 115 | 140 |
| Hamblen fine sandy loam [2] | 35 | 55 | ----- | 17 | ----- | ----- | .9 | 1.5 | ------ | ------ | 85 | 120 |
| Lindside silt loam [2] | 42 | 62 | ----- | 20 | ----- | ----- | 1.2 | 1.7 | ------ | ------ | 115 | 140 |
| Staser silt loam | 45 | 70 | 15 | 20 | 35 | 50 | 1.1 | 1.7 | 1,500 | 1,800 | 115 | 140 |
| Staser fine sandy loam | 40 | 62 | 14 | 18 | 30 | 45 | 1.0 | 1.6 | 1,300 | 1,700 | 90 | 115 |
| Weaver silt loam [2] | 35 | 50 | ----- | 18 | ----- | ----- | .9 | 1.4 | ------ | ------ | 90 | 125 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

[2] Yields in columns A are those to be expected without artificial drainage; yields in columns B are those to be expected with adequate drainage.

## Management Group 1–A

Group 1–A consists of well drained to imperfectly drained soils on bottom lands. They are good to excellent for crops and pasture. Their aggregate area is about 26,291 acres. Nearly all of the acreage is now used for crops and pasture. The soils of this group are listed in table 7, and estimated yields are given for each under two levels of management.

These fertile soils are nearly level and are friable to a depth of several feet. They are subject to overflow. The imperfectly drained Lindside, Hamblen, Chewacla, and Weaver soils remain excessively wet later in the spring and longer after floods than the well-drained Staser and Congaree soils. All of the soils have good moisture-supplying capacity and have, especially the imperfectly drained soils, an adequate supply of moisture for crops during the dry periods of late summer and early fall. Because of the excessively high content of lime in its subsoil, the Weaver soil apparently is the least productive of this group.

*Use and management.*—The crop suitability of these soils is more restricted than that of the fertile well-drained soils of the uplands and stream terraces. Nevertheless, all of these soils are suited to intensive use. Corn is the chief crop; a fairly large acreage is in hay and pasture. The soils are suited to soybeans, red clover, orchardgrass, and most of the more desirable grasses and legumes. The high-lying areas of the Staser and Congaree soils are suited to certain truck crops, tobacco, and alfalfa, but these crops are likely to be seriously damaged by floods. Small grains, in general, mature late and are likely to lodge or to be damaged by disease.

If fertility is maintained and weeds controlled, these soils can produce high yields of row crops for many years in succession. A winter legume following the row crop may help maintain fertility and organic-matter content. A rotation of corn, or another row crop, and hay is also suited, especially to the imperfectly drained soils. In the well-drained areas, a rotation of corn, a small grain, and red clover or alfalfa is suited; truck crops such as cabbage or green beans also produce well in these areas.

Moderate crop yields are obtained without amendments, but for continued high yields fertilizer is required. Lime and phosphorus are generally needed to establish and maintain red clover, alfalfa, and others of the more exacting legumes. Yields of practically all crops are improved by liberal applications of phosphate. If row crops are grown continuously, nitrogen may be needed, but a legume included in the rotation will help maintain the supply.

These soils are easy to work. Good tilth is generally easy to maintain, but some areas of the Lindside, Hamblen, Chewacla, and Weaver soils are likely to be so wet in the spring that field operations are delayed. On farms that include only a limited acreage of well-drained soils suited to intensive use, these imperfectly drained soils may be artificially drained, either by open ditches or by tile drains. The feasibility of installing artificial drainage depends on the cost and on the need for better drained acreage.

These soils are about the best in the county for pasture. Good stands of grasses and legumes are easy to maintain. The moisture supply is favorable throughout much of the growing season, so the pastures provide good grazing through midsummer and early fall. Weeds and brush are troublesome on some areas of permanent pasture but are easily eliminated by mowing.

## Management Group 1–B

Group 1–B consists only of Buncombe loamy fine sand, an excessively drained soil that occurs on bottom lands. It is fair for crops and pasture. The aggregate area of this soil is 623 acres. Practically all of it has been cleared, and much is cropped or pastured. Estimated yields under two levels of management are given in table 8.

This soil is low in natural fertility. Plant nutrients are readily leached out, but the supply is replenished to some extent by materials deposited by overflow.

TABLE 8.—*Soils of management group 1–B and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management]

| Soil | Corn | | Wheat | | Oats | | Lespedeza | | Pasture | |
|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Tons* | *Tons* | *Cow-acre-days*[1] | *Cow-acre-days*[1] |
| Buncombe loamy fine sand | 18 | 30 | 6 | 10 | 12 | 22 | 0.5 | 0.8 | 20 | 40 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

The soil is droughty and does not supply enough moisture for any except very deep-rooted crops.

*Use and management.*—This soil is suited to intensive use for row crops. Corn, small grains, and red clover produce fair to good yields. Melons and potatoes, beans, cabbage, and other early truck crops are well suited. Fair pastures of bermudagrass can be established.

For good yields, all crops need frequent light applications of complete fertilizer, and the organic-matter content must be replenished frequently.

These soils are easy to work, but because of the sandy texture it is hard to use heavy machinery. Weeds are easily controlled. Erosion is a hazard only in places where floodwaters are likely to scour away the soil.

## Management Group 1–C

Group 1–C consists of well drained and imperfectly drained soils on young local alluvium. They are good to excellent for crops or pasture. Their aggregate area is about 24,900 acres. Most of the acreage is now used for crops or pasture. The soils of this group are listed in table 9, and estimated yields are given for each under two levels of management.

These soils are gently sloping, except for Ooltewah silt loam, which is nearly level. All of them are friable and are moderate to high in fertility. Moisture infiltrates well, and the moisture-supplying capacity is good to very good. The moisture is adequate for crops even during the drier part of the growing season. These soils are not frequently flooded, but sediments are deposited over much of the acreage during heavy rains. Because floods are less frequent, these soils have a wider range of suitability than the soils of management group 1–A.

*Use and management.*—The soils of this group are suited to intensive use. Corn and tobacco are the chief crops, but small grains, red clover, and many kinds of truck crops can be grown. The better drained areas are suited to alfalfa.

Good yields can be obtained under almost continuous row cropping, but a short rotation is desirable on most farms. A 3-year rotation consisting of corn, wheat or oats, and red clover is well suited. Tobacco or a truck crop can be substituted for the corn in this rotation, or 2 or 3 years of alfalfa for the red clover.

Continuous row cropping may be necessary on farms that have only a small acreage suitable to cultivation; for these areas a winter cover crop, such as crimson clover, would be beneficial. A winter cover crop will prevent leaching of plant nutrients, supply added organic matter, provide some grazing, and help control runoff.

The fertility of these soils is moderately high, and they also respond well to proper fertilization. Nitrogen is needed; some of this element can be supplied by legumes grown in the rotation. Phosphorus is re-

TABLE 9.—*Soils of management group 1–C and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management. Leaders indicate that, under the specified level of management, the soil is unsuited to the crop]

| Soil | Corn | | Wheat | | Oats | | Lespedeza | | Alfalfa | | Tobacco | | Pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Tons* | *Tons* | *Tons* | *Tons* | *Lb.* | *Lb.* | *Cow-acre-days*[1] | *Cow-acre-days*[1] |
| Barbourville fine sandy loam | 28 | 42 | 10 | 15 | 18 | 30 | 0.8 | 1.5 | ------ | ------ | 1,500 | 1,900 | 65 | 110 |
| Camp loam | 35 | 55 | 15 | 22 | 30 | 40 | 1.0 | 1.5 | ------ | ------ | 1,400 | 1,800 | 90 | 125 |
| Emory silt loam | 58 | 78 | 22 | 30 | 40 | 55 | 1.2 | 1.7 | 2.1 | 3.4 | 1,800 | 2,200 | 110 | 140 |
| Greendale silt loam | 42 | 60 | 18 | 26 | 35 | 48 | 1.0 | 1.6 | 1.9 | 3.0 | 1,600 | 1,900 | 100 | 130 |
| Ooltewah silt loam | 35 | 48 | 13 | 20 | 28 | 38 | 1.1 | 1.7 | 1.6 | ------ | ------ | ------ | 100 | 130 |
| Whitesburg silt loam | 36 | 50 | 14 | 20 | 28 | 38 | 1.1 | 1.6 | 1.8 | 2.0 | 1,100 | 1,500 | 100 | 130 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

quired to get high yields of most crops. The supply of potassium is less likely to be deficient, but it too may be required for some crops. Lime is needed on much of the acreage, especially for legumes and grasses. Areas used continuously for row crops require organic matter and need more fertilizer than areas where crops are rotated.

These gently sloping, friable soils are easily worked, but tillage is likely to be delayed on the imperfectly drained soils during wet periods. Control of runoff is not a problem, except in a few places where runoff is received from adjacent slopes. In such places, gullies may form or deposits of soil material may accumulate, unless diversion ditches are used. Cultivation should be on the contour.

These soils are highly productive of pasture. They remain moist longer during dry periods than many of the upland soils and therefore are especially valuable for pasture late in summer. Phosphorus should be applied to pastures, also lime, especially on the Barbourville soil. In many areas weeds invade the pastures, but they are fairly easy to control by mowing.

## Management Group 1–D

Group 1–D consists of undulating, deep, friable, reddish and brownish soils that are good to excellent for crops and pasture. Their aggregate area is 5,629 acres. Most of the acreage is used for crops. The soils of this group are listed in table 10, and estimated yields are given for each soil under two levels of management.

All of these soils are at least moderately high in fertility and are fairly easy to work. Sequatchie cobbly fine sandy loam is less fertile than the rest. The organic-matter content is moderately high, except in Sequatchie cobbly fine sandy loam, which has a moderate to moderately low supply of organic matter. Although these soils have firmer subsoils than the soils of groups 1–A, 1–B, and 1–C, they have medium internal drainage and, in general, good moisture-supplying capacity. Hayter stony loam, undulating phase, and Sequatchie cobbly fine sandy loam contain stones in quantities that interfere with cultivation.

*Use and management.*—The soils of this group are suited to many kinds of crops, including corn, tobacco, small grains, a wide variety of grasses and legumes, and many truck crops. Corn and tobacco are the principal row crops. The small grains are chiefly wheat and oats. Hay crops are mostly red clover, orchardgrass, and alfalfa, but other grasses and legumes are also grown.

If the soils are otherwise well managed, rotations can be moderately short. A 3- or 4-year rotation consisting of a row crop, a small grain, and hay or pasture is well suited. A winter legume could be planted following the row crop to protect the soil against erosion and to supply organic matter and nitrogen.

All of these soils respond well to fertilization. Tobacco is usually heavily fertilized. Most of the soils require lime, especially if legumes are grown. Alfalfa stands will be better if boron is applied. The moisture supply is good.

Good tilth is not difficult to maintain except in a few patches where subsoil is mixed with the surface soil. Areas that are intensively cultivated may require special care to prevent erosion. In general, runoff can be adequately controlled by using a rotation of moderate length, planting cover crops after row crops, and cultivating on the contour. Terracing or stripcropping may be needed on the longer slopes. Drainageways should remain in sod.

All of these soils produce good pasture stands if phosphorus, potassium, and lime are applied and weeds are controlled.

## Management Group 1–E

Group 1–E consists of undulating, deep, friable, yellow to yellowish-brown soils. They are fair to very

TABLE 10.—*Soils of management group 1–D and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management]

| Soil | Corn | | Wheat | | Oats | | Lespedeza | | Alfalfa | | Tobacco | | Pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Tons* | *Tons* | *Tons* | *Tons* | *Lb.* | *Lb.* | *Cow-acre-days*[1] | *Cow-acre-days*[1] |
| Cumberland silt loam, undulating phase | 35 | 60 | 17 | 28 | 32 | 55 | 1.1 | 1.6 | 2.6 | 4.0 | 1,700 | 2,000 | 90 | 130 |
| Elk and Tupelo silt loams, undulating phase | 32 | 58 | 15 | 25 | 28 | 43 | 1.0 | 1.6 | 2.2 | 3.8 | 1,400 | 1,700 | 95 | 130 |
| Hayter loam, undulating phase | 38 | 70 | 18 | 28 | 32 | 50 | 1.1 | 1.7 | 2.2 | 3.7 | 1,800 | 2,100 | 100 | 135 |
| Hayter stony loam, undulating phase | 35 | 65 | 15 | 24 | 28 | 40 | .9 | 1.5 | 2.1 | 3.5 | 1,500 | 1,800 | 90 | 115 |
| Hermitage silt loam, undulating phase | 35 | 60 | 17 | 28 | 32 | 55 | 1.1 | 1.6 | 2.6 | 4.0 | 1,700 | 2,000 | 95 | 130 |
| Masada loam, undulating phase | 30 | 55 | 15 | 23 | 30 | 50 | .9 | 1.5 | 2.3 | 3.6 | 1,400 | 1,900 | 70 | 120 |
| Sequatchie loam | 35 | 65 | 17 | 28 | 25 | 45 | 1.1 | 1.6 | 2.2 | 3.5 | 1,500 | 1,900 | 70 | 120 |
| Sequatchie cobbly fine sandy loam | 30 | 60 | 15 | 22 | 24 | 35 | .7 | 1.3 | 1.8 | 3.3 | 1,300 | 1,700 | 60 | 100 |
| State loam | 38 | 70 | 18 | 28 | 32 | 50 | 1.1 | 1.7 | 2.4 | 3.7 | 1,800 | 2,100 | 100 | 130 |
| Waynesboro loam, undulating phase | 33 | 55 | 16 | 26 | 30 | 53 | 1.0 | 1.5 | 2.5 | 3.7 | 1,600 | 1,900 | 70 | 120 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

TABLE 11.—*Soils of management group 1–E and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management]

| Soil | Corn | | Wheat | | Oats | | Lespedeza | | Alfalfa | | Tobacco | | Pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Tons* | *Tons* | *Tons* | *Tons* | *Lb.* | *Lb.* | *Cow-acre-days*[1] | *Cow-acre-days*[1] |
| Altavista loam, undulating phase | 30 | 52 | 15 | 22 | 30 | 50 | 0.9 | 1.5 | 2.2 | 3.2 | 1,400 | 1,800 | 70 | 125 |
| Holston loam, undulating phase | 25 | 43 | 12 | 18 | 25 | 45 | .8 | 1.3 | 2.0 | 2.7 | 1,100 | 1,700 | 60 | 115 |
| Jefferson loam, undulating phase | 28 | 45 | 11 | 18 | 23 | 40 | .7 | 1.2 | 1.9 | 2.6 | 1,100 | 1,700 | 50 | 100 |
| Jefferson stony loam, undulating phase | 25 | 40 | 9 | 15 | 15 | 33 | .6 | 1.1 | 1.7 | 2.4 | 900 | 1,500 | 40 | 80 |
| Nolichucky loam, undulating phase | 30 | 50 | 14 | 20 | 28 | 48 | .8 | 1.3 | 2.1 | 2.9 | 1,300 | 1,700 | 60 | 115 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

good for crops and pasture, except for Jefferson stony loam, undulating phase, which is fair to poor for crops. Their aggregate area is about 5,134 acres. Much of the acreage is not in crops and pasture. The soils of this group are listed in table 11, and estimated yields are given for each soil under two levels of management.

These soils are well drained, medium acid to strongly acid, and low in fertility. Moisture infiltrates easily, and the moisture-supplying capacity is fair to good. Jefferson stony loam, undulating phase, contains enough stones to interfere with tillage.

*Use and management.*—The soils of this group are suited to many kinds of crops. Corn and tobacco are the principal row crops. Small grains and truck crops are also grown. Orchardgrass, fescue, red clover, alfalfa, lespedeza, white clover, Ladino clover, and bluegrass are suitable hay and pasture crops. A 3- or 4-year rotation is needed in most places to control erosion and to maintain the organic-matter content.

Chiefly because the fertility is lower, these soils require more careful management than those in group 1–D. Large amounts of nitrogen, phosphorus, potassium, and lime are required, not only for tobacco and truck crops but also for legumes and grasses.

These soils are easily worked and, in general, easily maintained in good tilth. In a few spots that are eroded enough so that subsoil is mixed with the surface soil, tilth is unfavorable. Contour cultivation is advisable, and terracing or stripcropping will be needed on the longer slopes. Waterways should remain in sod.

Heavy applications of lime and fertilizer are needed to get good stands of the better pasture plants. If lime and fertilizer are not used, lespedeza, fescue, and redtop can be grown for pasture. Brush and weeds are likely to invade permanent pastures, but they can be controlled by mowing.

## Management Group 1–F

Group 1–F consists of undulating, deep, moderately well drained to imperfectly drained, yellowish soils that are fair to good for crops and pasture. Their aggregate area is about 14,920 acres. Most of the acreage is used for crops and pasture. A larger proportion of this group than of group 1–D is in pasture. The soils of this group are listed in table 12, and estimated yields are given for each soil under two levels of management.

TABLE 12.—*Soils of management group 1–F and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management. Leaders indicate the soil is unsuited to the crop]

| Soil | Corn | | Wheat | | Oats | | Lespedeza | | Alfalfa | | Tobacco | | Pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Tons* | *Tons* | *Tons* | *Tons* | *Lb.* | *Lb.* | *Cow-acre-days*[1] | *Cow-acre-days*[1] |
| Hollywood silty clay loam | 32 | 48 | ---- | 18 | 28 | 40 | 0.9 | 1.5 | ---- | ---- | ---- | ---- | 80 | 110 |
| Leadvale silt loam, undulating phase | 32 | 43 | 14 | 22 | 27 | 45 | .8 | 1.2 | ---- | ---- | 800 | 1,400 | 55 | 115 |
| Monongahela silt loam, undulating phase[2] | 25 | 38 | 10 | 16 | 24 | 40 | .7 | 1.1 | ---- | ---- | 750 | 1,300 | 50 | 110 |
| Pace silt loam, undulating phase | 35 | 55 | 15 | 23 | 30 | 50 | .9 | 1.5 | 2.1 | 3.0 | 1,500 | 1,900 | 70 | 120 |
| Pace cherty silt loam, undulating phase | 32 | 48 | 13 | 20 | 27 | 45 | .8 | 1.4 | 1.9 | 2.8 | 1,400 | 1,800 | 60 | 115 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

[2] Yields in columns A are those to be expected without artificial drainage. Yields in columns B are those to be expected with adequate drainage.

Except for Hollywood silty clay loam, these soils are low in fertility, are medium acid to strongly acid, and have friable surface layers. Internal drainage is impaired; consequently, the subsoils are mottled at depths of 22 to 30 inches. All soils of this group have firm or very firm subsoils. Infiltration of moisture is somewhat impaired, but moisture-supplying capacity is generally good. Pace cherty silt loam, undulating phase, contains enough chert in most places to interfere with tillage.

*Use and management.*—The soils of this group are suited to various kinds of crops. Corn, lespedeza for hay, and small grains are the chief crops. Tobacco is grown but to a lesser extent than on the more fertile, better drained soils. The soils are well suited to soybeans and certain legumes and grasses. They are not suited to alfalfa or to root crops such as potatoes. In general, they are not so well suited to truck crops as better drained soils. The imperfectly drained Monongahela soil is the most limited of this group in range of suitability for crops.

The rotation commonly used consists of a row crop, a small grain, and 1 or 2 years of hay. Generally, the rotation should be of at least moderate length.

All of these soils except Hollywood silty clay loam, which is more fertile, require lime, organic matter, and a large amount of fertilizer to maintain moderately high fertility. Moderate applications of a complete fertilizer are common; tobacco is heavily fertilized. Lime has been applied to much of the cultivated areas. A legume grown as a winter cover crop and turned under will help maintain organic matter.

Because of its clayey nature, Hollywood silty clay loam has poor tilth; it clods easily and is difficult to work to a good seedbed. Tilth is fairly good on the other soils of this group. Slow internal drainage, especially in the Monogahela soil, delays cultivation in the spring and during wet periods. The more strongly sloping areas of Pace and Leadvale soils are subject to erosion, but it can be controlled by using contour cultivation and a moderately long rotation. Terraces are usually needed on the stronger slopes. Waterways should remain in sod.

These soils will not produce good stands of the better legumes and grasses for pasture unless they are liberally fertilized and limed. On areas that are not adequately fertilized, lespedeza, redtop, and Italian ryegrass can be grown for pasture.

## Management Group 1–G

Group 1–G consists of rolling, deep, friable, well-drained, reddish and brownish soils that are good to very good for crops and pasture. Their aggregate area is about 7,510 acres, all of which has been cleared and is used for crops and pasture. The soils of this group are listed in table 13, and estimated yields are given for each soil under two levels of management.

These soils are moderate to high in fertility and are medium acid to strongly acid. Moisture infiltrates moderately well. The moisture-supplying capacity is generally good but is limited on severely eroded areas of Masada loam, eroded rolling phase, and Waynesboro loam, eroded rolling phase. All of the soils of this group are somewhat eroded but are at least moderately friable. The subsoils are moderately firm. Allen stony loam, rolling phase, and Waynesboro cobbly loam, eroded rolling phase, contain stones in quantities that interfere with tillage.

*Use and management.*—These soils are suited to many kinds of crops. If management is good high yields can be obtained. Corn and tobacco are important row crops. Hay and small grains are grown extensively. Many truck crops can be grown. Because of the rolling slopes, runoff is a hazard; moderate to long rotations are necessary to protect the soil against erosion and maintain its productivity. A row crop,

TABLE 13.—*Soils of management group 1–G and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management]

| Soil | Corn | | Wheat | | Oats | | Lespedeza | | Alfalfa | | Tobacco | | Pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Tons* | *Tons* | *Tons* | *Tons* | *Lb.* | *Lb.* | *Cow-acre-days*[1] | *Cow-acre-days*[1] |
| Allen loam, eroded rolling phase | 30 | 50 | 14 | 23 | 29 | 47 | 0.8 | 1.4 | 2.3 | 3.5 | 1,400 | 1,750 | 60 | 105 |
| Allen stony loam, rolling phase | 27 | 45 | 12 | 20 | 26 | 45 | .7 | 1.3 | 2.3 | 3.4 | 1,300 | 1,600 | 55 | 100 |
| Bolton loam, eroded rolling phase | 30 | 50 | 14 | 23 | 29 | 47 | .8 | 1.4 | 2.2 | 3.5 | 1,400 | 1,750 | 60 | 105 |
| Cumberland silty clay loam, eroded rolling phase | 32 | 55 | 15 | 25 | 30 | 50 | .9 | 1.5 | 2.4 | 3.7 | 1,500 | 1,850 | 75 | 120 |
| Hayter loam, eroded rolling phase | 35 | 58 | 15 | 25 | 29 | 47 | .9 | 1.5 | 2.1 | 3.5 | 1,650 | 1,900 | 85 | 125 |
| Hermitage silt loam, eroded rolling phase | 32 | 55 | 15 | 25 | 30 | 50 | .9 | 1.5 | 2.4 | 3.7 | 1,500 | 1,850 | 75 | 120 |
| Masada loam, eroded rolling phase | 27 | 50 | 13 | 21 | 28 | 45 | .8 | 1.4 | 2.2 | 3.3 | 1,300 | 1,750 | 60 | 105 |
| State loam, eroded rolling phase | 35 | 58 | 16 | 26 | 29 | 47 | .9 | 1.5 | 2.2 | 3.6 | 1,650 | 1,900 | 85 | 125 |
| Waynesboro loam, eroded rolling phase | 30 | 50 | 14 | 23 | 29 | 47 | .8 | 1.4 | 2.3 | 3.5 | 1,400 | 1,750 | 60 | 105 |
| Waynesboro cobbly loam, eroded rolling phase | 27 | 45 | 12 | 20 | 26 | 45 | .7 | 1.3 | 2.2 | 3.4 | 1,300 | 1,600 | 55 | 100 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

followed by a small grain and 2 or 3 years of hay, is suitable.

These soils respond well to adequate fertilization. Much of the acreage has been limed, and some fertilizer is commonly used on corn and small grains. Tobacco is heavily fertilized. Some of the nitrogen requirement can be supplied by legumes grown as part of a 4- or 5-year rotation. Phosphorus, potassium, and lime are also needed, especially for tobacco, truck crops, and legumes and grasses. Alfalfa stands will be improved if boron is applied. The organic-matter content can be kept up by applying manure or by turning under crops of legumes and grasses. Generally, a legume grown as a winter cover crop will serve this purpose.

A few of the soils in this group have good tilth, but in the more eroded areas the plow layer consists partly of subsoil. In these areas the soil tends to be cloddy; it should not be tilled when too wet, and it is somewhat difficult to till and to work to a good seedbed. Tillage should be on the contour, because of the hazard created by runoff on the rolling slopes. Terracing and stripcropping may be satisfactory methods of controlling runoff in some places. Waterways should remain in sod.

If adequately fertilized, all of these soils will support pastures of high quality. Lime and phosphorus are needed to maintain good stands of legumes and grasses. Pastures of orchardgrass, alfalfa, Ladino clover, or white clover can be maintained at a fairly high carrying capacity. Brush and weeds are likely to invade the pastures, but they can be controlled by mowing.

## Management Group 1–H

Group 1–H consists of rolling deep reddish and yellowish soils that have friable surface soils but firm to very firm subsoils. These soils are good to very good for crops and pasture. Their aggregate area is about 48,341 acres. Much of the acreage has been cultivated at one time, and a large part is still used for crops or pasture. The soils of this group are listed in table 14, and estimated yields are given for each soil under two levels of management.

Except for Dunmore cherty silty clay loam, eroded rolling phase, these soils are moderately high to high in fertility. They are medium acid to strongly acid. Because of the firm to very firm subsoils, infiltration is retarded, but internal drainage is adequate for all crops including alfalfa. The moisture-supplying capacity is generally good but is limited in severely eroded areas. Many of these soils are appreciably eroded. In places stones and chert interfere with cultivation.

*Use and management.*—Soils of this group are suited to various crops. Hay crops are probably grown most extensively, but small grains, corn, and pasture are important, and some tobacco is grown. The soils are especially well suited to small grains, also to legumes and grasses, particularly alfalfa. Although row crops yield well, they should be grown only at moderately long intervals. Chiefly because of their firm subsoil, which in most places is at a shallow depth, these soils are not well suited to truck crops, especially root crops.

TABLE 14.—*Soils of management group 1–H and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management]

| Soil | Corn | | Wheat | | Oats | | Lespedeza | | Alfalfa | | Tobacco | | Pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Tons* | *Tons* | *Tons* | *Tons* | *Lb.* | *Lb.* | *Cow-acre-days*[1] | *Cow-acre-days*[1] |
| Decatur silty clay loam, eroded rolling phase | 30 | 52 | 16 | 27 | 32 | 52 | 1.0 | 1.6 | 2.5 | 3.8 | 1,500 | 1,850 | 70 | 115 |
| Dewey silty clay loam, eroded rolling phase | 30 | 52 | 15 | 26 | 30 | 50 | .9 | 1.5 | 2.4 | 3.8 | 1,500 | 1,850 | 70 | 115 |
| Dunmore silt loam, rolling phase | 33 | 52 | 14 | 22 | 30 | 47 | .8 | 1.4 | 2.5 | 3.8 | 1,200 | 1,500 | 60 | 110 |
| Dunmore silty clay loam, eroded rolling phase | 30 | 48 | 13 | 20 | 28 | 45 | .8 | 1.4 | 2.4 | 3.7 | 1,100 | 1,400 | 55 | 105 |
| Dunmore cherty silt loam, rolling phase | 30 | 48 | 12 | 19 | 28 | 45 | .8 | 1.4 | 2.1 | 3.3 | 1,200 | 1,500 | 55 | 105 |
| Dunmore cherty silty clay loam, eroded rolling phase | 28 | 45 | 11 | 18 | 26 | 42 | .7 | 1.3 | 2.0 | 3.2 | 1,100 | 1,400 | 50 | 105 |
| Dunmore loam: | | | | | | | | | | | | | | |
| Rolling phase | 33 | 52 | 14 | 22 | 30 | 47 | .8 | 1.4 | 2.5 | 3.8 | 1,200 | 1,500 | 60 | 110 |
| Eroded rolling phase | 30 | 48 | 13 | 20 | 28 | 45 | .8 | 1.4 | 2.4 | 3.7 | 1,100 | 1,400 | 55 | 105 |
| Dunmore stony loam: | | | | | | | | | | | | | | |
| Rolling phase | 30 | 47 | 12 | 19 | 28 | 45 | .8 | 1.4 | 2.1 | 3.3 | 1,200 | 1,500 | 55 | 105 |
| Eroded rolling phase | 27 | 43 | 11 | 18 | 26 | 42 | .7 | 1.3 | 2.0 | 3.2 | 1,100 | 1,400 | 50 | 105 |
| Elk and Tupelo silt loams, eroded rolling phase | 28 | 52 | 13 | 19 | 26 | 40 | .7 | 1.3 | 2.0 | 3.5 | 1,200 | 1,500 | 80 | 115 |
| Groseclose silt loam, rolling phase | 27 | 40 | 12 | 18 | 22 | 40 | .7 | 1.3 | 2.2 | 3.5 | 950 | 1,350 | 50 | 100 |
| Groseclose silty clay loam, eroded rolling phase | 25 | 38 | 12 | 18 | 22 | 40 | .7 | 1.2 | 2.1 | 3.4 | 900 | 1,300 | 50 | 100 |
| Groseclose cherty silt loam: | | | | | | | | | | | | | | |
| Rolling phase | 25 | 38 | 11 | 17 | 20 | 38 | .6 | 1.2 | 2.1 | 3.4 | 900 | 1,300 | 45 | 95 |
| Eroded rolling phase | 25 | 38 | 11 | 17 | 20 | 38 | .6 | 1.1 | 2.0 | 3.3 | 900 | 1,300 | 45 | 95 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

TABLE 15.—*Soils of management group 1–I and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management]

| Soil | Corn | | Wheat | | Oats | | Lespedeza | | Alfalfa | | Tobacco | | Pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Tons* | *Tons* | *Tons* | *Tons* | *Lb.* | *Lb.* | *Cow-acre-days*[1] | *Cow-acre-days*[1] |
| Altavista loam, eroded rolling phase | 26 | 45 | 12 | 20 | 25 | 40 | 0.8 | 1.3 | 2.0 | 2.9 | 1,100 | 1,600 | 50 | 100 |
| Holston loam, eroded rolling phase | 24 | 42 | 10 | 17 | 22 | 35 | .7 | 1.1 | 1.8 | 2.6 | 1,000 | 1,450 | 45 | 90 |
| Jefferson loam: | | | | | | | | | | | | | | |
| Rolling phase | 25 | 45 | 11 | 18 | 23 | 36 | .8 | 1.1 | 1.9 | 2.7 | 1,100 | 1,550 | 50 | 95 |
| Eroded rolling phase | 24 | 42 | 10 | 17 | 22 | 35 | .7 | 1.1 | 1.8 | 2.6 | 1,000 | 1,450 | 45 | 90 |
| Jefferson stony loam: | | | | | | | | | | | | | | |
| Rolling phase | 23 | 38 | 8 | 15 | 21 | 34 | .5 | 1.0 | 1.6 | 2.4 | 950 | 1,350 | 45 | 85 |
| Eroded rolling phase | 22 | 38 | 8 | 15 | 20 | 32 | .5 | 1.0 | 1.5 | 2.4 | 900 | 1,300 | 40 | 80 |
| Nolichucky loam: | | | | | | | | | | | | | | |
| Rolling phase | 27 | 47 | 12 | 19 | 25 | 38 | .8 | 1.3 | 1.8 | 2.7 | 1,300 | 1,700 | 55 | 105 |
| Eroded rolling phase | 26 | 45 | 11 | 18 | 24 | 37 | .8 | 1.3 | 1.9 | 2.8 | 1,200 | 1,550 | 50 | 100 |
| Nolichucky cobbly fine sandy loam, eroded rolling phase | 24 | 42 | 10 | 17 | 23 | 36 | .7 | 1.2 | 1.7 | 2.6 | 1,100 | 1,450 | 45 | 90 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

A 4- or 5-year rotation consisting of a row crop, 1 or 2 years of a small grain, and 2 or 3 years of hay or pasture is suitable. If a 3-year rotation is used, particular care will be required to control runoff.

Soils of this group need more intensive management than soils of groups 1–A, 1–B, 1–C, 1–D, and 1–G. All of the soils respond to fertilization. Most of the areas have been limed, and fertilizer is used on most crops. Tobacco and alfalfa are liberally fertilized, as a rule. Moderately heavy applications of phosphorus, potash, and lime are required to get good stands of legumes and grasses for hay. Alfalfa requires boron. Most of the nitrogen requirement can be supplied by legumes grown in the rotation. Organic matter can be supplied by turning under green manure crops or by applying barnyard manure.

Tilth is good where the plow layer consists entirely of the original loam or silt loam surface soil. It is less favorable in eroded areas where the plow layer includes some material from the subsoil. The soil in these places should not be tilled when wet, because it tends to clod. It is difficult to prepare a good seedbed in eroded areas. Because of the rolling slopes and slow infiltration, runoff creates an erosion hazard. Contour tillage and stripcropping would help to control runoff. Waterways should remain in sod.

All these soils are very productive of high-quality pasture if a high level of fertility is maintained and a suitable pasture mixture is seeded. The more eroded exposed parts are droughty during the drier part of the season, but most areas provide grazing through most of the grazing period. Weeds are troublesome in many places, especially in old pastures. They can be controlled by mowing.

## Management Group 1–I

Group 1–I consists of rolling, deep, friable, moderately well drained and well drained yellowish soils. They are fair to good for crops and pasture, except for Jefferson stony loam, eroded rolling phase, which is fair to poor for crops. The aggregate area is about 11,933 acres. Most of the acreage is in crops or pasture; a small acreage has not been cleared. The soils of this group are listed in table 15, and estimated yields are given for each soil under two levels of management.

These soils are low in fertility and are medium acid to strongly acid. The organic-matter content is low. Most of the acreage is moderately eroded, and the plow layer consists of a mixture of surface soil and subsoil. Some of the soils contain enough stones to interfere with cultivation.

*Use and management.*—These soils are suited to many kinds of crops. Corn, tobacco, small grains, and hay are the principal crops. Potatoes and other truck crops are also grown. The hay crops for which the soils are suitable are red clover, lespedeza, and orchardgrass.

A 4- to 6-year rotation is needed to keep these soils productive. If a shorter rotation is used, special measures to control erosion are needed. A suitable rotation consists of a row crop, 1 or 2 years of small grains, and 2 or 3 years of hay or pasture.

These soils will not produce high yields of crops or good stands of pasture plants unless they are heavily fertilized. Liberal amounts of complete fertilizer and barnyard manure are applied to alfalfa and tobacco. Some fertilizer is used on corn and small grains. Much of the cropped acreage has been limed. These soils respond well to fertilization but are more difficult to keep productive than the soils of groups 1–A, 1–C, and 1–D.

These soils are moderately easy to work. Tilth is very good on the less severely eroded areas and fair to good where erosion has been more severe. Because of the rolling slopes, field operations are somewhat difficult. Cultivation should be on the contour to check runoff. Terracing and stripcropping may be advisable

TABLE 16.—*Soils of management group 1–J and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management. Leaders indicate the soil is unsuited to the crop]

| Soil | Corn | | Wheat | | Oats | | Lespedeza | | Alfalfa | | Tobacco | | Pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Tons* | *Tons* | *Tons* | *Tons* | *Lb.* | *Lb.* | *Cow-acre-days*[1] | *Cow-acre-days*[1] |
| Leadvale silt loam, eroded rolling phase | 24 | 35 | 11 | 17 | 22 | 37 | 0.7 | 1.1 | ------ | ------ | 700 | 1,300 | 45 | 100 |
| Monongahela silt loam, eroded rolling phase | 24 | 35 | 9 | 15 | 20 | 35 | .6 | 1.0 | ------ | ------ | 750 | 1,300 | 45 | 100 |
| Pace silt loam, eroded rolling phase | 30 | 48 | 13 | 20 | 25 | 42 | .8 | 1.3 | 2.0 | 2.8 | 1,500 | 1,850 | 60 | 110 |
| Pace cherty silt loam, eroded rolling phase | 28 | 45 | 12 | 18 | 24 | 40 | .8 | 1.2 | 1.6 | 2.4 | 1,400 | 1,750 | 55 | 105 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

in some places to control erosion. Waterways should remain in sod.

Good pastures can be established by careful management. The better pasture plants require fertilizer and lime. Weeds and brush are likely to invade the older pastures, but they can be controlled by mowing.

## Management Group 1–J

Group 1–J consists of rolling, moderately well drained to imperfectly drained, yellowish soils that are fair for crops and fair to good for pasture. Their aggregate area is about 7,984 acres, all of which has been cleared. Practically all of it is now in crops or pasture. The soils of this group are listed in table 16, and estimated yields are given for each soil under two levels of management.

These soils are low in fertility and are medium acid to strongly acid. They are moderately deep to deep over bedrock. Internal drainage is impaired. Moisture infiltrates well in the Pace soils, but the Monongahela and Leadvale soils have firm to very firm subsoils that retard infiltration. The moisture-supplying capacity is generally only fair, but is somewhat better in some areas of Pace soils. Pace cherty silt loam, eroded rolling phase, contains enough chert to interfere with cultivation.

*Use and management.*—These soils are suited to corn, small grains, hay, and pasture crops. Because of slow drainage and the compact subsoil, they are not suited to alfalfa or truck crops and are less well suited to tobacco than better drained soils. On farms that have enough acreage of soils better suited to crops, the soils of group 1–J, particularly the Monongahela and Leadvale soils, can best be used for permanent pasture.

These soils are low in plant nutrients, organic matter, and lime. Some fertilizer is applied to corn and small grains, and large quantities are used on tobacco. Much of the acreage has been limed. The soils respond well to liberal fertilization but are more difficult to keep productive than more fertile, better drained soils. A 4- to 6-year rotation is suitable. If the rotation consists largely of legumes, most of the nitrogen requirement will be supplied.

Tilth is good in the Pace soils, but Pace cherty silt loam, eroded rolling phase, is difficult to cultivate. In the Leadvale soil tilth is fair to good, depending on how much subsoil has been incorporated in the plow layer. In the Monongahela soil tilth is only fair, and slow drainage sometimes makes it necessary to delay cultivation. Because of the rolling slopes, runoff creates an erosion hazard. Contour cultivation and, in places, diversion ditches or terraces will help control runoff. Waterways should remain in sod.

Fertilizer and lime and large quantities of seed are needed to establish good pasture. Bluegrass, bermudagrass, orchardgrass, lespedeza, white clover, and Ladino clover are suitable if enough fertilizer is used to maintain a high level of fertility. In areas that are not liberally fertilized, lespedeza, redtop, and fescue can be grown. In spite of the slow internal drainage, much of the acreage is droughty; consequently, pasture plants do not grow well during dry spells.

## Management Group 1–K

Group 1–K consists of rolling, very firm, severely eroded, reddish soils that are moderately deep to deep over bedrock. They are fair for crops and fair to good for pasture. Their aggregate area is about 901 acres. All of the acreage has been cultivated, but only a little is now cropped. Much of it is in unimproved pasture, and the rest is idle or has been reforested to pine. The soils of this group are listed in table 17, and estimated yields are given for each soil under two levels of management.

These soils are low in plant nutrients and organic matter and are medium acid to strongly acid. Infiltration of moisture is retarded, and moisture-supplying capacity is only fair. Practically all of the original surface soil has been lost through erosion, and the plow layer now consists of very firm clayey subsoil.

*Use and management.*—These soils need careful management and are suited to a limited number of crops. They are suited to corn, soybeans, small grains, and legumes and grasses, but are not suited to tobacco, potatoes, and truck crops. Good stands of alfalfa can be maintained if the soils are adequately limed and fertilized, but the limited moisture supply restricts yields.

TABLE 17.—*Soils of management group 1–K and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management]

| Soil | Corn | | Wheat | | Oats | | Lespedeza | | Alfalfa | | Pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Tons* | *Tons* | *Tons* | *Tons* | *Cow-acre-days*[1] | *Cow-acre-days*[1] |
| Dewey silty clay, severely eroded rolling phase | 12 | 32 | 7 | 14 | 14 | 32 | 0.4 | 1.1 | 2.0 | 3.3 | 35 | 90 |
| Dunmore silty clay, severely eroded rolling phase | 12 | 30 | 6 | 13 | 12 | 30 | .4 | 1.0 | 2.0 | 3.3 | 35 | 85 |
| Dunmore cherty silty clay, severely eroded rolling phase | 12 | 30 | 6 | 13 | 12 | 30 | .4 | 1.0 | 2.0 | 3.3 | 35 | 80 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

Long rotations that consist chiefly of grasses and deep-rooted legumes are required to build up and maintain the productivity of these soils. Row crops should not be grown more than once in 5 or 6 years; hay or pasture should make up at least three-fourths of the rotation.

These soils all require organic matter, plant nutrients, and lime. Some fertilizer is used on crops, and some of the acreage has been limed. Organic matter is especially needed to improve the tilth and increase the moisture-supplying capacity. Alfalfa requires boron.

Because of the firm consistence of the plow layer, tillage is difficult. The soils puddle easily if tilled when a little too wet and form hard clods if tilled too dry. Good seedbeds are difficult to prepare. Tilth and permeability can be improved by growing deep-rooted crops and adding organic matter. Subsoiling, which is practiced to some extent, also improves permeability. Because of the moderately strong slopes and slow rate of infiltration contour cultivation is advisable. Terracing or stripcropping may be needed. Waterways should remain in sod.

On farms that have sufficient acreages of better soils for cropland, the soils of this group can best be used for permanent pasture. They will support good pastures of legumes and grasses if adequately fertilized and limed and properly seeded. Alfalfa, Ladino clover, and orchardgrass or white clover and bluegrass form suitable pasture mixtures. These soils are somewhat droughty, and pastures may not provide adequate forage during the driest part of the grazing season.

## Management Group 1–L

Group 1–L consists of undulating and rolling moderately shallow to shallow shaly soils. They are fair for crops and fair to good for pasture. Their aggregate area is about 30,843 acres. Much of the acreage is in unimproved pasture or is idle. A small part is cropped. The rest of the acreage is still under native forest, some of which lies in narrow strips on ridgetops. The soils of this group are listed in table 18, and estimated yields are given for each soil under two levels of management.

These soils are moderate to low in fertility and range from medium acid to alkaline. Internal drainage is medium in all of them. Moisture infiltrates well, except in Needmore soils, which have firm to very firm subsoils. Shallow depth to bedrock limits the moisture-

TABLE 18.—*Soils of management group 1–L and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management. Leaders indicate the soil is unsuited to the crop]

| Soil | Corn | | Wheat | | Oats | | Lespedeza | | Alfalfa | | Tobacco | | Pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Tons* | *Tons* | *Tons* | *Tons* | *Lb.* | *Lb.* | *Cow-acre-days*[1] | *Cow-acre-days*[1] |
| Armuchee silty clay loam, eroded rolling phase | 13 | 18 | 6 | 11 | 12 | 22 | 0.6 | 0.9 | 1.3 | 1.6 | ------ | ------ | 50 | 95 |
| Dandridge silt loam, rolling phase | 15 | 20 | 7 | 12 | 14 | 25 | .6 | .9 | 1.4 | 1.7 | ------ | ------ | 55 | 100 |
| Dandridge shaly silt loam, eroded rolling phase | 13 | 18 | 6 | 11 | 12 | 22 | .6 | .9 | 1.3 | 1.6 | ------ | ------ | 50 | 95 |
| Litz loam, rolling phase | 15 | 20 | 7 | 12 | 14 | 25 | .6 | .9 | 1.3 | 1.6 | ------ | ------ | 45 | 85 |
| Litz loam, eroded rolling phase | 13 | 18 | 6 | 11 | 12 | 22 | .5 | .8 | 1.2 | 1.5 | ------ | ------ | 40 | 80 |
| Litz silt loam, rolling phase | 15 | 20 | 7 | 12 | 14 | 25 | .6 | .9 | 1.3 | 1.6 | ------ | ------ | 45 | 85 |
| Litz shaly silt loam, eroded rolling phase | 13 | 18 | 6 | 11 | 12 | 22 | .5 | .8 | 1.2 | 1.5 | ------ | ------ | 40 | 80 |
| Needmore silt loam, undulating phase | 28 | 42 | 12 | 18 | 22 | 35 | .8 | 1.1 | 1.6 | 2.6 | 1,100 | 1,400 | 55 | 105 |
| Needmore silt loam, rolling phase | 21 | 32 | 10 | 16 | 20 | 35 | .6 | 1.1 | 1.8 | 2.7 | ------ | ------ | 45 | 95 |
| Needmore silty clay loam, eroded rolling phase | 20 | 30 | 9 | 15 | 19 | 33 | .6 | 1.1 | 1.7 | 2.6 | ------ | ------ | 45 | 90 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

supplying capacity. Shale fragments occur throughout the profiles of some of the soils.

*Use and management.*—These soils are not so well suited to crops that require a long growing season as soils that are deeper to bedrock. Corn, small grains, and hay are grown on the cropped areas. Although some lime and fertilizer have been used, yields are not high. The soils are suited to fall-sown small grains, winter cover crops, and legumes and grasses. If liberal amounts of fertilizer are used, rotations of moderate length can be used. For most of the acreage, however, long rotations consisting mostly of hay crops are more suitable. Alfalfa, red clover, Ladino clover, orchardgrass, and fescue are suitable hay crops if the soil is well fertilized.

Tilth is good, except in severely eroded patches of the Armuchee and Needmore soils and in places where the soil is so shallow that the shaly underlying material is within plow depth. Many of the shallow areas can be improved for cultivation by breaking up the shale with subsoiling equipment. Cultivation should be on the contour to protect the soil against erosion. Stripcropping is generally advisable on the longer slopes. Waterways should remain in sod.

Good pastures of the better legumes and grasses can be maintained if the soils are well fertilized and limed as required. The amount of forage is limited, however, especially during the dry period in late summer and early fall, because the moisture-supplying capacity is fair to very poor. Pastures established on areas that have not been cultivated for several years are likely to be invaded by brush and weeds. Periodic mowing during the growing season helps control the growth of these undesirable plants.

## Management Group 1–M

Group 1–M consists of hilly, friable to moderately friable, deep, eroded soils that are fair for crops and fair to good for pasture. Their aggregate area is about 1,943 acres. Nearly all the acreage has been cleared and cultivated. At present some is cropped, some is in improved pasture, some is in unimproved pasture, and some is idle. The soils of this group are listed in table 19, and estimated yields are given for each soil under two levels of management.

These soils range from low to moderately high in fertility and are medium acid to strongly acid. They are permeable to moisture, but the moisture-supplying capacity is fair to poor. Most of the acreage has been eroded to the extent that subsoil is mixed with surface soil in the plow layer.

*Use and management.*—The soils of this group require careful management if cultivated. Row crops should be grown only once in a 5- to 7-year rotation. A rotation of corn, 1 or 2 years of small grain, and 3 to 5 years of hay or pasture is suitable. If no row crop is grown, a 4-year rotation of a small grain followed by 3 years of red clover and orchardgrass is suitable. On some farms small grain has been seeded in contour furrows and followed by lespedeza. The more exacting legumes and grasses can be grown if a fairly high level of fertility is maintained.

High yields can be obtained from these soils only if lime and moderately large amounts of fertilizer are applied. The Jefferson and Nolichucky soils are the least fertile in the group, and the Cumberland soil is the most fertile. Much of the acreage has been limed, and moderate amounts of fertilizer are used. Nevertheless, yields, on the average, are only fair.

Because the plow layer of these eroded soils is partly subsoil, tilth is less favorable than in uneroded soils. The Jefferson, Nolichucky, Allen, and Waynesboro soils are more friable than the Cumberland and Bolton soils. Tillage should be on the contour to check runoff. Stripcropping may also be advisable. Terracing is not practical, because the slopes are too steep. Waterways should remain in sod.

On farms that have sufficient acreage of better cropland, these soils can best be used for permanent pasture. They will support good pasture, but the Jefferson and Nolichucky are less productive than the other soils in the group. Lime and fertilizer, particularly phosphorus and potassium, are needed. North-facing slopes are probably better for pasture than south-facing slopes, because they are less droughty.

## Management Group 1–N

Group 1–N consists of hilly, moderately deep to deep soils that are fair for crops and fair to good for

TABLE 19.—*Soils of management group 1–M and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management]

| Soil | Corn | | Wheat | | Oats | | Lespedeza | | Alfalfa | | Pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Tons* | *Tons* | *Tons* | *Tons* | *Cow-acre-days*[1] | *Cow-acre-days*[1] |
| Allen loam, eroded hilly phase | 26 | 45 | 11 | 20 | 23 | 43 | 0.7 | 1.2 | 2.2 | 3.0 | 55 | 95 |
| Bolton loam, eroded hilly phase | 26 | 45 | 11 | 20 | 23 | 43 | .7 | 1.2 | 2.2 | 3.0 | 55 | 95 |
| Cumberland silty clay loam, eroded hilly phase | 28 | 48 | 13 | 21 | 26 | 45 | .8 | 1.3 | 2.3 | 3.5 | 65 | 110 |
| Jefferson loam, eroded hilly phase | 20 | 36 | 8 | 14 | 19 | 31 | .5 | .9 | 1.6 | 2.3 | 40 | 80 |
| Nolichucky loam, eroded hilly phase | 22 | 40 | 9 | 16 | 21 | 34 | .6 | 1.1 | 1.7 | 2.4 | 45 | 85 |
| Waynesboro loam, eroded hilly phase | 26 | 45 | 11 | 20 | 23 | 43 | .7 | 1.2 | 2.2 | 3.0 | 55 | 95 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

TABLE 20.—*Soils of management group 1–N and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management]

| Soil | Corn | | Wheat | | Oats | | Lespedeza | | Alfalfa | | Pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Tons* | *Tons* | *Tons* | *Tons* | *Cow-acre-days*[1] | *Cow-acre-days*[1] |
| Decatur silty clay loam, eroded hilly phase | 26 | 42 | 13 | 21 | 26 | 45 | 0.8 | 1.3 | 2.3 | 3.5 | 65 | 110 |
| Dewey silty clay loam, eroded hilly phase | 26 | 42 | 12 | 20 | 26 | 45 | .8 | 1.3 | 2.3 | 3.5 | 65 | 110 |
| Dunmore silt loam, hilly phase | 26 | 45 | 12 | 18 | 24 | 40 | .7 | 1.2 | 2.3 | 3.5 | 55 | 100 |
| Dunmore silty clay loam, eroded hilly phase | 25 | 43 | 11 | 16 | 22 | 37 | .7 | 1.1 | 2.1 | 3.3 | 50 | 95 |
| Dunmore loam, hilly phase | 26 | 45 | 12 | 18 | 24 | 40 | .7 | 1.2 | 2.3 | 3.5 | 55 | 100 |
| Dunmore loam, eroded hilly phase | 25 | 43 | 11 | 16 | 22 | 37 | .7 | 1.1 | 2.1 | 3.3 | 50 | 95 |
| Groseclose silty clay loam, eroded hilly phase | 21 | 38 | 9 | 14 | 19 | 32 | .6 | .9 | 1.9 | 2.9 | 40 | 85 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

pasture. Their aggregate area is about 15,792 acres. Most of the acreage has been cleared and used for crops and pasture. Much of it is now in pasture. Some is idle and some is cropped. The soils of this group are listed in table 20, and estimated yields are given for each soil under two levels of management.

These soils have firm to very firm subsoils, and the plow layers are less friable than those of the soils in group 1–M. All of the soils are medium acid to strongly acid. They range from moderate to high in fertility, except for the Groseclose soil, which is low in fertility. Internal drainage is medium, but infiltration is slower than in the soils of group 1–M, and runoff develops more quickly.

*Use and management.*—These soils require careful management if they are cultivated. Corn, small grains, and hay are the principal crops. If the fertility is maintained, good stands of alfalfa, red clover, orchardgrass, and Ladino clover can be established. The soils are not well suited to truck crops, especially root crops.

Some of the acreage has been limed, and some fertilizer is commonly used. The soils respond well to adequate fertilization. The supply of organic matter should be maintained so as to improve tilth and increase the moisture-supplying capacity.

Tilth is less favorable than in the soils of groups 1–A, 1–B, and 1–C. The plow layer dries out slowly, and cultivation is sometimes delayed because the soil is

TABLE 21.—*Soils of management group 2–A and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management. Leaders indicate that, under the level of management specified, the soil is unsuited to the crop]

| Soil | Corn | | Wheat | | Oats | | Lespedeza | | Alfalfa | | Pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Tons* | *Tons* | *Tons* | *Tons* | *Cow-acre-days*[1] | *Cow-acre days*[1] |
| Allen stony loam, eroded hilly phase | 23 | 39 | 10 | 18 | 23 | 40 | 0.6 | 1.2 | 2.0 | 3.3 | 55 | 95 |
| Cobbly alluvium, Hamblen soil material | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | 30 | 60 |
| Decatur silty clay, severely eroded hilly phase | ----- | ----- | ----- | ----- | ----- | ----- | .5 | .9 | 1.8 | 2.5 | 30 | 75 |
| Dewey silty clay, severely eroded hilly phase | ----- | ----- | ----- | ----- | ----- | ----- | .5 | .9 | 1.8 | 2.5 | 30 | 75 |
| Dunmore silty clay, severely eroded hilly phase | ----- | ----- | ----- | ----- | ----- | ----- | .4 | .8 | ----- | 2.0 | 30 | 70 |
| Dunmore cherty silt loam, hilly phase | 23 | 35 | 10 | 15 | 19 | 35 | .5 | .9 | 1.8 | 3.0 | 45 | 90 |
| Dunmore cherty silty clay loam, eroded hilly phase | 22 | 32 | 9 | 14 | 17 | 32 | .6 | 1.0 | 1.7 | 2.9 | 40 | 85 |
| Dunmore cherty silty clay, severely eroded hilly phase | ----- | ----- | ----- | ----- | ----- | ----- | .4 | .8 | ----- | ----- | 30 | 65 |
| Dunmore stony loam: | | | | | | | | | | | | |
| Hilly phase | 23 | 35 | 10 | 15 | 19 | 35 | .5 | .9 | 1.8 | 3.0 | 45 | 90 |
| Eroded hilly phase | 22 | 32 | 9 | 14 | 17 | 32 | .6 | 1.0 | 1.7 | 2.9 | 40 | 85 |
| Groseclose silty clay, severely eroded hilly phase | ----- | ----- | ----- | ----- | ----- | ----- | .3 | .7 | ----- | ----- | 25 | 60 |
| Groseclose cherty silt loam: | | | | | | | | | | | | |
| Hilly phase | 18 | 30 | 8 | 13 | 17 | 30 | .4 | .8 | ----- | ----- | 35 | 80 |
| Eroded hilly phase | 16 | 28 | 7 | 11 | 15 | 27 | .3 | .7 | ----- | ----- | 30 | 75 |
| Hayter stony loam, eroded hilly phase | 25 | 40 | 10 | 15 | 19 | 35 | .7 | 1.2 | 1.9 | 3.3 | 60 | 100 |
| Jefferson stony loam: | | | | | | | | | | | | |
| Hilly phase | ----- | ----- | 6 | 13 | ----- | ----- | .3 | .8 | ----- | ----- | 25 | 75 |
| Eroded hilly phase | ----- | ----- | 6 | 13 | ----- | ----- | .3 | .8 | ----- | ----- | 25 | 75 |
| Nolichucky cobbly fine sandy loam, eroded hilly phase | 18 | 34 | 7 | 15 | 18 | 35 | .5 | .9 | ----- | ----- | 30 | 80 |
| Waynesboro cobbly loam, eroded hilly phase | 23 | 39 | 10 | 18 | 23 | 40 | .6 | 1.2 | 2.0 | 3.3 | 55 | 95 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

wet. Because of the firm consistence of the plow layer, these soils are more difficult to cultivate than more friable soils. Runoff creates an erosion hazard when the soils are under cultivation. For erosion control, a close-growing crop should be on the land as much of the time as possible. Tillage should be on the contour, and stripcropping may be advisable, especially on the stronger slopes. Waterways should remain in sod.

All of these soils are well suited to pasture and, if feasible, should be used for that purpose. High-quality pastures of legumes and grasses can be maintained by using moderate applications of lime and fertilizer and seeding properly. If a high level of fertility is maintained, the pastures will have moderately high carrying capacity, but productivity may be reduced somewhat during the drier months of the season. In general, north-facing slopes are less droughty than south-facing slopes.

## Management Group 2–A

Group 2–A consists of stony, hilly, moderately deep to deep, severely eroded soils. Cobbly alluvium, Hamblen soil material, differs from the other soils of this group in that it is nearly level. These soils are poor for crops but fair to good for pasture. The aggregate area is about 39,006 acres. Small areas, mainly of Jefferson, Groseclose, and Dunmore soils, are still under native forest. The rest of the acreage has been cultivated. Part of it is still cropped or in improved pasture, and the rest is in unimproved pasture or is idle. The soils of this group are listed in table 21, and estimated yields are given for each soil under two levels of management.

All of these soils are medium acid to strongly acid. They range from moderate to low in fertility. In the less severely eroded Jefferson, Allen, Nolichucky, Waynesboro, and Hayter soils, infiltration is medium to rapid; in the severely eroded Groseclose, Dunmore, Dewey, and Decatur soils, infiltration is slow. The moisture-supplying capacity is good to poor. Some of the severely eroded soils are free of stones. Much of the acreage is so stony, however, that cultivation is impeded.

*Use and management.*—The soils of this group are poor for crops. Corn, small grains, and hay are grown in places, but yields are not high. Most of the acreage will support good pastures. Substantial amounts of phosphorus, potassium, and lime are needed to maintain pasture stands, and nitrogen is generally required to establish a stand. If a high level of fertility is maintained, alfalfa, white clover, Ladino clover, orchardgrass, and bluegrass are good pasture plants.

Periodic mowing during the growing season will help eradicate the weeds and brush that invade the pastures. Some of the acreage is so steep and stony that mowing is difficult. If the pasture has become very weedy, it can be plowed and used for a row crop, then reseeded with a good mixture of pasture grasses. However, this method of eradicating weeds should be used only every 8 or 10 years, because the soils are likely to erode if cultivated.

Subsoiling appears to increase the permeability of the soils. It is especially beneficial to soils that are severely eroded and those that have very firm subsoils.

If these soils must be used for cropland, fall-sown small grains and hay, which protect the soil from erosion, are the best crops. Tillage should be on the contour. Stripcropping is usually necessary. Cobbly alluvium, Hamblen soil material, is not likely to erode, but it is not well suited to tilled crops because it is extremely stony.

## Management Group 2–B

Group 2–B consists of steep soils that are moderately deep to deep over bedrock. They are poor for crops and fair to good for pasture. Their aggregate area is about 6,724 acres. About one-third of the acreage is under native forest; the rest has been cleared and cultivated, but most of it is now idle or in unimproved pasture. Only a small acreage is used for crops or for improved pasture. The soils of this group are listed in table 22, and the estimated carrying capacity is given for each soil under two levels of management.

TABLE 22.—*Soils of management group 2–B and average carrying capacity of pastures*

[Yields in column A are to be expected under the prevailing level of management. Yields in column B are to be expected under a high level of management]

| Soil | Pasture | |
|---|---|---|
| | A | B |
| | *Cow-acre-days* [1] | *Cow-acre-days* [1] |
| Bolton loam, eroded steep phase | 40 | 80 |
| Dewey silty clay loam, eroded steep phase | 45 | 85 |
| Dunmore silt loam, steep phase | 40 | 85 |
| Dunmore silty clay loam, eroded steep phase | 35 | 80 |
| Dunmore cherty silt loam, steep phase | 35 | 80 |
| Dunmore cherty silty clay loam, eroded steep phase | 30 | 75 |
| Dunmore loam: | | |
| Steep phase | 40 | 85 |
| Eroded steep phase | 35 | 80 |
| Dunmore stony loam: | | |
| Steep phase | 35 | 80 |
| Eroded steep phase | 30 | 75 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

These soils are moderate to low in fertility and are medium acid to strongly acid. Some of them contain enough stones to interfere with cultivation. In general, they are moderately friable, but some patches are eroded to the extent that the firm to very firm subsoil is exposed. Except in these severely eroded places, moisture infiltrates well, but the moisture-supplying capacity is poor. The north-facing slopes are less droughty than the south-facing slopes.

*Use and management.*—These soils are poor for crops, but corn and hay are grown on some areas.

TABLE 23.—*Soils of management group 2–C and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management. Leaders indicate that, under the specified level of management, the soil is unsuited to the crop]

| Soil | Wheat | | Lespedeza | | Alfalfa | | Pasture | |
|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Tons* | *Tons* | *Tons* | *Tons* | *Cow-acre-days*[1] | *Cow-acre-days*[1] |
| Armchee silt loam, hilly phase | | | | | | | 40 | 85 |
| Armuchee silty clay loam, eroded hilly phase | 5 | 10 | 0.4 | 0.7 | 1.0 | 1.4 | 30 | 70 |
| Armuchee silt loam, steep phase | | | | | | | 30 | 75 |
| Armuchee silty clay loam, eroded steep phase | | | | | | | 25 | 65 |
| Dandridge silt loam, hilly phase | | | | .6 | | 1.0 | 40 | 85 |
| Dandridge shaly silt loam, eroded hilly phase | | | .4 | .5 | | | 30 | 70 |
| Dandridge silt loam, steep phase | | | | | | | 30 | 75 |
| Dandridge shaly silt loam, eroded steep phase | | | | | | | 30 | 55 |
| Litz loam: | | | | | | | | |
| Steep phase | | | | | | | 25 | 55 |
| Eroded steep phase | | | | | | | 20 | 50 |
| Hilly phase | | | | .6 | | 1.0 | 30 | 70 |
| Eroded hilly phase | | | | .6 | | .9 | 25 | 60 |
| Litz silt loam, steep phase | | | | | | | 25 | 55 |
| Litz shaly silt loam, eroded steep phase | | | | | | | 20 | 50 |
| Litz silt loam, hilly phase | | | | | | | 30 | 70 |
| Litz shaly silt loam, eroded hilly phase | | | | | | | 25 | 60 |
| Stony rolling land, Dunmore soil material | | | .6 | | | | 30 | 70 |
| Stony hilly land: | | | | | | | | |
| Dunmore soil material | | | .5 | | 1.0 | | 25 | 50 |
| Armuchee soil material | | | | | | | 15 | 30 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

They will support good pastures if lime and plant nutrients are applied. Alfalfa, white clover, Ladino clover, bluegrass, and orchardgrass are suitable pasture plants. Overgrazing should be prevented, because excessive trampling may start ditches. Weeds and brush may invade the pastures; they are difficult to eradicate because of the steep slopes. Pastures should be reseeded in contour strips.

## Management Group 2–C

Group 2–C consists of hilly and steep shallow soils that are poor for crops and fair to good for pasture. Their aggregate area is about 67,415 acres. About two-thirds of the acreage is under native forest. Most of the rest has been cleared and cultivated, but little is now in crops. A small acreage has reverted to forest, and a substantial acreage is idle or in unimproved pasture. The soils of this group are listed in table 23, and estimated yields are given for each soil under two levels of management.

In general, these soils are moderate to low in fertility and low in organic matter. They range from medium acid to alkaline. Moisture infiltrates well, but the moisture-supplying capacity is limited, because bedrock is so near the surface. Runoff begins quickly during heavy rains.

*Use and management.*—These soils are poor for crops. Under average conditions they are poor to fair for pasture. If they are limed and liberally fertilized, good stands of pasture plants can be maintained. Bluegrass, white clover, orchardgrass, Ladino clover, and alfalfa are suitable for pastures on these soils. The carrying capacity of pastures is limited, because the moisture-supplying capacity of pastures is very low. Grazing should be controlled because, if the soil is trampled excessively, ditches may be formed by runoff. Brush and weeds invade the pastures. They are difficult to remove because of the steep slopes. In some places they can be mowed by hand. North-facing slopes are less likely to be droughty, but south-facing slopes provide grazing earlier in the spring.

If areas of these soils must be used for crops, careful management is needed to check runoff and control erosion. Stripcropping is advisable. Pastures should be reseeded in contour strips. Row crops need liberal amounts of fertilizer, and they should not be grown

***Figure 13.*—Subsoiling is practiced on Dandridge shaly silt loam, eroded hilly phase. This practice increases infiltration of moisture in shallow soils.**

oftener than once in 5 to 8 years. A vegetative cover should be kept on the soil as much of the time as possible. Subsoiling appears to benefit these soils by increasing the rate of infiltration and improving the permeability (fig. 13).

## Management Group 2–D

Group 2–D consists of nearly level, imperfectly drained to poorly drained soils that are poor for crops and fair to good for pasture. Their aggregate area is about 5,606 acres. Practically all the acreage occurs in small areas that are associated with better drained soils of the bottom lands and stream terraces. Much of the acreage is cleared, but only a little is cultivated. The soils of this group are listed in table 24, and estimated yields are given for each soil under two levels of management.

Melvin silt loam and Prader silt loam are low to moderately high in fertility. Both these soils are subject to overflow. Melvin silt loam is slightly acid to slightly alkaline, and Prader silt loam is medium acid to neutral.

Roanoke loam and Tyler silt loam are low in fertility and are medium acid to strongly acid. They are likely to be flooded temporarily during periods of heavy rainfall.

Infiltration of moisture is slow in all soils of the group.

TABLE 24.—*Soils of management group 2–D and average acre yields of principal crops*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management. Leaders indicate that, under the specified level of management, the soil is unsuited to the crop]

| Soil | Corn | | Lespedeza | | Pasture | |
|---|---|---|---|---|---|---|
| | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Tons* | *Tons* | *Cow-acre-days* [1] | *Cow-acre-days* [1] |
| Melvin silt loam [2] | ------ | 45 | ------ | 1.3 | 40 | 110 |
| Prader silt loam [2] | ------ | 40 | ------ | 1.2 | 35 | 100 |
| Roanoke loam [2] | ------ | 40 | 0.5 | 1.2 | 35 | 90 |
| Tyler silt loam [2] | ------ | 40 | .6 | 1.2 | 35 | 90 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

[2] Yields in columns A are those to be expected without artificial drainage. Yields in columns B are those to be expected with adequate drainage.

*Use and management.*—These soils are poor for crops. They could be improved by artificial drainage, but installing a drainage system might be too expensive to be justified by the probable increase in yields. With the possible exception of Melvin silt loam, artificially drained soils would require substantial applications of fertilizer. Undrained areas need lime to make them suitable for legumes and grasses.

Even if artificially drained, these soils would be suitable for only a limited number of crops. Of the row crops, the soils would probably be best suited to corn and soybeans. They would also be suited to redtop, some annual grasses, and possibly orchardgrass and timothy for hay. Good yields could be obtained if the soils are adequately drained and if enough fertilizer is used.

Permanent pastures on these soils would also be much improved by artificial drainage. Ladino clover, white clover, bluegrass, and possibly orchardgrass would be suitable pasture plants for drained areas. If it is not feasible to install artificial drainage, pastures can be improved by using fertilizer, seeding moisture-tolerant plants, and mowing to remove weeds.

## Management Group 3–A

Group 3–A consists of soils and land types that have one or more of such undesirable characteristics as shallowness, stoniness, low fertility, and steep or very steep slopes. In general, they are unsuited to crops or

TABLE 25.—*Soils of management group 3–A and average carrying capacity of pastures*

[Yields in columns A are to be expected under the prevailing level of management. Yields in columns B are to be expected under a high level of management. Leaders indicate the soil is unsuited to pasture]

| Soil | Pasture | |
|---|---|---|
| | A | B |
| | *Cow-acre-days* [1] | *Cow-acre-days* [1] |
| Allen stony loam, steep phase | 20 | 40 |
| Armuchee silt loam, very steep phase | ---------- | ---------- |
| Dandridge silt loam, very steep phase | ---------- | ---------- |
| Dunmore silty clay, severely eroded steep phase | 20 | 40 |
| Dunmore cherty silty clay, severely eroded steep phase | 20 | 40 |
| Groseclose cherty silt loam, eroded steep phase | 20 | 35 |
| Gullied land: | | |
| Limestone material | ---------- | ---------- |
| Shale material | ---------- | ---------- |
| Litz loam, very steep phase | ---------- | ---------- |
| Litz silt loam, very steep phase | ---------- | ---------- |
| Ramsey stony loam: | | |
| Steep phase | ---------- | ---------- |
| Very steep phase | ---------- | ---------- |
| Hilly phase | ---------- | ---------- |
| Stony steep land: | | |
| Dunmore soil material | ---------- | ---------- |
| Armuchee soil material | ---------- | ---------- |
| Stony very steep land, Ramsey and Muskingum soil materials | ---------- | ---------- |
| Stony colluvium, Jefferson soil material | ---------- | ---------- |
| Teas loam, steep phase | ---------- | ---------- |
| Teas shaly loam: | | |
| Eroded steep phase | ---------- | ---------- |
| Eroded hilly phase | 15 | 35 |
| Teas-Litz stony loams: | | |
| Steep phase | ---------- | ---------- |
| Very steep phase | ---------- | ---------- |
| Hilly phase | 15 | 35 |

[1] "Cow-acre-days" is the number of days in a year that 1 acre will graze 1 cow without injury to the pasture.

pasture. On most farms these soils are probably best used for forest. The aggregate area of these soils is about 74,623 acres, of which 68,000 acres is under native cutover forest. The rest of the acreage has been cleared, but much of it has been reforested, mainly by natural reseeding. The soils of this group are listed in table 25, and the estimated carrying capacity of pasture is given for each soil under two levels of management.

*Use and management.*—The soils of this group are suited chiefly to forest. For further information turn to the section on Forests.

## *Capability Groups of Soils*

The capability grouping is an arrangement of soils to show relative suitability for crops, grazing, forestry, or wildlife. Soils that are nearly level, well drained, free from overflow, fairly fertile, and not otherwise limited are placed in class I. They are widely adaptable. The farmer can use his class I soils for crops without special practices and can choose one of several cropping systems; if he wishes he may use the soil for pasture or for some other purpose.

Soils are placed in class II if they are a little less widely adaptable and thus more limited than those in class I. A gently sloping soil, for example, must be farmed on the contour, kept under vegetation most of the time, or handled in some other manner to control erosion. Other soils may be in class II because they are too droughty, too wet, too sloping, or too shallow to be in class I.

Class III contains the soils that are suitable for regular cropping but that have narrower adaptations for use or more stringent management requirements than those in class II. The soils that are even more limited and that have narrower crop adaptations than those of class III, but that are still usable for tillage part of the time or with special precautions, are placed in class IV.

Soils not suitable for cultivation, or on which cultivation is not advisable, are in classes V, VI, VII, or VIII. Class V, which does not occur in this county, consists of soils not subject to erosion but unsuitable for cultivation because of standing water or frequent overflow. Class VI contains soils that are steep or droughty or that have other serious limitations but will produce fairly good amounts of forage or forest products. As a rule, class VI soils should not be cultivated. Nevertheless, some of them can safely be disturbed enough to prepare them for seeding to extremely long-producing pastures or planting to trees. Soils in class VII are more limited than those in class VI. They usually give only fair to poor yields of forage or wood products. They are generally best suited to forest. Soils in class VIII, not found in this county, are very rocky or are otherwise so severely limited that they produce little useful vegetation.

SUBCLASSES.—Since the broad capability classes are based on total suitability of the soils for different uses, one class usually contains several different kinds of soils. The kinds of management problems then differ because the soils are different. Class III soils in this county, for example, consist of some rolling soils subject to erosion, some shallow and droughty soils, and some poorly drained soils limited by excess water. It is convenient to recognize, within the broad classes, capability subclasses based on the dominant limitation. The following subclasses used in the county are established according to dominant limitations or risks: Erosion, designated by the letter "e" following the class number; excess water, designated by "w"; and stony, rocky, or shallow soil, designated by "s."

### Capability Classes and Subclasses in Greene County

Capability classes and subclasses for the soils of Greene County are given in the following list. The brief description of each subclass gives the general nature of the major soils included.

Class I.—Soils that are easy to farm and have no more than slight limitations in use. They may be used for intensive cultivation without any special measures to control excess water or erosion. They may be expected to produce high yields under normal good management. There are no subclasses under class I.

Class II.—Soils that can be used for tilled crops and that have only moderate conservation problems or limitations.
- IIe.—Gently sloping soils subject to moderate erosion.
- IIw.—Imperfectly drained alluvial and colluvial soils.

Class III.—Soils that have one or more serious conservation problems when used for tilled crops.
- IIIe.—Deep well-drained soils of the rolling uplands and terraces.
- IIIs.—Shallow soils that have poor moisture-supplying capacities.
- IIIw.—Poorly drained bottom land soils and somewhat poorly drained terrace soils.

Class IV.—Soils that have very serious conservation problems when cultivated and therefore require very careful treatment and management.
- IVe.—Deep well-drained soils of the hilly upland and terraces.
- IVs.—Shallow soils that have unfavorable subsoils and poor moisture-supplying capacities.
- IVw.—Poorly drained soils of the terrace lands.

Class VI.—Soils requiring permanent vegetation, usually long-producing pasture and forage, and having only moderate conservation problems under such use.
- VIe.—Deep soils of the hilly and steep uplands.
- VIs.—Stony and cobbly soils of the rolling to hilly uplands.

Class VII.—Soils generally best suited to trees. The more favorable sites are suited to limited grazing.
- VIIe.—Deep well-drained soils of the steep uplands; and gullied land.
- VIIs.—Shallow droughty soils of the steep uplands; and stony land.

The capability class and subclass for each soil is shown in the following list:

| | *Capability class and subclass* |
|---|---|
| Allen loam: | |
| Eroded rolling phase (Ab) | IIIe. |
| Eroded hilly phase (Aa) | IVe. |
| Allen stony loam: | |
| Rolling phase (Ad) | IVs. |
| Eroded hilly phase (Ac) | VIs. |
| Steep phase (Ae) | VIIs. |
| Altavista loam: | |
| Undulating phase (Ag) | IIe. |
| Eroded rolling phase (Af) | IIIe. |
| Armuchee silt loam: | |
| Hilly phase (Ah) | IVs. |
| Steep phase (Ak) | VIIs. |
| Very steep phase (Al) | VIIs. |
| Armuchee silty clay loam: | |
| Eroded hilly phase (Am) | IVs. |
| Eroded rolling phase (An) | IVs. |
| Eroded steep phase (Ao) | VIIs. |

| | *Capability class and subclass* |
|---|---|
| Barbourville fine sandy loam (Ba) | IIe. |
| Bolton loam: | |
| Eroded hilly phase (Bb) | IVe. |
| Eroded rolling phase (Bc) | IIIe. |
| Eroded steep phase (Bd) | VIe. |
| Buncombe loamy fine sand (Be) | IVs. |
| Camp loam (Ca) | IIe. |
| Chewacla silt loam (Cb) | IIw. |
| Cobbly alluvium, Hamblen soil material (Cc) | VIIs. |
| Congaree fine sandy loam (Cd) | I. |
| Congaree loam (Ce) | I. |
| Cumberland silt loam, undulating phase (Cf) | IIe. |
| Cumberland silty clay loam: | |
| Eroded rolling phase (Ch) | IIIe. |
| Eroded hilly phase (Cg) | IVe. |
| Dandridge shaly silt loam: | |
| Eroded steep phase (Dc) | VIIs. |
| Eroded hilly phase (Da) | VIs. |
| Eroded rolling phase (Db) | IVs. |
| Dandridge silt loam: | |
| Hilly phase (Dd) | VIs. |
| Steep phase (Df) | VIIs. |
| Very steep phase (Dg) | VIIs. |
| Rolling phase (De) | IVs. |
| Decatur silty clay, severely eroded hilly phase (Dh) | IVe. |
| Decatur silty clay loam: | |
| Eroded rolling phase (Dl) | IIIe. |
| Eroded hilly phase (Dk) | IVe. |
| Dewey silty clay: | |
| Severely eroded rolling phase (Dn) | IIIe. |
| Severely eroded hilly phase (Dm) | IVe. |
| Dewey silty clay loam: | |
| Eroded rolling phase (Dp) | IIIe. |
| Eroded hilly phase (Do) | IVe. |
| Eroded steep phase (Dr) | VIe. |
| Dunmore cherty silty clay loam: | |
| Eroded rolling phase (Dnh) | IIIe. |
| Eroded hilly phase (Dng) | IVe. |
| Eroded steep phase (Dnk) | VIIe. |
| Dunmore cherty silty clay: | |
| Severely eroded rolling phase (Dne) | IVs. |
| Severely eroded hilly phase (Dnd) | VIe. |
| Severely eroded steep phase (Dnf) | VIIe. |
| Dunmore cherty silt loam: | |
| Rolling phase (Dnb) | IIIe. |
| Hilly phase (Dna) | IVe. |
| Steep phase (Dnc) | VIIe. |
| Dunmore loam: | |
| Rolling phase (Dnp) | IIIe. |
| Eroded rolling phase (Dnm) | IIIe. |
| Hilly phase (Dno) | IVe. |
| Eroded hilly phase (Dnl) | IVe. |
| Steep phase (Dnr) | VIIe. |
| Eroded steep phase (Dnn) | VIIe. |
| Dunmore silt loam: | |
| Rolling phase (Dsb) | IIIe. |
| Hilly phase (Dsa) | IVe. |
| Steep phase (Dsc) | VIIe. |
| Dunmore silty clay loam: | |
| Eroded rolling phase (Dsh) | IIIe. |
| Eroded hilly phase (Dsg) | IVe. |
| Eroded steep phase (Dsk) | VIIe. |
| Dunmore silty clay: | |
| Severely eroded rolling phase (Dse) | IIIe. |
| Severely eroded hilly phase (Dsd) | VIe. |
| Severely eroded steep phase (Dsf) | VIIe. |
| Dunmore stony loam: | |
| Rolling phase (Due) | IVs. |
| Eroded rolling phase (Dub) | IVs. |
| Hilly phase (Dud) | VIs. |
| Eroded hilly phase (Dua) | VIs. |
| Steep phase (Duf) | VIIs. |
| Eroded steep phase (Duc) | VIIs. |
| Elk and Tupelo silt loams: | |
| Undulating phase (Eb) | IIe. |
| Eroded rolling phase (Ea) | IIIe. |
| Emory silt loam (Ec) | I. |
| Greendale silt loam (Ga) | IIe. |
| Groseclose silt loam, rolling phase (Gg) | IIIe. |
| Groseclose cherty silt loam: | |
| Rolling phase (Gf) | IIIe. |
| Eroded rolling phase (Gc) | IIIe. |
| Eroded hilly phase (Gb) | IVe. |
| Eroded steep phase (Gd) | VIIe. |
| Hilly phase (Ge) | IVe. |
| Groseclose silty clay loam: | |
| Eroded rolling phase (Gl) | IIIe. |
| Eroded hilly phase (Gk) | IVe. |
| Groseclose silty clay, severely eroded hilly phase (Gh) | VIe. |
| Gullied land: | |
| Limestone material (Gm) | VIIe. |
| Shale material (Gn) | VIIe. |
| Hamblen fine sandy loam (Ha) | IIw. |
| Hamblen silt loam (Hb) | IIw. |
| Hayter loam: | |
| Undulating phase (Hd) | IIe. |
| Eroded rolling phase (Hc) | IIIe. |
| Hayter stony loam: | |
| Undulating phase (Hf) | IVs. |
| Eroded hilly phase (He) | VIs. |
| Hermitage silt loam: | |
| Undulating phase (Hh) | IIe. |
| Eroded rolling phase (Hg) | IIIe. |
| Hollywood silty clay loam (Hk) | IIIw. |
| Holston loam: | |
| Undulating phase (Hm) | IIe. |
| Eroded rolling phase (Hl) | IIIe. |
| Jefferson loam: | |
| Undulating phase (Jd) | IIe. |
| Rolling phase (Jc) | IIIe. |
| Eroded rolling phase (Jb) | IIIe. |
| Eroded hilly phase (Ja) | IVe. |
| Jefferson stony loam: | |
| Undulating phase (Jk) | IVs. |
| Rolling phase (Jh) | IVs. |
| Eroded rolling phase (Jf) | IVs. |
| Hilly phase (Jg) | VIs. |
| Eroded hilly phase (Je) | VIs. |
| Leadvale silt loam: | |
| Eroded rolling phase (La) | IIIe. |
| Undulating phase (Lb) | IIe. |
| Lindside silt loam (Lc) | IIw. |
| Litz loam: | |
| Rolling phase (Lh) | IIIs. |
| Eroded rolling phase (Le) | IIIs. |
| Hilly phase (Lg) | IVs. |
| Eroded hilly phase (Ld) | IVs. |
| Steep phase (Lk) | VIIs. |
| Eroded steep phase (Lf) | VIIs. |
| Very steep phase (Ll) | VIIs. |
| Litz shaly silt loam: | |
| Eroded rolling phase (Ln) | IIIs. |
| Eroded hilly phase (Lm) | IVs. |
| Eroded steep phase (Lo) | IVs. |
| Litz silt loam: | |
| Rolling phase (Lr) | IIIs. |
| Hilly phase (Lp) | IVs. |
| Steep phase (Ls) | VIIs. |
| Very steep phase (Lt) | VIIs. |
| Masada loam: | |
| Undulating phase (Mb) | IIe. |
| Eroded rolling phase (Ma) | IIIe. |
| Melvin silt loam (Mc) | IIIw. |
| Monongahela silt loam: | |
| Undulating phase (Me) | IIe. |
| Eroded rolling phase (Md) | IIIe. |
| Needmore silt loam: | |
| Undulating phase (Nb) | IIe. |
| Rolling phase (Na) | IIIe. |
| Needmore silty clay loam, eroded rolling phase (Nc) | IIIe. |
| Nolichucky cobbly fine sandy loam: | |
| Eroded rolling phase (Ne) | IVs. |
| Eroded hilly phase (Nd) | VIs. |
| Nolichucky loam: | |
| Rolling phase (Nh) | IIIe. |
| Eroded rolling phase (Ng) | IIIe. |
| Undulating phase (Nk) | IIe. |
| Eroded hilly phase (Nf) | IVe. |

| | *Capability class and subclass* |
|---|---|
| Ooltewah silt loam (Oa) | IIw. |
| Pace cherty silt loam: | |
| Eroded rolling phase (Pa) | IIIe. |
| Undulating phase (Pb) | IIe. |
| Pace silt loam: | |
| Undulating phase (Pd) | IIe. |
| Eroded rolling phase (Pc) | IIIe. |
| Prader silt loam (Pe) | IIIw. |
| Ramsey stony loam: | |
| Hilly phase (Ra) | VIs. |
| Steep phase (Rb) | VIIs. |
| Very steep phase (Rc) | VIIs. |
| Roanoke loam (Rd) | IVw. |
| Sequatchie cobbly fine sandy loam (Sa) | IVs. |
| Sequatchie loam (Sb) | IIe. |
| Staser fine sandy loam (Sc) | I. |
| Staser silt loam (Sd) | I. |
| State loam (Se) | IIe. |
| State loam, eroded rolling phase (Sf) | IIIe. |
| Stony colluvium, Jefferson soil material (Sg) | VIIs. |
| Stony hilly land, Armuchee soil material (Sh) | VIIs. |
| Stony hilly land, Dunmore soil material (Sk) | VIIs. |
| Stony rolling land, Dunmore soil material (Sl) | VIIs. |
| Stony steep land, Armuchee soil material (Sm) | VIIs. |
| Stony steep land, Dunmore soil material (Sn) | VIIs. |
| Stony very steep land, Ramsey and Muskingum soil materials (So) | VIIs. |
| Teas loam, steep phase (Td) | VIIs. |
| Teas shaly loam: | |
| Eroded hilly phase (Te) | IVs. |
| Eroded steep phase (Tf) | VIIs. |
| Teas-Litz stony loams: | |
| Hilly phase (Ta) | VIs. |
| Steep phase (Tb) | VIIs. |
| Very steep phase (Tc) | VIIs. |
| Tyler silt loam (Tg) | IIIw. |
| Waynesboro cobbly loam: | |
| Eroded rolling phase (Wb) | IVs. |
| Eroded hilly phase (Wa) | VIs. |
| Waynesboro loam: | |
| Undulating phase (We) | IIe. |
| Eroded rolling phase (Wd) | IIIe. |
| Eroded hilly phase (Wc) | IVe. |
| Weaver silt loam (Wf) | IIw. |
| Whitesburg silt loam (Wg) | IIw. |

## *Soil Associations*

A soil association is a geographic group of two or more soils that normally occur together in a fairly uniform distribution pattern. Ordinarily, the boundaries of an association are fairly well defined. The soils in each association may differ from each other, but their proportions and distribution are about the same wherever the association occurs. The usefulness and agricultural importance of a particular soil are affected by the kinds of soils with which it is associated.

The 12 soil associations recognized in Greene County are described briefly in the following pages. A colored map that shows the location and extent of each of the 12 associations is in the back part of this report.

### 1. Dunmore–Greendale Soil Association

The Dunmore–Greendale soil association is the largest in the county. It occupies about 30 percent of the total area. Much of the area consists of broad rolling to hilly uplands. Narrow strips of nearly level to gently sloping local alluvium occur along the drainageways. These narrow belts consist chiefly of Greendale soil and to a lesser extent of Emory and Hermitage soils. Small sinkholes are common; a landscape that contains many of them may be described as having a karst relief. Rolling and hilly Dunmore soils predominate in the soil pattern. Small areas of Dewey and Decatur soils occur in the uplands.

Approximately 80 percent of this association has been cleared. The part still under forest consists chiefly of steep Dunmore soils and Stony land. The farms are small to moderate in size. Most of them consist of from 15 to 160 acres. General livestock farming predominates; beef and dairy cattle are the chief livestock. Tobacco is an important cash crop, but most of the farms have a limited acreage of soils that are suitable for cultivation.

### 2. Groseclose–Dunmore Soil Association

The Groseclose–Dunmore soil association occupies only about 1.5 percent of the county. It occurs on rolling to hilly slopes (fig. 14) in the southern part of the county. Groseclose soils predominate on the uplands, and narrow strips of Greendale soil occur along the drainageways. Dunmore soils and Stony land are intermixed with the Groseclose soils in some places. The Groseclose soils are moderately low in fertility and moderately deep to shaly limestone bedrock.

*Figure 14.*—**Rolling to hilly soils of the Groseclose-Dunmore soil association. Productive pasture at left. Poor pasture on unstabilized soil at right.**

Much of the acreage has been cleared, but a larger proportion of this association than of the Dunmore–Greendale association is under forest. Although these soils are lower in productivity, they are suited to about the same uses as the soils of the Dunmore–Greendale association. General livestock farming predominates, but tobacco is an important cash crop.

### 3. Stony land–Dunmore Soil Association

The Stony land–Dunmore association occupies about 6 percent of the county. Most of the areas are adjacent

to or surrounded by more extensive areas of the Dunmore–Greendale association. The landscape is like that of the Dunmore soils. Litz soils form a minor part of the association. Stony land and Litz soils together make up between 40 and 60 percent of the association.

Much of the acreage has been cleared, but a larger proportion of this association than of the Dunmore–Greendale association is under forest. The soils are less productive than those of the Dunmore–Greendale association; farms are larger, but the acreage in crops is smaller. Fairly large farm units are needed to produce farm incomes comparable to those obtained on the average farms in the Dunmore–Greendale association. General livestock farming predominates. Small acreages of tobacco are common, but little of the soil in this association is suited to this crop.

### 4. Dandridge–Whitesburg Soil Association

The Dandridge–Whitesburg association is one of the more extensive associations in the county. It occupies about 18.5 percent of the area. Most of it is in the northwestern part of the county. Much of the landscape consists of hilly and steep Dandridge soils. Narrow strips of the Whitesburg soil occur along drainageways, and Hamblen and Staser soils are on the narrow bottom lands along the larger streams. A larger proportion of the area of this association than of the Dunmore–Greendale association is under forest. Much of the forest is on the steeper slopes. The erosion hazard is serious.

Most of the farms are large. Many are general livestock farms on which small acreages of tobacco are grown. On many others farm products are raised only for home use.

Only a limited acreage is suited to crops. General livestock farming, which requires large areas of permanent pasture, is well suited to these soils. Large farm units are needed, and the limited acreage of good cropland normally has to be cultivated intensively to provide the necessary row crops.

### 5. Monongahela–Needmore–Dandridge Soil Association

The Monongahela–Needmore–Dandridge association occupies about 11.5 percent of the county. Practically all of it occurs in an irregular strip in the northwestern part. Much of it is undulating to rolling; narrow, nearly level strips occur along drainageways. Small hilly patches are widely distributed throughout the uplands. Only a small part is on steep slopes. The predominant soils are moderately deep over shale bedrock. They are rather low in fertility. Most of the acreage has a firm subsoil. For much of the acreage, internal drainage is somewhat less favorable than for the predominant soils of the Dunmore–Greendale association but is nevertheless adequate for many kinds of crops.

A great part of this association is now used for general livestock farming, supplemented by tobacco as a cash crop.

### 6. Hamblen–Staser Soil Association

The Hamblen–Staser association occupies only about 2 percent of the county. Most of it occurs as an irregular strip along Lick Creek. The soils are moderate to high in fertility. Much of the acreage is subject to flooding; nevertheless, it is sufficiently well drained to be suitable for many kinds of crops. There is little risk of erosion.

Practically all of the acreage has been cleared, and much of it is now used intensively for row crops, chiefly corn. Some of the acreage is used in a rotation of which hay is an important part.

The soils in this association are in farms that are comprised partly of soils of the Monongahela–Needmore–Dandridge association. Most of the cropland on the farms consists of soils of the Hamblen–Staser association.

### 7. Nolichucky–Waynesboro–Cumberland Soil Association

The Nolichucky–Waynesboro–Cumberland soil association occupies about 5.5 percent of the county. It occurs as an irregular strip along part of the Nolichucky River and consists largely of soils of the high stream terraces. The slopes are predominantly undulating to rolling.

Most of the soils are fair to moderately high in fertility. The soils in general are permeable, but permeability is restricted in the more poorly drained soils and in areas where the alluvium is shallow to the underlying residuum of limestone. Erosion is not difficult to control.

Most of this association is used for crops or pasture. Farms are of moderate size. General livestock farms predominate. Tobacco is raised as a supplementary cash crop. There is little idle land, and farm income is probably higher than the county average.

### 8. Congaree–Altavista Soil Association

The Congaree–Altavista association occupies only 1 percent of the county. The soils in this association are nearly level to undulating. They occur in irregular areas on the bottom lands and on low to moderately high stream terraces along the lower reaches of the Nolichucky River. The soils on the bottom lands are moderately high in fertility, but they are subject to overflow. The soils on the terraces are less fertile.

Practically all of this association has been cleared, and much of it is used for crops. A few farms are wholly within this association, but most of the farms extend into the Dandridge–Whitesburg association. Most of the fields are large and are used fairly intensively for row crops. Corn, tobacco, and truck crops are common, and small grains and hay occupy much of the remaining acreage. Some of the areas used for truck crops are irrigated. Pasture is confined chiefly to the less desirable soils.

### 9. Litz Soil Association

The Litz association occupies less than 1 percent of the county. It is confined to a few small areas in the central and eastern parts and consists almost entirely of Litz silt loams and Litz shaly silt loams. The soils are hilly to steep. They are predominantly shallow or very shallow over acid shale bedrock that contains a few thin lenses of limestone. Small areas of nearly level soils that consist of local alluvium occur along drainageways. Because soils of the Dandridge–Whitesburg association are derived from calcareous shale, they are better suited to agriculture than those of the Litz association. The Litz association is less rugged, has less sandy material, and has fewer outcrops of hard rock than the Teas–Litz–Stony land association.

Most of the soils of the Litz association are low in fertility, contain little organic matter, and are limited in moisture-supplying capacity. Runoff creates an erosion hazard on tilled areas.

Probably more than half of this association is in forest. Much of the cleared part is in unimproved pasture. A small acreage is in crops. Few, if any, farms are wholly within this association.

### 10. Jefferson–Allen–Hayter Soil Association

The Jefferson–Allen–Hayter association occupies about 7.5 percent of the county. It occurs chiefly in a broad strip or belt along the base of the mountains in the southeastern part of the county (fig. 15). Although the soils are mainly rolling to hilly, about 60 percent of the acreage consists of undulating to rolling soils that are suited to crops.

*Figure 15.*—**Soils of the Jefferson-Allen-Hayter soil association in foreground. Steep rugged area in background is part of the Ramsey-Stony land soil association and is suited only to forest.**

Most of the acreage that is suited to cultivation is moderate to low in fertility, is permeable, and is moderately deep. A small part, however, is moderately high in fertility. Much of the association has cobblestones in numbers that interfere with cultivation.

Much of the acreage suited to cultivation is in crops or pasture. General livestock farming predominates, but tobacco is an important cash crop. Most of the farms are between 100 and 200 acres in size. This association is one of the better agricultural associations of the county.

### 11. Teas–Litz–Stony Land Soil Association

The Teas–Litz–Stony land association occupies about 4 percent of the county. Much of it is on Bays Mountains. Slopes are steep to very steep. A small part of this association is in the southern part of the county, next to the Ramsey–Stony land association. The soils are shallow to very shallow. Bedrock, in places, is acid sandy shale or interbedded limestone and shale. Some places, especially in the northern part of this association, overlie acid sandstone bedrock. Rock fragments are numerous, and bedrock commonly crops out on the higher lying places, especially on those underlain by sandstone. Little of the soil is deep enough to be tilled.

These soils are low in fertility and contain little organic matter. They are medium acid to approximately neutral. Runoff is rapid in most places, chiefly because of strong slopes and shallowness; consequently, moisture-supplying capacity is very poor.

Most of the area is under cutover deciduous forest. It can best be used for permanent forest.

### 12. Ramsey–Stony Land Soil Association

The Ramsey–Stony land association occupies about 11.5 percent of the county. It occurs in a mountainous belt along the southeastern border of the county. In this steep rugged area the soil material is shallow to very shallow over bedrock. Much of the acreage is stony, and the soil material is of low fertility.

Most of the area is under cutover native forest, and only a few small tracts are suited to crops or pasture.

## *Forests*[4]

Before white settlers came into the area, practically all of Greene County was forested. By 1950, over 80 percent had been cleared. The major forest types are the upland-hardwoods, the oak-chestnut, the yellow pine-hardwoods, the cedar-hardwoods, the white pine-hardwoods, and the hemlock-hardwoods. Stands of northern hardwoods and pure stands of yellow pine also occur but in comparatively small acreages.

### Forest Cover by Soil Associations

In the Dunmore–Greendale, Groseclose–Dunmore, and Stony land–Dunmore soil associations, the forests are confined chiefly, but not entirely, to the rougher and stonier areas. In the stoniest areas the cedar-hardwoods type is predominant, elsewhere the upland-

[4] Prepared by G. B. Shivery, Extension Forester, University of Tennessee.

hardwoods and yellow pine-hardwoods types. The predominant species are northern red oak, southern red oak, black oak, scarlet oak, white oak, post oak, yellow-poplar, chestnut oak, Virginia pine, shortleaf pine, redcedar, and several species of hickory. Less common species are beech, black walnut, white pine, white ash, blackgum, sycamore, basswood, hemlock, pitch pine, and several species of maple (*10*). On the deeper and less stony alluvial soils in these associations, high-quality timber can be produced. Most of the woodland in these three associations is in small to moderate-sized farm tracts.

In the Jefferson–Allen–Hayter soil association, the yellow pine-hardwood type of forest is predominant. Small acreages of the upland-hardwood type and the white pine-hardwood type also occur. The most common species are southern red oak, Virginia pine, scarlet oak, yellow-poplar, hemlock, white pine, sourwood, red maple, rhododendron, mountain-laurel, and chestnut oak. Less common are white oak, black oak, yellow locust, holly, northern red oak, white hickory, and pitch pine. Much of this association has been cleared, but, in comparison to the Dunmore–Greendale association, a larger proportion of the acreage is unsuitable for crops and is still forested.

Forest occupies practically all of the Ramsey–Stony rough land association. The yellow pine-hardwoods type is predominant. The oak-chestnut type occurs on the lower slopes. The chestnut trees are dead, and many have been removed; they have been replaced by other species. Small areas of the hemlock-hardwoods and northern hardwoods types are intermixed with the yellow pine-hardwoods forest. In the Ramsey–Stony land soil association, the commonest trees are pitch pine, chestnut oak, red maple, sourwood, blackgum, rhododendron, yellow-poplar, northern red oak, yellow locust, Fraser magnolia, black birch, serviceberry, hemlock, Table-Mountain pine, basswood, buckeye, white ash, mountain maple, viburnum, and grapevine. The principal species in the areas of northern hardwoods are yellow birch, beech, and sugar maple.

The forests in the Dandridge–Whitesburg soil association are of the upland-hardwoods, yellow pine-hardwoods, and cedar-hardwoods types. The cedar-hardwoods forest occurs chiefly on very shallow or severely eroded slopes. Conspicuous hardwood species in the Dandridge–Whitesburg soil association are southern red oak, post oak, white oak, scarlet oak, black oak, red maple, white hickory, scalybark hickory, and dogwood. The understory is redbud. Yellow-poplar, northern red oak, beech, and sugar maple occur in the hollows and in small areas that face north or east. The yellow pine-hardwoods forest consists chiefly of Virginia pine and shortleaf pine. The cedar-hardwoods forest is predominantly redcedar intermixed with southern red oak, scarlet oak, dogwood, and hickory. Some Virginia pine and shortleaf pine are intermixed in places.

Much of the Teas–Litz–Stony land association is covered by upland-hardwoods and yellow pine-hardwoods forests. Scarlet oak, Virginia pine, red maple, shortleaf pine, black oak, white hickory, chestnut oak, sourwood, blackgum, blackjack oak, and chestnut sprouts grow on the drier south and west exposures. Yellow-poplar, northern red oak, beech, white oak, rhododendron, black oak, chestnut oak, red maple, Virginia pine, shortleaf pine, pignut hickory, and chestnut sprouts grow on the ridgetops and in the more moist places. Galax, strawberrybush, redbud, and benzoin occur in association with these trees.

## Forest Management

Good forest management, particularly of farm woodland, requires (1) fire prevention; (2) elimination of grazing; (3) harvesting practices that include selective cutting; and (4) systematic reforestation.

*Fire prevention.*—Forest fires not only destroy timber, they also destroy organic matter in the soil and make the soil more susceptible to erosion.

Fire towers, administered by either the State or Federal Government, serve extensive areas in this section of the State. The Camp Creek Bald tower is in the Cherokee National Forest on the Tennessee–North Carolina boundary. The tower at Chimney Top is in Greene County near the Washington County line. This tower is coordinated with the Bays Mountains tower in Hawkins County and with the Kingsport tower in Sullivan County. In addition, three mobile fire crews have been organized to furnish fire protection for Greene County. One is at Camp Creek, another near Bulls Gap, and the third at Chimney Top.

*Elimination of grazing.*—Forest is of little or no value for grazing. In an experiment conducted in Indiana *(2)*, animals grazed in woodland, at the rate of 2, 4, or 6 acres to each animal, and received no supplementary feed. Over a 6-month period, the condition of the animals deteriorated and the productive capacity of the forest was reduced by browsing and trampling, which prevented natural regeneration of the stand. Continued grazing will also cause compaction of the soil and impair its capacity to absorb water.

*Harvesting practices.*—In Greene County only mature timber trees are cut, as a rule, and little or no effort is made to improve the woodlands. The removal of culls and weed trees—those that are unsound, crooked, short, bushy-topped, slow-growing, or of little commercial value—will encourage growth of tall, straight, well-crowned trees into a valuable timber crop. A 12-inch yellow-poplar, under favorable conditions and on a good site, will grow to a 20-inch tree in 20 years, increasing its volume 5 times and its net value 28 times[5].

*Reforestation.*—Areas are reforested either by natural reseeding or planting. Natural seeding is satisfactory only in areas near stands of seed trees of good timber species. Exposed mineral soils are favorable for the germination of pine seed. Virginia pine grows readily in dry places (fig. 16). At higher elevations where there is even less moisture, pitch pine is the

[5] Southeastern Forest Experiment Station, Asheville, N. C. Much of the inferior timber that is removed can be used for fuel and pulpwood. Timber should be removed carefully, so as not to damage the remaining trees.

*Figure 16.*—Reestablished forest on Dunmore and Greendale soils. Deciduous trees in middle distance on Greendale soil; Virginia pine predominates on Dunmore soils. Vigorous understory protects woodlot from grazing.

prevalent reseeding tree. Shortleaf pine is generally confined to low elevations and the more productive soils.

Planting is necessary in places where good timber species do not reseed themselves. Preparation for reforesting may include breaking and mulching galled areas, building low check dams in gullies, and plowing contour furrows. Seedlings are provided free by the Tennessee Valley Authority, through the office of the county agent. Shortleaf pine is the best species for planting throughout the county, except for the highest elevations. In areas where the moisture supply is poor, Virginia pine may be better. White pine is suitable for the lower elevations where the moisture supply is good, especially on north and east slopes, and for ravines where the soil is deep. Black locust is not recommended except for reclamation of areas of friable, well-aerated soil, such as may accumulate behind check dams in gullies. Yellow-poplar is a useful tree, but the seedlings require a deep fertile soil and a cool moist site.

Substantial acreages in the county have been reforested by natural reseeding. In addition, a total of 818 acres of the soils of Greene County have been replanted to trees by landowners and by the Civilian Conservation Corps[6]. The chief species planted are black locust and shortleaf pine. Virginia pine, loblolly pine, pitch pine, yellow-poplar, and white pine have been planted less extensively. About 103 acres of white pine and 12 acres of red pine have been seeded in the Cherokee National Forest.

The following mapping units are in need of further reforestation: Dunmore silty clay, severely eroded steep phase; Dunmore cherty silty clay, severely eroded steep phase; Groseclose cherty silt loam, eroded steep phase; Teas shaly loam, eroded steep phase; Teas shaly loam, eroded hilly phase; Gullied land, limestone material; and Gullied land, shale material. All of these mapping units have been cleared at one time, but parts have been reforested, mostly by natural reseeding. Others may need to be reforested to meet the needs of individual farmers.

[6] Information obtained from the Department of Forestry Relations, Tennessee Valley Authority.

## Indirect Benefits of Good Forest Management

A well-managed forest provides indirect benefits, aside from the production of timber, especially on areas that are likely to erode. A protective layer of forest litter absorbs the impact of rainfall and prevents damage to the soil structure.

Fungi, bacteria, and minute animals that consume the litter and each other produce a dark-brown colloidal substance called humus. If carried downward into the mineral soil by percolating water, the humus improves both structure and fertility. Litter and humus absorb water, and root channels increase the porosity of the soil. The dense network of surface roots helps to bind the soil.

Records kept at the erosion station near Statesville, N. C., show a loss of only 0.002 of a ton of soil per acre and 0.06 percent of rainfall in an area of virgin woods (*6*). A plot of woods that was burned twice yearly lost 11.5 percent of the rainfall by runoff and lost 3.08 tons of soil an acre, compared to runoff of 0.06 percent and soil loss of 0.001 ton per acre on an unburned plot. Similar experiments at Zanesville, Ohio, for a 9-year period on cultivated land, pasture, and woodland, show the runoff as 20.6 percent, 13.8 percent, and 3.2 percent, respectively, and soil loss per acre as 17.18 tons, 0.10 ton, and 0.01 ton (*7*). These figures show that control of erosion and a good cover of forest help increase water absorption. Soil under original forest is more porous and absorbs water much more rapidly than cultivated soil. If second-growth forest is properly maintained, the soil will not lose its porosity unless the area is overgrazed or the litter is destroyed by fire (*1*).

## *Literature Cited*

(1) AUTEN, JOHN T.
1933. POROSITY AND WATER ABSORPTION OF FOREST SOILS. U. S. Dept. Agr. Jour. Agr. Res. 46: 997–1014.

(2) DENUYL, DANIEL, and DAY, RALPH K.
1934. WOODLAND CARRYING CAPACITIES AND GRAZING INJURY STUDIES. Ind. Agr. Expt. Sta. Bul. 391, 12 pp., illus.

(3) FENNEMAN, NEVIN M.
1938. PHYSIOGRAPHY OF EASTERN UNITED STATES. 714 pp., illus. New York and London.

(4) GOODSPEED PUBLISHING COMPANY.
1887. HISTORY OF TENNESSEE FROM THE EARLIEST TIME TO THE PRESENT, THE EAST TENNESSEE EDITION. 1317 pp., illus. Chicago and Nashville.

(5) POND, WALTER F.
1933. GEOLOGIC MAP OF TENNESSEE. Ed. 4. Div. of Geol., Tenn. Dept. Ed.

(6) UNITED STATES DEPARTMENT OF AGRICULTURE.
1944. INVESTIGATIONS IN EROSION CONTROL AND RECLAMATION OF ERODED LAND. U. S. Dept. Agr. Tech. Bul. 873, 66 pp., illus.

(7) ———
1945. INVESTIGATIONS IN EROSION CONTROL AND RECLAMATION OF ERODED LAND. U. S. Dept. Agr. Tech. Bul. 888, 95 pp., illus.

(8) UNITED STATES GEOLOGICAL SURVEY.
1896. GEOLOGIC ATLAS OF UNITED STATES, MORRISTOWN FOLIO, TENNESSEE. Folio 27, 13 pp., illus.

(9) ———
1905. GEOLOGIC ATLAS OF UNITED STATES, GREENEVILLE FOLIO, TENNESSEE. Folio 118, 15 pp., illus.

(10) UNIVERSITY OF TENNESSEE AGRICULTURAL EXPERIMENT STATION.
1947. WOODLANDS AND FARM ECONOMY OF EAST TENNESSEE. Bul. 204, 38 pp., illus.

*Summary of important characteristics of the soils*

| Soil | Map symbol | Management group[1] | Slope range | Surface soil color[2 3] | Subsoil | | Depth[5] | Parent rock or parent material |
|---|---|---|---|---|---|---|---|---|
| | | | | | Color[3] | Consistence[4] | | |
| | | | *Percent* | | | | *Feet* | |
| Allen loam: | | | | | | | | |
| Eroded rolling phase | Ab | 1–G | 5 –15 | Reddish brown or yellowish brown. | Yellowish red to red. | Firm | 2½–10 | Old local alluvium or colluvium derived chiefly from sandy rocks; some limestone. |
| Eroded hilly phase | Aa | 1–M | 15 –30 | Reddish brown | Yellowish red to red. | Firm | 2 – 8 | Same. |
| Allen stony loam: | | | | | | | | |
| Rolling phase | Ad | 1–G | 5 –15 | Brown | Yellowish red to red. | Firm | 3 –10 | Same. |
| Eroded hilly phase | Ac | 2–A | 15 –30 | Reddish brown | Red | Firm | 2 – 8 | Same. |
| Steep phase | Ae | 3–A | 30 –60 | Reddish brown | Red to yellowish red. | Firm | 1½– 6 | Same. |
| Altavista loam: | | | | | | | | |
| Undulating phase | Ag | 1–E | 1 – 5 | Dark yellowish brown. | Yellowish brown | Friable to firm | 6 –20 | Old general alluvium derived chiefly from granite, gneiss, and schist. |
| Eroded rolling phase | Af | 1–I | 5 –12 | Yellowish brown | Yellowish brown | Friable to firm | 4 –16 | Same. |
| Armuchee silt loam, hilly phase | Ah | 2–C | 15 –30 | Light yellowish brown. | Reddish yellow (substratum). | Very firm | 1 – 2½ | Interbedded limestone and shale. |
| Armuchee silty clay loam, eroded hilly phase. | Am | 2–C | 15 –30 | Yellowish brown to reddish yellow. | Reddish yellow | Very firm | ½– 2 | Interbedded limestone and shale. |
| Armuchee silt loam, steep phase | Ak | 2–C | 30 –60 | Light yellowish brown. | Reddish yellow | Very firm | ½– 2 | Interbedded limestone and shale. |
| Armuchee silty clay loam, eroded steep phase. | Ao | 2–C | 30 –60 | Reddish yellow | Reddish yellow | Very firm | ¼– 1½ | Interbedded limestone and shale. |
| Armuchee silt loam, very steep phase. | Al | 3–A | 60+ | Light yellowish brown to reddish yellow. | Reddish yellow | Very firm | ½– 1½ | Interbedded limestone and shale. |
| Armuchee silty clay loam, eroded rolling phase. | An | 1–L | 5 –15 | Light yellowish brown to reddish yellow. | Reddish yellow | Very firm | ½– 3 | Interbedded limestone and shale. |
| Barbourville fine sandy loam | Ba | 1–C | 1 – 4 | Pale brown or grayish brown. | Yellowish brown | Friable | 2½– 8 | Young local alluvium derived chiefly from slate and quartzite. |
| Bolton loam: | | | | | | | | |
| Eroded hilly phase | Bb | 1–M | 12 –25 | Brown to dark brown. | Yellowish red to red. | Firm | 10 –20 | Limestone that contains lenses of sand. |
| Eroded rolling phase | Bc | 1–G | 5 –12 | Brown to dark brown. | Yellowish red to red. | Friable to firm | 10 –25 | Limestone that contains lenses of sand. |
| Eroded steep phase | Bd | 2–B | 25 –60 | Dark brown to red | Yellowish red to red. | Friable to firm | 8 –15 | Limestone that contains lenses of sand. |
| Buncombe loamy fine sand | Be | 1–B | 1 – 3 | Pale brown | Pale yellow | Loose | 5 –15 | Young general alluvium derived chiefly from granite, gneiss, and schist. |

*Summary of important characteristics of the soils*—Continued

| Soil | Map symbol | Management group[1] | Slope range | Surface soil color[2 3] | Subsoil | | Depth[5] | Parent rock or parent material |
|---|---|---|---|---|---|---|---|---|
| | | | | | Color[3] | Consistence[4] | | |
| | | | *Percent* | | | | *Feet* | |
| Camp loam | Ca | 1–C | 1 – 4 | Reddish brown | Weak reddish brown. | Firm | 2 – 8 | Young local alluvium derived chiefly from reddish shale; some calcareous shale. |
| Chewacla silt loam | Cb | 1–A | 0 – 1 | Dark to very dark brown. | Mottled yellowish brown. | Firm | 4 –15 | Young general alluvium derived chiefly from granite, gneiss, and schist. |
| Cobbly alluvium, Hamblen soil material. | Cc | 2–A | 0 – 3 | Grayish brown | Yellowish brown to mottled (substratum). | Very friable | 2 –10 | Young general alluvium derived chiefly from acid sandy rock and slate. |
| Congaree loam | Ce | 1–A | 0 – 3 | Dark brown | Dark yellowish brown. | Friable | 4 –15 | Young general alluvium derived from granite, gneiss, and schist. |
| Congaree fine sandy loam | Cd | 1–A | 0 – 3 | Brown | Dark yellowish brown. | Friable | 4 –15 | Young general alluvium derived from granite, gneiss, and schist. |
| Cumberland silt loam, undulating phase. | Cf | 1–D | 2 – 5 | Dark brown | Dark red | Firm | 4 –20 | Old mixed general alluvium derived chiefly from limestone. |
| Cumberland silty clay loam: | | | | | | | | |
| Eroded rolling phase | Ch | 1–G | 5 –12 | Brown to reddish brown. | Dark red | Firm | 3 –15 | Old mixed general alluvium derived chiefly from limestone. |
| Eroded hilly phase | Cg | 1–M | 12 –25 | Reddish brown, dark red, or dark brown. | Dark red | Firm | 2 –10 | Old mixed general alluvium derived chiefly from limestone. |
| Dandridge silt loam, hilly phase | Dd | 2–C | 15 –30 | Pale brown | Light yellowish brown (substratum). | Friable to firm | ½– 2½ | Calcareous shale. |
| Dandridge shaly silt loam, eroded hilly phase. | Da | 2–C | 15 –30 | Pale brown to light yellowish brown. | Light yellowish brown to yellowish brown. | Friable | ½– 2 | Calcareous shale. |
| Dandridge silt loam, rolling phase | De | 1–L | 5 –15 | Pale brown | Same | Friable | ½– 2½ | Calcareous shale. |
| Dandridge shaly silt loam, eroded rolling phase. | Db | 1–L | 5 –15 | Pale brown to yellowish brown. | Same | Friable | ¼– 2 | Calcareous shale. |
| Dandridge silt loam, steep phase | Df | 2–C | 30 –60 | Pale brown | Same | Friable | ½– 2 | Calcareous shale. |
| Dandridge shaly silt loam, eroded steep phase. | Dc | 2–C | 30 –60 | Light yellowish brown. | Same | Friable | ¼– 1½ | Calcareous shale. |
| Dandridge silt loam, very steep phase. | Dg | 3–A | 60+ | Yellowish brown | Same | Friable | ½– 1½ | Calcareous shale. |
| Decatur silty clay loam: | | | | | | | | |
| Eroded rolling phase | Dl | 1–H | 5 –12 | Dark reddish brown. | Dark red | Very firm when moist; plastic when wet. | 7 –20 | High-grade limestone. |

| Soil | Map symbol | Management group[1] | Slope range | Surface soil color[2 3] | Subsoil | | Depth[5] | Parent rock or parent material |
|---|---|---|---|---|---|---|---|---|
| | | | | | Color[3] | Consistence[4] | | |
| | | | *Percent* | | | | *Feet* | |
| Eroded hilly phase | Dk | 1–N | 12 –25 | Dark reddish brown. | Dark red | Very firm | 5 –15 | High-grade limestone. |
| Decatur silty clay, severely eroded hilly phase. | Dh | 2–A | 12 –25 | Dark red | Dark red | Very firm | 4 –12 | High-grade limestone. |
| Dewey silty clay loam, eroded rolling phase. | Dp | 1–H | 5 –12 | Brown to reddish brown. | Red | Firm | 8 –23 | Fairly high grade limestone. |
| Dewey silty clay, severely eroded rolling phase. | Dn | 1–K | 5 –12 | Red | Red | Plastic when wet; firm when moist. | 7 –20 | Fairly high grade limestone. |
| Dewey silty clay loam, eroded hilly phase. | Do | 1–N | 12 –25 | Reddish brown | Red | Firm | 7 –18 | Fairly high grade limestone. |
| Dewey silty clay, severely eroded hilly phase. | Dm | 2–A | 12 –25 | Red | Red splotched yellow and brown. | Firm | 6 –15 | Fairly high grade limestone. |
| Dewey silty clay loam, eroded steep phase. | Dr | 2–B | 25 –50 | Reddish brown | Red | Very firm | 5 –12 | Fairly high grade limestone. |
| Dunmore silt loam, rolling phase | Dsb | 1–H | 5 –12 | Brown; pale yellow when dry. | Strong brown to reddish yellow. | Very firm | 3 –15 | Slightly clayey limestone. |
| Dunmore silty clay loam, eroded rolling phase. | Dsh | 1–H | 5 –12 | Pale yellow to yellowish brown. | Strong brown | Very firm | 2½–15 | Slightly clayey limestone. |
| Dunmore silty clay, severely eroded rolling phase. | Dse | 1–K | 5 –12 | Strong brown | Strong brown | Very firm | 2 –12 | Slightly clayey limestone. |
| Dunmore silt loam, hilly phase | Dsa | 1–N | 12 –25 | Brown; pale yellow when dry. | Strong brown | Very firm when moist; plastic when wet. | 2 –12 | Slightly clayey limestone. |
| Dunmore silty clay loam, eroded hilly phase. | Dsg | 1–N | 12 –25 | Yellowish brown | Strong brown | Very firm | 2 –11 | Slightly clayey limestone. |
| Dunmore silty clay, severely eroded hilly phase. | Dsd | 2–A | 12 –25 | Strong brown | Strong brown or red splotched with yellow. | Very firm | 1½– 9 | Slightly clayey limestone. |
| Dunmore silt loam, steep phase | Dsc | 2–B | 25 –50 | Yellowish brown | Strong brown | Very firm | 1½– 9 | Slightly clayey limestone. |
| Dunmore silty clay loam, eroded steep phase. | Dsk | 2–B | 25 –50 | Yellowish brown | Strong brown | Very firm | 1½– 8 | Slightly clayey limestone. |
| Dunmore silty clay, severely eroded steep phase. | Dsf | 3–A | 25 –50 | Strong brown | Strong brown | Very firm | 1½– 7 | Slightly clayey limestone. |
| Dunmore cherty silt loam, rolling phase. | Dnb | 1–H | 5 –12 | Light yellowish brown; pale yellow when dry. | Strong brown to reddish yellow. | Very firm | 3 –15 | Slightly cherty, clayey limestone. |
| Dunmore cherty silty clay loam, eroded rolling phase. | Dnh | 1–H | 5 –12 | Yellowish brown | Strong brown to reddish yellow. | Very firm | 3 –15 | Slightly cherty, clayey limestone. |
| Dunmore cherty silty clay, severely eroded rolling phase. | Dne | 1–K | 5 –12 | Strong brown to reddish yellow. | Strong brown to reddish yellow. | Very firm | 2 –12 | Slightly cherty, clayey limestone. |
| Dunmore cherty silt loam, hilly phase. | Dna | 2–A | 12 –25 | Light yellowish brown; pale yellow when dry. | Strong brown to reddish yellow. | Very firm | 2 –12 | Slightly cherty, clayey limestone. |
| Dunmore cherty silty clay loam, eroded hilly phase. | Dng | 2–A | 12 –25 | Yellowish brown | Strong brown to reddish yellow. | Firm | 2 –11 | Slightly cherty, clayey limestone. |
| Dunmore cherty silty clay, severely eroded hilly phase. | Dnd | 2–A | 12 –25 | Strong brown | Strong brown | Very firm | 1½– 9 | Slightly cherty, clayey limestone. |
| Dunmore cherty silt loam, steep phase. | Dnc | 2–B | 25 –50 | Yellowish brown; pale yellow when dry. | Strong brown to reddish yellow. | Very firm | 1½– 9 | Slightly cherty, clayey limestone. |
| Dunmore cherty silty clay loam, eroded steep phase. | Dnk | 2–B | 25 –50 | Yellowish brown | Strong brown | Very firm | 1 – 8 | Slightly cherty, clayey limestone. |
| Dunmore cherty silty clay, severely eroded steep phase. | Dnf | 3–A | 25 –50 | Strong brown to reddish yellow. | Strong brown to reddish yellow. | Very firm | 1 – 7 | Slightly cherty, clayey limestone. |

*Summary of important characteristics of the soils*—Continued

| Soil | Map symbol | Management group[1] | Slope range | Surface soil color[2 3] | Subsoil | | Depth[5] | Parent rock or parent material |
|---|---|---|---|---|---|---|---|---|
| | | | | | Color[3] | Consistence[4] | | |
| | | | *Percent* | | | | *Feet* | |
| Dunmore loam: | | | | | | | | |
| Rolling phase | Dnp | 1–H | 5 –12 | Brownish yellow; pale yellow when dry. | Strong brown to reddish yellow. | Firm to very firm. | 3 –15 | Slightly clayey limestone that contains interbeds of sandstone. |
| Eroded rolling phase | Dnm | 1–H | 5 –12 | Yellowish brown | Strong brown to reddish yellow. | Firm to very firm. | 3 –15 | Slightly clayey limestone that contains interbeds of sandstone. |
| Hilly phase | Dno | 1–N | 12 –25 | Yellowish brown; pale yellow when dry. | Strong brown to reddish yellow. | Firm to very firm. | 2 –12 | Slightly clayey limestone that contains interbeds of sandstone. |
| Eroded hilly phase | Dnl | 1–N | 12 –25 | Yellowish brown | Strong brown to reddish yellow. | Very firm | 2 –11 | Slightly clayey limestone that contains interbeds of sandstone. |
| Steep phase | Dnr | 2–B | 25 –50 | Yellowish brown | Strong brown to reddish yellow. | Very firm | 1½– 9 | Slightly clayey limestone that contains interbeds of sandstone. |
| Eroded steep phase | Dnn | 2–B | 25 –50 | Yellowish brown | Strong brown to reddish yellow. | Very firm | 1 – 8 | Slightly clayey limestone that contains interbeds of sandstone. |
| Dunmore stony loam: | | | | | | | | |
| Rolling phase | Due | 1–H | 5 –12 | Brownish gray; pale yellow when dry. | Strong brown to reddish yellow. | Firm to very firm. | 2 –10 | Slightly clayey limestone that contains interbeds of sandstone. |
| Eroded rolling phase | Dub | 1–H | 5 –12 | Yellowish brown | Strong brown to reddish yellow. | Firm to very firm. | 2 –10 | Slightly clayey limestone that contains interbeds of sandstone. |
| Hilly phase | Dud | 2–A | 12 –25 | Brownish gray; pale yellow when dry. | Strong brown to reddish yellow. | Firm to very firm. | 2 – 8 | Slightly clayey limestone that contains interbeds of sandstone. |
| Eroded hilly phase | Dua | 2–A | 12 –25 | Yellowish brown | Strong brown to reddish yellow. | Firm to very firm. | 2 – 7 | Slightly clayey limestone that contains interbeds of sandstone. |
| Steep phase | Duf | 2–B | 25 –50 | Brownish yellow; pale yellow when dry. | Strong brown to reddish yellow. | Firm to very firm. | 1½– 6 | Slightly clayey limestone that contains interbeds of sandstone. |
| Eroded steep phase | Duc | 2–B | 25 –50 | Yellowish brown | Strong brown to reddish yellow. | Firm to very firm. | 1 – 5 | Slightly clayey limestone that contains interbeds of sandstone. |
| Elk and Tupelo silt loams: | | | | | | | | |
| Undulating phase | Eb | 1–D | 2 – 5 | Elk: Brown; Tupelo: Grayish brown. | Elk: Yellowish brown; Tupelo: Pale yellow. | Elk: Friable to firm; Tupelo: Firm to very firm. | 3 – 7 | Moderately old general alluvium derived chiefly from limestone. |

| Soil | Map symbol | Management group[1] | Slope range | Surface soil color[2 3] | Subsoil | | Depth[5] | Parent rock or parent material |
|---|---|---|---|---|---|---|---|---|
| | | | | | Color[3] | Consistence[4] | | |
| | | | *Percent* | | | | *Feet* | |
| Eroded rolling phase | Ea | 1–H | 5 –12 | Elk: Yellowish brown; Tupelo: Grayish brown to brownish yellow. | Elk: Yellowish brown; Tupelo: Pale yellow or yellowish brown. | Same | 3 – 6 | Moderately old general alluvium derived chiefly from limestone. |
| Emory silt loam | Ec | 1–C | 1 – 4 | Dark brown to brown. | Yellowish brown | Friable | 3 –10 | Young local alluvium derived chiefly from high-grade limestone. |
| Greendale silt loam | Ga | 1–C | 1 – 4 | Light yellowish brown to pale brown. | Light yellowish brown to yellowish brown. | Friable | 3 –10 | Young local alluvium or colluvium derived chiefly from cherty limestone. |
| Groseclose silt loam, rolling phase | Gg | 1–H | 5 –12 | Light yellowish brown. | Yellow or brownish yellow. | Very firm when moist; plastic when wet. | 2 – 8 | Shaly limestone. |
| Groseclose silty clay loam: | | | | | | | | |
| Eroded rolling phase | Gl | 1–H | 5 –12 | Light yellowish brown to yellowish brown. | Yellow or yellowish brown. | Same | 1½– 7 | Shaly limestone. |
| Eroded hilly phase | Gk | 1–N | 12 –25 | Light yellowish brown. | Yellow | Same | 1 – 5 | Shaly limestone. |
| Groseclose silty clay, severely eroded hilly phase. | Gh | 2–A | 12 –25 | Yellow to yellowish brown. | Yellow to yellowish brown; mottled gray at depths of about 20 inches. | Same | 1 – 5 | Shaly limestone. |
| Groseclose cherty silt loam: | | | | | | | | |
| Rolling phase | Gf | 1–H | 5 –12 | Light yellowish brown. | Yellowish brown to olive yellow. | Same | 2 – 8 | Shaly limestone. |
| Eroded rolling phase | Gc | 1–H | 5 –12 | Light yellowish brown. | Pale yellow | Same | 1½– 7 | Shaly limestone. |
| Hilly phase | Ge | 2–A | 12 –25 | Light yellowish brown. | Pale yellow to light yellowish brown. | Same | 1 – 5 | Shaly limestone. |
| Eroded hilly phase | Gb | 2–A | 12 –25 | Light yellowish brown. | Pale yellow to yellow. | Same | 1 – 5 | Shaly limestone. |
| Eroded steep phase | Gd | 3–A | 25 –60 | Light yellowish brown. | Pale yellow to yellow. | Same | 1 – 4 | Shaly limestone. |
| Gullied land: | | | | | | | | |
| Limestone material | Gm | 3–A | 5 –40 | Almost all of the surface soil has been removed by erosion. | Reddish yellow, strong brown, or pale yellow to yellowish brown (substratum). | Very firm | 0 – 8 | Limestone. |
| Shale material | Gn | 3–A | 5 –50 | Same | Yellow to pale yellow (substratum). | Friable to firm. | 0 – 2 | Calcareous shale. |
| Hamblen silt loam | Hb | 1–A | 0 – 3 | Brown or grayish brown. | Brown mottled with gray and brownish yellow. | Friable | 3 –10 | Young general alluvium derived chiefly from calcareous limestone. |

*Summary of important characteristics of the soils*—Continued

| Soil | Map symbol | Management group[1] | Slope range | Surface soil color[2 3] | Subsoil | | Depth[5] | Parent rock or parent material |
|---|---|---|---|---|---|---|---|---|
| | | | | | Color[3] | Consistence[4] | | |
| | | | *Percent* | | | | *Feet* | |
| Hamblen fine sandy loam | Ha | 1–A | 0 – 3 | Yellowish brown to brown. | Same | Friable | 3 –10 | Same. |
| Hayter loam: | | | | | | | | |
| Undulating phase | Hd | 1–D | 2 – 5 | Dark brown to brown. | Strong brown to yellowish red. | Friable to firm. | 3 –10 | Mixed local alluvium derived from sandy and shaly rock and limestone. |
| Eroded rolling phase | Hc | 1–G | 5 –15 | Dark brown | Strong brown | Friable to firm. | 2 – 8 | Same. |
| Hayter stony loam: | | | | | | | | |
| Undulating phase | Hf | 1–D | 2 – 5 | Dark brown to brown. | Strong brown to yellowish red. | Firm | 3 –10 | Same. |
| Eroded hilly phase | He | 2–A | 15 –30 | Dark brown to brown. | Strong brown to yellowish red. | Firm | 2 – 8 | Same. |
| Hermitage silt loam: | | | | | | | | |
| Undulating phase | Hh | 1–D | 2 – 5 | Dark brown to brown. | Yellowish red | Firm | 3 –10 | Old local alluvium or colluvium derived from high-grade limestone. |
| Eroded rolling phase | Hg | 1–G | 5 –15 | Dark brown or reddish brown. | Yellowish red | Firm to very firm. | 2 – 8 | Old local alluvium or colluvium derived from high-grade limestone. |
| Hollywood silty clay loam | Hk | 1–F | 1 – 3 | Very dark gray | Very dark gray, mottled. | Very firm when moist; plastic when wet. | 3 – 6 | Local alluvium derived chiefly from shales but limestone in places. |
| Holston loam: | | | | | | | | |
| Undulating phase | Hm | 1–E | 2 – 5 | Light yellowish brown. | Yellow to yellowish brown. | Moderately firm when moist; slightly sticky when wet. | 3 –12 | Mixed old general alluvium derived chiefly from sandy rock, shale, and limestone. |
| Eroded rolling phase | Hl | 1–I | 5 –12 | Light yellowish brown. | Yellow to yellowish brown. | Firm | 2 –10 | Same. |
| Jefferson loam: | | | | | | | | |
| Undulating phase | Jd | 1–E | 2 – 5 | Light yellowish brown. | Yellow to yellowish brown. | Firm | 3 –15 | Old local alluvium or colluvium derived chiefly from quartzite, sandstone, and shale. |
| Rolling phase | Jc | 1–I | 5 –15 | Light yellowish brown. | Yellow to yellowish brown. | Firm | 2½–13 | Same. |
| Eroded rolling phase | Jb | 1–I | 5 –15 | Light yellowish brown to yellowish brown. | Yellow to yellowish brown. | Firm | 2 –12 | Same. |
| Eroded hilly phase | Ja | 1–M | 15 –30 | Light yellowish brown to yellowish brown. | Yellow to yellowish brown. | Firm | 1½– 8 | Same. |
| Jefferson stony loam: | | | | | | | | |
| Undulating phase | Jk | 1–E | 2 – 5 | Light yellowish brown. | Yellow to yellowish brown. | Firm | 3 –12 | Same. |
| Rolling phase | Jh | 1–I | 5 –15 | Light yellowish brown. | Yellow to yellowish brown. | Firm | 2 –10 | Same. |

| Soil | Map symbol | Management group[1] | Slope range | Surface soil color[2 3] | Subsoil | | Depth[5] | Parent rock or parent material |
|---|---|---|---|---|---|---|---|---|
| | | | | | Color[3] | Consistence[4] | | |
| | | | *Percent* | | | | *Feet* | |
| Eroded rolling phase | Jf | 1–I | 5 –15 | Light yellowish brown to yellowish brown. | Yellow to yellowish brown. | Firm | 2 –10 | Same. |
| Hilly phase | Jg | 2–A | 15 –30 | Light yellowish brown. | Yellow to yellowish brown. | Firm | 1½– 8 | Same. |
| Eroded hilly phase | Je | 2–A | 15 –30 | Light yellowish brown to yellowish brown. | Yellow to yellowish brown. | Firm | 1½– 7 | Same. |
| Leadvale silt loam: | | | | | | | | |
| Undulating phase | Lb | 1–F | 2 – 5 | Light yellowish brown. | Yellow or mottled | Very firm | 2 – 8 | Old local alluvium derived chiefly from shale. |
| Eroded rolling phase | La | 1–J | 5 –15 | Light yellowish brown to yellowish brown. | Yellow or mottled | Very firm | 1½– 6 | Old local alluvium derived chiefly from shale. |
| Lindside silt loam | Lc | 1–A | 0 – 2 | Dark yellowish brown or brown. | Yellowish brown, mottled. | Firm | 2½–10 | Young general alluvium derived chiefly from limestone. |
| Litz loam: | | | | | | | | |
| Steep phase | Lk | 2–C | 30 –60 | Yellowish brown or brownish yellow. | Yellow or light reddish yellow. | Friable | ½– 2 | Interbedded calcareous sandstone and shale that have been leached, and shale that contains a few sandy lenses of limestone. |
| Eroded steep phase | Lf | 2–C | 30 –60 | Yellowish brown or brownish yellow. | Yellow or light reddish yellow. | Friable | ¼– 1½ | Same. |
| Very steep phase | Ll | 3–A | 60+ | Light yellowish brown. | Yellow or light reddish yellow. | Firm | ¼– 1 | Same. |
| Hilly phase | Lg | 2–C | 15 –30 | Light yellowish brown or brownish yellow. | Yellow or light reddish yellow. | Firm | ½– 2 | Same. |
| Eroded hilly phase | Ld | 2–C | 15 –30 | Light yellowish brown to yellowish brown. | Brownish yellow or yellowish brown. | Firm | ½– 1¾ | Same. |
| Rolling phase | Lh | 1–L | 5 –15 | Yellowish brown or brownish yellow. | Same | Friable or firm. | ½– 2 | Same. |
| Eroded rolling phase | Le | 1–L | 5 –15 | Yellowish brown or light yellowish brown. | Yellowish brown or reddish yellow. | Friable | ½– 1¾ | Same. |
| Litz silt loam, steep phase | Ls | 2–C | 30 –60 | Pale brown or light yellowish brown. | Yellowish brown or yellow (substratum). | Crumbly | ½– 1¼ | Acid shale that contains thin lenses of limestone and calcareous shale. |
| Litz shaly silt loam, eroded steep phase. | Lo | 2–C | 30 –60 | Light yellowish brown. | Yellowish brown | Friable | ¼– 1 | Same. |
| Litz silt loam: | | | | | | | | |
| Very steep phase | Lt | 3–A | 60+ | Pale brown or light yellowish brown. | Yellowish brown or yellow. | Crumbly | ¼– 1 | Same. |
| Hilly phase | Lp | 2–C | 15 –30 | Pale brown or light yellowish brown. | Yellowish brown or yellow. | Friable | ½– 1½ | Same. |

*Summary of important characteristics of the soils*—Continued

| Soil | Map symbol | Management group[1] | Slope range | Surface soil color[2 3] | Subsoil | | Depth[5] | Parent rock or parent material |
|---|---|---|---|---|---|---|---|---|
| | | | | | Color[3] | Consistence[4] | | |
| | | | *Percent* | | | | *Feet* | |
| Litz shaly silt loam, eroded hilly phase. | Lm | 2–C | 15 –30 | Light yellowish brown or yellowish brown. | Yellowish brown or yellow. | Friable | ¼– 1¼ | Same. |
| Litz silt loam, rolling phase | Lr | 1–L | 5 –15 | Pale brown to light yellowish brown. | Yellowish brown or yellow. | Friable | ¾– 1½ | Same. |
| Litz shaly silt loam, eroded rolling phase. | Ln | 1–L | 5 –15 | Light yellowish brown. | Yellowish brown | Friable | ½– 1¼ | Same. |
| Masada loam: | | | | | | | | |
| Undulating phase | Mb | 1–D | 2 – 5 | Dark yellowish brown to brown. | Reddish yellow or yellowish red. | Firm | 4 –20 | Old general alluvium derived chiefly from granite, gneiss, and schist. |
| Eroded rolling phase | Ma | 1–G | 5 –12 | Dark yellowish brown to light reddish yellow. | Reddish yellow or yellowish red. | Firm | 3 –15 | Same. |
| Melvin silt loam | Mc | 2–D | 0 – 2 | Dark yellowish brown or yellowish brown mottled with gray. | Gray mottled, yellow, and dark brown. | Very firm when moist; plastic when wet. | 2½–10 | Young general alluvium derived chiefly from limestone. |
| Monongahela silt loam: | | | | | | | | |
| Undulating phase | Me | 1–F | 0 – 5 | Pale yellow or light yellowish brown. | Olive yellow or mottled. | Firm | 3 –12 | Old general alluvium derived from sandy and shaly rock and limestone. |
| Eroded rolling phase | Md | 1–J | 5 –12 | Pale yellow or light yellowish brown. | Olive yellow to mottled. | Firm | 2½–10 | Old general alluvium derived from sandy and shaly rock and limestone. |
| Needmore silt loam: | | | | | | | | |
| Undulating phase | Nb | 1–L | 2 – 5 | Yellowish brown to pale yellow. | Strong brown to yellowish brown. | Firm to very firm. | 1¼– 3½ | Calcareous shale. |
| Rolling phase | Na | 1–L | 5 –12 | Yellowish brown to pale yellow. | Yellowish brown or yellow to splotched or variegated. | Firm to very firm. | 1 – 3 | Calcareous shale. |
| Needmore silty clay loam, eroded rolling phase. | Nc | 1–L | 5 –12 | Yellowish brown to strong brown. | Same | Very firm or plastic. | 1 – 3 | Calcareous shale. |
| Nolichucky loam: | | | | | | | | |
| Undulating phase | Nk | 1–E | 2 – 5 | Light yellowish brown to pale brown. | Yellowish brown to reddish yellow. | Friable or firm | 3 –15 | Old general alluvium derived from sandy and shaly rock and limestone. |
| Rolling phase | Nh | 1–I | 5 –12 | Light yellowish brown to pale brown. | Same | Friable or firm | 2½–12 | Old general alluvium derived from sandy and shaly rock and limestone. |
| Eroded rolling phase | Ng | 1–I | 5 –12 | Light yellowish brown to reddish yellow. | Reddish yellow to yellowish red. | Firm | 2½–12 | Old general alluvium derived from sandy and shaly rock and limestone. |

| Soil | Map symbol | Management group[1] | Slope range | Surface soil color[2 3] | Subsoil | | Depth[5] | Parent rock or parent material |
|---|---|---|---|---|---|---|---|---|
| | | | | | Color[3] | Consistence[4] | | |
| | | | *Percent* | | | | *Feet* | |
| Eroded hilly phase | Nf | 1–M | 12 –25 | Light yellowish brown to reddish yellow. | Reddish yellow to yellowish red. | Firm | 2 –10 | Old general alluvium derived from sandy and shaly rock and limestone. |
| Nolichucky cobbly fine sandy loam: Eroded rolling phase | Ne | 1–I | 5 –12 | Light yellowish brown or pale brown. | Reddish yellow to yellowish red. | Firm | 2½–15 | Old general alluvium derived from sandy and shaly rock and limestone. |
| Eroded hilly phase | Nd | 2–A | 12 –25 | Light yellowish brown or pale brown. | Reddish yellow to yellowish red | Firm | 2 –10 | Old general alluvium derived from sandy and shaly rock and limestone. |
| Ooltewah silt loam | Oa | 1–C | 0 – 2 | Dark yellowish brown to yellowish brown. | Mottled gray, yellow, and brown. | Friable or firm. | 4 –15 | Young local alluvium derived chiefly from limestone. |
| Pace silt loam: Undulating phase | Pd | 1–F | 2 – 5 | Yellowish brown to dark yellowish brown. | Yellowish brown to yellow. | Friable or firm.. | 3 –10 | Old local alluvium derived from cherty limestone. |
| Eroded rolling phase | Pc | 1–J | 5 –12 | Yellowish brown.... | Yellowish brown to yellow. | Friable or firm.. | 2 – 8 | Old local alluvium derived from cherty limestone. |
| Pace cherty silt loam: Undulating phase | Pb | 1–F | 2 – 5 | Brownish gray to brownish yellow. | Yellowish brown to yellow. | Friable or firm.. | 3 –10 | Old local alluvium derived from cherty limestone. |
| Eroded rolling phase | Pa | 1–J | 5 –12 | Brownish gray to brownish yellow. | Yellowish brown to yellow. | Friable or firm.. | 2 – 8 | Old local alluvium derived from cherty limestone. |
| Prader silt loam | Pe | 2–D | 0 – 2 | Dark yellowish brown to yellowish brown. | Gray to mottled.... | Very firm or plastic. | 2½–10 | Young general alluvium derived chiefly from calcareous shale; some slate and quartzite. |
| Ramsey stony loam: Steep phase | Rb | 3–A | 25 –50 | Yellowish brown to light yellowish brown. | Brownish yellow to yellow. | Friable | 1 – 3 | Quartzite, sandstone, shale, and slate. |
| Very steep phase | Rc | 3–A | 50+ | Light yellowish brown. | Yellowish brown to yellow. | Friable | ½– 2 | Quartzite, sandstone, shale, and slate. |
| Hilly phase | Ra | 3–A | 12 –25 | Light yellowish brown. | Yellowish brown to yellow. | Friable | 1½– 3 | Quartzite, sandstone, shale, and slate. |
| Roanoke loam | Rd | 2–D | 0 – 2 | Dark gray; light gray when dry. | Mottled gray, brown, yellow, and olive gray. | Firm to very firm. | 5 –15 | Old general alluvium derived chiefly from granite, gneiss, and schist. |

*Summary of important characteristics of the soils*—Continued

| Soil | Map symbol | Management group[1] | Slope range | Surface soil color[2 3] | Subsoil | | Depth[5] | Parent rock or parent material |
|---|---|---|---|---|---|---|---|---|
| | | | | | Color[3] | Consistence[4] | | |
| | | | *Percent* | | | | *Feet* | |
| Sequatchie loam | Sb | 1–D | 1 – 5 | Brown to dark brown. | Yellowish brown | Friable to firm | 4 –15 | Old general alluvium derived chiefly from sandy and shaly rock and limestone. |
| Sequatchie cobbly fine sandy loam | Sa | 1–D | 1 – 5 | Brown to light brown. | Yellowish brown to reddish yellow. | Friable | 4 –15 | Same. |
| Staser silt loam | Sd | 1–A | 0 – 3 | Brown to yellowish brown. | Yellowish brown | Friable | 3 –10 | Young general alluvium derived chiefly from shale and sandstone. |
| Staser fine sandy loam | Sc | 1–A | 0 – 3 | Light brown to brown. | Yellowish brown | Friable | 3 –10 | Young general alluvium derived chiefly from sandstone, quartzite, and shale. |
| State loam | Se | 1–D | 1 – 5 | Brown to dark yellowish brown. | Yellowish brown | Friable | 4 –15 | Old general alluvium derived chiefly from granite, gneiss, and schist. |
| State loam, eroded rolling phase | Sf | 1–G | 5 –12 | Yellowish brown | Yellowish brown | Friable or firm | 4 –15 | Old general alluvium derived chiefly from granite, gneiss, and schist. |
| Stony rolling land, Dunmore soil material. | Sl | 2–C | 2 –12 | Brownish yellow to reddish brown. | Reddish brown (substratum, no subsoil). | Very firm | 0 – 4 | Slightly clayey limestone. |
| Stony hilly land, Dunmore soil material. | Sk | 2–C | 12 –30 | Brownish yellow to reddish brown. | Same | Very firm | 0 – 3 | Slightly clayey limestone. |
| Stony steep land, Dunmore soil material. | Sn | 3–A | 30 –60 | Brownish yellow to yellowish red. | Same | Very firm | 0 – 3 | Slightly clayey limestone. |
| Stony hilly land, Armuchee soil material. | Sh | 2–C | 5 –30 | Reddish yellow to light yellowish brown. | Reddish yellow (substratum, no subsoil). | Very firm | 0 – 1½ | Limestone and to a lesser extent interbedded shale. |
| Stony steep land, Armuchee soil material. | Sm | 3–A | 30 –60 | Reddish yellow | Same | Very firm | 0 – 1½ | Limestone and to a lesser extent interbedded shale. |
| Stony very steep land, Ramsey and Muskingum soil materials. | So | 3–A | 60+ | Brownish yellow | Brownish yellow (substratum, no subsoil). | Friable | 0 – 1½ | Quartzite and sandstone. |
| Stony colluvium, Jefferson soil material. | Sg | 3–A | 3 –15 | Brownish yellow | Same | Friable | 2 –10 | Quartzite and sandstone. |
| Teas loam, steep phase | Td | 3–A | 30 –60 | Weak red or purplish red. | Weak red (substratum, no subsoil). | Friable | 0 – 1½ | Reddish shale, much of which is calcareous, interbedded with sandstone and limestone. |
| Teas shaly loam: Eroded steep phase | Tf | 3–A | 30 –60 | Weak red or purplish red. | Same | Friable | 0 – 1 | Same. |

| Soil | Map symbol | Management group[1] | Slope range | Surface soil color[2 3] | Subsoil | | Depth[5] | Parent rock or parent material |
|---|---|---|---|---|---|---|---|---|
| | | | | | Color[3] | Consistence[4] | | |
| | | | *Percent* | | | | *Feet* | |
| Eroded hilly phase | Te | 3–A | 15 –30 | Weak red or purplish red. | Same | Friable | ½– 2 | Same. |
| Teas-Litz stony loams: | | | | | | | | |
| Steep phase | Tb | 3–A | 30 –60 | Teas: Weak red or purplish red; Litz: Yellowish brown. | Teas: Dusky red (substratum); Litz: Brownish yellow (substratum). | Friable or firm | 0 – 1½ | Teas: Reddish and purplish shale; Litz: Acid shale. |
| Very steep phase | Tc | 3–A | 60+ | Teas: Weak red or purplish red; Litz: Brownish yellow or brownish gray. | Teas: Weak red or purplish red; Litz: Brownish yellow or brownish gray. | Friable or firm | 0 – 1 | Teas: Reddish and purplish shale; Litz: Acid shale. |
| Hilly phase | Ta | 3–A | 15 –30 | Teas: Weak red or purplish red; Litz: Yellowish brown or brownish gray. | Teas: Dark red (substratum); Litz: Brownish yellow (substratum). | Friable | 0 – 1½ | Teas: Reddish and purplish shale; Litz: Acid shale. |
| Tyler silt loam | Tg | 2–D | 0 – 2 | Grayish brown to gray. | Gray or mottled | Very firm or plastic. | 3 –15 | Old general alluvium derived chiefly from sandy and shaly rock and limestone. |
| Waynesboro loam: | | | | | | | | |
| Undulating phase | We | 1–D | 2 – 5 | Brown | Red or light red | Firm | 3 –15 | Same. |
| Eroded rolling phase | Wd | 1–G | 5 –12 | Light reddish brown. | Red | Firm | 2½–15 | Same. |
| Eroded hilly phase | Wc | 1–M | 12 –25 | Light reddish brown. | Red | Firm | 2 –10 | Same. |
| Waynesboro cobbly loam: | | | | | | | | |
| Eroded rolling phase | Wb | 1–G | 5 –12 | Light reddish brown. | Red or light red | Firm | 2½–15 | Same. |
| Eroded hilly phase | Wa | 2–A | 12 –25 | Light reddish brown to red. | Red | Firm | 2 –10 | Same. |
| Weaver silt loam | Wf | 1–A | 0 – 3 | Brown to dark grayish brown. | Yellowish brown or mottled. | Firm | 3 – 8 | Young general alluvium derived chiefly from limestone. |
| Whitesburg silt loam | Wg | 1–C | 1 – 3 | Brown to yellowish brown. | Yellowish brown or mottled. | Friable | 2 – 6 | Young local alluvium derived chiefly from calcareous shale. |

[1] The numeral 1 in the management group symbol designates soils suitable for crops; the numeral 2, soils not suitable for crops but suitable to pasture; the numeral 3, soils poor for either crops or pasture.

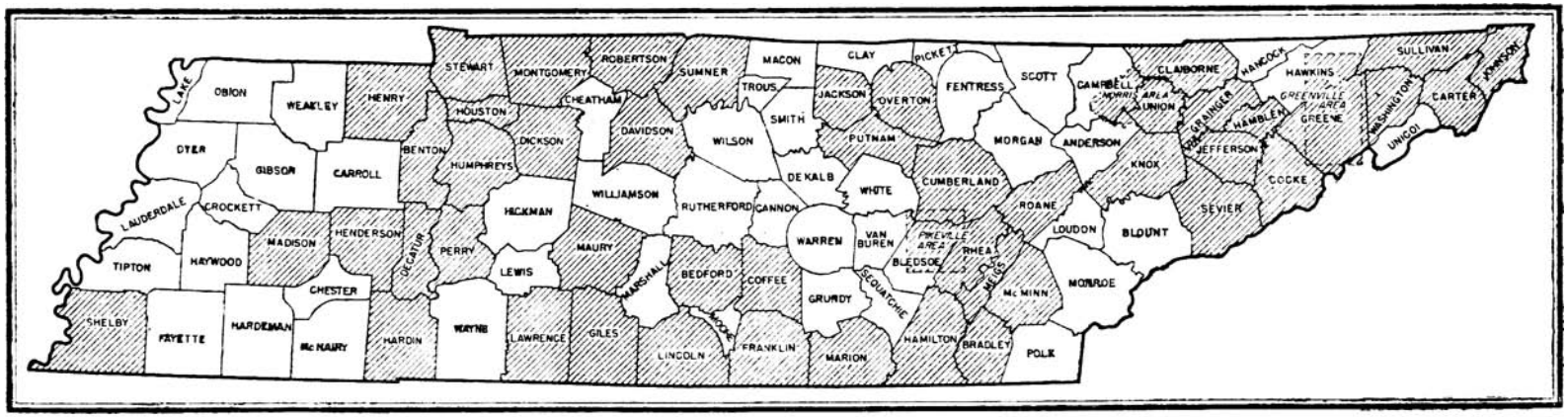
[2] Color for eroded phases is for the plow layer.

[3] Color when the soil is moist.

[4] Consistence when moderately moist. Definitions of terms: Loose—noncoherent; very friable—crushes under very gentle pressure but coheres; friable—crushes under gentle to moderate pressure but coheres; firm—crushes under moderate pressure but has distinct resistance; very firm—crushes under strong pressure; extremely firm—crushes only under very strong pressure and must be broken apart.

[5] Depth to bedrock or to material distinctly different from the soil.

☆ U. S. GOVERNMENT PRINTING OFFICE: 1957—429182




**Areas surveyed in Tennessee shown by shading.**

# Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at (800) 457–3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all of its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, political beliefs, genetic information, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write to USDA, Assistant Secretary for Civil Rights, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, S.W., Stop 9410, Washington, DC 20250-9410, or call toll-free at (866) 632–9992 (English) or (800) 877–8339 (TDD) or (866) 377–8642 (English Federal-relay) or (800) 845–6136 (Spanish Federal-relay). USDA is an equal opportunity provider and employer.