Series 1954, No. 11

Issued July 1960

SOIL SURVEY

Nottoway County Virginia

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In Cooperation With
VIRGINIA AGRICULTURAL EXPERIMENT STATION

HOW TO USE THE SOIL SURVEY REPORT

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

In making this survey, soil scientists walked over the fields and woodlands. They dug holes and examined surface soils and subsoils; measured slopes with a hand level; noticed differences in growth of crops, weeds, and brush; and, in fact, recorded all the things about the soils that they believed might affect their suitability for farming, engineering, and related uses. They plotted the boundaries of the soils on aerial photographs. Then, cartographers prepared the detailed soil map in the back of this report.

Locating Soils

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

Finding Information

Few readers will be interested in all of the soil report, for it has special sections for different groups, as well as some sections of value to all. The introductory part, which mentions climate and physiography and gives some information about the location and extent of the county, will be of interest mainly to those not familiar with the county.

Farmers and those who work with farmers will be interested mainly in the section, Soil Descriptions, and in the section, Management of Soils. Study of these sections will aid them in identifying soils on a farm, in learning ways the soils can be managed, and in judging what yields can be expected. The guide to mapping units at the back of the report will simplify use of the map and the report. This guide gives the map symbol for each soil, the name of the soil, the page on which the soil is described, the capability unit in which the soil has been placed, and the page where the capability unit is described.

Foresters and others interested in the management of woodlands can refer to the section, Woodlands of Nottoway County. In this section the types of forest are mentioned and factors affecting their management are explained.

Engineers will want to refer to the section, Engineering Properties of Soils. Tables in that section show characteristics of the soils that affect engineering.

Soil scientists will find information about how the soils were formed and how they were classified in the section, Genesis, Morphology, and Classification of Soils.

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

* * * * *

Fieldwork for this survey was completed in 1954. Unless otherwise indicated, all statements in the report refer to conditions in the county at that time.

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Contents

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SOIL SURVEY OF NOTTOWAY COUNTY, VIRGINIA

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UNITED STATES DEPARTMENT OF AGRICULTURE IN COOPERATION WITH THE VIRGINIA AGRICULTURAL EXPERIMENT STATION

NOTTOWAY COUNTY is mainly undulating to rolling, but there are narrow, hilly and steep areas adjacent to many of the streams. Other areas are nearly level. The county is primarily agricultural, but there are a few other industries. The number of dairy and beef cattle has increased considerably since World War II.

General Nature of the Area

This introductory section is intended mainly for readers not familiar with Nottoway County. It discusses the location and extent of the county and mentions the climate, drainage, and physiography and relief.

Location and Extent

Nottoway County, in the southeastern part of Virginia (fig. 1), has a total area of 308 square miles. It is

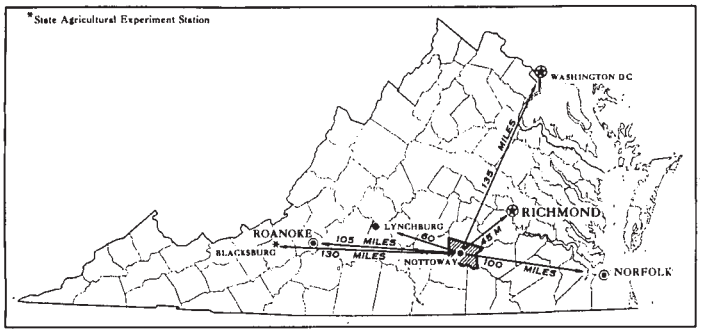

Figure 1.—Location of Nottoway County in Virginia.

divided into 4 civil districts. Nottoway, the county seat, is near the center of the county. The county is roughly rectangular. The Nottoway River forms the southern boundary, and Dinwiddie County and Namozine Creek, the eastern boundary. Amelia and Prince Edward Counties form the northern and western boundaries, respectively.

Physiography and Relief

Nottoway County is entirely within the Piedmont physiographic province. In general, the land surface slopes gently toward the southeast. The elevation ranges from 550 feet in the west to 200 feet in the southeast.

The area is an old plain that has been dissected by many small streams that flow in narrow, winding valleys. Streams have dissected more extensively in the western part than in the rest of the county, and as a result the relief in the western part is rolling to hilly. In the central and eastern parts of the county, there are many broad, gently undulating to nearly level ridgetops. As a rule, these areas are divides between two major watersheds, where the streams have not cut back into the broad ridges.

Near the Nottoway River and many of the other larger streams in the county, the small tributaries have cut deep, V-shaped valleys that have narrow, steep slopes. These small streams have cut vertically downward to the level of the larger streams and have done very little cutting laterally.

The geologic formations of the county extend in a northeast-southwest direction. The rocks consist of granite gneiss, granite, hornblende gneiss, diabase, quartz, mica gneiss, and quartz sericite schist.

Climate

The county has a continental climate. The winters are fairly mild, but there are frequent short, cold spells. The average annual precipitation is 40.88 inches. The difference between the average temperature in summer and the average temperature in winter is about 37.6° F., but extreme temperatures of 106° have been recorded in summer and of −16° in winter. Table 1 gives temperatures and precipitation representative of those in Nottoway County. Because complete records were not available in the county, the information was compiled from records taken at the United States Weather Bureau station at Farmville, Va.

The winters are usually mild enough so that outdoor work can be done. Wheat, barley, rye, and alfalfa, and kale and other winter vegetables are grown on the well-drained areas with little danger of winterkilling.

The average frost-free period extends from April 16 to October 24, or 191 days. Frost has occurred as late as May 12, however, and as early as October 2. Livestock can graze from about the middle of April to the first of November. Most farmers allow beef cattle to remain on the pastures or in feedlots during the winter. Milk cows generally are kept in barns during the cold weather and are turned out for only short periods.

TABLE 1.—*Temperature and precipitation at Farmville, Prince Edward County, Virginia*

[Elevation, 450 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1941)	Wettest year (1937)	Average snowfall
	° F.	° F.	° F.	Inches	Inches	Inches	Inches
December	39. 0	78	−6	3. 16	2. 22	0. 27	2. 0
January	38. 3	80	−16	2. 84	2. 91	10. 39	2. 7
February	38. 7	82	−8	2. 75	. 99	3. 27	3. 7
Winter	38. 7	82	−16	8. 75	6. 12	13. 93	8. 4
March	47. 7	90	5	4. 06	2. 32	1. 38	1. 5
April	55. 5	95	17	3. 05	3. 10	7. 75	[3]
May	66. 2	98	27	3. 87	1. 60	4. 72	0
Spring	56. 5	98	5	10. 98	7. 02	13. 85	1. 5
June	74. 2	105	35	4. 58	5. 44	7. 62	0
July	78. 2	105	45	4. 19	5. 41	6. 05	0
August	76. 4	106	41	4. 03	. 92	8. 73	0
Summer	76. 3	106	35	12. 80	11. 77	22. 40	0
September	70. 2	106	30	2. 73	1. 09	2. 51	0
October	58. 2	100	15	3. 28	. 70	7. 17	0
November	48. 0	88	11	2. 34	. 70	2. 09	. 2
Fall	58. 8	106	11	8. 35	2. 49	11. 77	. 2
Year	57. 6	106	−16	40. 88	27. 40	61. 95	10. 1

[1] Average temperature based on a 33-year record, through 1954; highest and lowest temperatures on a 30-year record, through 1952.
[2] Average precipitation based on a 36-year record, through 1955; wettest and driest years based on a 35-year record, in the period 1897–1955; snowfall based on a 30-year record, through 1952.
[3] Trace.

Rainfall is fairly well distributed throughout the year, but most of it falls in spring and summer when it is needed for crops and pastures. Nevertheless, the plants in most of the pastures show a marked decrease in growth late in July, during August, and early in September, probably because of the generally high temperatures that prevail during that time. Rains are generally slow and steady in spring and fall, but late in summer there are frequent, heavy downpours and thunderstorms.

Short periods of dry or wet weather are common during the growing season. They affect most crops, particularly tobacco and grain crops, and they account for the usual seasonal variations in yields and in the quality of tobacco. The wet periods are generally harmful to crops, particularly if they occur during the time when small grains or tobacco are being harvested. In 1953 and 1954, the extremely dry weather in the summer and fall damaged most of the crops and all of the pastures. The wettest year recorded recently was 1937, when the rainfall was 61.95 inches.

Relief ranges from nearly level to steep, but variations in relief do not cause marked differences in climate in this county. The temperatures are fairly uniform throughout the county. The amount of rainfall from local thundershowers varies considerably, however. As a result, differences in the amount of rainfall influence the yield and quality of crops, particularly of tobacco.

The prevailing winds are from the west. Winds of high velocity are infrequent, but the average hourly wind velocity is greatest in spring. Hailstorms are infrequent and generally affect only small areas.

The relative humidity is the greatest in the morning and the least at noon. It is greatest during the fall months but decreases progressively during summer, winter, and spring.

Drainage

Nottoway County is divided into two main watersheds. United States Highway No. 460, which crosses the county from northwest to southeast, runs along the top of the divide that separates the two watersheds.

Nearly all of the area lying north of Highway No. 460 drains northeast or north into the Appomattox River. The northern half of the county, in the Appomattox River watershed, is drained by Saylers, Ellis Fork, Flat, West, Little, Deep, Winningham, Woody, Watson, Cellar, Lees, Bland, and Namozine Creeks.

The area lying south of the highway drains southeast or south into the Nottoway River. The southern half of the county, in the Nottoway River watershed, is drained by the Little Nottoway River and its tributaries, Mallorys, Carys, Laxaretta, Whetstone, and Horsepen Creeks, and by Jacks Branch. The southeastern part of the watershed is drained by Long Branch, Hurricane Branch, and Deep Creek, which flow directly into the Nottoway River.

General Soil Map

In mapping a county or other large tract, it is fairly easy to see definite differences as one travels from place to place. There are many obvious differences, among them differences in shape, gradient, and length of slopes; in number and size of streams and in the width of the bordering valleys; in the kinds of native plants; and even in the kinds of agriculture. With these more obvious differences, there are less easily noticed differences in the pattern of soils. The soils change along with the other parts of the environment.

By drawing lines around the different patterns of soils on a small map, one may obtain a map of the general soil areas, or as they are sometimes called, soil associations. The soils in any one of the various patterns, or soil associations, may be nearly uniform, or they may be entirely different. Such a map is useful to those who want only a general idea of the soils, who want to compare different parts of a county, or who want to locate large areas suitable for a particular kind of agriculture or other land use.

The 13 main soil associations, or kinds of soil patterns in Nottoway County, are shown on the colored map at the back of this report.

1. Appling-Louisburg-Cecil

This association consists of deep, well-drained soils and shallow, excessively drained, undulating to rolling soils that overlie granite, granite gneiss, or pegmatite. The soils are on broad, undulating to rolling upland ridgetops

or in narrow strips in the steep-sided valleys where recent alluvium has been deposited. They are mainly sandy loams or fine sandy loams, and they cover about 16 percent of the county.

The Appling soils, which make up about 60 percent of the association, are on the ridgetops. They are deep and well drained and have reddish-yellow to yellowish-red subsoils of friable clay loam. The Cecil soils are also deep and well drained and are on ridgetops. They occupy only a small acreage in the association. Unlike the Appling soils, their subsoils are red, firm clay. The Louisburg soils occupy narrow strips on the steeper side slopes of the valleys. They are shallow and excessively drained. The Louisburg soils make up about 20 percent of the association.

Minor areas in the association are occupied by the Seneca and Chewacla soils and Mixed alluvial land. In addition, small areas of Colfax, Durham, Helena, and Wilkes soils and members of the Enon-Vance-Helena complexes occur throughout the uplands. The Seneca soil is well drained to moderately well drained; it occurs around and in the heads of drains and has formed from deposits of local alluvium and colluvium. The Chewacla soil, which is somewhat poorly drained, and Mixed alluvial land, which is somewhat poorly drained to poorly drained, have also formed in recent alluvium deposited in the narrow valleys.

Many of the best managed and most productive farms in the county are within this association. There are a number of dairy farms, and a large acreage is used as pasture for the dairy cattle. The farms range in size from medium to large. About 65 percent of the acreage is pastured or used to grow bright tobacco, corn, small grains, and hay crops. The steeper slopes generally have trees growing on them.

2. Wilkes-Enon-Vance-Helena

This association consists of shallow, excessively drained, steep soils and moderately well drained, undulating to rolling soils. The soils overlie mixed materials from acidic and basic rocks, including granite, granite gneiss, quartz mica gneiss, hornblende gneiss, and diabase. They occur on long, fairly narrow, undulating to rolling ridgetops or in the many narrow strips in the steep-sided valleys where recent alluvium has been deposited. The soils are predominantly sandy loams or fine sandy loams. They are mainly in two large areas, one north of Blackstone and the other north of Burkeville. There are also many smaller areas scattered throughout the county. The association covers approximately 17 percent of the county.

The Wilkes soils, which occupy about 45 percent of the association, are on the steeper side slopes of the valleys. They are shallow and excessively drained. The soils of the Enon-Vance-Helena complexes make up about 38 percent of the association. They are on ridgetops and are moderately well drained to somewhat poorly drained.

Minor soils in the association are the Seneca, Chewacla, Wehadkee, Augusta, and Mixed alluvial land. In addition, small areas of Appling, Bremo, Cecil, Durham, Lloyd, Louisburg, and Madison soils and soils of the Iredell-Mecklenburg complexes occur on the ridgetops and side slopes.

The Seneca soil is well drained to moderately well drained. It occurs in and around the heads of drains, where it has formed from local alluvium and colluvium. The Chewacla soil, which is somewhat poorly drained, and the Wehadkee, which is poorly drained, have also formed from recent alluvium. They occur in the narrow valleys. The Augusta soil is somewhat poorly drained. It is on the few stream terraces that are within the association. Mixed alluvial land is somewhat poorly drained to poorly drained. It is in the narrow valleys, where it has formed from recent alluvium.

About 40 percent of the association is used for pasture or to grow corn, small grains, dark tobacco, or hay crops consisting mainly of lespedeza. The steeper, sloping areas are used mostly as woodland. The yields of crops are fairly low. Using the soils for crops such as bright tobacco, to which they are not well suited, has caused them to erode badly. As a result there are many abandoned farms on the soils of the Enon-Vance-Helena complexes and on other eroded areas within the association.

This association is better suited to beef, dairy, or general farms than to other types. Most of the farms are of the general-purpose type and are small to medium in size.

3. Cecil-Appling

This association consists of deep, well-drained, undulating to rolling soils that overlie granite and granite gneiss. The soils are on fairly broad, undulating to rolling ridges or in deeply cut drains. They are mainly sandy loams or fine sandy loams, but in some small, eroded areas the texture of the surface layer is clay loam. The association occupies approximately 9 percent of the county. The only large area is north of Blackstone.

The Cecil and Appling soils are on ridgetops. The Cecil soils are deep and well drained and have subsoils of red, firm clay. They occupy approximately 75 percent of the association. The Appling soils are deep and well drained and have reddish-yellow to yellowish-red subsoils of friable clay loam. They occupy about 15 percent of the association. Eroded Cecil soils are on the steeper side slopes along with the Louisburg soils, which are excessively drained and shallow.

Minor soils in the association are the Wilkes, Vance, Durham, Colfax, and Lloyd and soils of the Enon-Vance-Helena complexes. These occur in small, widely distributed areas on the uplands.

About 45 percent of the association is used for pasture or to grow tobacco, corn, small grains, and hay crops. The yields of dark tobacco and alfalfa on the Cecil soils and the yields of bright tobacco on the Appling soils are among the best in the county.

Most of the farms in the association are medium to large. They are mainly general farms or dairy farms.

4. Appling-Durham-Louisburg

This association consists of soils that are dominantly deep and well drained and that are undulating to rolling. The soils overlie granite, granite gneiss, or pegmatite. They are on broad, undulating ridgetops, on fairly steep side slopes, or in narrow strips in the valleys, where

recent alluvium has been deposited. They are mainly sandy loams or fine sandy loams. Part of the town of Burkeville is within one of the two large areas, and part of the town of Blackstone is within the boundaries of the other. Several smaller areas are scattered throughout the county. The association covers about 10 percent of the county.

The Appling soils, which make up approximately 70 percent of the association, are on the higher ridgetops. They are deep and well drained and have reddish-yellow to yellowish-red subsoils of friable clay loam. The Durham soils are on the lower ridgetops. They are deep, moderately well drained to well drained, and have subsoils of brownish-yellow sandy clay loam. They have a slightly compacted horizon at a depth of about 29 inches, and their surface layer is thicker than that of any of the other soils in the county. The Durham soils make up about 12 percent of the association. The Louisburg soils, which are shallow and excessively drained, are on the steeper slopes.

Minor areas in the association consist of Colfax and Seneca soils and Mixed alluvial land. In addition, small areas of Vance, Helena, Cecil, and Worsham soils and soils of the Enon-Vance-Helena complexes occur throughout the uplands. The Colfax—a somewhat poorly drained soil that has a fragipan—occurs around the heads of drains. The Seneca is a well drained to moderately well drained soil formed from local alluvium and colluvium. It also occurs around and in the heads of drains. Mixed alluvial land consists of somewhat poorly drained to poorly drained recent alluvium and occurs in bottoms.

Bright tobacco is the principal crop grown on this association. The Appling and Durham soils are especially desirable for growing this crop. The soils are also suited to most of the other crops grown locally. The soils on the steeper slopes are used chiefly as woodland, and the more poorly drained soils are used mainly as pasture.

Most of the farms are small. They are well managed. Their operations center mainly around growing bright tobacco, but there are a few large dairy farms in the association. Most of the homes and other farm buildings have been improved in recent years.

5. Cecil and Georgeville-Appling and Herndon

This association is made up of deep, well-drained, undulating soils that overlie fine-grained schists, granite gneiss, and granite. The soils are on fairly broad, undulating ridgetops extending down onto a few, steep-sided, deeply cut drains. They are mainly very fine sandy loams. The one large area is along the Nottoway River in the southeastern part of the county. The association occupies slightly less than 3 percent of the county.

The undifferentiated soil group of Cecil and Georgeville soils is on ridgetops. It makes up about 75 percent of the association. The soils are deep and well drained and have red, firm, clayey subsoils. The undifferentiated soil group made up of Appling and Herndon soils is also on ridgetops, but it makes up only about 10 percent of the association. The Appling and Herndon soils are also deep and well drained, but the subsoils range from the reddish-yellow to yellowish-red clay loam of the Appling soils to the yellowish-red silty clay loam to silty clay of the Herndon soils.

Minor soils in the association are the Wilkes, Wehadkee, and Chewacla. In addition, small areas of Enon and Lloyd soils are widely scattered over the uplands. The Wilkes soils are on the steeper slopes and are shallow and excessively drained. The Wehadkee soil is poorly drained. It has formed from recent alluvium and is on bottom lands. The Chewacla is a somewhat poorly drained soil that has formed on the few broad bottoms along the Nottoway River. It also has formed from recent alluvium.

Most of the small acreage that has been cleared is used to grow small grains, hay, and tobacco. Dark tobacco is grown mainly on the Cecil and Georgeville soils. All of the small acreage of bright tobacco grown in this association is grown on the Appling and Herndon soils.

Most of the association is made up of large holdings of timber. Little is in farms, and the farms are small.

6. Iredell-Mecklenburg-Bremo

This association consists of moderately deep, somewhat poorly drained to well-drained, undulating soils and shallow, excessively drained, rolling soils that overlie hornblende gneiss or diabase. The soils are on fairly narrow, highly dissected, undulating ridgetops or in the many, deep, steep-walled valleys. They have a surface layer of loam. There is only one area of the association, and it occupies less than 1 percent of the county.

The soils of the Iredell-Mecklenburg complexes occupy about 55 percent of the association. They are on ridgetops. The Iredell soils are somewhat poorly drained and have subsoils of yellowish-brown clay. The Mecklenburg soils are well drained to moderately well drained and have subsoils of yellowish-red clay. The Bremo soils, which are excessively drained, and a few areas of Wilkes soils, also excessively drained, are on the steeper slopes. The Bremo soils make up about 40 percent of the association. Mixed alluvial land, which is somewhat poorly drained to poorly drained, is in the valleys.

The soils in much of the association are severely eroded, and many areas have been abandoned. The abandoned areas have been reseeded or are in the process of reseeding to shortleaf pine, Virginia pine, and eastern redcedar. If adequate fertilizer is applied, fairly high yields of small grains are obtained on the soils of the ridgetops and pastures are good on the steeper slopes. The small grains, however, are difficult to seed and to harvest in wet weather.

Except for one dairy farm that is within the association, the farms are small. The association appears to be best suited to the raising of beef cattle.

7. Durham-Worsham-Colfax

This association consists of deep, well-drained to poorly drained, nearly level soils that overlie granite and granite gneiss. The soils are on broad, nearly level, upland flats, around the heads of shallow drains, or in the many landlocked depressions that are filled with water in wet seasons. There are only two areas—one

in the central part of the county southwest of the town of Nottoway, and the other, in the extreme eastern part of the county along the Amelia County line. The association covers about 2 percent of the county.

The Durham soils, which make up about 65 percent of the association, are on ridgetops. They are moderately well drained to well drained and have subsoils of brownish-yellow sandy clay loam. They have a thick surface layer and a slightly compacted horizon at a depth of about 29 inches. The Worsham soils are poorly drained. The surface layer is 10 to 24 inches thick and ranges in texture from silt loam to sandy loam. It overlies mottled gray to brownish-yellow soil material that ranges in texture from silty clay loam to clay. The Colfax soils are somewhat poorly drained and have a compacted layer with some characteristics of a fragipan at a depth of about 19 inches. Small areas of Appling soils, which are well drained, are on the few high points in the association.

Large holdings of forest are extensive in this association. Less than half of the association is used for farms. The soils on most of the ridgetops are well suited to the growing of bright tobacco, and most of the farming operations are centered around growing that crop. The soils in the depressions are better suited to trees than to crops or pasture. In most places they are covered by loblolly pine. The somewhat poorly drained soils on the upland flats are best suited to pasture.

The farms are of medium size and are generally well managed. Because of the sandy texture of the surface layer, plant nutrients leach out very rapidly and need to be replenished often.

8. Madison-Wilkes-Cecil

This association consists of moderately deep and deep, well-drained, undulating to rolling soils that overlie quartz-mica gneiss, granite gneiss, and granite, and of shallow, excessively drained, hilly soils that overlie mixed materials from acidic and basic rocks. The soils are on long, fairly narrow, undulating to rolling ridgetops; on the steeper side slopes; or in narrow strips where recent alluvium has been deposited in the deeply cut valleys. They are mainly sandy loams or fine sandy loams, but in small eroded areas the surface soil is clay loam.

This association covers about 15 percent of the county. The largest of the four areas extends to the north and south of the town of Nottoway in the central part of the county.

The Madison soils, on the ridgetops, make up about 65 percent of the association. They are moderately deep and well drained and have subsoils of red, friable clay loam. The Madison soils resemble the Cecil soils, which are also on ridgetops, but they are not so deep and have a higher content of mica. The Cecil soils are not extensive in this association. The Wilkes soils, which are shallow and excessively drained, are on the steeper side slopes. They make up about 20 percent of the association.

Minor areas in the association consist of the Starr soil and Mixed alluvial land. The Starr soil is well drained to moderately well drained. It occurs around the heads of drains and has formed from local alluvium and colluvium. Mixed alluvium is somewhat poorly drained to poorly drained. It has formed from recent alluvium and is in the narrow valleys.

Most of the ridgetops have been cleared and are pastured, or the soils are used to grow all of the common cultivated crops except bright tobacco. The steeper side slopes and the valleys are used mainly as woodland.

The farms are medium to large in size and are well managed. They are mainly general farms, and dark tobacco and livestock are the chief products. Several dairy farms are located within the association.

9. Appling-Cecil-Durham

This association consists of deep, well-drained, mostly undulating soils that overlie granite and granite gneiss. It is the largest in the county. The soils are in the few shallow to deep drains or on broad ridgetops that are generally undulating. The association covers about 22 percent of the county. Most of it is in the eastern half.

The Appling soils, which make up about 50 percent of the association, are deep and well drained. They have subsoils of reddish-yellow to yellowish-red, friable clay loam. The Cecil soils, which make up about 30 percent of the association, are deep and well drained and have subsoils of red, firm clay. The Durham soils make up about 10 percent of the association. They are moderately well drained to well drained. The Durham soils have a thick surface layer and a subsoil of brownish-yellow sandy clay loam. They have a slightly compacted horizon at a depth of about 29 inches.

Minor areas in the association are occupied by the Louisburg, Colfax, and Worsham soils and Mixed alluvial land. The Louisburg soils are shallow and excessively drained. They are on the steeper side slopes. The Colfax soils and Mixed alluvial land are somewhat poorly drained, and the Worsham soils are poorly drained. The Colfax and Worsham soils occur around the heads of drains, and Mixed alluvial land is in the valleys along the larger streams.

About 50 percent of the acreage is within the Camp Pickett Military Reservation. This is mainly in loblolly pine. About 30 percent of the association is occupied by general farms and dairy farms. Most of the farming operations are centered around the growing of bright tobacco. The rest of the association is mainly used as woodland. In the past 7 years, large companies that manufacture paper and pulp have bought several large farms in this association and have planted loblolly pine for pulpwood. The soils are suited to most of the crops grown locally.

10. Cecil-Louisburg

This association consists of deep, well-drained and shallow, excessively drained, undulating to hilly soils that overlie granite, granite gneiss, and pegmatite. The soils are on broad, undulating to rolling ridges or in narrow strips where recent alluvium has been deposited in the deep, steep-walled valleys. In much of the association, the surface layer is sandy loam. The association occurs in two small areas that occupy about 1 percent of the county.

The Cecil soils are on ridgetops. They make up about 70 percent of the association. These soils are deep and well drained. They have a subsoil of red, firm clay. The Louisburg soils, on the steeper side slopes, make up about 20 percent of the association. They are shallow and excessively drained.

Minor areas in the association consist of Wilkes and Starr soils and Mixed alluvial land. Like the Louisburg soils, the Wilkes are on the steeper side slopes and are excessively drained. The Starr soil is well drained to moderately well drained. It occurs in and around the heads of drains and has formed from local alluvium and colluvium. Mixed alluvial land is somewhat poorly drained to poorly drained. It is in the narrow valleys.

Most of the association is in large timber holdings that are managed so as to obtain wood products. The soils on the ridgetops are well suited to dark tobacco and alfalfa. The few general farms are small, as are the farms where dark tobacco is the principal crop.

11. Lloyd-Wilkes

This association consists of deep, well-drained and shallow, excessively drained, undulating to hilly soils over mixed materials from acidic and basic rocks. The soils are on fairly broad, undulating to rolling ridges or in the few narrow strips where recent alluvium has been deposited in the steep-walled valleys. In much of the association, the surface layer is loam or sandy loam, but in a fairly large acreage, the soil is eroded to the extent that the surface layer is now clay loam. This is the smallest association in the county. The three areas make up less than 1 percent of the total acreage.

The Lloyd soils make up about 65 percent of the association. They are mainly on ridgetops and are deep and well drained. They have subsoils of dark-red, firm clay. The Wilkes soils and some of the eroded Lloyd soils are on the steeper side slopes. The Wilkes soils make up about 25 percent of the association. They are shallow and excessively drained.

Minor areas in the association are occupied by the Cecil and Starr soils and Mixed alluvial land. The Cecil soils occupy small areas throughout the uplands. They are deep and well drained and have subsoils of red, firm clay. The Starr soil is well drained to moderately well drained. It occurs in and around the heads of drains and has formed from local alluvium and colluvium. Mixed alluvial land, which is somewhat poorly drained to poorly drained, is in the narrow valleys.

Nearly all of this association is in large timber holdings that are managed for timber production. The soils are well suited, however, to dark tobacco, alfalfa, small grains, and corn. They retain added plant nutrients well. Dairy farms, general farms, or farms on which dark tobacco is the chief crop would be good possibilities on this association.

12. Appling-Colfax

This association consists of deep, well-drained and somewhat poorly drained, undulating to nearly level soils that overlie granite and granite gneiss. The soils are on a broad, gently undulating upland flat that acts as a divide between the Nottoway River and Appomattox River watersheds. The flat contains a few shallow drains. The association covers about 1 percent of the county and includes most of the town of Blackstone.

The Appling soils make up about 55 percent of the association. They occur at higher elevations than the other soils and are deep and well drained. They have subsoils of reddish-yellow to yellowish-red, friable clay loam. The Colfax soils, which make up about 35 percent of the association, surround the depressions. They are somewhat poorly drained and have a fragipan at a depth of about 19 inches.

Minor soils in the association are the Worsham, Durham, and Vance. The Worsham soils are in depressions. They are poorly drained and are under water during wet seasons. The Durham and Vance soils occupy small, widely scattered areas.

This association has been used mostly for building lots, inasmuch as it is centered around the town of Blackstone. The soils at the higher elevations are easy to work, however, and are suited to many different crops. The other soils of the association are better suited to pasture or for use as woodland.

13. Durham-Appling-Worsham

This association consists of dominantly deep, well drained and moderately well drained, nearly level soils that overlie granite and granite gneiss. It occupies two broad, gently undulating upland flats that contain a few shallow drains. The association covers about 2 percent of the county.

The Durham soils make up about 65 percent of the association. They occur at lower elevations than the other soils. The Durham soils are moderately well drained to well drained and have thick surface layers and subsoils of brownish-yellow sandy clay loam. They have a slightly compacted horizon at a depth of about 29 inches. The Appling soils make up about 15 percent of the association. They occur at the higher elevations and are deep and well drained. They have reddish-yellow to yellowish-red subsoils of friable clay loam. The Worsham soils, which make up about 12 percent of the association, are in depressions. They are poorly drained and are under water during wet seasons.

Colfax and Cecil soils make up a minor part of the association. The Colfax soils are somewhat poorly drained and have a fragipan at a depth of about 19 inches. In most places they are between areas of Worsham and Durham soils. The Cecil soils are deep and well drained. They are near the Appling soils at the higher elevations.

About 60 percent of the association is in large timber holdings that are managed for timber production. Farming operations on the areas that are cleared are centered around the growing of bright tobacco to which the soils are well suited.

Management of Soils

This section has three main parts. In the first, the system of grouping soils according to their capability is explained and the soils of the county are placed in capability units, or, as they are sometimes called, manage-

ment groups. In the second part, general principles of soil management are discussed. In the third part, productivity ratings are given. From these ratings, estimates can be made of the yields that may be expected from different soils under two different levels of management. For suggestions on the use and management of each mapping unit, refer to the section, Soil Descriptions.

Capability Groups

Capability grouping is a system of classification used to show the relative suitability of soils for crops, grazing, forestry, or wildlife. It is a practical grouping based on the needs and limitations of the soils, on the risks of damage to them, and also on their response to management. In this report, soils have been grouped on three levels above the soil mapping unit. They are the capability unit, the subclass, and the class.

The capability unit, which can also be called a management group of soils, is the lowest level of capability grouping. A capability unit is made up of soils similar in kind of management needed, in risk of damage, and in general suitability for use. The capability unit is represented by the figures 1, 2, and 3 in the classification symbols, IIe–1, IIe–2, and IIe–3.

The next broader grouping, the subclass, is used to indicate the dominant kind of limitation. The letter symbol "e" means that the main limiting factor is risk of erosion if the plant cover is not maintained. The symbol "w" means that excess water retards plant growth or interferes with cultivation. The symbol "s" means that the soils are shallow, stony, droughty, or low in fertility. The symbol "c" means that the climate is so hazardous that it limits the use of the soil.

The broadest grouping, the class, is identified by Roman numerals. All of the soils in one class have limitations and management problems of about the same degree, but of different kinds, as shown by the subclass. All of the classes, except class I, may have one or more subclasses.

In classes I, II, and III are soils that are suitable for annual or periodic cultivation of annual or short-lived crops.

Class I soils are those that have the widest range of use and the least risk of damage. They are level or nearly level, productive, well drained, and easy to work. They can be cultivated with almost no risk of erosion and will remain productive if managed with normal care.

Class II soils can be cultivated regularly, but they do not have quite so wide a range of suitability as class I soils. Some class II soils are gently sloping. Consequently, they need moderate care to prevent erosion. Other soils in class II may be slightly droughty, slightly wet, or somewhat limited in depth.

Class III soils can be cropped regularly, but they have a narrower range of use. They need even more careful management.

In class IV are soils that should be cultivated only occasionally or only under very careful management.

In classes V, VI, and VII are soils that normally should not be cultivated for annual or short-lived crops but that can be used for pasture. They can also be used as woodland, as parts of watersheds, or to provide shelter and food for wildlife.

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Class V soils are nearly level and gently sloping, but they are droughty, wet, low in fertility, or otherwise unsuitable for cultivation.

Class VI soils are not suitable for crops, because they are steep, stony, droughty, or otherwise limited. Nevertheless, pastures on these soils give fair yields of forage and forests give fair to high yields of forest products. Some soils in class VI can, without damage, be cultivated enough so that forest trees can be set out or pasture crops seeded.

Class VII soils provide only poor to fair yields of forage. Yields of forest products may be fair to high. The soils have characteristics that severely limit their use for pasture and, in some places, for woodland.

In class VIII are soils that have practically no agricultural use. Some areas have value for watershed protection, wildlife shelter, or recreation.

No class I soils occur in Nottoway County. The capability classes and units in this county are given in the following list.

Class II.—Soils that have moderate limitations if cultivated.
- IIe–1. Undulating, well-drained, medium-textured soils that have subsoils of red clay or clay loam.
- IIe–2. Undulating, well-drained, coarse-textured soils that have subsoils of red clay or clay loam.
- IIe–3. Gently sloping, moderately well drained, medium-textured soils of colluvial lands.
- IIe–4. Undulating, well-drained soils that have moderately coarse textured surface layers and yellowish-red to yellowish-brown subsoils of clay loam.
- IIe–5. Undulating, well-drained, medium-textured soils that have subsoils of yellowish-red to yellowish-brown clay loam.

Class III.—Soils that are severely limited but that are suitable for regular use as cropland.
- IIIe–1. Rolling, well-drained, medium-textured soils that have subsoils of red clay.
- IIIe–2. Predominantly rolling, well-drained soils that have subsoils of yellowish-red to yellowish-brown clay loam.
- IIIe–3. Undulating, shallow, excessively drained soils on uplands.
- IIIe–4. Undulating soils that have brown to yellowish-brown, clay subsoils.
- IIIe–5. Rolling, moderately well drained soils that have brown to yellowish-brown clay subsoils.
- IIIe–6. Eroded soils that generally have surface layers of red clay loam and subsoils of dark-red clay.
- IIIw–1. Undulating, somewhat poorly drained soils with a compacted layer that has some characteristics of a fragipan.
- IIIw–2. Nearly level, mostly somewhat poorly drained, medium-textured soils on bottoms.

Class IV.—Soils very severely limited for use as cropland; suitable for cultivation part of the time or for special crops.
- IVe–1. Eroded soils that generally have surface layers of red clay loam and subsoils of dark-red clay.
- IVe–2. Hilly, well-drained soils on uplands.

IVe–3. Undulating to rolling, shallow soils on uplands that are excessively drained.
IVw–1. Level to gently sloping, wet soils in intermittent drainageways.

Class V.—Soils that have little or no erosion hazard but that are suitable only for pasture, range, woodland, or wildlife areas because of other limitations that are impractical to remove.
Vw–1. Level or gently sloping, excessively wet soils suited to pasture or woodland.

Class VI.—Soils too steep, stony, arid, or wet, for cultivation, or that are limited otherwise.
VIe–1. Eroded, undulating to hilly, well-drained soils on uplands.
VIe–2. Rolling and hilly soils and stony land generally best suited to pasture.
VIe–3. Rolling, well-drained and poorly drained soils that erode easily.

Class VII.—Soils not suitable for cultivation and severely limited for use as pasture or woodland.
VIIe–1. Eroded, rolling to hilly, shallow upland soils that are excessively drained.

Class VIII.—Extremely rough, arid, or swampy soils or soils that are otherwise limited; not suitable for cultivation, grazing, or forestry.
VIIIe–1. Gullied land suitable only for recreational purposes.
VIIIw–1. Swampy soils suitable only for recreational purposes.

Management by capability units

In the following pages, the capability units of Nottoway County are described. A list of soils in each group is given, and the use suitabilities and management needs are discussed.

CAPABILITY UNIT IIe–1

This capability unit is made up of undulating, well-drained, medium-textured soils that have subsoils of red clay or clay loam.

The surface layers range from silt loam to sandy loam in texture. The subsoils are red, moderately permeable clay or clay loam. The soils are on uplands or terraces. They have slopes of 2 to 7 percent. All of them are likely to erode; some areas have lost as much as 75 percent of the original surface layer through erosion. The following soils are in capability unit IIe–1:

Cecil fine sandy loam, undulating phase.
Cecil and Georgeville very fine sandy loams, undulating phases.
Lloyd loam, undulating phase.
Wickham fine sandy loam.

These soils are medium acid to very strongly acid. Their supply of organic matter is low to medium, and their supply of plant nutrients is generally low. The Lloyd and Wickham soils are among the soils that have the best supply of plant nutrients. The Cecil soils have a fairly high content of potash.

All of the soils are responsive to good management and retain added fertilizer in a form available to plants. The Lloyd soil has a sticky subsoil and tends to adhere to machinery if tilled when it is too wet. All of the soils have a moderate capacity for holding available moisture.

More than 75 percent of the acreage is in forest. The cleared areas are used mainly for corn, dark tobacco, and small grains and for red clover, lespedeza, alfalfa, and other crops grown for hay. The soils are well suited to pasture.

Examples of suitable cropping systems are (1) 1 year of corn or dark tobacco, 1 year of a small grain, and 1 year of clover or common lespedeza; and (2) 1 year of corn, 1 year of a small grain, and 2 to 4 years of alfalfa. Other cropping systems may be used, but it is best not to grow corn or other clean-cultivated crops more than 1 year out of every 3.

Apply enough lime to raise the pH to between 6.0 and 6.5 for general crops and to between 5.0 and 5.5 for tobacco. Corn needs a complete fertilizer applied at seeding time and a nitrogen fertilizer used as a side dressing. Small grains need to have ½ to ⅔ as much complete fertilizer applied at seeding time as is used for corn. As a rule, nitrogen is needed also as a topdressing.

Alfalfa uses large amounts of plant nutrients, and it needs to be fertilized adequately each year. When it is seeded, it needs a borated fertilizer that is high in phosphate and potash. Small amounts of nitrogen may be of some benefit on soils that are low in plant nutrients. Good yields of red clover, lespedeza, and pasture can be obtained by adding only about half the amount of fertilizer required for alfalfa.

CAPABILITY UNIT IIe–2

This capability unit is made up of undulating, well-drained, coarse-textured soils that have subsoils of red clay or clay loam.

The surface layers have a texture of sandy loam or coarse sandy loam. The subsoils are red, moderately permeable clay or clay loam. The soils are on uplands. They have slopes of 2 to 7 percent. Runoff is rapid enough to cause sheet erosion; as much as 75 percent of the original surface layer has been lost in some areas. The following soils are in capability unit IIe–2:

Cecil coarse sandy loam, undulating phase.
Madison sandy loam, undulating phase.
Madison sandy loam, eroded undulating phase.

The supply of organic matter is low in these soils. The soils are strongly acid to very strongly acid. The Cecil soil has a fairly high content of potash, but, otherwise, the soils are low in plant nutrients. The capacity for holding available moisture is moderate. These soils are easy to till and respond well to good management.

About 60 percent of the acreage is in forest, 22 percent is in crops, 13 percent is in pasture, and 5 percent is idle. The soils are well suited to corn, dark tobacco, small grains, alfalfa, lespedeza, and red clover.

They are not so well suited to bright tobacco, but the Madison soil is one of the best in the county for dark tobacco.

Examples of suitable cropping systems are (1) 1 year of corn or dark tobacco, 1 year of a small grain, and 1 year of clover or lespedeza grown for hay; and (2) 1 year of corn, 1 year of a small grain, and 2 to 4 years of alfalfa. Other cropping systems may be used, but corn or other clean-tilled crops should be grown no oftener than 1 year out of every 3.

Management of the soils in this capability unit is somewhat similar to that of the soils in capability unit

IIe–1, but yields of most crops are slightly lower. For general crops, apply enough lime to raise the pH to between 6.0 and 6.5. For tobacco, apply enough to raise the pH to between 5.0 and 5.5. Corn generally needs a complete fertilizer applied at the time of seeding and nitrogen used as a side dressing. Wheat needs to have about ½ to ⅔ as much fertilizer at seeding time as corn, and nitrogen is generally needed as a topdressing.

Alfalfa needs a good supply of plant nutrients. If a good stand is to be obtained, it must be fertilized adequately every year. At seeding time it needs a borated fertilizer that is high in phosphate and potash. Nitrogen may be of some benefit if used in small amounts on soils that are low in plant nutrients. Good yields of red clover, lespedeza, and pasture crops can be obtained if about half the amount of fertilizer used for alfalfa is used for these crops.

CAPABILITY UNIT IIe–3

This capability unit is made up of gently sloping, moderately well drained, medium-textured soils of colluvial lands.

The surface layers range from clay loam to sandy loam in texture. The subsoils are red, dark-red, or yellowish-brown, moderately permeable sandy clay or sandy loam. The soils are in small areas in depressions at the heads of drains, along the bases of slopes, or adjacent to many of the intermittent streams throughout the county. They have slopes of 2 to 7 percent. The following soils are in capability unit IIe–3:

Seneca sandy loam.
Starr loam.

These soils are medium acid to strongly acid. They have a good supply of organic matter and plant nutrients. The Starr soil has a subsurface layer that is slightly sticky when wet, and this makes the soil somewhat difficult to till.

About 25 percent of the Seneca soil and 45 percent of the Starr soil are in forest; 50 percent of the Seneca soil and 35 percent of the Starr soil are cultivated; and most of the rest is in pasture. The soils are well suited to corn, hay crops, and pasture. Dark tobacco grows well on the better drained sites. These soils are also well suited to truck crops; potatoes, sweet corn, cabbage, peas, and tomatoes are commonly grown. The Seneca soil is also well suited to watermelons and cantaloups. Because of the high water table, the soils are not suited to alfalfa and other deep-rooted crops.

Some farmers grow corn year after year on these soils and obtain high yields by adding manure and growing a winter cover crop. The best cropping system to use, if dark tobacco is grown, is 1 year of dark tobacco, 1 year of a small grain, and 1 or 2 years of red clover. Dark tobacco normally requires moderate to large amounts of a complete fertilizer.

Small grains usually lodge on these soils. The lodging can be corrected to some extent if the topdressing is omitted and small amounts of phosphate and potash are applied when the small grain is seeded.

Enough lime is needed to raise the pH to about 6.0. Red clover and lespedeza grown for hay require small amounts of phosphate and potash used as a topdressing. Large amounts of a complete fertilizer are needed for good yields of vegetables and melons.

Pastures require 1 ton of lime every 3 to 4 years. They need small amounts of phosphate and potash each year.

CAPABILITY UNIT IIe–4

This capability unit is made up of undulating, well-drained soils that have moderately coarse textured surface layers and yellowish-red to yellowish-brown subsoils of clay loam. The soils are on uplands. They have slopes of 2 to 7 percent. The following soils are in capability unit IIe–4:

Appling coarse sandy loam, undulating phase.
Appling coarse sandy loam, eroded undulating phase.
Appling fine sandy loam, eroded undulating phase.
Durham coarse sandy loam, undulating phase.

These soils are very strongly acid to strongly acid. They are low in organic matter and plant nutrients. The capacity for holding available moisture is moderate to low. Permeability ranges from moderate to moderately rapid in the subsoils. The soils are easy to till and to conserve, and they warm early in spring. They respond well if fertilizer is added.

About 50 percent of the total acreage is in forest, 25 percent is in crops, and the rest is pastured or idle. The soils are well suited to bright tobacco, corn, oats, and most of the other crops commonly grown. They are among the best in the county for growing vegetables and melons, but they are only fairly well suited to hay crops and pasture. Most of the bright tobacco in the county is grown on these soils or on the soils of capability unit IIe–5. All of the peach and apple orchards are located on the soils of these two capability units.

Bright tobacco is generally grown year after year, and a cover crop is grown in winter. If a cropping system consisting of 1 year of bright tobacco, 1 year of oats, and 1 year of redtop is used, tobacco diseases are more easily controlled, yields are higher, and the quality of the tobacco improves. A good cropping system for corn is 1 year of corn, 1 year of a small grain, and 1 year of a nonleguminous hay crop.

Most farmers use large amounts of a complete fertilizer when they plant bright tobacco. Many of them apply a small amount of nitrogen and potash as a side dressing 3 to 4 weeks after the plants are set. The side dressing is especially effective on the Durham soil, which has a deep, sandy surface soil. It is also very effective on the other soils, if a heavy rain falls shortly after the plants are set out.

For high yields of corn, the open, sandy soils, especially the Durham, require large amounts of a complete fertilizer. Because of the high rate of leaching, it is desirable to apply the nitrogen in more than one side dressing.

Oats make better yields on these soils than other small grains. They need a small amount of a complete fertilizer applied when the crop is sown in fall. Nitrogen is applied as a topdressing in spring.

Because plant nutrients leach out of these soils fairly rapidly, pastures require frequent applications of lime. They also need large amounts of a complete fertilizer applied annually. All of the manure available should be added.

The Appling soils are better suited to hay crops than the Durham soils. Lespedeza is the crop grown the most extensively for hay, but clover and alfalfa are also grown.

The yields are often low because lime and fertilizer are not applied, or the hay crop follows a small grain and the amounts of fertilizer used are inadequate. Hay crops need moderate amounts of phosphate and potash applied annually.

CAPABILITY UNIT IIe–5

This capability unit consists of undulating, well-drained, medium-textured soils that have subsoils of yellowish-red to yellowish-brown clay loam. The surface layers have a texture of fine sandy loam or very fine sandy loam. The subsoils are yellowish-red to yellowish-brown, moderately permeable clay loam or silty clay loam. The soils are on uplands and have slopes of 2 to 7 percent. The following soils are in capability unit IIe–5:

Appling fine sandy loam, undulating phase.
Appling and Herndon very fine sandy loams, undulating phases.
Durham fine sandy loam, undulating phase.

These soils are strongly acid to very strongly acid. They are low in organic matter and plant nutrients. The soils are easy to till and are fairly easy to conserve, but they require some practices to protect them from erosion. The capacity for holding available moisture is moderate to low.

About 60 percent of the total acreage is in forest, 25 percent is in cultivated crops, and the rest is in pasture or idle. The soils are among the best in the county for bright tobacco, peaches, vegetables, and melons. They are also well suited to corn, small grains, and apples. They are only fairly well suited to hay crops and pasture.

Bright tobacco is generally grown year after year and is followed by a cover crop in winter. Diseases are controlled more easily, yields are higher, and the quality of the tobacco is improved if the cropping system includes 1 year of bright tobacco, 1 year of a small grain, and 1 year of redtop. A good cropping system for corn is 1 year of corn, 1 year of a small grain, and 1 year of a hay crop.

Bright tobacco normally is fertilized by adding large amounts of a complete fertilizer at planting time. Many farmers supplement this with a small amount of nitrogen and potash applied as a side dressing 3 to 4 weeks after the plants are set out.

Small grains receive a small application of a complete fertilizer when they are seeded in fall. Nitrogen is then used as a topdressing in spring.

Pastures need to have lime added frequently. They also require moderate amounts of a complete fertilizer applied annually.

Lespedeza is the crop grown the most extensively for hay, but clover and alfalfa are also grown. The yields are often low because lime and fertilizer have not been applied. A large amount of phosphate and potash used as a topdressing will help to increase the yields. The Appling and Herndon soils are better suited to hay crops than the Durham soil. Yields of 3½ to 4 tons of alfalfa hay per acre have been reported on the Appling and Herndon soils. These yields were obtained by using 3 tons of ground limestone and 1,200 pounds of borated 2–12–12 fertilizer at seeding time. A topdressing of 1,000 pounds of borated 0–10–20 fertilizer was then applied each year.

CAPABILITY UNIT IIIe–1

This capability unit consists of rolling, well-drained, medium-textured soils that have subsoils of red clay. The soils have surface layers that range in texture from fine sandy loam to loam. The subsoils are red, moderately permeable clay. These soils are on uplands and have slopes of 7 to 20 percent. If they are cultivated, practices are needed to protect them from erosion. A few of the areas have lost as much as 75 percent of the original surface layer through erosion, and there are a few deep gullies. The following soils are in capability unit IIIe–1:

Cecil fine sandy loam, rolling phase.
Cecil and Georgeville very fine sandy loams, rolling phases.
Lloyd loam, rolling phase.
Madison sandy loam, rolling phase.

These soils are very strongly acid to strongly acid. They are low in organic matter. The Cecil soils have a relatively high content of potash. Otherwise, the soils have a moderate supply of plant nutrients; the Lloyd soil has the best supply. All of these soils respond well to good management and retain applied plant nutrients well.

About 70 percent of the acreage is in forest, 12 percent is in cultivated crops, 12 percent is pastured, and 6 percent is idle. The Cecil and Georgeville soils are used more for forest than the other soils. The soils are best suited to corn, dark tobacco, and small grains, and to red clover, lespedeza, and alfalfa grown for hay; these are the principal crops. The soils are also suited to pasture.

If corn, dark tobacco, or other clean-cultivated crops are grown, practices must be used to control erosion. Such practices include tilling on the contour, using sodded waterways, and stripcropping if the fields are large enough to make it feasible. The cropping system should consist mainly of small grains, hay, and pasture.

CAPABILITY UNIT IIIe–2

This capability unit is made up of predominantly rolling, well-drained soils that have subsoils of yellowish-red to yellowish-brown clay loam. The soils are on uplands and have slopes of 7 to 20 percent. Runoff is medium to rapid. In most of the areas, erosion is slight to moderate, and there are a few deep gullies. If the soils are cultivated, practices are needed to control erosion. The subsoils are yellowish-red to yellowish-brown clay loam and are moderately to rapidly permeable. The following soils are in capability unit IIIe–2:

Appling angular cobbly sandy loam, rolling phase.
Appling angular cobbly sandy loam, undulating phase.
Appling coarse sandy loam, rolling phase.
Appling coarse sandy loam, eroded rolling phase.
Appling fine sandy loam, rolling phase.
Appling fine sandy loam, eroded rolling phase.
Appling and Herndon very fine sandy loams, rolling phases.
Cecil coarse sandy loam, rolling phase.
Durham coarse sandy loam, rolling phase.
Durham fine sandy loam, rolling phase.
Madison sandy loam, eroded rolling phase.

These soils are strongly acid to very strongly acid. They are low in organic matter and plant nutrients. The surface soils are tilled easily, but they erode readily. The capacity for holding available moisture is moderate to low. Small areas of excessively drained soils and of

soils that have undulating relief are included with these soils.

Approximately 60 percent of the acreage is in forest, 20 percent is in cultivated crops, and the rest is distributed about equally between pasture and idle areas. The Appling, Herndon, and Durham soils have the highest proportion of forest.

Bright tobacco is grown on all of these soils, but the Appling and Durham soils are the best suited to it. Corn, small grains, and hay crops are also grown. The soils are better suited to hay crops or pasture than to crops that are clean tilled. If the Appling and Herndon soils are limed and fertilized properly, alfalfa will make satisfactory growth. The other soils are not suited to alfalfa.

Bright tobacco is usually grown year after year and is followed by a winter cover crop of rye. Diseases are controlled more easily and the soils will be better protected from washing if the tobacco is grown for only 1 year and is followed by 1 year of a small grain and then by 1 or 2 years of redtop. If row crops are grown, the soils should be tilled on the contour. If the fields are large, stripcropping is desirable to control runoff.

Crops need about the same kinds and amounts of fertilizer as those on the soils of capability units IIe–4 and IIe–5. Pastures need frequent, large applications of a complete fertilizer for good yields. The Appling and Herndon soils are the most suitable for pasture.

CAPABILITY UNIT IIIe–3

Only one soil, Wilkes sandy loam, undulating phase, is in this capability unit. This is a shallow, excessively drained soil that occurs on uplands. It will erode if it is not protected, and droughtiness is also a limiting factor. The surface layer is sandy loam. There has been little or no development in the subsoil. This soil has formed from basic materials or from mixed basic and acidic materials. It has slopes of 2 to 7 percent. Sheet erosion has been slight to moderate, and there are a few deep gullies.

This soil is low in organic matter and in most plant nutrients. Permeability is moderate to rapid. The capacity for holding available moisture is low.

Approximately 60 percent of the total acreage is in forest, 20 percent is in pasture, 12 percent is in cultivated crops, and the rest is idle. This soil is not well suited to crops. Nevertheless, many farmers have had to use it for that purpose because of the lack of more suitable soils.

Small grains and lespedeza grown for hay are the principal crops. Corn and dark tobacco are grown to some extent. Unless there is abundant rainfall, the yields of corn and tobacco are generally low.

A good cropping system consists of growing a small grain for 1 year, hay crops for 2 years, and then pasturing the soils for 1 or more years. By seeding redtop and orchardgrass with lespedeza, losses from leaching could be reduced during the winter months.

The soil needs enough lime to raise the pH to 6.0 or 6.5. The small grains require a moderate application of a complete fertilizer when they are seeded in fall, and they should be topdressed with nitrogen late in the winter. Hay crops and pastures normally require an annual topdressing with a moderate amount of phosphate and potash.

CAPABILITY UNIT IIIe–4

This capability unit is made up of undulating soils that have brown to yellowish-brown clay subsoils. The surface layers range in texture from loam to fine sandy loam. The subsoils are brown to yellowish-brown, plastic clay and have moderately slow to slow permeability. In general, the drainage ranges from moderately good to good, but in some of the soils drainage is somewhat poor. The soils have slopes of 2 to 7 percent. In some of the areas, most of the original surface layer has been lost through erosion. There are a few deep gullies. The following soils are in capability unit IIIe–4:

Enon fine sandy loam, undulating phase.
Enon fine sandy loam, eroded undulating phase.
Enon-Vance-Helena soils, undulating phases.
Enon-Vance-Helena soils, eroded undulating phases.
Helena fine sandy loam, undulating phase.
Iredell-Mecklenburg loams, undulating phases.
Vance fine sandy loam, undulating phase.

These soils are medium acid to very strongly acid. They are low in organic matter and are medium to low in plant nutrients. They retain added plant nutrients well. The capacity for holding available moisture is moderate. The soils are difficult to till compared to many of the soils in the county. They can be tilled only within a narrow range of moisture content because the subsoils are plastic when wet and very hard when dry. If they are used for cultivated crops, practices to control erosion are required.

About 60 percent of the acreage is in forest, 12 percent is in cultivated crops, 13 percent is in pasture, and 15 percent is idle. Proportionately, the eroded soils have the least acreage in cultivated crops and the largest in forest of any of the soils. The Vance soil has the highest proportion of cultivated crops.

The principal crops are corn, dark tobacco, small grains, and hay. The Enon soils and the Enon-Vance-Helena complexes are the most widely used of this group for dark tobacco. Bright tobacco is grown in a few places, but the quality is poor and the yields are usually low. The soils are better suited to small grains, hay crops, and pasture than to tilled crops. They are poorly suited to alfalfa because the plastic clay in the subsoil causes drainage to be impeded.

A suitable cropping system consists of a small grain grown for 1 year, hay grown for 2 years, and 1 or more years of pasture. The small grains require a moderate application of a complete fertilizer when they are seeded in fall. They need to be topdressed with nitrogen in spring. Lespedeza, redtop, and orchardgrass make a good seeding mixture for these soils. They generally need an annual topdressing of phosphate and potash.

The soils of this capability unit are much better suited to livestock production than to use for growing cash crops. There are several successful dairy farms located on them.

CAPABILITY UNIT IIIe–5

This capability unit is made up of rolling, moderately well drained soils that have brown to yellowish-brown clay subsoils. The surface layers are easily tilled fine sandy loam. The subsoils are plastic, slowly permeable clay. The soils are on uplands and have slopes

of 7 to 12 percent. The risk of erosion is high. Some areas have lost most of the original surface layer, and deep gullies are common. The following soils are in capability unit IIIe–5:

Enon fine sandy loam, rolling phase.
Enon fine sandy loam, eroded rolling phase.
Enon-Vance-Helena soils, rolling phases.
Enon-Vance-Helena soils, eroded rolling phases.
Helena fine sandy loam, rolling phase.
Helena fine sandy loam, eroded rolling phase.
Helena fine sandy loam, eroded undulating phase.
Vance fine sandy loam, rolling phase.

These soils are medium acid to very strongly acid. They are low in organic matter, and their supply of plant nutrients is medium to low. The soils retain added plant nutrients well. The capacity for holding available moisture is moderately high. The soils can be cultivated only within a narrow range of moisture content, because the subsoils are plastic when wet and very hard when dry.

About 70 percent of the acreage is in forest, 12 percent is in cultivated crops, and the rest is pastured or idle. If the soils are cultivated, runoff is difficult to control on the steep slopes. Some areas are used to grow corn, dark tobacco, and small grains, but the soils are better suited to hay and pasture. They are not suited to bright tobacco and alfalfa.

A suitable cropping system consists of growing a small grain for 1 year, hay for 2 years, and then using the soils for pasture for 1 or more years.

Small grains need a moderate application of a complete fertilizer. If they are seeded in fall, they should be topdressed late in winter with nitrogen. Lespedeza, redtop, and orchardgrass make a good seeding mixture for these soils. Topdress annually with a moderate application of phosphate and potash.

These soils are much better suited to livestock production than to use for cash crops. There are several successful dairy farms located on them.

CAPABILITY UNIT IIIe–6

This capability unit is made up of eroded soils that generally have surface layers of red clay loam and subsoils of dark-red clay. The soils have been damaged by sheet and gully erosion. In some areas only remnants of the original surface soil remain. There are a few gullies. The soils are on uplands. They have slopes of 2 to 7 percent. The following soils are in capability unit IIIe–6:

Cecil clay loam, eroded undulating phase.
Lloyd clay loam, eroded undulating phase.
Madison clay loam, eroded undulating phase.

These soils are very strongly acid to strongly acid. They are low in organic matter and have a moderate supply of plant nutrients. They are moderately permeable, and their capacity for holding available moisture is moderate.

About 50 percent of the total acreage is in forest, 25 percent is in cultivated crops, 15 percent is in pasture, and 10 percent is idle.

Corn, small grains, and hay are the principal crops. Some dark tobacco is grown on the Cecil and Madison soils. Large amounts of complete fertilizer will be needed to obtain satisfactory yields. Liming will be necessary at rather high rates because of the acidity of these soils.

Good pastures can be obtained on these soils if moderate applications of a complete fertilizer and lime are added.

CAPABILITY UNIT IIIw–1

This capability unit is made up of undulating, somewhat poorly drained soils that are variable in texture and color. The soils have a compacted layer that has some of the characteristics of a fragipan. The compacted layer occurs at depths ranging from about 18 to 32 inches. These soils are on low stream terraces, on smooth divides between major drainage systems, or at the heads of intermittent drainageways. They have slopes of as much as 12 percent. The following soils are in capability unit IIIw–1:

Augusta loam.
Colfax sandy loam, undulating phase.

These soils are very strongly acid. Their supply of plant nutrients is low, and the capacity for holding available moisture is moderate. The soils are easily conserved, but they are difficult to till. They are cultivated only if better drained soils are not available.

About 80 percent of the total acreage is in forest, 5 percent is in cultivated crops, and the rest is pastured or idle. The soils are better used for pasture or hay crops than for cultivated crops. Some bright tobacco is grown on small areas of the Colfax soil that are within larger areas of Durham or Appling soils. Yields of tobacco are only about half as high as those on the surrounding soils.

Lespedeza is the principal hay crop. Its yields can generally be increased by adding large amounts of ground limestone and a moderate amount of phosphate and potash at seeding time. The lespedeza should also be topdressed with phosphate and potash each year.

Kentucky 31 fescue, ladino clover, and similar plants that tolerate water are desirable to use as mixtures for seeding the pastures. The pastures require 1 to 2 tons of ground limestone every 3 or 4 years and moderate applications of a complete fertilizer.

The Augusta soil can be drained, but drainage is not feasible on the Colfax soil. Yields on the Augusta soil can be increased considerably if tile drainage is used. Little of this soil has been drained, however, because the areas are generally small and occur within larger areas of well-drained soils.

CAPABILITY UNIT IIIw–2

This capability unit consists of nearly level, mostly somewhat poorly drained, medium-textured soils on bottoms. The soils have formed from recent alluvium. They are subject to frequent flooding. The following soils are in capability unit IIIw–2:

Chewacla silt loam.
Mixed alluvial land.

These soils are slightly acid to strongly acid. Their supply of organic matter and plant nutrients ranges from low to fairly high. The capacity for holding available moisture is moderate. Both of the soils are somewhat poorly drained. Drainage in Mixed alluvial land, however, ranges from excessive in the sandy spots to poor, and the texture of Mixed alluvial land is variable, even in small areas.

Because of the risk of flooding, most of the acreage is in forest. The trees have little or no commercial value. A few small areas are used for pasture.

These soils can be drained. If flooding can be prevented, they are fairly well suited to cropping. When drained, fair yields of corn can be obtained. When used for pasture, V-type ditches should be provided to remove excess water.

Pastures need 1 to 2 tons of ground limestone before they are seeded. They also need a moderate amount of a complete fertilizer at seeding time. They may need to be topdressed with a moderate amount of fertilizer to maintain high yields. The correct pH normally can be maintained by adding 1 ton of ground limestone every 3 to 4 years.

There are several good pastures of whiteclover and bluegrass on these soils. The pasture mixtures include Kentucky 31 fescue and lespedeza. Thus, they include plants that grow on wet spots and those that grow on sandy spots. Ladino clover and orchardgrass grow well on the Chewacla soil. Pastures that are managed properly on these soils have a high carrying capacity.

CAPABILITY UNIT IVe–1

This capability unit is made up of eroded soils that generally have surface layers of red clay loam and subsoils of dark-red clay. The soils have been damaged severely by sheet and gully erosion. In some areas only remnants of the original surface soil remain. There are a few deep gullies. The soils are on uplands. They have slopes of 7 to 12 percent. The following soils are in capability unit IVe–1:

Cecil clay loam, eroded rolling phase.
Cecil clay loam, severely eroded rolling phase.
Lloyd clay loam, eroded rolling phase.
Madison clay loam, eroded rolling phase.
Madison clay loam, severely eroded rolling phase.

These soils are very strongly acid to strongly acid. They are low in organic matter and have a moderate supply of plant nutrients. They are moderately permeable, and their capacity for holding available moisture is moderate. The intake rate of water is slow.

About 50 percent of the total acreage is in forest, 25 percent is in cultivated crops, 15 percent is in pasture, and 10 percent is idle. Close-growing crops should be grown on the cleared areas most of the time. If cultivated crops are grown, crimson clover and rye are good cover crops to grow in winter. Orchardgrass, redtop, whiteclover, and lespedeza are good pasture plants to use in seeding mixtures on these soils.

All of the fertilizer needed for corn can be applied to these soils prior to planting, without excessive loss by leaching. Small grains make good response to a complete fertilizer applied at seeding time.

Pastures respond well to moderate applications of a complete fertilizer. They also need a large amount of phosphate and potash applied as a topdressing about every 3 years. Pasture plants grow best if the pH of the soil is at least 6.0. All of the manure available should be applied to maintain good growth. On farms where these soils predominate, the raising of livestock would be helpful so that manure would be available to build up the soil.

CAPABILITY UNIT IVe–2

This capability unit consists of hilly, well-drained soils on uplands. The surface layers range in texture from coarse sandy loam to loam. The subsoils are red, moderately permeable clay. The soils have slopes of 12 to 20 percent. If they are cultivated, practices are needed to protect them from erosion. The following soils are in capability unit IVe–2:

Cecil coarse sandy loam, hilly phase.
Cecil fine sandy loam, hilly phase.
Lloyd loam, hilly phase.
Madison sandy loam, hilly phase.
Madison sandy loam, eroded hilly phase.

These soils are strongly acid to very strongly acid. They are low in organic matter. The Cecil soils have a fairly high content of potash. All of these soils have a moderate supply of plant nutrients, but the Lloyd soil generally has the best supply. These soils respond well to good management and retain applied plant nutrients well.

About 75 percent of this capability unit is in forest, 12 percent is in pasture, and the rest is in cultivated crops or idle.

These soils are best suited to forest and pasture. They are fairly well suited to small grains and hay crops. Yields are generally lower than are obtained from the same soils on more gentle slopes.

CAPABILITY UNIT IVe–3

This capability unit is made up of undulating to rolling, shallow upland soils that are excessively drained. The soils have slopes that range from 2 to 12 percent. Sheet erosion has been slight to moderate. Loose stones occur on the surface, and there are a few outcrops of bedrock. The texture of the surface layers ranges from loam to sandy loam. The following soils are in capability unit IVe–3:

Bremo loam, eroded rolling phase.
Louisburg sandy loam, undulating phase.
Louisburg sandy loam, rolling phase.
Louisburg sandy loam, eroded rolling phase.
Wilkes sandy loam, rolling phase.
Wilkes sandy loam, eroded rolling phase.

These soils are strongly acid to medium acid. They are low in organic matter and plant nutrients. Internal drainage and permeability are both rapid. The capacity for holding available moisture is low.

About 65 percent of the acreage in this capability unit is in forest, 15 percent is in crops, and the rest is in pasture or idle. These soils are not well suited to pasture because they are droughty. Bright tobacco grows fairly well on the lower slopes. Corn, small grains, and hay crops are also grown, but yields are generally low. In years when rainfall is above average, yields can be increased by adding a nitrogen fertilizer.

A suggested cropping system is 1 year each of corn, small grains, and lespedeza grown for hay.

CAPABILITY UNIT IVw–1

Only one soil, Wehadkee silt loam, is in this capability unit. This is a level to gently sloping, wet soil that occurs in intermittent drainageways. The surface layer is mottled silt loam. The underlying material is mottled clay loam and silt loam. Internal drainage is very slow.

This soil is very strongly acid. It is fairly well supplied with organic matter and plant nutrients. The water table is high, but some artificial drainage is possible. Wide, V-type ditches will drain off excess surface water and will make this soil useful for pasture and some limited cultivation. Ladino clover and tall fescue will make good pasture, but lime will be needed to obtain satisfactory yields.

Even though 90 percent of this soil is covered by forest, little timber of commercial value is produced.

CAPABILITY UNIT Vw–1

This capability unit is made up of level, wet soils in intermittent drainageways. The surface layers range from grayish silt loam to sandy loam. The underlying material is mottled clay and is slowly to very slowly permeable. The following soils are in capability unit Vw–1:

Worsham sandy loam.
Worsham silt loam.

These soils are strongly acid. They are low in organic matter and plant nutrients. The soils are easily conserved, but they are difficult to till. Because of the poor natural drainage, they are not productive unless some artificial drainage is provided.

More than 85 percent of the acreage is in forest, and most of the rest is pastured. Loblolly pine grows well in the areas that have the best drainage. Willow oak, white ash, sycamore, river birch, sweetgum, and other hardwoods that tolerate water grow where the soils remain wet most of the year.

If drainage is provided to remove the excess surface water, Kentucky 31 fescue, ladino clover, and other pasture plants that tolerate water can be grown. V-type ditches are economical for removing the excess surface water.

Pastures generally require about 2 tons of ground limestone and a moderate application of a complete fertilizer before they are seeded. After the stand is established, moderate amounts of fertilizer, applied each year as a topdressing, may be needed. One ton of ground limestone applied every third or fourth year will probably maintain the correct pH.

CAPABILITY UNIT VIe–1

This capability unit consists of eroded, undulating to hilly, well-drained soils on uplands. The surface layers are predominantly reddish brown, and the subsoils are red, moderately permeable clay. The soils have slopes of 12 to 20 percent. Surface runoff is rapid to very rapid. The following soils are in capability unit VIe–1:

Cecil clay loam, eroded hilly phase.
Lloyd clay loam, eroded hilly phase.
Madison clay loam, eroded hilly phase.
Madison clay loam, severely eroded hilly phase.

These soils are medium acid to very strongly acid. They are low in organic matter and have a moderate supply of plant nutrients. The capacity for holding moisture available is moderate, but the intake rate of water is slow. Some areas of these soils have lost all of the surface soil and part of the subsoil through erosion. There are deep gullies, some of which are fairly far apart, and others, less than 100 feet apart.

About 80 percent of the total acreage is in forest, and most of the rest is in pasture. Virginia and shortleaf pines are desirable trees for these soils, and yellow-poplar grows well on the northern and eastern slopes. Ladino clover and orchardgrass make a good mixture for seeding the pastures.

One of the limiting factors in establishing pastures on the gullied areas and on areas that have lost all of the surface soil is the slow rate at which water infiltrates into the soil. Most of the rainfall runs off these bare areas. One way of improving the intake rate is by adding manure or a light covering of straw.

Pastures require a moderate application of a complete fertilizer when they are seeded. In areas where gullies have been filled, the rate of application should be doubled if no manure is used. A good stand of grass must be established quickly; otherwise, heavy rains may wash out all of the soil material that was used to fill the gullies. After the stand is established, it may be topdressed each year with a moderate application of fertilizer to maintain high yields. If pastures are overgrazed, erosion will become active once more. Weeds need to be clipped periodically.

CAPABILITY UNIT VIe–2

This capability unit is made up of rolling and hilly soils and of stony land that is generally best suited to pasture. The soils vary widely in color, depth, and type of underlying soil material. The following soils are in capability unit VIe–2:

Bremo loam, eroded hilly phase.
Enon-Vance-Helena soils, hilly phases.
Enon-Vance-Helena soils, eroded hilly phases.
Stony land.
Wilkes sandy loam, hilly phase.
Wilkes sandy loam, eroded hilly phase.

These soils are unsuitable for cultivated crops because they are steep, shallow, or stony, or have a heavy claypan in the profile. They are difficult to till, and the use of machinery is restricted greatly.

Good pastures can be obtained if the soils are managed properly. Annual lespedeza, whiteclover, and orchardgrass or Kentucky 31 fescue make a good pasture mixture. Enough lime should be added so that the soils have a pH of 6.0 to 6.5. Generally, 2 tons of ground limestone will be needed as an initial application, and an additional ton every 3 or 4 years will maintain the correct pH.

Pastures normally require a moderate application of a complete fertilizer at seeding time. They also require a moderate amount of fertilizer applied as a topdressing every 3 or 4 years. It is important to protect the pastures from overgrazing.

CAPABILITY UNIT VIe–3

This capability unit is made up of rolling, well-drained and poorly drained soils. The soils have yellowish-brown and yellowish-red, firm clay subsoils. The texture of the surface layer is loam.

These soils erode easily. Some areas have already lost much of the original surface layer. Surface runoff is medium to rapid. The following soils are in capability unit VIe–3:

Iredell-Mecklenburg loams, rolling phases.
Iredell-Mecklenburg loams, eroded rolling phases.

These soils are strongly acid to medium acid. They have a moderate supply of plant nutrients and organic matter. The firm, plastic clay subsoils limit the use of the soils for cultivation.

Almost all of the acreage is covered by forest. A small acreage is in crops and pasture.

The forests should be managed so that adequate production is obtained and the soil protected from erosion.

Pastures do fairly well if lime and fertilizer are used.

CAPABILITY UNIT VIIe–1

This capability unit is made up of eroded, rolling to hilly, shallow, upland soils that are excessively drained. The soils have slopes that range from 7 to 45 percent, and most of them have slopes greater than 12 percent. In about half of the areas, there are deep gullies more than 100 feet apart. Sheet erosion is slight to moderate. The following soils are in capability unit VIIe–1:

Louisburg sandy loam, hilly phase.
Louisburg sandy loam, eroded hilly phase.

These soils are very strongly acid to medium acid. They are low in organic matter and plant nutrients. Surface runoff is rapid to very rapid. Internal drainage and permeability are both rapid. The capacity for holding available moisture is low.

About 80 percent of the acreage is in forest, and most of the rest is idle or in pasture. The soils are too shallow and droughty for pasture. Good stands of loblolly pine can be established on them. Yellow-poplar grows well on the northern or eastern exposures near the foot slopes.

Cleared areas and areas that are understocked need to be replanted with loblolly pine. If a stand has already been established, the cutting should be light so as to leave enough trees to fully stock the areas. Enough yellow-poplar should be left for reseeding the areas that have northern and eastern exposures and that are near the foot slopes.

CAPABILITY UNIT VIIIe–1

This capability unit is made up of gullied land that is suitable only for recreational purposes. Gullied land consists of a network of deep, connecting gullies that have no plants or only a sparse cover of plants growing on them. Sericea lespedeza or bicolor lespedeza will help to check erosion in these areas. The lespedeza will also provide food and shelter for wildlife. A moderate application of phosphate is needed when the seed is sown or the plants are set out.

Honeysuckle and kudzu will also help to control erosion and will provide cover for wildlife. If these are planted, a fertilizer high in phosphate and potash should be added before the plants are set out.

CAPABILITY UNIT VIIIw–1

This capability unit is made up of swampy soils that are suitable only for recreational purposes. Wehadkee soils are the only soils in this unit. Some of these soils are on low first bottoms along the larger streams. Others are on flooded bottoms along small streams that have been dammed by beavers.

The areas are under water during most of the year. No trees of commercial value grow on them, and they are best used for growing plants that tolerate water. These plants will supply food for wild ducks and muskrats. In addition to being used for recreational purposes, the areas also provide a source of income for trappers and hunters, and for persons who lease shooting rights to hunters who wish to shoot ducks.

Some General Principles of Soil Management

The basic requirements for obtaining the highest yields practical are somewhat similar for the various soils in the county. Yet, a specific soil may require special management for good yields to be obtained. In the following pages some of the general principles of soil management are pointed out. More specific suggestions for managing the soils are discussed for each capability unit in the section, Capability Groups.

Soil tests.—As crops are removed year after year and water from rain and snow dissolves and leaches out the plant nutrients, the soils become acid and low in plant nutrients. Then, fertilizer and lime must be added if satisfactory yields are to be obtained.

Soil tests help to show the kinds of plant nutrients that should be added to the soil for best growth of plants. They indicate the amounts of lime, phosphate, and potash needed to correct deficiencies in the soil. More lime or fertilizer is needed on some soils than on others. For example, less potash is generally required on the Cecil soils than on the Appling soils.

The soil tests, together with the soil map, show where the deficiencies are so that the correct kind and amount of plant nutrients can be added. The yield level at which the farmer wishes to operate will help to determine the amount of plant nutrients he will need to apply. Consult technicians of the Soil Conservation Service, the county agricultural agent, or members of the Virginia Agricultural Experiment Station for assistance in testing the soils and for help with special problems.

Fertilizer, lime, and organic matter.—Inasmuch as tobacco is one of the main cash crops, the use of large amounts of commercial fertilizer has been a common practice in this county. Generally, between 1,000 and 1,400 pounds of commercial fertilizer per acre is added for bright tobacco, and 1,000 to 1,300 pounds of a complete fertilizer, for dark tobacco. In addition, 10 tons or more of manure is used for dark tobacco. Between 800 and 1,000 pounds per acre of a complete fertilizer is generally added to corn. In addition, 200 to 400 pounds of nitrate of soda or its equivalent is added as a side dressing.

Small grains receive between 300 and 500 pounds of a complete fertilizer. In addition, 200 to 400 pounds of nitrate of soda, or its equivalent, is applied as a top-dressing in spring. Alfalfa usually receives between 1,000 and 1,200 pounds of a borated complete fertilizer at seeding time. Then it receives an annual application of between 800 and 1,000 pounds of a borated fertilizer that is high in phosphate and potash.

All of the soils that are used to grow alfalfa and most of the ones used to grow dark tobacco have been limed, as have many of the pastures. The soils on which bright tobacco is grown have had little lime.

Most of the soils are low in organic matter and nitrogen. Applying nitrogen to all crops, except legumes, will not only increase the yields but will also help to increase the amount of organic matter that can be re-

turned to the soil. The organic matter, in turn, improves the water-holding capacity and the tilth of the soil and helps to reduce losses through erosion.

Unlike phosphorus and potassium, nitrogen is not a constituent of the soil minerals. It comes largely from plant remains, especially legumes, and from commercial fertilizer. Manure supplies some nitrogen and a large amount of organic matter. The use of crop residues, manure, and a nitrogen fertilizer will depend largely on the needs of the crop that is grown.

Erosion control.—Nearly 25 percent of the soils in the county have been damaged seriously through sheet or gully erosion. To protect the soils, the farm operator needs to use careful management. One of the most effective ways of reducing erosion is to keep a good supply of plant nutrients in the soil. When plants have an adequate supply of nutrients, they make better growth. A good cover of plants adds to the supply of organic matter, and the organic matter, in turn, improves the structure of the soil and the rate of infiltration.

Tilling on the contour, stripcropping, and using grassed waterways also help to control erosion. Steep areas should be kept in forest or pasture, and the soils protected from fires or overgrazing. The cropping system needs to include enough cover crops so that the soil will not be exposed for long periods. An example of a cropping system that will keep a cover of plants on the soil most of the time is 1 year of dark tobacco, 1 year of wheat, and 3 years of alfalfa.

Drainage.—Crops growing on wet soils that cannot be tile drained or drained by ditches are affected to a greater extent by unfavorable weather than crops on soils that are readily permeable to water and roots. Choosing crops that tolerate water and fertilizing the soils properly will help to offset the unfavorable effects of poor drainage. Many of the poorly drained soils on bottoms are idle. Each area needs to be studied to determine whether drainage would be feasible. The drainage class for each soil is given in the description of the soil.

Tillage.—If high yields are to be obtained, the soils must be kept in good tilth. Some soils can be tilled only within a narrow range of moisture content and puddle if they are tilled too wet. Others become cloddy if they are tilled too dry. Growing sod-forming crops and adding organic matter in the form of crop residues or manure will help to improve the structure of the soil and to maintain good tilth.

Irrigation.—The irrigation of crops is fairly new in Nottoway County. The first system was put into use in 1952 to irrigate bright tobacco. By 1955, there were 10 irrigation systems in the county. Three of these were used on dairy farms to irrigate pasture, and the others were on tobacco farms. All are portable systems and have rotating sprinkler heads (fig. 2).

Several farmers use streams as a source of irrigation water, and others use farm ponds. Tobacco is irrigated one or more times, but, as a rule, it is not irrigated more than three times after the plants have become well established. In dry seasons water is applied when the plants are still in beds and again when they are set out. There were 119 farm ponds in the county in 1956. Many of these were constructed to furnish water for livestock, but most of the larger ponds could also be used as a source of water for irrigation.

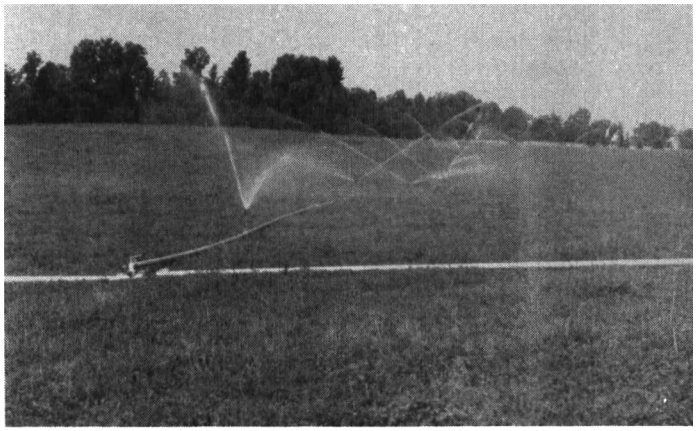

Figure 2.—**Irrigating a pasture of ladino clover and orchardgrass on Appling coarse sandy loam, undulating phase.**

Most of the farmers who have irrigation systems say that the increase in the value of the tobacco crop during the dry years of 1953 and 1954 paid for the irrigation system the first year. Even if the season is not unusually dry, there are generally one or more dry spells during the growing season. Many farmers feel that irrigation during these dry spells would increase the quantity and quality of bright tobacco enough to pay for the equipment in 2 or 3 years.

Productivity Ratings

In table 2, the soils of the county are rated according to their productivity. Each rating denotes the productivity of a soil for a particular crop in relation to a standard index of 100.

In table 2, the standard productivity indexes are shown in parentheses just below the names of the crops. The standard index represents the average acre yield obtained, without the use of amendments, on the more extensive and better soil types in the regions of the United States where the crop is grown the most widely. For corn, the standard index of 100 is equal to a yield of 50 bushels per acre. A rating of more than 100 indicates that the expected yield of corn is greater than 50 bushels, whereas a rating of less than 100 indicates the expected yield of corn is less than 50 bushels.

To convert a productivity rating to an expected yield figure, multiply the productivity rating by the standard yield given at the head of the column for a particular crop. Then, divide the figure obtained by 100. For example, Appling coarse sandy loam, undulating phase, has a productivity rating of 70 for corn grown under the ordinary, or A, level of management. By multiplying 70 times 50 (standard yield) and dividing the answer by 100, you find that a yield of 35 bushels of corn per acre can be expected on this soil under ordinary management.

The productivity ratings, which are given under two levels of management, are based chiefly on information obtained through field observations and consultations with farmers and other agricultural specialists in the State. When available, data on crop yields were used.

The ratings in columns A are for ordinary management, or the management practiced by most farmers; those in columns B are for improved management, or the

best practical management that most farmers could be expected to apply.

For the soils of uplands and terraces, ordinary management includes the use of a 3- to 5-year rotation consisting of corn or dark tobacco followed by a small grain and a legume grown for hay. Corn receives 200 to 400 pounds of a complete fertilizer per acre. In addition, available manure is applied and the corn is sidedressed with 100 to 150 pounds of nitrate of soda, or the equivalent. Small grains receive 200 to 400 pounds of a complete fertilizer and a small application of nitrogen fertilizer as a topdressing. Lespedeza, red clover, or another legume crop is seeded in the small grain, and lime is applied at the rate of 1 to 2 tons per acre once during each rotation period.

Ratings in columns B (good management) are largely estimates because only a small part of the total acreage is being managed under the best practices known. Accurate data are not available to support these figures adequately. Nevertheless, these ratings represent reasonably well the yields to be expected under the best management that is currently being practiced.

These management practices include the use of suitable crops and cropping systems and supporting practices to maintain the content of organic matter and a favorable soil reaction (pH), the conservation of moisture, and the control of erosion. A 3- to 5-year rotation is generally satisfactory, but liberal applications of a complete fertilizer are necessary.

Corn requires applications of 600 to 1,000 pounds of a complete fertilizer per acre, and, in addition, 200 to 250 pounds of a fertilizer containing 20 percent nitrogen, or its equivalent, applied as a side dressing. A good variety of hybrid seed must be used. Manure, when available, is used for corn and dark tobacco.

Dark tobacco receives 1,200 to 1,500 pounds of a complete fertilizer per acre. Bright tobacco receives 1,100 to 1,400 pounds of a complete fertilizer per acre and is sidedressed with 75 to 100 pounds of a nitrogen-potash fertilizer. Small grains receive 400 to 600 pounds of a complete fertilizer per acre, and, in addition, 100 to 250 pounds of a fertilizer containing 20 percent nitrogen, or its equivalent. Alfalfa grown for hay requires 1,000 to 1,200 pounds per acre of a borated complete fertilizer, or its equivalent, at seeding time, and 600 to 1,000 pounds per acre of a borated phosphate-potash fertilizer as a topdressing each year.

The productivity ratings reflect the average yields that are considered obtainable over a long period of time. Higher or lower yields may be obtained during a given year, depending on climatic conditions. A farmer should compare the yields on soils on his farm with yields reflected in table 2. If he obtains lower average yields than those indicated for a given soil, he may need to change the methods he is using.

On most soils, yields can be increased beyond those on which the productivity ratings are based. To do this the farmer should base his fertilizer treatments, as well as other management practices, on current suggestions made in publications of the Virginia Agricultural Experiment Station.

Because of new crop varieties and cultural and fertilizer practices, or because of the increase in insect pests and plant diseases, the standard yields on which the productivity ratings are based are subject to change. Therefore, the ratings given in table 2, must be regarded as representing conditions at the time this report was prepared. Nevertheless, the productive capacity of any one soil in relation to that of another is not likely to change.

Engineering Properties of Soils

This soil survey report for Nottoway County, Va., contains information that engineers can use to—

1. Make soil and land use studies that will aid in selecting and developing industrial, business, residential, and recreational sites.
2. Assist in designing drainage and irrigation structures and in planning dams and other structures for water and soil conservation.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting highway and airport locations and in planning detailed soil surveys for the intended locations.
4. Locate sand and gravel for use in structures.
5. Correlate performance of engineering structures with types of soil and thus develop information that will be useful in designing and maintaining the structures.
6. Determine the suitability of soil units for cross-county movements of vehicles and construction equipment.
7. Supplement information obtained from other published maps and reports and aerial photographs, for the purpose of making soil maps and reports that can be used readily by engineers.

The mapping and the descriptive report are somewhat generalized, however, and should be used only in planning more detailed field surveys that will, in turn, be used to determine the in-place condition of the soil at the site of the proposed engineering construction.

Soil Science Terminology

Some terms used by the agricultural soil scientist may be unfamiliar to the engineer, and some words, for example, soil, clay, silt, sand, aggregate, and granular, may have special meanings in soil science. These terms, as well as other special terms used in soil survey reports, are defined in the glossary.

ENGINEERING CLASSIFICATION SYSTEMS

AASHO classification.—The American Association of State Highway Officials has developed a classification based on the field performance of soils. In this classification soils are placed in seven groups, designated A–1, A–2, A–3, A–4, A–5, A–6, and A–7. Some of the groups are divided into subgroups. The soils in each group are valued by means of a group index, a number that takes into account the behavior of soil and soil materials in embankments, subgrades, and subbases. The essentials of the classification are shown in table 4, which also describes, for each class, the nature and the stability of the material. Most highway engineers classify soil in accordance with this system.

TABLE 2.—*Productivity ratings for the*

[Productivity indexes in columns A are for ordinary

Soil	Capability unit	Corn (100=50 bu.)		Wheat (100=25 bu.)		Barley (100=40 bu.)	
		A	B	A	B	A	B
Appling coarse sandy loam:							
Undulating phase	IIe-4	70	150	80	120	85	110
Eroded undulating phase	IIe-4	35	80	40	80	35	75
Rolling phase	IIIe-2	60	100	56	104	78	105
Eroded rolling phase	IIIe-2	30	70	36	75	30	70
Appling angular cobbly sandy loam:							
Undulating phase	IIIe-2	60	120	72	100	83	138
Rolling phase	IIIe-2	50	90	48	88	40	93
Appling fine sandy loam:							
Undulating phase	IIe-5	70	155	82	125	93	155
Eroded undulating phase	IIe-4	37	82	42	83	35	78
Rolling phase	IIIe-2	58	96	60	110	78	140
Eroded rolling phase	IIIe-2	30	72	38	80	34	72
Appling and Herndon very fine sandy loams:							
Undulating phases	IIe-5	50	105	75	120	80	110
Rolling phases	IIIe-2	40	85	45	90	72	125
Augusta loam	IIIw-1	40	70	[3]	[4]	[3]	[4]
Bremo loam:							
Eroded rolling phase	IVe-3	40	80	48	132	30	83
Eroded hilly phase	VIe-2	[3]	[4]	[3]	[4]	[3]	[4]
Cecil coarse sandy loam:							
Undulating phase	IIe-2	65	150	82	125	86	130
Rolling phase	IIIe-2	55	135	70	110	73	120
Hilly phase	IVe-2	[3]	[4]	40	80	45	95
Cecil fine sandy loam:							
Undulating phase	IIe-1	70	160	85	135	90	150
Rolling phase	IIIe-1	60	140	75	112	75	140
Hilly phase	IVe-2	[3]	[4]	50	90	50	100
Cecil clay loam:							
Eroded undulating phase	IIIe-6	44	96	64	120	66	105
Eroded rolling phase	IVe-1	40	90	56	100	43	90
Eroded hilly phase	VIe-1	[3]	[4]	34	60	40	90
Severely eroded rolling phase	IVe-1	[3]	[4]	[3]	[4]	[3]	[4]
Cecil and Georgeville very fine sandy loams:							
Undulating phases	IIe-1	60	125	75	140	85	145
Rolling phases	IIIe-1	50	110	36	115	45	135
Chewacla silt loam [5 6]	IIIw-2	30	70	[3]	[4]	[3]	[4]
Colfax sandy loam, undulating phase	IIIw-1	35	65	40	60	30	55
Durham coarse sandy loam:							
Undulating phase	IIe-4	50	125	55	90	45	75
Rolling phase	IIIe-2	45	120	52	86	42	72
Durham fine sandy loam:							
Undulating phase	IIe-5	52	130	60	95	48	80
Rolling phase	IIIe-2	48	120	54	92	44	74
Enon fine sandy loam:							
Undulating phase	IIIe-4	66	150	72	120	85	150
Eroded undulating phase	IIIe-4	[4]	[4]	[4]	[4]	[4]	[4]
Rolling phase	IIIe-5	60	140	64	112	75	140
Eroded rolling phase	IIIe-5	[4]	[4]	[4]	[4]	[4]	[4]
Enon-Vance-Helena soils:							
Undulating phases	IIIe-4	58	140	66	110	80	145
Eroded undulating phases	IIIe-4	40	80	45	100	55	125
Rolling phases	IIIe-5	54	136	60	104	74	135
Eroded rolling phases	IIIe-5	[4]	[4]	[4]	[4]	[4]	[4]
Hilly phases	VIe-2	[4]	[4]	[4]	[4]	[4]	[4]
Eroded hilly phases	VIe-2	[4]	[4]	[4]	[4]	[4]	[4]
Gullied land	VIIIe-1	[4]	[4]	[4]	[4]	[4]	[4]
Helena fine sandy loam:							
Undulating phase	IIIe-4	40	64	32	56	25	40
Eroded undulating phase	IIIe-5	[4]	[4]	[4]	[4]	[4]	[4]
Rolling phase	IIIe-5	28	56	28	52	20	35
Eroded rolling phase	IIIe-5	[4]	[4]	[4]	[4]	[4]	[4]
Iredell-Mecklenburg loams:							
Undulating phases	IIIe-4	40	90	48	100	35	93
Rolling phases	VIe-3	36	84	44	90	30	88
Eroded rolling phases	VIe-3	[4]	[4]	[4]	[4]	[4]	[4]

See footnotes at end of table.

soils under two levels of management

management; those in columns B are for good management]

Oats (100=50 bu.)		Tobacco (bright)[1] (100=1,000 lbs.)	Tobacco (dark)[1] (100=1,000 lbs.)	Lespedeza hay (100=1½ tons)		Mixed hay (100=2 tons)		Alfalfa hay (100=4 tons)		Pasture (100=100 cow-acre-days)[2]	
A	B	B	B	A	B	A	B	A	B	A	B
40	95	160	100	55	100	40	100	63	90	34	74
30	75	70	(3)	30	87	30	70	32	60	30	68
37	85	100	95	43	93	43	83	55	75	30	70
28	60	(3)	(3)	27	60	25	55	28	56	28	65
46	96	120	(3)	53	107	45	85	60	85	34	74
28	60	100	(3)	47	100	38	80	45	78	30	70
50	100	150	110	55	110	45	105	65	92	36	76
30	75	75	(3)	30	85	33	72	34	68	30	70
34	85	105	100	50	100	42	85	60	80	32	72
30	64	(3)	(3)	30	67	25	58	33	60	28	68
40	85	95	90	50	105	45	95	55	85	30	70
30	72	80	80	40	90	35	75	48	60	28	65
(3)	(4)	(4)	(4)	50	100	40	100	(4)	(4)	36	82
28	72	(4)	(3)	53	87	40	82	(3)	(4)	25	60
(3)	(4)	(4)	(4)	35	65	30	60	(3)	(4)	23	50
60	100	135	115	65	110	45	105	65	90	34	78
55	88	100	105	55	100	38	85	55	80	32	76
38	60	(4)	(4)	30	78	30	70	33	62	30	72
80	110	130	120	80	120	45	110	70	95	36	80
60	90	95	110	60	110	40	90	60	85	32	80
40	70	(4)	(4)	33	80	30	75	33	66	30	72
40	90	----------	85	50	100	40	95	50	90	32	76
35	78	(4)	75	40	88	35	75	45	70	30	74
34	55	(4)	(4)	27	50	30	50	30	50	28	70
(3)	(4)	(4)	(4)	(3)	(4)	(3)	(4)	(3)	(4)	24	64
60	115	(3)	100	57	93	40	95	50	80	33	78
36	100	(3)	90	43	87	30	85	35	71	32	75
(3)	(4)	(4)	(4)	67	127	60	100	(4)	(4)	70	180
30	50	70	(4)	47	87	38	68	(4)	(4)	34	70
44	80	163	(4)	45	90	40	80	40	75	24	55
40	65	140	(4)	42	86	38	75	38	72	24	52
46	82	170	(4)	45	92	40	82	40	75	26	60
42	66	137	(4)	42	88	38	78	38	73	26	56
48	96	(4)	120	57	120	60	115	(4)	(4)	45	105
(4)	(4)	(4)	(4)	48	100	50	90	(4)	(4)	24	96
42	90	(4)	110	53	110	55	100	(4)	(4)	42	100
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	20	90
44	90	(4)	110	50	93	50	90	(4)	(4)	40	100
32	78	(4)	90	33	80	33	68	(4)	(4)	32	90
38	84	(4)	105	47	87	48	80	(4)	(4)	36	95
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	25	75
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	27	80
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	20	52
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
20	30	(4)	65	40	73	25	70	(4)	(4)	25	55
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	20	48
18	28	(4)	60	42	75	28	75	(4)	(4)	25	58
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	18	40
40	88	(4)	80	53	100	50	100	(4)	(4)	39	80
36	80	(4)	75	50	87	40	85	(4)	(4)	35	76
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	30	65

TABLE 2.—*Productivity ratings for the soils*

[Productivity indexes in columns A are for ordinary

Soil	Capability unit	Corn (100=50 bu.)		Wheat (100=25 bu.)		Barley (100=40 bu.)	
		A	B	A	B	A	B
Lloyd loam:							
Undulating phase	IIe-1	72	165	85	140	90	130
Rolling phase	IIIe-1	68	145	56	132	70	115
Hilly phase	IVe-2	56	76	40	85	40	90
Lloyd clay loam:							
Eroded undulating phase	IIIe-6	68	112	52	120	55	125
Eroded rolling phase	IVe-1	60	108	48	112	50	106
Eroded hilly phase	VIe-1	(4)	(4)	(4)	(4)	(4)	(4)
Louisburg sandy loam:							
Undulating phase	IVe-3	30	65	44	72	30	60
Rolling phase	IVe-3	24	50	36	64	25	52
Eroded rolling phase	IVe-3	(4)	(4)	(4)	(4)	(4)	(4)
Hilly phase	VIIe-1	(4)	(4)	(4)	(4)	(4)	(4)
Eroded hilly phase	VIIe-1	(4)	(4)	(4)	(4)	(4)	(4)
Madison sandy loam:							
Undulating phase	IIe-2	65	150	80	132	86	130
Eroded undulating phase	IIe-2	50	120	56	94	64	100
Rolling phase	IIIe-1	44	110	48	90	50	92
Eroded rolling phase	IIIe-2	(4)	(4)	40	78	45	76
Hilly phase	IVe-2	(4)	(4)	32	68	35	66
Eroded hilly phase	IVe-2	(4)	(4)	(4)	(4)	(4)	(4)
Madison clay loam:							
Eroded undulating phase	IIIe-6	44	100	40	85	45	90
Eroded rolling phase	IVe-1	36	88	34	80	40	82
Severely eroded rolling phase	IVe-1	(4)	(4)	(4)	(4)	(4)	(4)
Eroded hilly phase	VIe-1	(4)	(4)	(4)	(4)	(4)	(4)
Severely eroded hilly phase	VIe-1	(4)	(4)	(4)	(4)	(4)	(4)
Mixed alluvial land [5]	IIIw-2	30	70	(3)	(3)	(3)	(3)
Seneca sandy loam [7]	IIe-3	80	160	40	80	38	88
Starr loam [7]	IIe-3	84	190	56	120	43	100
Stony land	VIe-2	(4)	(4)	(4)	(4)	(4)	(4)
Vance fine sandy loam:							
Undulating phase	IIIe-4	46	92	52	100	45	93
Rolling phase	IIIe-5	40	88	48	92	40	88
Wehadkee silt loam	IVw-1	(4)	(4)	(4)	(4)	(4)	(4)
Wehadkee soils	VIIIw-1	(4)	(4)	(4)	(4)	(4)	(4)
Wickham fine sandy loam	IIe-1	90	180	92	128	68	125
Wilkes sandy loam:							
Undulating phase	IIIe-3	30	74	56	96	25	63
Rolling phase	IVe-3	28	64	48	70	20	54
Eroded rolling phase	IVe-3	(4)	(4)	(4)	(4)	(4)	(4)
Hilly phase	VIe-2	(4)	(4)	(4)	(4)	(4)	(4)
Eroded hilly phase	VIe-2	(4)	(4)	(4)	(4)	(4)	(4)
Worsham sandy loam	Vw-1	(4)	(4)	(4)	(4)	(4)	(4)
Worsham silt loam	Vw-1	(4)	(4)	(4)	(4)	(4)	(4)

[1] For tobacco, ratings are given only under columns B (good management) because the best practices known are followed in growing this crop.

[2] Cow-acre-days is a term used to express the carrying capacity of pasture. It represents the number of days in a year that 1 animal unit can be supported on 1 acre without injury to the pasture. An animal unit is 1 cow, steer, or horse, 5 hogs, or 7 sheep or goats. For example, a soil that would provide grazing for 1 animal unit to the acre for 100 days would rate 100 cow-acre-days; a soil that would provide grazing for 1 animal unit to 4 acres for 100 days would rate 25 cow-acre-days. For ratings in column A, the grazing period is estimated to be 180 days a year, and for those in column B, 210 days.

[3] The crop is not commonly grown.

Unified soil classification system.—This is a soil classification system in which the soil materials are identified as coarse grained (8 classes), fine grained (6 classes), or highly organic. The principal characteristics of these 15 classes of soils are given in table 5. The classification of the tested soils according to the Unified system is given in the last column of table 3.

DEFINITIONS OF TERMS

Liquid limit.—The moisture content at which the soil material passes from a plastic to a liquid state.

Maximum dry density.—The highest dry density obtained in the compaction test.

Moisture density.—If a soil material is compacted at successively higher moisture contents, assuming that the

under two levels of management—Continued

management; those in columns B are for good management]

Oats (100=50 bu.)		Tobacco (bright)[1] (100=1,000 lbs.)	Tobacco (dark)[1] (100=1,000 lbs.)	Lespedeza hay (100=1½ tons)		Mixed hay (100=2 tons)		Alfalfa hay (100=4 tons)		Pasture (100=100 cow-acre-days)[2]	
A	B	B	B	A	B	A	B	A	B	A	B
80	122	(4)	125	80	125	50	120	70	100	45	105
70	110	(4)	90	60	113	45	95	65	85	42	98
36	80	(4)	(4)	33	67	32	65	60	70	38	92
46	110	(4)	100	53	100	45	90	45	88	40	82
42	98	(4)	75	47	87	38	80	40	76	36	74
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	26	54
32	68	100	(4)	37	68	32	50	(4)	(4)	22	50
28	78	90	(4)	30	55	25	42	(4)	(4)	18	44
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	14	40
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	14	38
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	12	34
60	100	135	125	65	115	45	108	65	95	34	78
48	94	(3)	100	57	103	40	90	58	80	32	75
46	90	(3)	95	53	95	38	85	52	75	30	72
38	76	(4)	80	43	80	30	70	44	68	28	70
32	64	(4)	(4)	38	68	28	66	40	65	26	66
(4)	(4)	(4)	(4)	34	60	25	60	(4)	(4)	22	65
44	84	(4)	75	47	93	30	80	35	75	28	68
40	76	(4)	70	33	73	20	65	30	68	25	64
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	22	48
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	24	60
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
(3)	(3)	(3)	(3)	47	87	38	70	(4)	(4)	33	68
36	90	(4)	120	50	100	40	88	50	60	45	100
44	90	(4)	130	80	140	50	105	60	70	85	200
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	18	44
36	82	80	85	33	73	50	88	(4)	(4)	35	78
32	78	75	65	27	67	45	83	(4)	(4)	32	74
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	22	50
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
76	110	100	120	72	120	50	110	65	95	50	100
32	64	(4)	75	53	87	40	68	(4)	(4)	24	54
25	56	(4)	70	33	73	35	60	(4)	(4)	20	48
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	16	42
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	18	42
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	25	56
(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	28	62

[4] The crop is not commonly grown, and the soil is considered unsuitable for it under the management specified.

[5] Floodwaters occasionally damage crops on this soil, but the hazard of flooding was not considered in assigning productivity ratings.

[6] The productivity ratings under columns A are based on average yields to be expected without artificial drainage; the productivity ratings under columns B are based on the estimated average yields on adequately drained areas.

[7] Wheat, oats, and barley lodge on this soil.

compactive effort remains constant, the density of the compacted material will increase until the optimum moisture content is reached. After that, the density decreases with increase in moisture content. The highest dry density obtained in the compaction test is termed maximum dry density. Data showing moisture density are important in earthwork, for, as a rule, optimum stability is obtained if the soil is compacted to about the maximum dry density when it is at approximately the optimum moisture content.

Plastic limit.—The moisture content at which the soil material passes from a solid to a plastic state.

Plasticity index.—The numerical difference between the liquid limit and the plastic limit. The plasticity index indicates the range of moisture content within which a soil material is plastic.

Soil Engineering Tests and Classifications

To make the best use of the soil map and the soil survey report, the engineer needs to know the physical properties of the soil materials and the in-place condition of the soils. Some engineering information can be obtained from the soil map. It will often be necessary to refer to other sections of the report, however, particularly to the sections, Soil Series and Their Relations; Soil Descriptions; and Genesis, Morphology, and Classification of Soils. In this section several tables summarize the physical properties of the soils that affect their use in engineering structures and foundations. This information will aid the engineer in preliminary planning but is not intended as a substitute for the engineering tests that will need to be made at the site selected for construction.

Table 3 records data from 11 extensive soil types tested in accordance with standard procedures (*1*).[1] The data in this table were used in evaluating the soils of the county for engineering purposes. The engineering soil classifications in table 3 are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. Mechanical analyses were made by combined sieve and hydrometer methods. Percentages of clay obtained by the hydrometer method should not be used in naming the textural classes of soils.

Table 4 shows the characteristics of the soils that are considered in classifying them by the AASHO system (*1*), and table 5, those properties taken into account in classifying soils by the Unified system (*8*). These two tables are intended primarily for those not familiar with these systems of classification.

Table 6 summarizes the primary engineering features of a representative soil of each series—its permeability, structure, pH, shrink-swell potential, depth to water table, natural drainage, and suitability as a source of topsoil or for earthwork during prolonged wet periods. Other soils of the same series that were mapped in the county have essentially the same properties as the ones listed; for example, all of the Appling coarse sandy loams are much like Appling coarse sandy loam, undulating phase. In this table the depths for the profile are essentially the same as those given for the typical profile in the section, Soil Descriptions. They are not always identical, however, for the depths given in table 6 indicate changes in soil material that are significant to engineering. Hence, in table 6 adjacent soil layers having essentially the same engineering properties have been shown as one layer.

The estimated permeability of the soils listed in table 6 was based mostly on examination of soil texture and structure, but other properties of the soil may influence permeability. Permeability of each soil layer is important in planning the drainage for a farm and in other construction work. Layers that impede drainage or that are too permeable, in comparison to adjacent layers, may greatly affect the suitability of a soil for engineering purposes. Also to be considered in planning are soil structure, consistence, and content of organic matter, which affect the moisture-holding capacity of the soils.

[1] Italic numbers in parentheses refer to literature cited p. 85.

Soils whose volume changes greatly with variations in moisture generally are not suitable for road embankments or for the upper parts of earthen dams. Materials used for road subgrades or for the foundation of pavements should have a low shrink-swell potential.

Roadway designs in which the shoulders are wide and the slopes less steep than normal tend to prevent excessive changes in volume in the subgrade material beneath the pavement. The shrinking and swelling of the subgrade materials can also be controlled by compacting the materials to maximum density at or slightly above the optimum moisture content, as determined in the AASHO compaction test.

Table 6 shows the suitability of the various soils as sources of topsoil for use on embankments, shoulders, ditches, and cut slopes. The shoulders of roads that are intended to support only limited traffic preferably should be built of sandy loams or loamy sands.

The ratings given in table 6 for suitability of the soils for earthwork during prolonged wet periods are based on drainage as well as on the workability of the soils when wet. During prolonged wet periods, some soils may not dry out enough for earthwork, and as a result construction is delayed. Also, during prolonged wet periods the water table is nearer the surface than at any other time of the year. In Nottoway County the Louisburg soils are the only ones well suited to earthwork during prolonged wet periods. The Louisburg soils are permeable, they dry rapidly after rains, and their water table is below the normal depth of excavation.

Some of the soils are ponded or have a water table at shallow depths for long periods each year. Roads on these soils must be constructed on embankments or provided with an adequate system of underdrains and surface drains. In low areas and in other areas that are flooded, roads should be constructed on a continuous embankment that is several feet above the level of frequent floods.

The Augusta, Colfax, and Durham soils have a compact layer at shallow depths. This layer impedes vertical drainage, and as a result these soils have a perched water table. When roads are designed for nearly level areas of these soils, the side ditches of the roads should extend below the compact layer and the pavement grade needs to be at least 4 feet above the top of the compact layer. In steeper areas the road cuts normally extend below the compact layer. Nevertheless, adequate underdrainage must be provided if the construction changes from a cut section to a fill section. This can be done by excavating the compact layer and replacing it with a more permeable material. A similar problem is caused by the layers of very plastic clay in the Enon, Helena, Iredell, Mecklenburg, and Vance soils, and the same construction procedure should be used.

Pavements should not be constructed on a subgrade composed of soil material of which more than 35 percent passes the No. 200 sieve (0.074 mm. openings). Repeated movements of heavy-axle trucks on a rigid pavement over such a subgrade will cause the soil and water in the subgrade to be forced out through the joints and at the edges of the pavement. This pumping action occurs in many of the soils of the county, particularly in those that have undrained, compact layers or un-

drained layers of clay at a shallow depth below the pavement.

Soils in Conservation Engineering

The soils of Nottoway County vary widely in their suitability for sprinkler irrigation and for the construction of farm ponds, drainage systems for septic tanks, and foundations. Building these structures involves moving large quantities of earth and is expensive. If earthen structures are to perform satisfactorily, they need to be designed and planned well and built from suitable soil.

In table 7 the principal hazards affecting the construction of ponds are summarized for each soil series. In the same table, each series is rated according to its suitability for drainage fields for septic tanks, for sprinkler irrigation, and for foundations.

Farm ponds excavated in soils that have a sandy substratum or that are shallow over bedrock may have serious problems of leakage or seepage. Sand alone is a poor fill material for dams, and, if it is used, it may result in excessive seepage through the base of the dam or into the underlying formation. Likewise, the Madison soils are not satisfactory as fill material because they have a high content of mica, which prevents good compaction. In ponds over bedrock, there is the danger of leakage around the rocks as well as through the cracks in the rocks. Ponds excavated in areas subject to overflow may become clogged with sediments. As a result, they will require excessive maintenance.

Construction of ponds on the Iredell, Enon, Helena, Mecklenburg, and Vance soils may be somewhat limited because these soils can be worked only within a narrow range of moisture content.

In table 7, soils listed as "Good" in the column, Foundations, generally are the most stable for farm buildings and roads. Buildings and roads constructed on the soils listed as "Poor" in this column commonly sag.

TABLE 3.—*Engineering test data*[1] *for*

Soil name and location	Parent material	Bureau of Public Roads report number	Depth	Horizon	Moisture-density	
					Maximum dry density	Optimum moisture content
			Inches		*Lb. per cu. ft.*	*Percent*
Appling coarse sandy loam:						
1 mile SW of Wellville in Camp Pickett Military Reservation.	Granite	91490	0–5	A_1	121	10
		91491	12–27	B_2	102	21
		91492	43–59	C	93	27
Cecil fine sandy loam:						
1.5 miles SW of Nottoway Court House	Granite gneiss	91493	0–7	A_2	122	11
		91494	12–23	B_2	100	21
		91495	39–47	C	104	19
Colfax sandy loam:						
5 miles NE of Wellville	Granite	91477	7–14	A_2	122	10
		91478	14–19	B_2	115	14
		91479	19–28	B_{2m}	113	15
		91480	28–32	C	113	15
Durham fine sandy loam:						
3 miles NE of Spainville	Granite	91496	7–16	A_2	129	7
		91497	20–29	B_{21}	114	15
		91498	29–41	B_{2m}	116	14
		91499	41–78	B^3	119	13
		91500	78–92	C	119	12
Enon fine sandy loam:						
3 miles E of Fergusonville	Granite gneiss and hornblende gneiss.	91484	0–9	A_p	123	10
		91485	12–21	B_2	91	26
		91486	27–40	C	106	18
Helena fine sandy loam:						
7 miles NE of Crewe	Mixture of hornblende gneiss and granite gneiss.	91481	3–10	A_2	127	9
		91482	15–27	B_{2m}	100	22
		91483	36–48	C	118	13
Louisburg sandy loam:						
0.75 mile SW of Crewe	Granite gneiss	91501	3–16	A_2	122	9
		91502	16–26	C	119	11
Madison sandy loam:						
1.25 miles SE of Nottoway Court House	Quartz mica gneiss	91503	1–6	A_2	122	11
		91504	6–20	B_2	100	23
		91505	28–40	C	102	20
Vance sandy loam:						
5 miles SW of Crewe	Granite gneiss mixed with hornblende gneiss.	91487	0–8	A_p	123	9
		91488	13–24	B_2	103	21
		91489	40–52	C	96	24
Wehadkee silt loam:						
3 miles SW of Blackstone	Alluvium	91506	0–22	A_2	97	23
Worsham silt loam:						
1 mile NW of The Falls	Colluvium	91507	0–7	A_2	110	16
		91508	10–46	B_2	104	20
		91509	46–62	C	113	14

[1] Tests performed by Bureau of Public Roads in accordance with standard procedures of the American Association of State Highway Officials (AASHO).

[2] Mechanical analyses according to the AASHO Designation, T. 88. Results by this procedure frequently differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 mm. in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method, and the material coarser than 2 mm. in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes of soils.

soil samples taken from 11 soil profiles

Mechanical analysis[2]											Liquid limit	Plasticity index	Classification	
Percentage passing sieve							Percentage smaller than—							
¾ in.	⅜ in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO[3]	Unified[4]
			100	80	66	35	31	22	11	8	18	2	A–2–4(0)	SM
			100	92	86	71	70	65	54	48	55	26	A–7–6(16)	MH–CH
			100	97	90	69	68	61	46	40	63	23	A–7–5(15)	MH
		100	98	83	70	41	37	28	15	9	20	3	A–4(1)	SM
			100	95	90	74	63	49	41	39	51	25	A–7–6(16)	CH
			100	89	80	55	49	38	27	25	42	12	A–7–5(5)	ML
			100	78	68	52	45	31	16	10	18	2	A–4(3)	ML
			100	80	72	58	54	45	30	24	33	13	A–6(6)	CL
			100	83	75	60	54	43	32	26	34	14	A–6(7)	CL
			100	70	62	47	42	34	25	18	31	10	A–4(2)	SC
			100	79	62	33	29	21	12	6	12	2	A–2–4(0)	SM
			100	83	71	51	48	41	34	31	40	18	A–6(6)	CL
			100	88	73	53	47	38	32	29	39	16	A–6(6)	CL
			100	79	65	45	40	34	27	23	34	16	A–6(4)	SC
			100	74	56	34	30	24	22	21	34	15	A–2–6(1)	SC
		100	99	82	70	36	30	20	12	9	18	1	A–4(0)	SM
			100	95	91	80	78	72	65	62	86	53	A–7–5(20)	CH
			100	87	75	51	46	38	23	18	41	17	A–7–6(6)	ML–CL
			100	79	66	40	36	28	18	11	17	3	A–4(1)	SM
			100	91	86	75	73	68	60	55	75	43	A–7–5(20)	CH
			100	74	60	34	29	21	14	11	31	7	A–2–4(0)	SM
		100	97	65	50	30	25	18	12	7	18	1	A–2–4(0)	SM
		100	99	67	52	30	24	16	10	8	23	0	A–2–4(0)	SM
100	99	99	98	61	50	33	29	22	14	9	24	4	A–2–4(0)	SM–SC
			100	82	74	61	61	58	50	46	64	31	A–7–5(16)	MH–CH
			100	75	61	41	39	35	26	22	58	9	A–5(2)	SM
100	99	99	99	76	60	29	24	15	8	4	16	1	A–2–4(0)	SM
			100	90	82	67	67	62	50	43	57	29	A–7–6(17)	MH–CH
			100	95	87	63	63	57	42	36	65	28	A–7–5(16)	MH
			100	98	93	80	79	72	55	38	46	17	A–7–6(12)	ML
			100	93	88	72	65	51	33	26	31	9	A–4(7)	ML–CL
			100	97	95	86	82	72	58	48	60	34	A–7–6(20)	CH
			100	92	86	68	62	52	41	35	48	26	A–7–6(14)	CL

[3] Based on the Classification of Soils and Soil-Aggregate Mixtures for Highway Purposes, AASHO Designation: M 145–49.
[4] Based on the Unified Soil Classification System, Tech. Memo. No. 3–357, v. 1, Waterways Experiment Station, Corps of Engineers, March 1953.

TABLE 4.—*Classification used by the*

General classification	Granular materials (35 percent or less passing No. 200 sieve)				
Group classification	A-1		A-3	A-2	
	A-1-a	A-1-b		A-2-4	A-2-5
Sieve analysis:					
Percent passing—					
No. 10	50 maximum.				
No. 40	30 maximum.	50 maximum.	51 minimum.		
No. 200	15 maximum.	25 maximum.	10 maximum.	35 maximum.	35 maximum.
Characteristics of fraction passing No. 40 sieve:					
Liquid limit			NP [2]	40 maximum.	41 minimum.
Plasticity index	6 maximum.	6 maximum.	NP	10 maximum.	10 maximum.
Group index	0	0	0	0	0
Usual types of significant constituent material	Stone fragments, gravel, and sand.	Stone fragments, gravel, and sand.	Fine sand.	Silty gravel and sand.	Silty gravel and sand.
General rating as subgrade	Excellent to good.				

Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (pt. 1; ed. 7): The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, AASHO. Designation: M 145–49.

American Association of State Highway Officials [1]

Granular materials—Continued (35 percent or less passing No. 200 sieve)		Silt-clay materials (more than 35 percent passing No. 200 sieve)				
A–2—Continued		A–4	A–5	A–6	A–7	
A–2–6	A–2–7				A–7–5	A–7–6
35 maximum.	35 maximum.	36 minimum.	36 minimum.	36 minimum.	36 minimum.	36 minimum.
40 maximum. 11 minimum. 4 maximum. Clayey gravel and sand.	41 minimum. 11 minimum. 4 maximum. Clayey gravel and sand.	40 maximum. 10 maximum. 8 maximum. Nonplastic to moderately plastic silty soils.	41 minimum. 10 maximum. 12 maximum. Highly elastic silts.	40 maximum. 11 minimum. 16 maximum. Medium plastic clays.	41 minimum. 11 minimum.[3] 20 maximum. Highly plastic clays.	41 minimum. 11 minimum.[3] 20 maximum. Highly plastic clays.
Fair to poor						

[2] NP=Nonplastic.

[3] Plasticity index of A–7–5 subgroup is equal to or less than LL minus 30. Plasticity index of A–7–6 subgroup is greater than LL minus 30.

TABLE 5.—*Characteristics of soil groups*

Major divisions	Group symbol	Soil description	Value as foundation material [2]	Value as base course directly under bituminous pavement
Coarse-grained soils (*50 percent or less passing No. 200 sieve*):				
Gravels and gravelly soils (*more than half of coarse fraction retained on No. 4 sieve*).	GW	Well-graded gravels and gravel-sand mixtures; little or no fines.	Excellent	Good
	GP	Poorly graded gravels and gravel-sand mixtures; little or no fines.	Good to excellent.	Poor to fair
	GM	Silty gravels and gravel-sand-silt mixtures.	Good	Poor to good
	GC	Clayey gravels and gravel-sand-clay mixtures.	Good	Poor
Sands and sandy soils (*more than half of coarse fraction passing No. 4 sieve*).	SW	Well-graded sands and gravelly sands; little or no fines.	Good	Poor
	SP	Poorly graded sands and gravelly sands; little or no fines.	Fair to good	Poor to not suitable.
	SM	Silty sands and sand-silt mixtures	Fair to good	Same
	SC	Clayey sands and sand-clay mixtures	Fair to good	Not suitable
Fine-grained soils (*more than 50 percent passing No. 200 sieve*):				
Silts and clays (*liquid limit of 50 or less*)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, and clayey silts of slight plasticity.	Fair to poor	Not suitable
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, and lean clays.	Fair to poor	Not suitable
	OL	Organic silts and organic clays having low plasticity.	Poor	Not suitable
Silts and clays (*liquid limit greater than 50*)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, and elastic silts.	Poor	Not suitable
	CH	Inorganic clays having high plasticity and fat clays.	Poor to very poor.	Not suitable
	OH	Organic clays having medium to high plasticity and organic silts.	Same	Not suitable
Highly organic soils	Pt	Peat and other highly organic soils	Not suitable	Not suitable

[1] Based on information in the Unified Soil Classification System, Tech.-Memo. No. 3–357, v. 1, 2, and 3, Waterways Experiment Station, Corps of Engineers, 1953. Ratings and ranges in test values are for guidance only. Design should be based on field survey and test of sample from construction site.

in Unified soil classification system [1]

Value for embankments	Compaction: Characteristics and recommended equipment	Approximate range in AASHO maximum dry density [3]	Field (in-place) CBR	Subgrade modulus k	Drainage characteristics	Comparable groups in AASHO classification
		Lb./cu. ft.		*Lb./sq. in./in.*		
Very stable; use in pervious shells of dikes and dams.	Good; use crawler-type tractor, pneumatic-tire roller, or steel-wheel roller.	125–135	60–80	300+	Excellent	A–1.
Reasonably stable; use in pervious shells of dikes and dams.	Same	115–125	25–60	300+	Excellent	A–1.
Reasonably stable; not particularly suited to shells but may be used for impervious cores or blankets.	Good, but needs close control of moisture; use pneumatic-tire or sheepsfoot roller.	120–135	20–80	200–300+	Fair to practically impervious.	A–1 or A–2.
Fairly stable; may be used for impervious cores.	Fair; use pneumatic-tire or sheepsfoot roller.	115–130	20–40	200–300	Poor to practically impervious.	A–2.
Very stable; may be used in pervious sections; slope protection required.	Good; use crawler-type tractor or pneumatic-tire roller.	110–130	20–40	200–300	Excellent	A–1.
Reasonably stable; may be used in dike section having flat slopes.	Same	100–120	10–25	200–300	Excellent	A–1 or A–3.
Fairly stable; not particularly suited to shells but may be used for impervious cores or dikes.	Good, but needs close control of moisture; use pneumatic-tire or sheepsfoot roller.	110–125	10–40	200–300	Fair to practically impervious.	A–1, A–2, or A–4.
Fairly stable; use as impervious core for flood-control structures.	Fair; use pneumatic-tire roller or sheepsfoot roller.	105–125	10–20	200–300	Poor to practically impervious.	A–2, A–4, or A–6.
Poor stability; may be used for embankments if properly controlled.	Good to poor; close control of moisture is essential; use pneumatic-tire or sheepsfoot roller.	95–120	5–15	100–200	Fair to poor	A–4, A–5, or A–6.
Stable; use in impervious cores and blankets.	Fair to good; use pneumatic-tire or sheepsfoot roller.	95–120	5–15	100–200	Practically impervious.	A–4, A–6, or A–7.
Not suitable for embankments	Fair to poor; use sheepsfoot roller.[4]	80–100	4–8	100–200	Poor	A–4, A–5, A–6, or A–7.
Poor stability; use in core of hydraulic fill dam; not desirable in rolled fill construction.	Poor to very poor; use sheepsfoot roller.[4]	70–95	4–8	100–200	Fair to poor	A–5 or A–7.
Fair stability on flat slopes; use in thin cores, blankets, and dike sections of dams.	Fair to poor; use sheepsfoot roller.[4]	75–105	3–5	50–100	Practically impervious.	A–7.
Not suitable for embankments	Poor to very poor; use sheepsfoot roller.[4]	65–100	3–5	50–100	Practically impervious.	A–5 or A–7.
Not used in embankments, dams, or subgrades for pavements					Fair to poor	None.

[2] Ratings are for subgrade and subbases for flexible pavement.
[3] Determined in accordance with test designation: T 99–49, AASHO (pt. 2).
[4] Pneumatic-tire rollers may be advisable, particularly when moisture content is higher than optimum.

TABLE 6.—*Engineering*

Map symbol	Soil name	Depth [2]	Dominant texture	Classification		Permeability	Structure	pH
				AASHO	Unified			
		Inches				*Inches per hour*		
Ac	Appling coarse sandy loam, undulating phase (2 to 7 percent slopes).	0–12	Coarse sandy loam	A–2	SM	2. 5 – 5. 0	Granular	4. 5–5. 0
		12–43	Clay loam	A–7	MH–CH	. 8 – 2. 5	Subangular blocky.	4. 5–5. 0
		43–59	Loam to silt loam	A–7	MH	. 8 – 2. 5	Structureless	4. 5–5. 0
Ao	Augusta loam (0 to 2 percent slopes).	0–7	Loam	A–6	ML–CL	. 8 – 2. 5	Granular	4. 5–5. 0
		7–22	Clay loam to clay	A–7	MH–CH	. 05– . 2	Subangular blocky to platy.	5. 0–5. 5
		22–34	Fine sandy loam (fragipan).	A–4	SM	. 8 – 2. 5	Subangular blocky.	4. 5–5. 0
Ba	Bremo loam, eroded rolling phase (7 to 12 percent slopes).	0–17	Loam	A–4 or A–6.	ML–CL	. 8 – 2. 5	Granular	5. 1–6. 0
		17–21+	Partially weathered hornblende gneiss.	A–2	SM–SC	5. 0 –10. 0	Structureless	5. 6–6. 5
Ch	Cecil fine sandy loam, undulating phase (2 to 7 percent slopes).	0–7	Fine sandy loam	A–4	SM	2. 5 – 5. 0	Granular	4. 5–5. 5
		7–12	Fine sandy clay loam	A–7	ML	. 8 – 2. 5	Subangular blocky.	4. 5–5. 0
		12–39	Clay to silty clay loam.	A–7	CH	. 8 – 2. 5	Subangular blocky.	5. 1–5. 5
		39–47	Fine sandy clay loam.	A–7	ML	. 8 – 2. 5	Subangular blocky to structureless.	5. 1–5. 5
Co	Chewacla silt loam (0 to 2 percent slopes).	0–32	Silt loam	A–6 or A–7.	ML	. 05– . 2	Granular	5. 1–5. 5
		32–40	Silty alluvial material containing some fragments of rock.	A–7	ML–CL	(5)	Structureless	5. 1–5. 5
Cp	Colfax sandy loam, undulating phase (2 to 12 percent slopes).	0–14	Sandy loam	A–4	ML	2. 5 – 5. 0	Granular	4. 5–5. 0
		14–19	Sandy clay loam	A–6	CL	. 05– . 2	Subangular blocky.	4. 5–5. 0
		19–28	Sandy loam (fragipan).	A–6	CL	(5)	Weak platy	4. 5–5. 0
		28–32+	Sandy loam, granite or granite gneiss.	A–4	SC	(5)	Structureless	4. 5–5. 0
Da	Durham coarse sandy loam, undulating phase (2 to 7 percent slopes).	0–18	Coarse sandy laom	A–2	SM	5. 0 –10. 0	Granular	4. 5–5. 0
		18–29	Sandy clay loam	A–6	CL	2. 5 – 5. 0	Subangular blocky.	4. 5–5. 0
		29–41	Sandy clay loam (fragipan).	A–6	CL	. 05– . 2	Subangular blocky.	4. 5–5. 0
		41–78	Sandy clay loam	A–6	SC	2. 5 – 5. 0	Subangular blocky.	5. 1–5. 5
		78–92	Weathered granite or granite gneiss.	A–2	SC	5. 0 –10. 0	Structureless	4. 5–5. 0

See footnotes at end of table.

interpretations of representative soils [1]

Shrink-swell potential	Kind of bedrock and approximate depth to bedrock	Depth to water table [3]	Natural drainage	Suitability—		Desirable location of gradeline	Remarks
				As source of topsoil [4]	For earthwork during prolonged wet periods		
		Feet					
Low Moderate. to low. Moderate to low.	Granite or granite gneiss at depths of 20 to 35 feet.	More than 10.	Good	Fair	Fair	Anywhere	The surface layer is a source of subgrade material. Several borrow pits are located in this soil.
Low Moderate. Low.	Granite, granite gneiss, or schist at depths greater than 10 feet.	1½	Somewhat poor.	Good	Unsuitable.	Anywhere adequate subdrainage is provided.	This soil has formed in alluvial material on low stream terraces.
Low Moderate. to low.	Hornblende gneiss at depths of 1½ to 2½ feet.	More than 10.	Excessive	Good	Fair	Influenced by bedrock.	
Low Moderate to low. Moderate. Moderate.	Granite or granite gneiss at depths of 15 to 30 feet.	More than 12.	Good	Fair	Fair	Anywhere.	
Moderate Moderate.	Variable bedrock at depths greater than 10 feet.	1	Somewhat poor.	Good	Unsuitable.	At least 4 feet above high water table.	Bedrock generally is so deep that it is no problem in highway engineering; the soil has formed from recent alluvium and is subject to periodic overflows; except during dry periods, water table usually is within 20 inches of the surface.
Low Low to moderate. Low. Low.	Granite or granite gneiss at depths of 15 to 30 feet.	1	Somewhat poor.	Fair	Unsuitable.	Anywhere adequate subdrainage is provided.	The surface layer is a source of subgrade material; the somewhat poor drainage is the result of a perched water table over a fragipan and of seepage from higher surrounding areas.
Low Low to moderate. Low to moderate. Low to moderate. Low.	Granite or granite gneiss at depths of 20 to 35 feet.	2	Moderately good.	Fair	Fair	Anywhere adequate subdrainage is provided.	Perched water table is over fragipan; lateral drains should go below fragipan.

TABLE 6.—*Engineering interpretations*

Map symbol	Soil name	Depth [2]	Dominant texture	Classification		Permeability	Structure	pH
				AASHO	Unified			
Ea	Enon fine sandy loam, undulating phase (2 to 7 percent slopes).	0–12	Fine sandy loam	A–4	SM	0.8 – 2.5	Granular	5.6–6.0
		12–21	Clay	A–7	CH	.2 – .8	Weak subangular blocky to massive.	5.6–6.5
		21–27	Clay loam	A–7	MH–CH	.2 – .8	Massive	5.6–6.5
		27–40	Fine sandy loam material.	A–7	ML–CL	.8 – 2.5	Structureless	5.6–7.3
(6)	Georgeville very fine sandy loam, undulating phase (2 to 7 percent slopes).	0–8	Very fine sandy loam.	A–4	ML	2.5 – 5.0	Granular	5.1–5.5
		8–40	Silty clay to silty clay loam.	A–7	MH	.8 – 2.5	Subangular blocky.	5.1–5.5
		40–54	Soft, decomposed schist high in silt.	A–7	MH	5.0 –10.0	Structureless	4.5–5.0
Ha	Helena fine sandy loam, undulating phase (2 to 7 percent slopes).	0–15	Fine sandy loam	A–4	SM	2.5 – 5.0	Granular to subangular blocky.	5.1–5.5
		15–36	Clay to clay loam	A–7	CH–MH	.05– .2	Subangular blocky to massive.	5.6–6.0
		36–48	Fine sandy loam material.	A–2	SM	.8 – 2.5	Structureless	5.6–6.0
(7)	Herndon very fine sandy loam, undulating phase (2 to 7 percent slopes).	0– 7	Very fine sandy loam.	A–4	ML	.8 – 2.5	Granular	4.5–5.0
		7–29	Silty clay loam to silty clay.	A–7	MH–CH	.8 – 2.5	Subangular blocky.	5.0–5.5
		29–40+	Highly silty material	A–7	MH	5.0 –10.0	Subangular blocky to structureless.	4.5–5.0
(8)	Iredell loam, undulating phase (2 to 7 percent slopes).	0–9	Loam	A–4	ML–CL	.8 – 2.5	Granular	5.1–6.0
		9–26	Clay	A–7	CH	(5)	Massive	5.6–6.5
		26–31+	Highly weathered hornblende gneiss and diabase material.	A–7	CH	(5)	Structureless	6.1–7.3
Ld	Lloyd loam, undulating phase (2 to 7 percent slopes).	0–12	Loam	A–4 or A–6.	ML–CL	.8 – 2.5	Granular	5.6–6.0
		12–42	Clay	A–7	MH	.8 – 2.5	Subangular blocky.	5.6–6.5
		42–66	Silty clay loam	A–7	MH	.8 – 2.5	Subangular blocky.	5.6–6.5
		66–76+	Silt loam material	A–6	ML–CL	.8 – 2.5	Structureless	5.6–6.5
Lg	Louisburg sandy loam, undulating phase (2 to 7 percent slopes).	0–16	Sandy loam	A–2	SM	5.0 –10.0	Granular	4.5–5.0
		16–26	Sandy loam	A–2	SM	5.0 –10.0	Structureless	4.5–5.0
Mf	Madison sandy loam, undulating phase (2 to 7 percent slopes).	0–6	Sandy loam	A–2	SM–SC	5.0 –10.0	Granular	4.5–5.5
		6–28	Clay loam to heavy silt loam.	A–7	MH or CH	.8 – 2.5	Subangular blocky.	5.1–5.5
		28–40+	Weathered quartz mica gneiss.	A–5	SM	5.0 –10.0	Structureless	5.1–5.5

See footnotes at end of table.

of representative soils [1]—Continued

Shrink-swell potential	Kind of bedrock and approximate depth to bedrock	Depth to water table [3]	Natural drainage	Suitability—		Desirable location of gradeline	Remarks
				As source of topsoil [4]	For earthwork during prolonged wet periods		
Low High. Moderate to high. Moderate to low.	Hornblende gneiss at depths of 4 to 9 feet.	More than 6.	Moderately good.	Good	Unsuitable	Anywhere (see Remarks).	The expandable clay subsoil layer should be removed and replaced by suitable subgrade material.
Low Moderate. Moderate.	Fine-grained schist at depths of 20 to 40 feet.	More than 10.	Good	Fair	Fair	Anywhere.	
Low Very high to high. Moderate to high.	Granite gneiss and hornblende gneiss at depths of 8 to 20 feet.	1½	Somewhat poor	Fair	Unsuitable	At least 4 feet above water table (see Remarks).	Water accumulates above the expandable clay layer during wet seasons; this clay layer should be excavated and replaced with suitable subgrade material.
Low Moderate. Moderate.	Fine-grained schist at depths of 20 to 40 feet.	More than 10.	Good	Fair	Fair	Anywhere.	
Moderate Very high. High to moderate.	Hornblende gneiss or diabase at depths of 4 to 7 feet.	1	Somewhat poor.	Fair	Unsuitable	At least 4 feet above water table (see Remarks).	Water accumulates above the expandable clay layer during wet seasons; this layer should be excavated and replaced with suitable subgrade material.
Low to moderate. Moderate. Moderate. Moderate.	Granite gneiss and hornblende gneiss at depths of 10 to 25 feet.	More than 10.	Good	Good	Unsuitable	Anywhere.	
Low Low.	Granite, granite gneiss, or pegmatite at depths of 2 to 6 feet.	More than 10.	Excessive	Poor	Good	Depends on bedrock.	This soil is a source of subgrade material.
Low Moderate. Moderate to low.	Quartz mica gneiss at depths of 6 to 20 feet.	More than 10.	Good	Fair	Fair	Anywhere (see Remarks).	The high content of mica in the soil makes it hard to pack, so it is not suitable for dams or subgrade material for roads; the subsoil has to be replaced for good compaction.

TABLE 6.—*Engineering interpretations*

Map symbol	Soil name	Depth [2]	Dominant texture	Classification		Permeability	Structure	pH
				AASHO	Unified			
([9])	Mecklenburg loam, undulating phase (2 to 7 percent slopes).	0–12	Loam	A–6	ML–CL	0.8 – 2.5	Granular	5.1–6.0
		12–30	Clay	A–7	MH	.2 – .8	Subangular blocky to massive.	5.6–6.5
		30–36+	Sandy loam material	A–2	SM–SC	.2 – .8	Structureless	6.1–7.3
Sa	Seneca sandy loam (2 to 7 percent slopes).	0–32	Sandy loam	A–2	SM	5.0 –10.0	Granular	5.1–6.0
		32–36+	Sandy clay loam	A–4 or A–6.	ML	.8 – 2.5	Structureless	5.1–6.0
Sb	Starr loam (2 to 7 percent slopes).	0–8	Loam	A–4 or A–6.	ML–CL	.8 – 2.5	Granular	5.6–6.0
		8–30	Silty clay loam	A–7	MH–CH	.8 – 2.5	Subangular blocky.	5.6–6.0
		30–40+	Silty material	A–7	ML–CL	.8 – 2.5	Structureless	5.6–6.0
Va	Vance fine sandy loam, undulating phase (2 to 7 percent slopes).	0–10	Fine sandy loam	A–2	SM	.8 – 2.5	Granular	4.5–5.0
		10–22	Clay	A–7	MH–CH	.05– .8	Subangular blocky.	5.1–5.5
		22–42	Clay loam	A–7	MH	.05– .8	Subangular blocky.	5.1–5.5
		42–52	Loam	A–7	MH	.02– .8	Structureless	5.1–6.0
Wa	Wehadkee silt loam (0 to 2 percent slopes).	0–22	Silt loam	A–7	ML	([5])	Subangular blocky.	4.5–5.0
		22–56	Light silty clay loam	A–7	ML	([5])	Massive to subangular blocky.	5.1–5.5
		56–64+	Mixture of sand, silt, and gravel.	A–4	SM or SC	([5])	Structureless	5.1–5.5
Wc	Wickham fine sandy loam (2 to 7 percent slopes).	0–11	Fine sandy loam	A–2	SM	2.5 – 5.0	Granular	5.1–5.5
		11–66	Clay loam to sandy clay loam.	A–6 or A–7.	ML, MH, or CH.	.8 – 2.5	Subangular blocky.	5.1–6.0
		66–77+	Fine sandy loam	A–2 or A–4.	SM	5.0 –10.0	Structureless	5.1–5.5
Wd	Wilkes sandy loam, undulating phase (2 to 7 percent slopes).	0–17	Sandy loam to fine sandy loam.	A–2	SM	5.0 –10.0	Weak granular to structureless.	4.5–5.0
		17–25	Soft, decomposed granite, granite gneiss, hornblende gneiss, diabase, and quartz mica gneiss.	A–4 or A–5.	SM–ML	.8 –10.0	Structureless	5.1–6.5
Wl	Worsham silt loam (0 to 7 percent slopes).	0–7	Silt loam	A–4	ML–CL	.05– .2	Granular	5.1–5.5
		7–46	Clay loam	A–7	CH	([5])	Subangular blocky.	5.1–6.0
		46–62	Clay loam	A–7	CL	([5])	Structureless	5.1–5.5

[1] Data for the soil most nearly representative of each series. In eroded soils the second layer of the profile described generally is the surface layer of the severely eroded phase.
[2] Profiles are divided into layers significant to engineers.
[3] Minimum depth to water table during wettest periods.
[4] Rating is for the surface layer, or the A horizon, that is used on embankments, cut slopes, and ditches to promote the growth of plants.
[5] Less than 0.05.

of representative soils [1]—Continued

Shrink-swell potential	Kind of bedrock and approximate depth to bedrock	Depth to water table [3]	Natural drainage	Suitability—		Desirable location of gradeline	Remarks
				As source of topsoil [4]	For earthwork during prolonged wet periods		
Moderate to low. High. Moderate.	Hornblende gneiss at depths of 4 to 10 feet.	More than 8.	Moderately good.	Fair	Unsuitable	Anywhere (see Remarks).	The clay subsoil layer should be excavated and replaced with suitable subgrade material.
Low Moderate.	Granite, granite gneiss, or schist at depths greater than 3 feet.	2	Moderately good.	Fair	Fair	At least 4 feet above water table.	This soil has formed from local alluvium or colluvium.
Low to moderate. Moderate. Moderate.	Granite, gneiss, or schist at depths greater than 3 feet.	3½	Moderately good.	Good	Unsuitable	At least 4 feet above water table.	This soil has formed from local alluvium and colluvium.
Low High. High. Moderate.	Granite, granite gneiss, hornblende gneiss, or diabase at depths of 8 to 20 feet.	2	Moderately good.	Fair	Unsuitable	At least 4 feet above water table.	During wet seasons, water accumulates above the expandable clay layer; this layer should be excavated and replaced with suitable material.
Moderate Moderate. Low.	Variable bedrock at depths greater than 10 feet.	0	Poor	Poor	Unsuitable	At least 4 feet above high water table.	Bedrock generally is too deep to present problems in highway engineering; the soil has formed from recent alluvium and is subject to frequent flooding; the water table is near the surface most of the year.
Low Moderate. Low.	Granite, granite gneiss, or schist at depths greater than 10 feet.	More than 10.	Good	Good	Fair	Anywhere	This soil has formed over young alluvial deposits on narrow stream terraces.
Low Moderate.	Granite, granite gneiss, hornblende gneiss, diabase, and quartz mica gneiss at depths of 2 to 5 feet.	More than 10.	Excessive	Poor	Fair	Depends on bedrock.	
Moderate Moderate. Moderate.	Granite, granite gneiss, or schist at depths greater than 3 feet.	0	Poor	Poor	Unsuitable	At least 4 feet above water table.	This soil has formed from local alluvium and colluvium; it is wet throughout the year because of a high water table and seepage water.

[6] Mapped only in undifferentiated soil groups with Cecil soils.
[7] Mapped only in undifferentiated soil groups with Appling soils.
[8] Mapped only in a soil complex with Mecklenburg soils.
[9] Mapped only in a soil complex with Iredell soils.

TABLE 7.—*Soil features*

Soil series	Farm ponds	
	Kind	Hazards
Excessively drained soils:		
Bremo	Impounded and excavated	Leakage through rock strata
Louisburg	Impounded and excavated	Possible overflow. Possible leakage around bedrock and through cracks.
Wilkes	Impounded and excavated	Possible leakage through and around rock strata
Well-drained soils:		
Appling	Impounded and excavated	Possible overflow
Cecil	Impounded and excavated	Possible overflow
Georgeville	Impounded and excavated	Possible overflow. Possible leakage through underlying schist material.
Herndon	Impounded and excavated	Possible overflow. Possible leakage through underlying schist material.
Lloyd	Impounded and excavated	Possible overflow
Madison	Impounded and excavated	Possible overflow. Possible leakage through rock strata; dams may leak because of lack of compaction as a result of the high content of mica.
Wickham	Impounded and excavated	Possible leakage through deep sand strata
Moderately well drained soils:		
Durham	Impounded and excavated	Possible overflow. Possible leakage through deep sand strata.
Enon [4]	Impounded and excavated	Possible overflow
Mecklenburg	Impounded and excavated	Possible overflow
Seneca	Impounded and excavated	Possible overflow. Possible leakage through sand strata
Starr [4]	Impounded and excavated	Possible overflow
Vance	Impounded and excavated	Possible overflow
Somewhat poorly drained soils:		
Augusta	Excavated	Seepage through sand strata; seepage through holes left by decaying logs and roots.
Chewacla [5]	Excavated or impounded	Leakage through sand or gravel strata
Colfax	Excavated or impounded	Possible leakage through sand strata
Helena	Impounded and excavated	Possible overflow
Iredell	Impounded and excavated	Possible overflow
Poorly drained soils:		
Wehadkee	Excavated or impounded	Possible leakage through sand strata
Worsham	Excavated or impounded	Possible overflow. Possible leakage through sand strata

[1] Good—Percolation rate at a depth of 28 inches must be greater than 1 inch per hour. More than 90 percent of the septic tanks in soils with this rating are successful.
Fair—Percolation rate barely 1 inch per four. Requires an on-site check.
Unsuitable—Percolation rate is less than 1 inch per hour.
[2] Based on estimated intake rate, which is determined by texture, structure, and content of organic matter.

Soil Survey Methods and Definitions

The scientist who makes a soil survey examines soils in the fields and woodlands. He classifies the soils in accordance with the facts observed and maps their boundaries on an aerial photograph or other map. The map shows the location of each kind of soil identified, as well as the roads, houses, streams, railroads, and other natural and cultural features of the landscape.

FIELD STUDY.—The soil scientist records everything about the soils that he believes might affect their suitability for farming. He examines surface soils and subsoils; measures slopes with a hand level; and notes differences in growth of crops, weeds, trees, and other vegetation. He 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. Most of the time they are not more than a quarter of a mile apart, and sometimes they are much closer. Each excavation reveals several distinct layers, called *soil horizons*, which collectively are known as the *soil profile*. Each horizon is studied to see how it differs from others in the profile and to learn the things about the soil that influence its capacity to support plant growth.

Color is normally related to the amount of organic matter in the soil. 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. Other colors may reflect the kind of parent material or soil weathering processes.

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

affecting conservation work

Suitability for—		
Drainage systems of septic tanks [1]	Sprinkler irrigation [2]	Foundations [3]
Unsuitable (soil is too shallow above bedrock)	Good (soil is used only for pasture)	Good.
Good (may be limited by shallow depth to bedrock and steep slopes).	Good	Good.
Unsuitable	Fair (soil is used only for pasture)	Fair.
Fair	Good	Good.
Good	Good	Good.
Good	Good	Good.
Fair	Good	Good.
Good	Good	Good.
Good	Good	Good.
Good	Good	Good.
Fair	Good	Good.
Unsuitable	Fair	Poor.
Unsuitable	Fair	Poor.
Unsuitable (water table is too high at times)	Good	Fair.
Unsuitable (water table is too high at times)	Good	Fair.
Unsuitable	Fair	Fair.
Unsuitable	Fair	Poor.
Unsuitable	Fair	Poor.
Unsuitable	Fair	Fair to poor.
Unsuitable	Fair	Poor.
Unsuitable	Poor	Poor.
Unsuitable	Not needed	Poor.
Unsuitable	Not needed	Poor.

[3] Based on the weight-supporting qualities of the soil.
[4] Ranges from moderately well drained to well drained.
[5] Ranges from somewhat poorly drained to moderately well drained.

Structure is the way the individual soil particles are arranged in larger aggregates, or peds, and the amount of pore (open) space between the aggregates. Structure indicates the ease or difficulty with which the soil is penetrated by plant roots, water, and air.

Other characteristics observed in field study and considered in classifying the soil are the depth of the soil over bedrock or compact layers; the presence of gravel or stones that may interfere with cultivation; the steepness and pattern of slopes; the degree of erosion; the nature of the underlying material from which the soil developed; and the reaction (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 in phases, types, and series. The soil type is the basic unit of classification. A soil type may consist of several phases. Types that resemble each other in most characteristics are grouped in soil series.

Soil type.—Soils similar in kind, thickness, and arrangement of horizons, and having essentially the same texture in the surface soil, are classified as members of one soil type.

Soil phase.—Soil types are frequently divided into phases because of differences other than those in kind, thickness, and arrangement of horizons. Frequently, these differences are significant in managing the soil. Among the characteristics that suggest dividing a soil type into phases are variation in slope, frequency of rock outcrop, degree of erosion, depth of soil over subsoil, and natural drainage.

The soil phase (or the soil type if it has not been divided into phases) is the unit shown on the soil map. It is the unit that has the smallest range of characteristics. Use and management, therefore, can be specified more easily than for broader groups of soils that necessarily contain more variation.

Soil series.—Two or more soil types that are similar in kind, thickness, and arrangement of soil layers are

normally designated as a soil series. In some places, however, a soil series may be represented by only one soil type. Each soil series is named for a place near which it was first mapped. For example, the Durham series was identified and mapped for the first time near the town of Durham in North Carolina.

Miscellaneous land types.—Areas that have little true soil are not classified in types, phases, or series; they are identified by descriptive names. In Nottoway County the miscellaneous land types are Gullied land, Mixed alluvial land, and Stony land.

Undifferentiated soil groups.—If it is not feasible for two or more soils that normally do not occur in regular geographic association to be mapped separately, the soils are mapped together as an undifferentiated soil group. The group is named for the soils in it. Examples in Nottoway County are the Appling and Herndon very fine sandy loams and the Cecil and Georgeville very fine sandy loams.

DEFINITIONS.—Some of the terms used in describing soils have been defined or partially defined in this section. More detailed definitions of these terms and of other terms commonly used in soil science will be found in the glossary.

Soil Series and Their Relations

To make full use of the soil survey, it is necessary for the reader to know the soils and to understand their relationship to one another. The relationship is more easily understood if the soils are grouped according to their position on the landscape. The soils have been placed in four groups, according to their position on the landscape, as follows: (1) Soils of uplands, (2) soils of colluvial lands, (3) soils of terraces, and (4) soils of bottom lands. In addition, several miscellaneous land types have been mapped in the county. These four groups and the miscellaneous land types are described in the following pages.

Soils of Uplands

The soils of uplands are on the higher lands above the stream valleys. They have formed in place from weathered acidic rocks (mostly granite), basic rocks (mostly hornblende gneiss), or a mixture of these two kinds of rocks. Of the upland soils, the Appling are the most extensive. The soils of uplands are members of the following series:

Cecil	Georgeville	Enon
Appling	Herndon	Mecklenburg
Durham	Lloyd	Iredell
Colfax	Vance	Bremo
Louisburg	Helena	
Madison	Wilkes	

The Cecil, Appling, Durham, Colfax, and Louisburg soils were formed from similar parent materials derived chiefly from granite and granite gneiss. The Cecil soils are well drained. Their subsoil is red, firm clay. The Durham soils are well drained to moderately well drained. Their subsoil is brownish-yellow, friable sandy clay loam and overlies a slightly compacted layer that occurs at a depth of about 29 inches. The Appling soils are well drained and are intermediate in color between the Durham and Cecil soils.

The Louisburg soils are excessively drained. They have a surface layer that is similar to those of the Durham and Appling soils. The Louisburg soils have little or no development in the subsoil, and decomposed granitic material is at shallow depths.

The Colfax soil is similar to the Durham but is somewhat poorly drained and has a mottled subsoil. The compact layer, which is at a depth of about 19 inches, inhibits the growth of most roots. The undulating and rolling Cecil, Appling, Durham, and Louisburg soils are the most desirable of any of the soils in the county for growing bright tobacco.

The Madison soils are the only upland soils underlain by quartz mica gneiss. These soils are not so deep as the Cecil soils. Their subsoil and parent material are micaceous.

The Georgeville soils of the undifferentiated Cecil and Georgeville soil group and the Herndon soils of the undifferentiated Appling and Herndon soil group are well drained. The texture of the surface layer varies considerably in these soils, or from very fine sandy loam to silt loam. These soils have all formed mainly from weathered products of fine-grained, acid schist mixed with granite gneiss and granite. For the most part, the Georgeville and Herndon soils have formed over the acid schists; the Cecil and Appling have formed over granite and granite gneiss.

The Georgeville soils are similar to the Cecil soils, but they contain a greater proportion of silt. Likewise, the Herndon soils are similar to the Appling. Crops on the Georgeville and Herndon soils do not produce as good yields as crops on the Cecil and Appling soils. The Georgeville and Herndon soils are harder to work and cannot be worked within so wide a range of moisture content. Both of these undifferentiated soil groups are now largely in forest. Only a small acreage is used for crops.

The soils of the Lloyd, Vance, Helena, and Wilkes series are underlain by granite, granite gneiss, or fine-grained schist, mixed with basic rocks, mainly hornblende gneiss. The Lloyd soils have formed, in part, from weathered basic rocks. They are well drained and have a brown surface layer that overlies a subsoil of dark-red, firm clay. The Vance soils have formed over acid rocks mixed to some extent with basic rocks. They are moderately well drained and have a subsoil of reddish-yellow to brownish-yellow clay that is plastic when wet.

The Wilkes soils are excessively drained and have little or no development in the subsoil. They vary considerably in depth, texture, and consistence, and in the kind of underlying rock material. The Helena soils have formed in smoother areas than the Wilkes soils. They are somewhat poorly drained and have a subsoil of mottled clay that is plastic when wet.

The soils of the Enon, Mecklenburg, Iredell, and Bremo series are underlain by basic rocks, mainly by hornblende gneiss. The Enon soils are well drained to moderately well drained. They have a brown, friable

surface soil and a subsoil of strong-brown clay that is plastic when wet. The Iredell and Mecklenburg soils are mapped together as Iredell-Mecklenburg complexes.

The Iredell soils are moderately well drained to somewhat poorly drained. They have a fine sandy loam to loam surface soil and a clayey subsoil that is plastic when wet. The Iredell soils differ from the Helena, inasmuch as the Helena soils have a thick, sandy, transitional layer between the surface layer and subsoil, which is absent in the Iredell soils. The Helena soils also have a mottled subsoil and are generally deeper than the Iredell soils.

The Mecklenburg soils are well drained to moderately well drained. They have a surface layer of brown to yellowish-brown loam and a subsoil of yellowish-red clay; the clay is less plastic than that in the subsoil of the Enon soils. The Bremo soils are shallow and have little or no development in the subsoil. They are underlain by hornblende gneiss.

Soils of Colluvial Lands

The soils of colluvial lands occur in all parts of the county. They are in the following series:

Starr Seneca Worsham

The surface layer of the Starr soil is generally brown to reddish-brown loam, but small areas have a surface layer of silt loam or of silty clay loam. The subsoil is red to dark red. This soil is well drained to moderately well drained. It is one of the best in the county for corn and dark tobacco.

The Seneca soil normally has a surface layer of dark grayish-brown sandy loam, but the texture ranges from loam to coarse sandy loam. The subsurface layer is brownish-yellow, very friable sandy loam. The Seneca soil has formed from materials washed mainly from sandy soils underlain by granitic materials. It is well drained to moderately well drained.

The Worsham soils are the most extensive of the soils of colluvial lands. They are poorly drained. They have a surface layer of light-gray silt loam or sandy loam and a subsoil of mottled gray and yellowish-brown, firm silty clay loam or clay. The Worsham soils are difficult to drain. Crops on these soils produce low yields.

Soils of Terraces

Along the Nottoway River and some of the larger creeks are narrow terraces. These terraces are low but they are seldom flooded. They are made up largely of alluvial deposits consisting of sand, silt, and clay washed from the uplands.

Soils of the following series are on these terraces:

Wickham Augusta

The Wickham soil is the most extensive of the soils on terraces, and it is well drained. It is easily worked and highly productive. Its surface soil is normally brown to dark-brown, very friable fine sandy loam. The subsoil is red to yellowish-red, friable clay loam.

The Augusta soil is somewhat poorly drained. It has a surface layer of yellowish-brown loam. Its subsoil is yellowish-brown, firm clay loam or clay mottled with light gray and yellowish red.

Soils of Bottom Lands

The soils of bottom lands have formed from recent alluvial deposits. They are nearly level and are only a few feet higher than the normal level of the streams. These soils are subject to periodic flooding. The following soils are on bottom lands:

Chewacla Wehadkee

The Chewacla and Wehadkee soils have formed from deposits of sand, silt, and clay washed from the uplands. The soils of these two series are distinguished mainly by differences in drainage.

The Chewacla soil is somewhat poorly drained to moderately well drained. The surface layer is brown silt loam. It overlies brown, heavy silt loam mottled with yellowish brown and gray.

The Wehadkee soils are also silt loams. They are poorly drained and are mottled throughout with gray.

In recent years some areas of these soils have been cleared, drained by open ditches, and put in permanent pasture. Because of the risk of floods, pasture is probably the best use.

Miscellaneous Land Types

In addition to the soil series mapped in the county, there are several miscellaneous land types, namely, Gullied land, Stony land, and Mixed alluvial land. Gullied land consists of an intricate pattern of gullies in which little of the original soil remains. Stony land is characterized by numerous loose rocks and by occasional outcrops of bedrock. In addition, the soil around the rocks varies from place to place in amount and character. Mixed alluvial land varies considerably within short distances in drainage, texture of the surface soil, and in other characteristics.

Soil Descriptions

In the following pages is a description of each soil series and miscellaneous land type in Nottoway County. The description of each series is followed by descriptions of the mapping units. Each mapping unit is identified by an alphabetical symbol that appears after the name and slope range of the mapping unit. These are the same symbols that are used to identify each mapping unit on the detailed map in the back part of the report.

Use and management suggestions are given for each mapping unit, and the capability unit, or management group, is shown. Turn to the section, Capability Groups, for additional information on the use and management of a particular soil.

A list of the mapping units is given in the back of the report along with the capability unit of each. The approximate acreage and proportionate extent of each mapping unit are given in table 8.

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TABLE 8.—*Acreage and proportionate extent of the soils mapped*

Soil	Area	Extent
	Acres	*Percent*
Appling coarse sandy loam:		
Undulating phase	20, 657	10. 5
Eroded undulating phase	485	. 2
Rolling phase	8, 917	4. 5
Eroded rolling phase	7, 218	3. 7
Appling angular cobbly sandy loam:		
Undulating phase	773	. 4
Rolling phase	606	. 3
Appling fine sandy loam:		
Undulating phase	10, 882	5. 5
Eroded undulating phase	125	. 1
Rolling phase	2, 540	1. 3
Eroded rolling phase	2, 085	1. 1
Appling and Herndon very fine sandy loams:		
Undulating phases	218	. 1
Rolling phases	273	. 1
Augusta loam	177	. 1
Bremo loam:		
Eroded rolling phase	68	(1)
Eroded hilly phase	523	. 3
Cecil coarse sandy loam:		
Undulating phase	4, 995	2. 5
Rolling phase	946	. 5
Hilly phase	203	. 1
Cecil fine sandy loam:		
Undulating phase	8, 060	4. 1
Rolling phase	1, 748	. 9
Hilly phase	206	. 1
Cecil clay loam:		
Eroded undulating phase	2, 039	1. 0
Eroded rolling phase	2, 291	1. 2
Severely eroded rolling phase	349	. 2
Eroded hilly phase	564	. 3
Cecil and Georgeville very fine sandy loams:		
Undulating phases	1, 029	. 5
Rolling phases	938	. 5
Chewacla silt loam	344	. 2
Colfax sandy loam, undulating phase	4, 946	2. 5
Durham coarse sandy loam:		
Undulating phase	4, 761	2. 4
Rolling phase	540	. 3
Durham fine sandy loam:		
Undulating phase	3, 013	1. 5
Rolling phase	323	. 2
Enon fine sandy loam:		
Undulating phase	644	. 3
Eroded undulating phase	54	(1)
Rolling phase	377	. 2
Eroded rolling phase	224	. 1
Enon-Vance-Helena soils:		
Undulating phases	7, 000	3. 6
Eroded undulating phases	139	. 1
Rolling phases	3, 375	1. 7
Eroded rolling phases	4, 519	2. 3
Hilly phases	255	. 1
Eroded hilly phases	364	. 2
Gullied land	31	(1)
Helena fine sandy loam:		
Undulating phase	1, 160	0. 6
Eroded undulating phase	45	(1)
Rolling phase	106	. 1
Eroded rolling phase	112	. 1
Iredell-Mecklenburg loams:		
Undulating phases	280	. 1
Rolling phases	178	. 1
Eroded rolling phases	160	. 1
Lloyd loam:		
Undulating phase	1, 381	. 7
Rolling phase	148	. 1
Hilly phase	54	(1)
Lloyd clay loam:		
Eroded undulating phase	870	. 4
Eroded rolling phase	667	. 3
Eroded hilly phase	176	. 1
Louisburg sandy loam:		
Undulating phase	638	. 3
Rolling phase	2, 619	1. 3
Eroded rolling phase	681	. 3
Hilly phase	4, 514	2. 3
Eroded hilly phase	3, 278	1. 7
Madison sandy loam:		
Undulating phase	7, 420	3. 8
Eroded undulating phase	76	(1)
Rolling phase	1, 483	. 8
Eroded rolling phase	683	. 3
Hilly phase	154	. 1
Eroded hilly phase	96	(1)
Madison clay loam:		
Eroded undulating phase	2, 793	1. 4
Eroded rolling phase	3, 008	1. 5
Severely eroded rolling phase	480	. 2
Eroded hilly phase	563	. 3
Severely eroded hilly phase	181	. 1
Mixed alluvial land	11, 403	5. 8
Seneca sandy loam	2, 917	1. 5
Starr loam	1, 082	. 5
Stony land	703	. 4
Vance fine sandy loam:		
Undulating phase	1, 090	. 6
Rolling phase	240	. 1
Wehadkee silt loam	2, 688	1. 4
Wehadkee soils	290	. 1
Wickham fine sandy loam	348	. 2
Wilkes sandy loam:		
Undulating phase	564	. 3
Rolling phase	1, 999	1. 0
Eroded rolling phase	1, 630	. 8
Hilly phase	4, 086	2. 1
Eroded hilly phase	9, 943	5. 0
Worsham sandy loam	5, 626	2. 9
Worsham silt loam	144	. 1
Miscellaneous [2]	8, 539	4. 3
Total	197, 120	100. 0

[1] Less than 0.1 percent.

[2] Miscellaneous includes 6,363 acres in Camp Pickett Military Reservation.

Appling Series

The Appling series consists of well-drained, very strongly acid soils that have formed from weathered products of granite and granite gneiss. The soils are extensive. They occur on undulating to rolling uplands, mainly in the eastern and central parts of the county.

The surface layer of these soils is pale-yellow to brownish-yellow coarse sandy loam, sandy loam, or fine sandy loam. The subsoil is reddish-yellow to yellowish-red friable clay loam.

These soils occur in association with the Cecil, Durham, Louisburg, Colfax, Worsham, Seneca, and Herndon soils. The subsoil is yellower and coarser textured than that of the Cecil soils, which generally have a subsoil of red clay. The Appling soils do not have the compacted layer typical of the Durham soils. They are not excessively drained as are the Louisburg soils and have a much more strongly developed subsoil; they are better drained than the Colfax, Worsham, and Seneca soils; and they have formed from coarser textured material and have less silt throughout than the Herndon soils.

The natural vegetation consists mainly of mixed forests of hardwoods and shortleaf and loblolly pines. The hardwoods are mainly white oak and hickory.

Appling coarse sandy loam, undulating phase (2 to 7 percent slopes) (Ac).—The following describes a profile in a cultivated area:

0 to 9 inches, pale-yellow, very friable coarse sandy loam.
9 to 12 inches, brownish-yellow, friable coarse sandy loam.
12 to 27 inches, reddish-yellow to yellowish-red, friable clay loam; very fine mica flakes can be seen when the soil is rubbed smooth between the fingers.
27 to 43 inches, yellowish-red, friable clay loam mottled with strong brown, yellow, and red; very fine mica flakes common.
43 to 59 inches, mottled red, yellowish-brown, pale-yellow, white, strong-brown, and yellowish-red, very friable loam; highly weathered granite gneiss.

Some areas of this soil have a surface layer of gritty sandy loam. Many small, angular quartz pebbles are scattered over the surface in places. In some places the subsoil has a reddish color similar to that of the subsoil in the Cecil soils. In others it has a brownish-yellow color similar to that of the subsoil in the Durham soils.

This soil is very strongly acid. It is low in organic matter and plant nutrients. Permeability is moderately rapid in the surface soil and moderate in the subsoil. Surface runoff is slow, and internal drainage is medium. The capacity for holding available moisture is moderate, and the hazard of erosion is slight to moderate.

In some of the large wooded areas, small patches of Cecil and Durham soils are mapped with this soil.

Use and management.—About 45 percent of Appling coarse sandy loam, undulating phase, is in forest, 35 percent is cultivated, and the rest is idle or in pasture. Bright tobacco, corn, small grains, hay, and vegetables are the usual crops. The soil is easy to work and is fairly easy to conserve under cultivation. It responds well to management. Nevertheless, even though it is suited to many different crops, its use for cultivated crops is not likely to be profitable unless commercial fertilizer is applied (fig. 3).

Bright tobacco, the chief cash crop, is grown in most places in a 1- or 2-year rotation. If it is grown in a 1-year rotation, it is generally followed by a winter cover crop of rye. In the 2-year rotation, tobacco is grown for 1 year and then the soil is left idle for 1 year. This soil is in capability unit IIe–4.

Figure 3.—**Lespedeza produces high yields of hay on Appling coarse sandy loam, undulating phase, if adequate fertilizer and lime are applied.**

Appling coarse sandy loam, eroded undulating phase (2 to 7 percent slopes) (Ad).—This soil differs from Appling coarse sandy loam, undulating phase, chiefly in that all areas have a few deep gullies that are more than 100 yards apart. All of this soil has had some sheet erosion, but a few small areas are severely sheet eroded. Surface runoff is slow to medium, and internal drainage is medium.

Use and management.—About 55 percent of this soil is in forest, 25 percent is cultivated, and the rest is idle or in pasture. Corn, small grains, lespedeza grown for hay, and bright tobacco are the most commonly grown crops. Bright tobacco is not grown so extensively, however, as on Appling coarse sandy loam, undulating phase.

Erosion is fairly easy to control on this soil if good management is used. Poor management in the past has been partly responsible for the gullies. Some formed because water had been turned from highways onto the fields. The soil is fairly easy to work. It is fairly well suited to crops, but yields are low.

This soil needs protection from runoff. If tilled crops are grown, a suitable fertilizer should be applied at frequent intervals. More small grains and hay crops and fewer corn and tobacco crops should be included in the rotation than where Appling soils are less sloping and less eroded.

The few small areas that have lost most of the surface soil and that have deep gullies are best suited to pasture or forest. Nevertheless, the cost of establishing and maintaining pastures on the eroded areas is high. This soil is in capability unit IIe–4.

Appling coarse sandy loam, rolling phase (7 to 20 percent slopes) (Ae).—This soil has stronger slopes than Appling coarse sandy loam, undulating phase, and it normally is slightly shallower over bedrock. Surface runoff is medium to rapid, and internal drainage is medium. Sheet erosion ranges from slight to moderate.

Use and management.—About 60 percent of this soil is in forest, 20 percent is cultivated, and the rest is idle or in pasture. Corn, small grains, lespedeza for hay, and bright tobacco are the usual crops. Bright tobacco is not grown so extensively, however, as on Appling coarse sandy loam, undulating phase.

The hazard of erosion is moderate to high in this soil. In large part, the plant nutrients have been lost through surface runoff and leaching. Surface runoff needs to be controlled by tilling on the contour and by stripcropping where the fields are large enough to make this practice economical. Yields range from fairly good to fair, and the soil is fairly easy to work and conserve. This soil is suited to fewer crops than Appling coarse sandy loam, undulating phase. A suitable fertilizer should be applied frequently, and less corn and more small grains and hay crops should be included in the cropping system. This soil is in capability unit IIIe–2.

Appling coarse sandy loam, eroded rolling phase (7 to 20 percent slopes) (Af).—This soil has stronger slopes than Appling coarse sandy loam, undulating phase, and there has been more sheet and gully erosion. Surface runoff is rapid to very rapid, and internal drainage is

medium. Sheet erosion is moderate to severe. There are deep gullies in all of the areas, but in more than half of the acreage the gullies are more than 100 yards apart. The content of organic matter is low.

Use and management.—Most of this soil has been idle for many years. In some of the areas, pines have invaded. Fertilizer has been added to other small areas, which have then been seeded to pasture.

In most of the gullies, erosion is still active. It should be checked by establishing a cover of plants on the areas above the gullies so that runoff will be slowed. Rye will make good growth if small amounts of fertilizer are used, and it will provide a partial ground cover for several years.

After surface runoff has been controlled above the gullies, trees can be planted or the gullies can be filled. If the gullies are filled the areas can then be smoothed, fertilized and limed, and a suitable pasture mixture seeded. Most of this soil can be used for pasture, but the cost of establishing and maintaining a good pasture sod is high.

The best use for this soil is forest. Trees will seed naturally in most of the idle fields. This process will be slow, however, and the stands will not be fully stocked. In addition, many undesirable kinds of trees will become established. Loblolly pine grows well on this soil in areas that are not too severely eroded. This soil is in capability unit IIIe–2.

Appling angular cobbly sandy loam, undulating phase (2 to 7 percent slopes) (Aa).—This soil differs from Appling coarse sandy loam, undulating phase, in having many angular quartz cobblestones on the surface and in the surface layer. Also, it has more rapid permeability. It occurs in association with the Louisburg and Cecil soils and is mainly in the northwestern part of the county near the Prince Edward County line. The following describes a profile in a cultivated area:

0 to 10 inches, brownish-yellow, very friable sandy loam; contains many brown and white, angular quartz cobblestones ranging from 3 to 12 inches in diameter, but generally about 6 inches in diameter.
10 to 24 inches, yellowish-red, friable clay loam.
24 to 32 inches, yellowish-red, friable, light clay loam mottled with yellow and red.
32 to 46 inches, yellow, mingled with red and dark red, friable silt loam or loam from weathered products of granite or granite gneiss.

The texture of the surface layer ranges from sandy loam to fine sandy loam, and the thickness ranges from 8 to 12 inches. The number of cobblestones on the surface and in the profile varies greatly within short distances. Nevertheless, all of this soil has stones on the surface that interfere considerably with cultivation. In some areas the subsoil has a reddish color and resembles that of the Cecil soils. In others, it is a brownish yellow like that of the Durham soils.

Use and management.—About 40 percent of this soil is in forest, 25 percent is cultivated, 20 percent is idle, and 15 percent is pastured. The forests consist mainly of white oak, hickory, and shortleaf pine. The trees have been cut over several times, but several good stands of shortleaf pine that are suitable for sawtimber remain.

The soil has a medium range of suitability for crops. It has a low supply of plant nutrients, but it responds well to good management. The large number of stones on the surface and in the surface layer interfere greatly with cultivation.

Bright tobacco is the most important crop on this soil (fig. 4). It is generally fertilized heavily. If tobacco is grown in succeeding years, some farmers use rye as a winter cover crop.

Pastures on this soil have a low carrying capacity. They could be improved greatly by adding a complete fertilizer and enough lime to raise the pH to 6.0 or 6.5. This soil is in capability unit IIIe–2.

Figure 4.—**Field of Appling angular cobbly sandy loam, undulating phase, used to grow bright tobacco. The soil has been disked to prepare it for planting.**

Appling angular cobbly sandy loam, rolling phase (7 to 20 percent slopes) (Ab).—This soil has somewhat stronger slopes than Appling angular cobbly sandy loam, undulating phase, and it is more likely to become eroded. Surface runoff is medium to rapid, and internal drainage is medium. Some of the areas have lost much of their original surface soil, and there are a few deep gullies in places.

Included in mapping are small areas that have hilly relief. Also included are some small areas that have a surface layer of sandy loam.

Use and management.—Much of Appling angular cobbly sandy loam, rolling phase, has been cultivated. Now, most of it is in forest or is idle. The soil has a medium range of suitability. Under ordinary management, yields are low, but the soil responds well to good management. Nevertheless, the naturally low supply of plant nutrients and the cobblestones on the surface and throughout the profile limit its suitability for crops.

If cultivated crops are grown, the soils should be tilled on the contour and sod crops should be included in the cropping system. These practices are especially needed if bright tobacco is grown. This soil is in capability unit IIIe–2.

Appling fine sandy loam, undulating phase (2 to 7 percent slopes) (Ag).—This soil differs from Appling coarse sandy loam, undulating phase, mainly in the tex-

ture of its surface layer. The following describes a profile in a cultivated area:

0 to 9 inches, pale-yellow, very friable fine sandy loam.
9 to 14 inches, brownish-yellow, friable fine sandy clay loam.
14 to 22 inches, reddish-yellow, friable clay loam.
22 to 38 inches, mottled red, yellowish-red, brownish-yellow, and yellow, friable clay loam.
38 to 42 inches +, mottled red, yellow, pale-yellow, white, and gray soil material derived from highly weathered granite.

The texture of the surface layer ranges from fine sandy loam to sandy loam. In a few places many small, angular quartz pebbles are scattered over the surface. In some places the subsoil is reddish like that of the Cecil soils. In others it is yellowish like that of the Durham soils. Mica flakes occur throughout the profile and particularly in the lower part. A few small areas of Cecil soils are mapped with this soil.

Use and management.—About 60 percent of Appling fine sandy loam, undulating phase, is in forest, 25 percent is cultivated, and the rest is idle or in pasture. The soil is easy to work and conserve, and it is suited to many different crops.

Corn, bright tobacco, small grains, hay, and market vegetables are the principal crops. In many places corn is grown in a 3-year rotation with small grains and hay crops. During the past few years, the acreage planted to corn has decreased, but the yields per acre have increased. Bright tobacco is generally grown year after year, but recently there has been a trend toward growing it in a 3-year rotation. For lespedeza and mixed hay crops, a minimum of 1 ton of ground limestone should be applied at least once in the rotation. Small gardens and melon patches are common. They need heavy applications of commercial fertilizer for good yields. This soil is in capability unit IIe–5.

Appling fine sandy loam, eroded undulating phase (2 to 7 percent slopes) (Ah).—This soil resembles Appling fine sandy loam, undulating phase, but it has lost more of its original surface soil through sheet erosion. In addition, it has a few deep gullies that are more than 100 yards apart. Surface runoff is slow to medium, and internal drainage is medium. In a few places the soil is gravelly.

Use and management.—About 40 percent of this soil is cultivated, 30 percent is in forest, and the rest is pastured or idle. The forests consist mainly of shortleaf pine and oak. Tilth is fair to poor, but the soil is fairly easy to conserve. The yields are medium to low.

Crops grown on this soil are essentially the same as those grown on Appling fine sandy loam, undulating phase, and management is somewhat similar. The crops include less bright tobacco and corn, however, and more hay and small grains. The greatest problems in managing this soil are checking active erosion in the gullies and protecting the gullied areas with a cover of permanent grasses or trees. This soil is in capability unit IIe–4.

Appling fine sandy loam, rolling phase (7 to 20 percent slopes) (Ak).—This soil has stronger slopes and is shallower than Appling fine sandy loam, undulating phase. It has medium to rapid surface runoff and medium internal drainage.

Use and management.—About 58 percent of this soil is in forest, 22 percent is cultivated, and the rest is idle or in pasture. The forests are made up of shortleaf pine or hardwoods, mainly oak and hickory. This soil is fairly easy to work and conserve, and yields range from medium to low. Its supply of plant nutrients is low, but the soil responds well if lime and fertilizer are added.

The crops are essentially the same on this soil as on Appling fine sandy loam, undulating phase, but less bright tobacco and more hay crops and small grains are grown. The two soils need about the same kind and the same amounts of fertilizer. This soil needs to have runoff controlled by stripcropping and tilling on the contour. It is in capability unit IIIe–2.

Appling fine sandy loam, eroded rolling phase (7 to 20 percent slopes) (Al).—This soil differs from Appling fine sandy loam, undulating phase, chiefly in having stronger slopes, in having lost more of the original surface soil through sheet erosion, and in having deep gullies that in some areas are less than 100 yards apart. Surface runoff is rapid to very rapid, and internal drainage is medium.

Use and management.—About 76 percent of this soil is in forest. A small acreage is cultivated, and the rest is idle or in pasture. The forests consist mainly of shortleaf, Virginia, and loblolly pines mixed with hardwoods, mostly oak and hickory.

This soil is fairly easy to work but is difficult to conserve. The crops consist mainly of lespedeza grown for hay, but small grains are grown on a small acreage. Harvesting is difficult because of the deep gullies.

It would be difficult and expensive to establish and maintain pastures on this soil, and forest is its best use. Before trees are planted, however, measures should be taken to check surface runoff and to stop the active erosion in the gullies. This can be done by filling and smoothing the areas or by establishing a cover of plants on the bare areas above the gullies. This soil is in capability unit IIIe–2.

Appling and Herndon very fine sandy loams, undulating phases (2 to 7 percent slopes) (Am).—This undifferentiated soil group is made up partly of small areas of Appling and Herndon soils but mainly of areas in which the soils are transitional between the soils of the two series. The soils occupy a rather wide area in the southwestern part of the county along the Lunenburg County line.

The Appling soil generally has a light-colored surface layer and a yellowish-red to reddish-yellow, friable subsoil. Its profile contains less silt than that of the Herndon soil. The surface texture of the soils varies within short distances; in some places it is very fine sandy loam, and in others it is silt loam. The parent material of the Appling soil is granite or granite gneiss, and that of the Herndon soil is fine-grained schist. The following describes a profile of Appling very fine sandy loam, undulating phase, in a cultivated area:

0 to 7 inches, pale-yellow, very friable very fine sandy loam.
7 to 10 inches, brownish-yellow, very friable very fine sandy loam.
10 to 20 inches, strong-brown to brownish-yellow, friable clay loam.
20 to 30 inches, reddish-yellow to yellowish-red, friable clay loam.
30 to 36 inches, strong-brown, friable clay loam mottled with yellow and red; contains some small, platy fragments of fine-grained schist.

The surface layer ranges in thickness from 6 to 12 inches, and in places its texture is a fine sandy loam. In forested areas the upper part of the surface layer is darker than in cultivated areas because it contains a small amount of organic matter; in some places a thin layer of dark-colored leaf mold has accumulated. The following describes a profile of Herndon very fine sandy loam, undulating phase, in a cultivated area:

0 to 7 inches, pale-yellow, very friable very fine sandy loam.
7 to 10 inches, brownish-yellow, friable silty clay loam.
10 to 24 inches, yellowish-red, friable silty clay loam to silty clay.
24 to 29 inches, friable, light silty clay loam mottled with yellowish red, brown, and yellow.
29 to 40 inches, smooth, friable, very silty material mottled with pale red and red and with streaks of pale yellow.
40 inches +, very smooth, silty, decomposed schist with mixed colors of weak red, white, brown, and yellow.

The texture of the surface soil is silt loam in places. In a few small areas, the color of the subsoil resembles that of the Cecil soils.

The soils in this group have slow to medium surface runoff and medium internal drainage. Sheet erosion has removed part of the surface soil in most areas, and in a few areas gullies have developed. Erosion has been slight to moderate. The soils are very strongly acid and are low in organic matter and plant nutrients. They are moderately permeable, and their capacity for holding available moisture is moderate.

Use and management.—About 85 percent of this soil group is in forest, and about equal parts of the rest is idle, in pasture, or in crops. The soils are easy to work and are fairly easy to conserve if they are cultivated.

Corn, bright tobacco, hay, and small grains are the usual crops. The corn is normally grown in a 3-year rotation. Ground limestone is needed for the best yields of lespedeza and mixed hay crops. These soils are in capability unit IIe–5.

Appling and Herndon very fine sandy loams, rolling phases (7 to 20 percent slopes) (An).—The soils in this undifferentiated soil group are similar to Appling and Herndon very fine sandy loams, undulating phases, except that they have stronger slopes and are, therefore, more likely to erode. Some areas have lost a considerable amount of the original surface soil through erosion, and a few deep gullies have formed in places. Surface runoff is medium to rapid, and internal drainage is medium.

Use and management.—About 90 percent of the acreage in this undifferentiated soil group is in forests made up of loblolly and shortleaf pines and hardwoods, which are mainly oak and hickory. The rest is about equally distributed in pasture, crops, and idle land. The crops are similar to those grown on Appling and Herndon very fine sandy loams, undulating phases, and management is about the same. In many places yields are lower, however, because these soils are more eroded and are more difficult to cultivate. The soils are limited mainly by the low supply of plant nutrients. They respond well to good management. The soils of this group are in capability unit IIIe–2.

Augusta Series

Only one soil of the Augusta series, Augusta loam, occurs in this county. This series is made up of somewhat poorly drained, very strongly acid soils that have a compacted horizon with some characteristics of a fragipan. The soils have formed in alluvial materials. They are on low stream terraces near the larger streams.

The surface layer is yellowish-brown loam, and the subsoil is mottled, yellowish-brown, firm clay loam or clay. At a depth of about 22 inches is sandy loam that becomes harder and more compact with increasing depth.

The natural vegetation is mainly white, red, and willow oaks, and sweetgum and other deciduous trees. A few pines grow in places.

Augusta loam (0 to 2 percent slopes) (Ao).—This soil occurs in association with Wickham fine sandy loam. It is more poorly drained and has a lighter colored surface layer than the Wickham soil, and its subsoil is mottled and less red. The following describes a profile in a cultivated area:

0 to 7 inches, yellowish-brown, very friable loam.
7 to 12 inches, brownish-yellow, friable clay loam.
12 to 22 inches, mottled, yellowish-brown, light-gray, and yellowish-red, firm, heavy clay loam or clay.
22 to 34 inches, mottled, yellowish-brown, light-gray, pale-yellow, and reddish-brown, friable fine sandy loam; the sand particles are weakly cemented but can be crushed easily between the fingers; this layer becomes harder and more compact with increasing depth.

In some places the surface layer of this soil is silt loam. The soil is very strongly acid, and its natural supply of plant nutrients is low. The surface soil is moderately permeable, and the subsoil is slowly permeable. The capacity to hold available moisture is moderate.

Mapped with this soil are a few areas of Roanoke silt loam, which is not mapped separately in this county. The Roanoke soil is poorly drained, and gray mottlings occur throughout its profile.

Use and management.—Almost all of Augusta loam has once been used for crops. Now, about 80 percent is in forest, approximately 10 percent is idle, and 5 percent each is in pasture or crops.

The small areas that are cropped are used mainly to grow corn and hay. Yields are low unless drainage has been provided. The soil is used for cultivated crops only if better drained areas are not available, but it is better suited to pasture.

Except for the small areas of Roanoke soil that were included in mapping, all of this soil could be drained. If drained, it responds well to good management. This soil is in capability unit IIIw–1.

Bremo Series

The soils of the Bremo series are shallow and excessively drained. They are medium acid to strongly acid. The soils have formed from weathered products of hornblende gneiss. They occur on rolling and hilly ridgetops and side slopes in the uplands. They are mainly in the northwestern part of the county along the Amelia County line.

These soils have an olive to light olive-brown surface layer of loam. Materials from partly weathered rock are at a depth of about 17 inches.

The soils occur in association with the Iredell and Mecklenburg soils. They are much better drained than the associated soils and lack the clay subsoil.

The present natural vegetation consists of mixed forests of hardwoods and pines, mostly shortleaf and Virginia pines. In Nottoway County more than 70 percent of the total acreage of the Bremo soils is in forest, which is probably the best use.

Bremo loam, eroded rolling phase (7 to 12 percent slopes) (Ba).—This soil has been moderately sheet eroded, and some areas have a few deep gullies. The following describes a profile in a cultivated area:

0 to 3 inches, olive, very friable loam.
3 to 17 inches, light olive-brown, friable loam; angular pieces of quartz, as much as 5 inches in diameter, are scattered throughout this layer; distinct brown streaks can be seen on a smooth-cut surface.
17 to 21 inches, mottled, olive-gray, yellow, and yellowish-brown, friable material from partly weathered hornblende gneiss.
21 inches +, hard, slightly weathered hornblende gneiss.

In some areas pieces of partly weathered gneiss are scattered over the surface. Depth of the soil over the parent rock varies considerably. In some places the soil is transitional to Wilkes sandy loam, rolling phase, which has a lighter colored and coarser textured surface layer.

This soil is medium to strongly acid. It has a moderate amount of organic matter, and it contains more calcium and magnesium than most of the soils in the county. Permeability is moderate in the surface soil, but it is rapid in the subsurface layer. The capacity for holding available moisture is low. Surface runoff is medium to rapid, and internal drainage is rapid.

A few small areas of Iredell-Mecklenburg loams, rolling phases, have been mapped with this soil.

Use and management.—About 70 percent of Bremo loam, eroded rolling phase, is in forest, 15 percent is in crops, and the rest is idle or in pasture. Corn, small grains, and lespedeza grown for hay are the principal crops. Droughtiness is a limiting factor. Small grains on this soil usually make better yields than corn. The soil is best used for hay or pasture, but the cropping system most commonly used is corn, a small grain, and lespedeza grown for hay. For good yields, a complete fertilizer and lime must be added. This soil is in capability unit IVe–3.

Bremo loam, eroded hilly phase (12 to 25+ percent slopes) (Bb).—This soil has a thinner surface layer and has been damaged more by sheet erosion than Bremo loam, eroded rolling phase. Deep gullies occur in about half of the acreage, but they are more than 100 yards apart in most places. Surface runoff is rapid to very rapid, and internal drainage is rapid. Permeability is moderate in the surface soil and rapid in the subsurface layer. The capacity for holding available moisture is low to very low.

Use and management.—About 80 percent of this soil is in forest, which consists mostly of shortleaf and Virginia pines. About 16 percent is in pasture, a few acres on the smoother slopes are in cultivated crops, and the rest is idle.

Pastures on the smoother, less eroded slopes produce fair to good yields if lime and fertilizer are added. The steeper, more eroded areas are best used for forest. This soil is in capability unit VIe–2.

Cecil Series

The soils of the Cecil series are generally deep and well drained and are strongly acid to very strongly acid. They have formed from weathered products of granite and granite gneiss. The soils are on undulating to hilly interstream divides.

In uneroded areas these soils have a light yellowish-brown surface layer that ranges in texture from coarse sandy loam to very fine sandy loam. In these areas the subsoil is red, firm clay and mottled material from weathered rock is at a depth of about 35 inches.

The Cecil soils occur in association with Appling, Durham, Vance, Starr, Georgeville, and Madison soils. They have a redder and finer textured subsoil than the Appling and Durham soils, and they do not have the compacted layer that is typical of the Durham soils. They are better drained than the Vance and Starr soils and have a redder subsoil than the Vance. Their subsoil contains more sand and less silt than that of the Georgeville soils, and they have less mica, especially in the upper part of the substratum, than the Madison soils. They also have a less friable subsoil.

The natural vegetation on these soils consists of mixed forests of hardwoods and pines. On old abandoned fields, shortleaf and Virginia pines are much more prevalent than the hardwoods.

The less sloping soils of this series are among the best in the county for agriculture. The steeper areas are largely in forest.

Cecil coarse sandy loam, undulating phase (2 to 7 percent slopes) (Ce).—Nearly all of this soil has been slightly to moderately sheet eroded. Nevertheless, the subsoil is exposed in only a few places. The following describes a profile in a cultivated area:

0 to 7 inches, light yellowish-brown, very friable coarse sandy loam; contains a few, brown, angular pebbles of quartz; in wooded areas the topmost inch is grayish brown.
7 to 11 inches, yellowish-red, friable coarse sandy clay loam; contains some brown, angular quartz pebbles.
11 to 21 inches, red, firm clay.
21 to 34 inches, red, friable silty clay loam with a few specks of brownish yellow.
34 to 50 inches +, mottled reddish-yellow and white, friable, heavy silt loam from granite-gneiss material; contains many very fine mica flakes.

The surface layer is pale brown when dry. In places small, white fragments of quartz occur on the surface. Some areas have a surface layer of sandy loam. In places plowed fields have a spotted appearance, because the plow has turned up some of the red clay subsoil where the surface layer is thin. In places the profile is only about 28 inches thick.

This soil is very strongly acid and is low in organic matter. Its supply of potassium is fairly high. The soil is low in other plant nutrients, however, and continuous cropping may deplete the supply of potassium.

The soil retains fertilizer well. It needs more lime than the Appling and Durham soils to raise the pH to a given level. The risk of erosion is moderate. Surface runoff is slow to medium, and internal drainage is medium. Permeability is rapid in the surface soil and moderate in the subsoil. The capacity to hold available moisture is moderate.

Use and management.—About 60 percent of this soil is in forest, 20 percent is cultivated, 16 percent is pastured, and 4 percent is idle. The forests have been cut over several times for timber and pulpwood.

The soil is fairly easy to work and is fairly easy to conserve. Lime is needed to correct the acidity, and a complete fertilizer is needed for high yields. The soil responds well if manure is added and crop residues are turned under.

The soil is well suited to corn, dark tobacco, and small grains, and to alfalfa, lespedeza, red clover, and other hay crops. Bright tobacco is grown in a few places, but its quality is likely to be inferior to that of bright tobacco grown on the Appling and Durham soils. Crops are generally grown in a 3-year rotation. This soil is in capability unit IIe–2.

Cecil coarse sandy loam, rolling phase (7 to 12 percent slopes) (Cf).—This soil has stronger slopes than Cecil coarse sandy loam, undulating phase. It is shallower over the parent material, and it is more likely to erode. In some areas much of the original surface layer has been lost. Deep gullies that are more than 100 yards apart have formed in a small acreage. Surface runoff is medium to rapid, and internal drainage is medium. In some areas that were mapped with this soil, the texture of the surface layer is sandy loam.

Use and management.—About 68 percent of Cecil coarse sandy loam, rolling phase, is in forest, 15 percent is pastured, 10 percent is cultivated, and the rest is idle.

The management of this soil is somewhat similar to that of Cecil coarse sandy loam, undulating phase, but simple methods of controlling erosion are necessary. These include tilling on the contour, stripcropping, and growing more hay in the cropping system. The soil responds well to good management. It is in capability unit IIIe–2.

Cecil coarse sandy loam, hilly phase (12 to 20 percent slopes) (Cg).—This soil has stronger slopes than Cecil coarse sandy loam, undulating phase, and it is shallower over weathered bedrock. Surface runoff is rapid to very rapid, and internal drainage is medium. Sheet erosion is slight to moderate. There are a few deep gullies in some places. Cleared areas, particularly those that are cultivated or idle, are subject to severe washing and gullying.

Use and management.—Most of this soil is in forest. A few acres are pastured or in crops, and the rest is idle. The few acres that are cultivated are used mainly to grow hay and small grains. The yields of many crops are considerably lower than of crops on Cecil coarse sandy loam, undulating phase. It is better to use the soil for pasture or forest than for cultivated crops, but lime and a complete fertilizer are required to establish good pasture. This soil is in capability unit IVe–2.

Cecil fine sandy loam, undulating phase (2 to 7 percent slopes) (Ch).—This soil occupies fairly large areas that have been slightly to moderately sheet eroded. In some places the subsoil is exposed, and in some there are a few deep gullies. The following describes a profile in a cultivated area:

0 to 7 inches, light yellowish-brown, very friable fine sandy loam; contains a few angular fragments of quartz; in wooded areas the topmost inch is grayish brown.
7 to 12 inches, yellowish-red, friable fine sandy clay loam.
12 to 23 inches, red, firm clay.
23 to 39 inches, red, friable silty clay loam.
39 to 47 inches +, mottled, red, reddish-yellow, and pale-yellow, friable fine sandy clay loam over highly weathered granite gneiss.

This soil is very strongly acid to strongly acid. It is low in organic matter, and there is moderate risk of erosion. The soil is fairly high in potassium, but continuous cropping may deplete the supply. It retains added plant nutrients well. More lime is needed to raise the pH to a given level than is needed on the Appling and Durham soils. Permeability is moderately rapid in the surface soil and moderate in the subsoil. Surface runoff is slow to medium, and internal drainage is medium. The capacity to hold available moisture is moderate.

Use and management.—Approximately 70 percent of this soil is in forest, 20 percent is cultivated, 6 percent is pastured, and the rest is idle. Most of the forests have been cut over several times, and the trees have been used as sawtimber or pulpwood.

This soil is well suited to corn, dark tobacco, and small grains, and to alfalfa, lespedeza, red clover, and similar hay crops. Bright tobacco is grown on some farms that do not have a large acreage of Appling, Durham, or other soils that are more suitable for growing bright tobacco. The quality is likely to be somewhat inferior to that of bright tobacco grown on the Appling and Durham soils. Crops are generally grown in a 3-year rotation. A cropping system that is commonly used is corn or dark tobacco followed by a small grain and hay.

This soil needs lime, and in most areas it needs a complete fertilizer. It responds well if manure is added and crop residues are turned under. The soil is in capability unit IIe–1.

Cecil fine sandy loam, rolling phase (7 to 12 percent slopes) (Ck).—This soil is more likely to erode than Cecil fine sandy loam, undulating phase. Some areas have lost a large part of the original surface layer. Deep gullies, more than 100 yards apart, have formed in a small acreage. Surface runoff is medium to rapid, and internal drainage is medium. In a few places there are many angular pieces of quartz on the surface and throughout the profile. Some small areas mapped with this soil have a surface layer of sandy loam.

Use and management.—About 67 percent of this soil is in forest, 15 percent is in cultivated crops, 12 percent is in pasture, and 6 percent is idle. Management is somewhat similar to that of Cecil fine sandy loam, undulating phase, but simple methods of controlling erosion are necessary. These include tilling on the contour, stripcropping if the fields are large enough, and using hay crops in the cropping system, particularly if dark tobacco is grown. The soil responds well to good management. Under ordinary management yields are medium to low. This soil is in capability unit IIIe–1.

Cecil fine sandy loam, hilly phase (12 to 20 percent slopes) (Cl).—This soil has much stronger slopes than Cecil fine sandy loam, undulating phase, and it is shallower over weathered bedrock. Surface runoff is rapid to very rapid, and internal drainage is medium. Some areas are moderately sheet eroded, but, in a few wooded areas that have never been cultivated, erosion is only slight. Deep gullies have formed in a few areas, but they are fairly far apart. In open areas, particularly those under cultivation or lying idle, there is a risk of severe washing and gullying.

Use and management.—Approximately 85 percent of this soil is in forest, 5 percent is cultivated, and the rest is idle or in pasture. Small grains and hay are the principal crops, but yields are generally lower than on Cecil fine sandy loam, undulating phase.

A few farmers use this soil entirely for pasture. If adequate lime and fertilizer are used, the pastures are fairly good. Nevertheless, unless the soil is needed for pasture, it is better to use it for forest. Areas now in forest should not be cleared. This soil is in capability unit IVe–2.

Cecil clay loam, eroded undulating phase (2 to 7 percent slopes) (Ca).—This soil differs from Cecil fine sandy loam, undulating phase, in having a finer textured, red surface soil. It occurs in small areas within larger areas of coarser textured Cecil soils.

Surface runoff is medium to rapid, and internal drainage is medium. Sheet erosion has been active in most of the areas, and only remnants of the original surface soil remain. Deep gullies that are fairly far apart have formed in part of the acreage. In most places the soil is moderately deep over the soft, decomposed parent rock. The following describes a profile of this soil:

0 to 7 inches, red, friable clay loam.
7 to 19 inches, red, firm clay.
19 to 35 inches, red, friable silty clay loam; contains very fine mica flakes.
35 to 42 inches +, mottled, red, reddish-yellow, and pale-yellow, friable sandy clay loam over material from highly weathered granite gneiss.

In some severely eroded areas the surface soil is firm, red clay. The thickness of the soil varies with the amount of subsoil that has been removed by sheet erosion. In places the profile is shallower than that described.

This soil is very strongly acid and is low in organic matter. It has a moderate supply of plant nutrients. Permeability is moderate, and the capacity to hold available moisture is high.

A few small areas of Madison clay loam, eroded undulating phase, have been mapped with this soil. These have more mica flakes in the subsoil and parent material than the Cecil soil. Also mapped with this soil are a few small areas that have been influenced by basic rock. In these small areas the soil has many of the characteristics of Lloyd clay loam, eroded undulating phase.

Use and management.—About 40 percent of Cecil clay loam, eroded undulating phase, is in forest, 30 percent is cultivated, 20 percent is pastured, and the rest is idle. Corn, small grains, and hay are the principal crops. Dark tobacco is grown in some areas.

If this soil is tilled when too dry, it is hard to work and breaks into large clods. If tilled too wet, it is sticky, bakes as it dries, and becomes very cloddy. Management is somewhat similar to that needed for Cecil fine sandy loam, undulating phase. Considerably more lime is needed, however, to raise the pH to a given level than is required for the Cecil fine sandy loams or the Cecil coarse sandy loams. Manure or crop residues turned under will improve the tilth. The soil responds well to good management. It should be used to grow small grains and hay crops rather than row crops. This soil is in capability unit IIIe–6.

Cecil clay loam, eroded rolling phase (7 to 12 percent slopes) (Cb).—This soil is distinguished by its red color and by severe sheet erosion. Deep gullies, more than 100 yards apart, occur in about 25 percent of the acreage, and there are many shallow gullies. Surface runoff is rapid, and internal drainage is medium. The soil is shallower over bedrock than Cecil clay loam, eroded undulating phase.

Use and management.—About 58 percent of this soil is in forest, 20 percent is cultivated, 14 percent is pastured, and 8 percent is idle. The principal crops are small grains and hay. A small acreage is used to grow corn and tobacco.

This soil is difficult to work and can be worked only within a narrow range of moisture content. It is difficult to conserve. Soil-conserving practices are needed, such as tilling on the contour, stripcropping, and growing small grains, hay crops, or other close-growing crops for long periods.

It is better to use this soil for pasture than for cultivated crops. Large amounts of lime and a complete fertilizer are needed to grow forage of good quality. This soil is in capability unit IVe–1.

Cecil clay loam, severely eroded rolling phase (7 to 12 percent slopes) (Cc).—A red color and severe gullying and sheet erosion distinguish this soil. There are many deep gullies in all of the acreage. The soil has stronger slopes and is shallower to bedrock than Cecil clay loam, eroded undulating phase. Surface runoff is rapid to very rapid, and internal drainage is medium.

Use and management.—Most of this soil is in forest, the use to which it is best suited. A few acres are idle or have a few scattered trees growing on them. The trees should be cut on a sustained-yield basis rather than clean cut for sawtimber or pulpwood. A few acres have been planted to kudzu. The kudzu checks erosion to some extent, but it also climbs and kills most of the trees that are nearby. This soil is capability unit IVe–1.

Cecil clay loam, eroded hilly phase (12 to 20 percent slopes) (Cd).—This soil has stronger slopes and is shallower to bedrock than Cecil clay loam, eroded undulating phase. It has lost more soil through sheet erosion, and a larger part of the acreage has deep gullies, some of which are less than 100 yards apart. Surface runoff is rapid to very rapid, and internal drainage is medium.

Use and management.—Most of this soil is in forest or is returning to forest. A few acres are idle or make up part of a pasture. The soil is better suited to forest than to use for pasture or cultivated crops. It is a problem to get trees started, however, because it is difficult to check the active gullies. The runoff above the gullies must be controlled before the trees are planted. Virginia pine will be the best choice for the areas that have been eroded the most severely. When the trees are harvested for sawtimber or pulpwood, the cutting should

be light so as to prevent erosion from again becoming active. This soil is in capability unit VIe–1.

Cecil and Georgeville very fine sandy loams, undulating phases (2 to 7 percent slopes) (Cm).—This undifferentiated group is made up of soils that are transitional between the Cecil and Georgeville series and of small areas of soils of the two series. The Cecil soil has a light-colored surface layer and a subsoil of red, firm clay. Its parent material is soft, decomposed granite and granite gneiss. The Georgeville soil is similar to the Cecil except that it has more silt throughout the profile. The parent material of the Georgeville soil is strongly weathered, fine-grained schist.

These soils have slow to medium surface runoff and medium internal drainage. Sheet erosion has been slight to moderate. In a few places the red subsoil is exposed, and its color contrasts sharply with the lighter color of the less eroded surface soil. The soils are in the southwestern part of the county along the Lunenburg County line. The following describes a profile of Cecil very fine sandy loam, undulating phase:

0 to 7 inches, light yellowish-brown, very friable very fine sandy loam.
7 to 11 inches, yellowish-red, friable fine sandy clay loam.
11 to 21 inches, red, firm clay.
21 to 42 inches, red, friable silty clay loam with a few specks of brownish yellow.
42 to 50 inches +, mottled, red, reddish-yellow, and white, friable, heavy silt loam from material derived from granite gneiss.

In forested areas the color of the topmost inch of soil material ranges from grayish brown to dark gray.

The following describes a profile of Georgeville very fine sandy loam, undulating phase:

0 to 8 inches, brownish-yellow, friable very fine sandy loam.
8 to 12 inches, reddish-yellow to yellowish-red, friable silty clay loam.
12 to 25 inches, red, firm silty clay.
25 to 40 inches, red, friable silty clay loam; contains small, partly weathered fragments of schist, but no mica is evident.
40 to 54 inches +, red, soft, decomposed schist that is smooth and slick; highly silty but lacking in mica; grades to pink, flaky, disintegrated, fine-grained schist streaked with pink, white, and shades of light red.

The texture of the surface soil ranges from silt loam to fine sandy loam. In places there are some sharp-edged pebbles of fine-grained quartz.

The soils of this group are strongly acid and are rather low in plant nutrients. Permeability is moderately rapid in the surface layer and moderate in the subsoil. The capacity for holding available moisture is moderate.

Use and management.—About 85 percent of this mapping unit is in forest, about 8 percent is cultivated, and the rest is either idle or in pasture. The forests are mainly oak and hickory mixed with shortleaf pine. In some areas there are pure stands of shortleaf pine.

The soils in this group are limited mainly by their low supply of plant nutrients. They respond well to good management. Corn, small grains, and lespedeza are the principal crops, but alfalfa is grown on a small acreage. The corn is usually followed by wheat or oats, and then lespedeza is grown for hay. The yields of corn and lespedeza could be increased greatly by adding large amounts of a complete fertilizer and lime. Because alfalfa gives good yields, however, it would be well to increase the acreage in that crop and to grow less lespedeza. This undifferentiated group of soils is in capability unit IIe–1.

Cecil and Georgeville very fine sandy loams, rolling phases (7 to 20 percent slopes) (Cn).—These soils have stronger slopes and are a little shallower than Cecil and Georgeville very fine sandy loams, undulating phases. They are also more likely to erode, and some areas have lost considerably more of the original surface layer. Deep gullies have formed in about one-sixth of the acreage, but nearly all of the gullies are more than 100 yards apart. Surface runoff is medium to rapid, and internal drainage is medium.

Use and management.—Only about 5 percent of this mapping unit is cultivated. Approximately 86 percent is in forest, and the rest is idle or in pasture. Small grains and hay are the principal crops. Corn is not grown extensively.

The soils of this group are fairly easy to work and conserve. They need management to control runoff. The pastures have a low carrying capacity. They would yield 4 to 5 times as much forage if adequate lime and fertilizer were applied. The soils in this mapping unit are in capability unit IIIe–1.

Chewacla Series

Chewacla silt loam is the only soil of the Chewacla series mapped in this county. The Chewacla soils are strongly acid and are somewhat poorly drained to moderately well drained. They have a high water table. These soils have formed in recent alluvial deposits. They occur on the wide, flat bottoms of streams and are flooded periodically.

The surface soil is brown silt loam. The underlying material is mottled, friable, heavy silt loam.

The present vegetation is mostly hardwoods that tolerate water.

Chewacla silt loam (0 to 2 percent slopes) (Co).—This soil is along the larger streams in the county. In most places it occurs between areas of Wehadkee soils and Mixed alluvial land. It has slightly better drainage than the Wehadkee soils, and its color, texture, and drainage are not so variable as those of Mixed alluvial land. The following describes a profile in a cultivated area:

0 to 11 inches, brown, friable silt loam.
11 to 32 inches, mottled, brown, yellowish-brown, and gray, friable, heavy silt loam.
32 to 40 inches +, predominantly mottled, yellowish-brown and light-gray, fine-textured alluvial material containing small, rounded, waterworn pebbles and fragments of rock.

In some places the texture of the surface soil is loam, and in others it is fine sandy loam. Some areas are wet.

This soil is strongly acid. It has a moderate supply of organic matter and is moderate to high in plant nutrients. Permeability is moderate, but the soil has a high water table. Surface runoff is very slow, and internal drainage is slow. The capacity to hold available moisture is moderate.

A few small areas of a well-drained, brown Congaree soil are mapped with this soil. The Congaree soils are not mapped separately in this county.

Use and management.—About 75 percent of Chewacla silt loam is in forest, 15 percent is in pasture, 5 percent is in crops, and the rest is idle. Nearly all of it was once used for crops. Ditches were cut around the bases of the slopes that border the bottom lands to keep the runoff from the uplands from flowing out onto these soils. The remains of the ditches can still be seen bordering most of the larger bottoms. They are referred to locally as hillside ditches. Now, nearly all of them are dry.

This soil is suited to only a limited number of crops, but it is fairly easy to easy to work and is easy to conserve. Mainly because of the frequency of flooding, yields range from medium to low. Because of the floods and excessive moisture in wet seasons, most of this soil has been allowed to revert to forest. The soil is well suited to pasture or lespedeza grown for hay. If it is drained, good yields of corn are obtained. Under good management the pastures have a carrying capacity of about one animal per acre. The yields of lespedeza can be increased greatly by adding large amounts of fertilizer and enough lime to raise the pH to 6.0. This soil is in capability unit IIIw–2.

Colfax Series

Only one soil of the Colfax series, Colfax sandy loam, undulating phase, occurs in this county. The Colfax soils are somewhat poorly drained and are very strongly acid. They have a compacted layer with some characteristics of a fragipan at a depth of about 19 inches. The compacted layer is hard during dry seasons so that it cannot be penetrated by the roots of most plants. The soils have formed from weathered products of granite or granite gneiss.

The surface soil is pale-yellow sandy loam. The subsoil is mottled, brownish-yellow, friable clay loam.

The present natural vegetation consists of a mixed stand of hardwoods and pines.

Colfax sandy loam, undulating phase (2 to 12 percent slopes) (Cp).—This soil is on the undulating divides between the major drainage systems in the county. It is also at the heads of intermittent drainageways. The largest area is northeast of Wellville. The soil generally lies between areas of Worsham and Durham soils or between areas of Worsham and Appling soils. The compact layer and slightly better drainage distinguish it from the Worsham soils. The Applying and Durham soils have better drainage than the Colfax. The following describes a profile of Colfax sandy loam in a cultivated area:

0 to 7 inches, pale-yellow, very friable sandy loam; contains many fine- to medium-sized, round holes that make the soil appear to be very porous.

7 to 14 inches, pale-yellow, very friable sandy loam mottled with brownish yellow.

14 to 19 inches, brownish-yellow, friable sandy clay loam mottled with light gray.

19 to 28 inches, mottled, brownish-yellow, light-gray, and white, friable, heavy sandy loam that is hard when dry; the light-gray material has formed a coating on the cleavage planes so that an unbroken piece of soil appears to have a uniform color; the roots of trees do not penetrate this material but stop or grow laterally at the top of the layer.

28 to 32 inches +, light-gray and white, friable sandy loam from granite material.

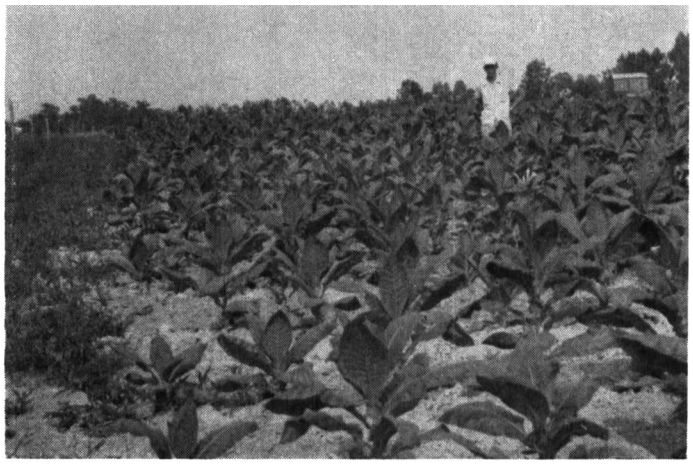

***Figure 5.*—In the foreground is bright tobacco growing on Colfax sandy loam, undulating phase. In the background the tobacco is growing on Durham coarse sandy loam, undulating phase.**

The compacted layer varies considerably in thickness and in hardness. In many places it has angular pieces of quartz, as much as 4 inches in diameter, on top of it. This layer of gravel is generally about 3 inches thick, and in many places it is partly cemented.

This soil is very strongly acid and is low in plant nutrients. The surface layer has moderately rapid permeability, and the subsoil, slow to very slow. Both surface runoff and internal drainage are slow to very slow. The capacity to hold available moisture is moderate.

Use and management.—About 82 percent of this soil is in forest, 10 percent is in pasture, 6 percent is in crops, and the rest is idle. Corn, small grains, hay crops, and bright tobacco (fig. 5) are grown to a limited extent in areas that occur within larger areas of Appling or Durham soils that are being cultivated. The yields are usually low because of poor drainage.

During wet seasons, corn, small grains, and bright tobacco generally fail regardless of the management practiced. Therefore, it would not be feasible to spend large amounts for commercial fertilizer, although commercial fertilizer would increase the yields of corn and lespedeza to some extent. The soil is best used for pasture or for lespedeza grown for hay. A mixture of ladino clover and tall fescue grows well if the soil is fertilized properly and limed to a pH of about 6.5. This soil is in capability unit IIIw–1.

Durham Series

The soils of the Durham series are well drained to moderately well drained, very strongly acid, and open and porous. They have formed from weathered products of granite and granite gneiss and occur on undulating to rolling uplands. The soils are associated with Colfax, Worsham, and Appling soils. They are better drained than the Colfax and Worsham soils but are not so well drained as the Appling. Also, the subsoil is brownish yellow, and that of the Appling soils is yellowish red or reddish yellow.

These soils have the thickest surface layer of any of the upland soils in the county. The surface layer is pale-yellow to light-gray or light brownish-gray coarse

sandy loam or fine sandy loam. The subsoil is brownish-yellow, friable sandy clay loam. A mottled, slightly compact layer is at depths ranging from 23 to 29 inches.

The original vegetation was mostly hardwoods of the oak-hickory type, but it included a few shortleaf and loblolly pines.

Durham coarse sandy loam, undulating phase (2 to 7 percent slopes) (Da).—The largest areas of this soil are in the eastern part of the county. The following describes a profile in a forested area:

0 to 1 inch, light-gray, very friable coarse sandy loam.
1 to 16 inches, pale-yellow, very friable coarse sandy loam.
16 to 18 inches, pale-yellow, friable to slightly compact coarse sandy loam.
18 to 29 inches, brownish-yellow, friable sandy clay loam with a few spots and specks of reddish yellow and red.
29 to 41 inches, mottled, brownish-yellow, strong-brown, red, and light-gray, compact sandy clay loam.
41 to 78 inches, mottled, brownish-yellow, light-gray, red, and strong-brown, friable sandy clay loam.
78 to 92 inches +, mottled, light-gray, red, brownish-yellow, and strong-brown, very friable sandy loam weathered from granite.

The surface layer is nearly white when dry. In cultivated areas there are many round, yellowish-brown balls of clay on the surface after heavy rains. These range from ¼ to ½ inch in diameter. The compact layer ranges from 2 to 12 inches in thickness and varies in degree of development. Roots rarely penetrate this layer and usually grow laterally along its top. When the soil is dry, this layer is difficult to penetrate with a soil auger. When it is moist, the slightly compacted layer cannot be distinguished.

This soil is very strongly acid and is low in organic matter and plant nutrients. Permeability is rapid to very rapid in the surface layer, moderately rapid to rapid in the subsoil, and slow in the compacted layer. Surface runoff is slow to very slow, and internal drainage is medium. Sheet erosion has generally been slight. The capacity to hold available moisture is moderately low.

Use and management.—About 65 percent of this soil is in forest, 25 percent is in crops, 6 percent is in pasture, and 4 percent is idle. The soil is excellent for bright tobacco, and many farmers use it entirely for that purpose. It is also desirable for sweetpotatoes, Irish potatoes, and other truck crops. One of the few commercial peach orchards in the county is on this soil.

This soil is very easy to work and conserve, and it is suited to a fairly large number of special crops. The yields are medium to low.

Tobacco is generally grown year after year and is followed by a winter cover crop of rye. Recently, however, since nematodes and black shank and other tobacco diseases have become prevalent, it is often grown in longer rotations. A cropping system that consists of 1 year each of tobacco, small grains, and redtop is commonly used. Corn is grown to some extent and is followed by a small grain and then by lespedeza grown for hay.

Small grains need large amounts of organic matter and commercial fertilizer. The cost of the fertilizer is probably too great to justify using it, however, because of the low yields that are obtained. Fertilizer is better used for bright tobacco or truck crops, because these crops give a high net return. This soil is in capability unit IIe–4.

Durham coarse sandy loam, rolling phase (7 to 12 percent slopes) (Db).—This soil has stronger slopes and is somewhat shallower than Durham coarse sandy loam, undulating phase, and it is more likely to erode. Some areas have lost a considerable amount of the original surface layer through erosion, and there are a few deep gullies. Surface runoff and internal drainage are medium. Mapped with this soil are small areas in which the surface layer is sandy loam.

Use and management.—About 75 percent of Durham coarse sandy loam, rolling phase, is in forest, 16 percent is in crops, and the rest is about equally distributed between pasture and idle areas. The soil is easy to work, and it is fairly easy to conserve. Nevertheless, it is suited to only a moderate number of crops.

Management of this soil is similar to that of Durham coarse sandy loam, undulating phase, but if bright tobacco or other row crops are grown, terraces should be used and the soil tilled on the contour. Except for bright tobacco, the yields of most crops are low.

The principal factor limiting yields is the rapid rate at which plant nutrients leach out of this soil. Because of the rapid leaching, fertilizer and lime need to be applied more frequently and in smaller quantities than on many other soils in the county. This soil is in capability unit IIIe–2.

Durham fine sandy loam, undulating phase (2 to 7 percent slopes) (Dc).—The surface layer of this soil has a slightly finer texture than that of Durham coarse sandy loam, undulating phase, because the soil has formed from fine-grained Burkeville granite. The largest areas are in the western part of the county near Burkeville. The following describes a profile in a forested area:

0 to 3 inches, light brownish-gray, very friable fine sandy loam.
3 to 19 inches, pale-yellow, very friable fine sandy loam.
19 to 23 inches, yellow, friable, light sandy clay loam.
23 to 27 inches, brownish-yellow, friable, light fine sandy clay loam faintly mottled with pale yellow; when moist, the soil is compact, and, when dry, it is hard and difficult to break with the hands.
27 to 36 inches, brownish-yellow, friable silty clay loam.
36 to 46 inches, mottled, brownish-yellow, red, white, and light-gray, friable, heavy silty clay loam.
46 to 52 inches +, mottled, light-gray, brownish-yellow, and red, very friable fine sandy loam weathered from granite.

The surface layer of this soil is nearly white when dry. In places the texture of the surface layer is sandy loam. In cultivated areas there are many round, yellowish-brown balls of clay on the surface after heavy rains. These range from ¼ to ½ inch in diameter. The compact layer, which is at depths between 23 and 27 inches in the profile described, ranges from 2 to 9 inches in thickness and varies in degree of development. When the soil is dry, this compact layer is very difficult to penetrate with a soil auger, but the auger penetrates easily when it is moist.

This soil is very strongly acid, and it is low in organic matter and plant nutrients. Permeability is rapid to very rapid in the surface layer and moderate to rapid in the subsoil. The capacity to hold moisture available is moderately low. Surface runoff is slow to very slow, and internal drainage is medium. This soil is only slightly sheet eroded.

Use and management.—About 55 percent of this soil is in forest, 5 percent is in crops, and the rest is about equally distributed between pasture and idle areas. The soil is easy to work and to conserve. It is well suited to bright tobacco and truck crops, which will give high net returns for the large amount of commercial fertilizer required. The soil has a fairly wide range of suitability for other crops, but yields are medium to low.

Tobacco is generally grown year after year and is followed by a winter cover crop of rye. During the past few years, however, because of the increase in tobacco diseases, this crop has been grown only once in about 3 years. If the tobacco is grown only every third year, it is followed by a small grain, and then by redtop. Corn is grown to some extent in rotation with small grains and lespedeza. This soil is in capability unit IIe–5.

Durham fine sandy loam, rolling phase (7 to 12 percent slopes) (Dd).—This soil has somewhat stronger slopes and is a little shallower than Durham fine sandy loam, undulating phase. It is also more subject to erosion. A few areas have lost a considerable amount of the surface soil, and there are a few deep gullies. The soil is open and porous, and plant nutrients leach out rapidly. Both surface runoff and internal drainage are medium. A few small areas in which the surface layer is sandy loam are mapped with this soil.

Use and management.—About 65 percent of Durham fine sandy loam, rolling phase, is in forest, 25 percent is in crops, about 5 percent is in pasture, and 5 percent is idle. The soil is easy to work and is fairly easy to conserve. It has a moderate range of suitability for crops.

The management of this soil is similar to that of Durham fine sandy loam, undulating phase, but if it is used for bright tobacco or other clean-tilled crops, terraces should be used and the soil tilled on the contour. The soil responds well to good management. It needs fertilizer and lime; the fertilizer is best applied in larger amounts than are used for many of the soils of the county. This soil is in capability unit IIIe–2.

Enon Series

The soils of the Enon series are well drained to moderately well drained and are medium acid. They have formed from weathered products of hornblende gneiss that in some areas are mixed with a small amount of material from granite or granite gneiss.

The surface layer is brown fine sandy loam. The subsoil is strong-brown, very firm clay.

These soils are mainly in the western half of the county. They occur on undulating to hilly uplands in association with Lloyd, Vance, and Helena soils. The subsoil in all four series is clay, but unlike the Enon soils, the Lloyd have dark-red subsoils, the Vance have reddish-yellow to brownish-yellow subsoils, and the Helena have mottled, yellowish-brown and light-gray subsoils.

The original vegetation was mostly hardwoods of the oak-hickory type, but there were some shortleaf and loblolly pines. In some old, abandoned fields these soils are reseeding, mostly to pine.

The soils of this series are somewhat difficult to cultivate; the subsoils are plastic when wet and very hard when dry. On the steeper slopes the risk of erosion is great.

Enon fine sandy loam, undulating phase (2 to 7 percent slopes) (Ea).—The following describes a profile in a cultivated area:

0 to 9 inches, brown, very friable fine sandy loam; round, black, and dark-brown concretions as large as one-fourth inch in diameter are common.
9 to 12 inches, brownish-yellow, friable fine sandy clay loam; contains many small, angular pebbles of quartz.
12 to 21 inches, strong-brown, very firm clay; plastic and slightly sticky when wet.
21 to 27 inches, mottled, light olive-brown, brownish-yellow, strong-brown, and yellow, firm, heavy clay loam; slightly plastic when wet but not sticky.
27 to 40 inches +, mottled, dark-brown, yellowish-brown, pale-yellow, and white, friable fine sandy loam from a mixture of materials weathered from hornblende gneiss and granite gneiss.

The thickness of the soil material over material that is essentially different varies. In some places there is a concentration of angular quartz pebbles in the subsoil.

This soil is medium acid. It has a moderate supply of plant nutrients. Permeability is moderate in the surface soil and moderately slow in the subsoil. Surface runoff is medium, and internal drainage is slow. Sheet erosion has removed part of the surface soil in most areas.

Use and management.—About 50 percent of this soil is in forest, 25 percent is in crops, 10 percent is in pasture, and 15 percent is idle. The principal crops are corn, small grains, dark tobacco, and lespedeza grown for hay. Dark tobacco is generally followed by a small grain and then by lespedeza or red clover, which is grown for 1 or 2 years.

This soil is difficult to fairly easy to work and is fairly easy to conserve. It has a moderate range of suitability for crops.

This soil is less strongly acid than most of the soils in the county. Nevertheless, the yields of most crops will be improved if 1 ton of ground limestone is applied once every 3 or 4 years. This soil is in capability unit IIIe–4.

Enon fine sandy loam, eroded undulating phase (2 to 7 percent slopes) (Eb).—This soil has lost more of its original surface soil through sheet erosion than Enon fine sandy loam, undulating phase, and gullies are common in many areas. Much of the original surface layer has been lost, and in some areas the present plow layer is clay loam.

Use and management.—About 35 percent of this soil is in forest, 40 percent is idle, and 25 percent is in pasture.

If it is to be used for tilled crops or pasture, this soil will need practices to control erosion. Deep gullies should be filled and smoothed. Management for crops and pasture will be essentially the same as that used for Enon fine sandy loam, undulating phase.

If the areas are used as woodland, redcedar, Virginia pine, and shortleaf pine are good choices for this soil. Virginia pine should be planted on the areas that are the most severely sheet eroded. This soil is in capability unit IIIe–4.

Enon fine sandy loam, rolling phase (7 to 12 percent slopes) (Ec).—This soil has stronger slopes than Enon fine sandy loam, undulating phase, and it is more likely to erode. Some areas have already lost much of the

original surface soil. Surface runoff is medium to rapid, and internal drainage is slow. Small areas in which the surface layer is sandy loam have been mapped with this soil.

Use and management.—About 64 percent of Enon fine sandy loam, rolling phase, is in forest, 12 percent is in crops, 15 percent is in pasture, and 9 percent is idle. The soil is difficult to work and is fairly difficult to conserve. Yields are medium.

Management of this soil is similar to that of Enon fine sandy loam, undulating phase. Tilling on the contour, terracing, and stripcropping should be used to control erosion if the fields are large enough to make these practices feasible. This soil is in capability unit IIIe–5.

Enon fine sandy loam, eroded rolling phase (7 to 12 percent slopes) (Ed).—This soil has steeper slopes than Enon fine sandy loam, undulating phase, and has lost more of its original surface layer through sheet and gully erosion. In most places the original surface layer is very thin or has been lost through erosion. Some areas are cut by deep gullies that are less than 100 yards apart. Small areas that have a surface layer of clay loam are mapped with this soil.

Use and management.—About 75 percent of Enon fine sandy loam, eroded rolling phase, is in forest, 10 percent is in pasture, and 15 percent is idle.

The soil will need practices to control erosion if it is to be used for tilled crops or pasture. Deep gullies should be filled and smoothed. Management for tilled crops and pasture will be about the same as for Enon fine sandy loam, rolling phase.

The areas not used for tilled crops or pasture are best planted to trees. Redcedar, Virginia pine, and shortleaf pine are good choices on this soil. Virginia pine is the best kind of tree to plant on the more severely eroded areas. This soil is in capability unit IIIe–5.

Enon-Vance-Helena soils, undulating phases (2 to 7 percent slopes) (Ee).—This soil complex is made up of moderately well drained to somewhat poorly drained soils. The soils occur in such an intricate pattern that they could not be mapped separately. The texture of the soils differs within distances of only 20 to 30 feet. As a result, a plowed field has a banded appearance because of the many different colors.

The soils have formed from weathered products of granite or granite gneiss mixed with weathered hornblende gneiss or diabase. They are mainly in two large areas, one north of Blackstone, and the other, north of Burkeville. In most places they occur in association with the Wilkes soils, which are excessively drained and shallow and lack the clay in the subsoil. The following describes a profile of Enon fine sandy loam:

0 to 9 inches, brown, very friable fine sandy loam; black and dark-brown, round concretions as much as one-fourth inch in diameter are common.
9 to 12 inches, brownish-yellow, friable fine sandy clay loam; contains many angular pebbles of quartz that range from very small to one-fourth inch in diameter.
12 to 21 inches, strong-brown, very firm clay; plastic and slightly sticky when wet.
21 to 27 inches, mottled, light olive-brown, brownish-yellow, strong-brown, and yellow, firm, heavy clay loam; slightly plastic but nonsticky when wet.
27 to 40 inches, mottled, dark-brown, yellowish-brown, pale-yellow, and white, friable fine sandy loam from a mixture of weathered hornblende gneiss and granite gneiss.

The following describes a profile of Vance fine sandy loam:

0 to 6 inches, grayish-brown, very friable fine sandy loam; a few white, angular pebbles of quartz, between ½ and 2 inches in diameter, are on the surface and in this layer.
6 to 10 inches, pale-yellow, very friable fine sandy loam with a few spots and streaks of grayish brown.
10 to 13 inches, brownish-yellow, friable fine sandy loam.
13 to 22 inches, reddish-yellow to brownish-yellow, firm clay; plastic and slightly sticky when wet.
22 to 32 inches, mottled, brownish-yellow, red, yellow, and white, friable clay loam.
32 to 42 inches, mottled, yellow, white, and yellowish-brown, friable, heavy silt loam derived from highly weathered granite gneiss.

The following describes a profile of Helena fine sandy loam:

0 to 3 inches, grayish-brown, very friable fine sandy loam.
3 to 10 inches, yellowish-brown, very friable fine sandy loam.
10 to 15 inches, mottled, yellowish-brown and pale-yellow, friable, light fine sandy clay loam.
15 to 27 inches, mottled, yellowish-brown and light-gray, very firm clay; very plastic and sticky when wet.
27 to 36 inches, mottled, yellowish-brown, pale-yellow, and white, friable to firm, heavy clay loam or clay; slightly plastic when wet.
36 to 48 inches, mottled, yellowish-brown, brown, pale-yellow, and white, very friable fine sandy loam derived from highly weathered hornblende gneiss mixed with material from weathered granite gneiss.

In addition to the areas of typical Enon, Vance, and Helena soils, this complex contains soils that are transitional from one kind of soil to another. The texture varies considerably. In uneroded areas it ranges from loam to sandy loam. In the eroded areas the texture is clay loam or clay.

The soils of this complex are moderately acid and have a moderate to low supply of plant nutrients. Permeability is moderate in the surface layer and moderately slow in the subsoil. Surface runoff is slow to medium, and internal drainage is slow. The capacity to hold available moisture is moderate. The soils have been slightly to moderately sheet eroded.

A few small areas of Appling soils are included in this complex. Also included are small areas of a red, micaceous soil that resembles the Madison soils.

Use and management.—About 65 percent of this complex is in forest, 15 percent is idle, and the rest is about equally distributed between cropped areas and pasture.

Corn, small grains, dark tobacco, and lespedeza grown for hay are the principal crops. Some bright tobacco is grown, but yields are low and the quality is poor. The time at which crops mature varies with each soil in the complex.

Since the soils of this complex are so varied, they are best used for small grains, pasture, or hay crops. Ladino clover, lespedeza, and tall fescue, orchardgrass, or other grasses are suitable hay crops. This complex is in capability unit IIIe–4.

Enon-Vance-Helena soils, eroded undulating phases (2 to 7 percent slopes) (Ef).—This complex is made up of soils that are more eroded than the complex consisting of Enon-Vance-Helena soils, undulating phases. In every area there are a few deep gullies. In many areas

much of the original surface soil has been lost. Surface runoff is slow to medium, and internal drainage is slow. Sheet erosion is moderate.

Use and management.—Approximately 50 percent of this complex is in forest, 20 percent is in pasture, 5 percent is in crops, and 25 percent is idle.

If this soil is to be used for tilled crops or pasture, practices will be needed to control erosion. Any deep gullies should be filled and smoothed. Management for tilled crops and pasture will be essentially the same as for Enon-Vance-Helena soils, undulating phases. This complex is in capability unit IIIe–4.

Enon-Vance-Helena soils, rolling phases (7 to 12 percent slopes) (Eg).—This soil complex is more likely to erode than Enon-Vance-Helena soils, undulating phases. Some areas have already lost much of the original surface layer. Surface runoff is medium to rapid, and internal drainage is slow.

Use and management.—About 70 percent of this complex is in forest, 12 percent is in crops, 10 percent is in pasture, and 8 percent is idle. The soils are difficult to work and conserve, but they respond well to good management. Yields are medium to low.

The crops grown on this complex are similar to those grown on Enon-Vance-Helena soils, undulating phases, and management is similar. If the fields are large enough to make such practices feasible, tilling on the contour, terracing, and stripcropping should be practiced. If dark tobacco is grown, it is important that hay crops be included in the cropping system. This complex is in capability unit IIIe–5.

Enon-Vance-Helena soils, eroded rolling phases (7 to 12 percent slopes) (Eh).—The soils in this complex have steeper slopes and are shallower and more eroded than those in the complex of Enon-Vance-Helena soils, undulating phases. In some places much of the original surface layer has been lost through sheet erosion. Deep gullies are common in most of the areas. Surface runoff is rapid, and internal drainage is slow.

Use and management.—About 76 percent of this complex is in forest, 22 percent is idle, and the rest is pastured. The soils are difficult to work and conserve.

If this soil is to be used for tilled crops or pasture, practices will be needed to control erosion. Deep gullies should be filled and smoothed. Management for tilled crops or pasture will be the same as for Enon-Vance-Helena soils, rolling phases.

It is desirable to plant idle areas that will not be used for tilled crops or pasture to Virginia pine. Cut trees for timber and pulpwood sparingly, and never clear cut. This complex is in capability unit IIIe–5.

Enon-Vance-Helena soils, hilly phases (12 to 20 percent slopes) (Ek).—The soils of this complex are shallower and have steeper slopes than those in the complex of Enon-Vance-Helena soils, undulating phases, and they are more likely to erode. Some areas have lost a large part of the original surface soil. Surface runoff is rapid to very rapid, and internal drainage is slow.

Use and management.—About 85 percent of this complex is in forest, 10 percent is pastured, and the rest is idle. If the soils are limed and fertilized properly, pastures of fair quality can be established. The pastures must not be overgrazed, because gullies form easily on the steeper slopes. This complex is in capability unit VIe–2.

Enon-Vance-Helena soils, eroded hilly phases (12 to 20 percent slopes) (El).—This complex is shallower, steeper, and more eroded than the complex of Enon-Vance-Helena soils, undulating phases. Most of the areas have been cut by deep gullies. Surface runoff is very rapid, and internal drainage is slow.

Use and management.—About 80 percent of this complex is in forest, and the rest is idle. The soils are so severely gullied that the only practical use is for forest. Before trees are planted, gully erosion needs to be checked. Virginia pine is one of the best kinds of trees to plant. When the trees are harvested for timber or pulpwood, enough of them should be left to provide adequate cover for the soils. This complex is in capability unit VIe–2.

Gullied Land

Gullied Land (Ga).—This mapping unit consists of deeply eroded soils that occupy small areas in many parts of the county. It is made up of soils of many series, but little of the original soil profiles remains. Most areas consist of an intricate pattern of deep, connecting gullies (fig. 6). Unless they are controlled, the gullies may encroach on the surrounding, less eroded soils.

Use and management.—Much of Gullied land has no plant cover and consists of active, unprotected gullies that have little or no value for agriculture. The first thing needed on these areas is to check the active gullies and stabilize the soil. Japanese fly honeysuckle will check the gully erosion, and in time it will cover the eroded areas. Kudzu also grows well on these gullied areas. Gullied land is in capability unit VIIIe–1.

Helena Series

The Helena soils of this county are moderately well drained to somewhat poorly drained and are strongly acid. They have formed mainly from a mixture of

Figure 6.—Area of Gullied land in which erosion is still active.

weathered products of granite gneiss and hornblende gneiss, but materials from weathered diabase and granite were included in the parent materials.

The surface layer is yellowish-brown to light yellowish-brown or grayish-brown fine sandy loam. The subsoil is mottled, yellowish-brown to light-gray, very firm clay.

These soils occupy small areas on undulating to hilly uplands and are mostly in the western part of the county. They occur in association with the Enon and Vance soils. All of these associated soils have a clay subsoil. Unlike the Helena soils, however, the Enon soils have a strong-brown subsoil, and the Vance, reddish-yellow to brownish-yellow subsoil. The Helena soils have the poorest drainage of any of these soils.

The original vegetation consisted mostly of forests of oak and hickory, but it included other hardwoods and some shortleaf pine. More than 70 percent of the total acreage of the Helena soils is in forest.

Helena fine sandy loam, undulating phase (2 to 7 percent slopes) (Ha).—The following describes a profile in a forested area:

0 to 3 inches, grayish-brown, very friable fine sandy loam.
3 to 10 inches, yellowish-brown, very friable fine sandy loam.
10 to 15 inches, mottled, yellowish-brown and pale-yellow, friable, light fine sandy clay loam.
15 to 27 inches, mottled, yellowish-brown and light-gray, very firm clay; very plastic and sticky when wet.
27 to 36 inches, mottled, yellowish-brown, pale-yellow, and white, friable to firm, heavy clay loam to clay; slightly plastic when wet.
36 to 48 inches, mottled, yellowish-brown, brown, pale-yellow, and white, very friable fine sandy loam from highly weathered hornblende gneiss mixed with highly weathered granite gneiss.

In some places the surface soil is sandy loam.

This soil is strongly acid, and its supply of plant nutrients is low. Permeability is moderately rapid in the surface layer and slow in the subsoil. The capacity to hold available moisture is moderate. Surface runoff and internal drainage are slow. Sheet erosion ranges from slight to moderate.

Use and management.—Approximately 70 percent of this soil is in forest, 12 percent is in pasture, 3 percent is in crops, and 15 percent is idle. The slow internal drainage, caused by the thick claypan in the subsoil, limits its use. Small grains and corn produce low yields on this soil, and bright tobacco generally fails. Dark tobacco yields better than bright tobacco, but the yields are much lower than those on the Cecil, Madison, Lloyd, and other soils better suited to dark tobacco. Lespedeza and lespedeza grown with orchardgrass give the best yields. Ladino clover grown with tall fescue or orchardgrass does well if it is fertilized properly and other good management is used. This soil is in capability unit IIIe–4.

Helena fine sandy loam, eroded undulating phase (2 to 7 percent slopes) (Hb).—This soil has had more sheet and gully erosion than Helena fine sandy loam, undulating phase. The gullies are deep, but they are generally more than 100 yards apart. Surface runoff is medium, and internal drainage is slow.

Practices need to be used intensively to control erosion, if this soil is to be used for tilled crops or pasture. If there are deep gullies, they should be filled and smoothed. Otherwise, this soil needs to be managed about the same as Helena fine sandy loam, undulating phase. It is in capability unit IIIe–5.

Helena fine sandy loam, rolling phase (7 to 12 percent slopes) (Hc).—This soil has stronger slopes than Helena fine sandy loam, undulating phase, and is more likely to erode. Some areas have already lost a large part of the original surface layer. This soil occurs in narrow bands along intermittent drainageways in association with Helena fine sandy loam, undulating phase. Surface runoff is medium to rapid, and internal drainage is slow.

Use and management.—About 74 percent of this soil is in forest, 10 percent is idle, 14 percent is pastured, and the rest is cropped. The soil is difficult to work and is fairly easy to difficult to conserve. It is suited to only a limited number of crops.

A few farmers cultivate small areas of this soil that are in the same field with other soils. Yields are low, and the crops often fail. The soil can be used for pasture. It is in capability unit IIIe–5.

Helena fine sandy loam, eroded rolling phase (7 to 12 percent slopes) (Hd).—This soil has stronger slopes than Helena fine sandy loam, undulating phase, and it is more likely to erode. The soil is not extensive, but it is a problem wherever it occurs on a farm. Surface runoff is rapid, and internal drainage is slow. Sheet erosion has generally been moderate, but in some places the entire original surface layer has been removed. Most of this soil has deep gullies. In most of the areas, the gullies are more than 100 yards apart, but in some areas they are closer and more numerous.

Use and management.—About 82 percent of this soil is in forest, and the rest is idle. The soil is difficult to work and conserve, and yields are low.

Practices need to be used intensively to control erosion. If there are deep gullies, they should be filled and smoothed. This soil needs to be managed about the same as Helena fine sandy loam, rolling phase.

Virginia pine will grow well on this soil because of its shallow root system. After a stand of trees has been established and erosion has been checked, all cutting should be done carefully so as to prevent further gully erosion. This soil is in capability unit IIIe–5.

Iredell-Mecklenburg Soils

The soils of this complex have formed from weathered products of dark-colored basic rocks, mainly hornblende gneiss, but including some diabase. In places angular pieces of basic rock, as large as 6 inches in diameter, cover the surface. Most of the complex consists of Mecklenburg soils, but small areas of Iredell soils are included. In places the soils have characteristics similar to those of both the Iredell and Mecklenburg soils.

The Iredell soils are moderately well drained to somewhat poorly drained. They have a dark yellowish-brown surface layer that ranges in texture from loam to fine sandy loam. Their subsoil is yellowish-brown, very firm clay.

The Mecklenburg soils are well drained to moderately well drained. Their surface layer is yellowish-brown loam. Their subsoil is yellowish-red, firm clay.

Most of these soils are on undulating to rolling uplands in the northeastern corner of the county. They occur along the Amelia County line, near the junction of Ellis Fork and Flat Creeks. The soils are associated with the Bremo and Wilkes soils, which are excessively drained. In contrast to the Bremo and Wilkes soils, which have little or no development in the subsoil, they have a well-developed clay subsoil.

The original vegetation was mostly hardwoods, but it included some shortleaf pine. More than 70 percent of the total acreage of Iredell-Mecklenburg soils is in forest, but most of the soils can be cultivated or pastured.

Iredell-Mecklenburg loams, undulating phases (2 to 7 percent slopes) (Ia).—The following describes a profile of Iredell loam, undulating phase, in a forested area:

0 to 3 inches, dark grayish-brown, very friable loam; weak, fine, granular structure.
3 to 9 inches, dark yellowish-brown, very friable loam; weak, fine, granular structure; a few small, dark-brown concretions in this layer appear as black streaks on a cut surface; angular pebbles of quartz up to one-half inch in diameter are in the lower part of this layer.
9 to 26 inches, yellowish-brown, very firm clay; massive, or structureless; very plastic and very sticky when wet.
26 to 31 inches +, material that is predominantly olive brown, derived from highly weathered hornblende gneiss and diabase; faint mottles of olive gray, pale yellow, and yellow.

The texture of the surface soil ranges from loam to fine sandy loam. The number of concretions and quartz pebbles in the lower part of the surface soil varies somewhat from place to place.

The following describes a profile of Mecklenburg loam, undulating phase, in a forested area:

0 to 2 inches, brown, very friable loam; weak, medium, granular structure; contains many angular pebbles of quartz.
2 to 8 inches, yellowish-brown, friable loam; weak, medium, granular structure; has many fine to very fine, round holes.
8 to 12 inches, dark-brown, friable to firm clay loam; moderate, medium, subangular blocky structure; small concretions appear as black streaks on a cut surface.
12 to 27 inches, yellowish-red, firm clay; strong, coarse to medium, subangular blocky structure; contains many black concretions that are as much as one-fourth inch in diameter; cleavage planes have black coatings.
27 to 30 inches, mottled, yellowish-red, light-yellow, dark-brown, and black, friable, heavy clay loam; no definite structure.
30 to 36 inches +, mottled, strong-brown, light-yellow, dark-brown, and black, very friable sandy loam derived from hornblende gneiss.

In some places semirounded and angular pebbles and cobbles of diabase and hornblende rock are strewn over the surface. The subsoil is red and plastic in a few places.

The soils in this complex are strongly acid to medium acid and are medium to low in organic matter. They have a moderate supply of most plant nutrients, but the supply of potash is fairly low. The surface layers are moderately permeable. The subsoil of the Iredell soil is very slow in permeability, and that of the Mecklenburg soil is moderately slow. The capacity to hold available moisture is generally moderate. Surface runoff is slow to medium. Internal drainage is slow in the Iredell soil and is medium to slow in the Mecklenburg soil. Sheet erosion is slight to moderate.

A few small areas of Bremo soils are included in this complex.

Figure 7.—**Fields of Iredell-Mecklenburg loams that have been plowed and disked. The large clods make the soil difficult to work.**

Use and management.—Approximately 70 percent of this complex is in forest, 12 percent is in crops, and the rest is about equally distributed between pasture and idle areas. The soils are difficult to work but are fairly easy to conserve. Yields are medium to low. The soils respond moderately well to management. They are medium in their range of suitability for crops.

The crops most commonly grown are corn, small grains, dark tobacco, and hay. Corn is usually grown in rotation with wheat or barley, and lespedeza is grown for hay. Under ordinary management corn makes fairly small average yields. The soils are best suited to use for dairy farming.

Large amounts of manure or other kinds of organic matter are needed to improve the tilth, and the soil needs to have a complete fertilizer added. Areas that have not been limed will require 1 to 2 tons of ground limestone.

The heavy clay in the subsoil limits yields unless rains are frequent and come at the proper times. It also limits the time when these soils can be cultivated (fig. 7). If the soils are worked when they are too wet, large clods form.

Some farmers use these soils entirely for pasture. Pasture mixtures that include ladino clover provide better grazing if the soils have been fertilized and limed properly.

Lespedeza, the principal hay crop, is generally seeded with redtop or orchardgrass. If the areas are fertilized properly, yields are good. These soils are in capability unit IIIe–4.

Iredell-Mecklenburg loams, rolling phases (7 to 12 percent slopes) (Ib).—The soils of this complex have stronger slopes than Iredell-Mecklenburg loams, undulating phases, and they are more likely to erode. Some areas have already lost much of the original surface soil. Surface runoff is medium to rapid. Internal drainage is slow in the Iredell soil and medium to slow in the Mecklenburg soil. The supply of plant nutrients is fairly high, but the heavy, plastic subsoil limits the use of the soils.

Use and management.—Approximately 72 percent of this complex is in forest, 15 percent is in crops, and the

rest is idle or in pasture. The soils are best suited to pasture and forest. A good mixture for seeding pastures includes ladino clover and either orchardgrass or Kentucky 31 fescue. Lime and fertilizer will be needed if adequate yields are to be obtained. These soils are in capability unit VIe–3.

Iredell-Mecklenburg loams, eroded rolling phases (7 to 20 percent slopes) (Ic).—Because they have stronger slopes, these soils are more likely to erode than Iredell-Mecklenburg loams, undulating phases. Surface runoff is rapid. Internal drainage is slow in the Iredell soil and medium to slow in the Mecklenburg soil. Sheet erosion ranges from moderate to severe. All of the areas have deep gullies. Most of the gullies are more than 100 yards apart, and trees have checked most of the erosion. In a few places, however, where the trees have been clean cut, gully erosion is active.

Use and management.—Almost all of this complex is in forest, but a few acres are idle. The forests should be managed so that enough of a stand is left to prevent serious washing. The trees best suited are southern redcedar, shortleaf pine, and Virginia pine. Virginia pine is better suited to the severely eroded areas than other kinds of trees.

These soils should not be cleared for pasture unless the owner is willing to spend a large amount of money per acre to fill the gullies and to fertilize, lime, and seed the areas. The pastures should be fairly good, however, if they are managed properly. These soils are in capability unit VIe–3.

Lloyd Series

The soils of the Lloyd series are deep and well drained and are strongly acid to medium acid. Locally, they are called chocolate land. The soils have formed from weathered products of granite gneiss and hornblende gneiss. Normally, their surface layer is brown loam, and their subsoil is dark-red, firm clay.

These soils are on undulating to hilly uplands. They are widely distributed throughout the county. One of the largest areas is about 3 miles east of The Falls along the Lunenburg County line. The soils occur in association with Madison, Enon, Cecil, and Wilkes soils. They have less mica throughout the profile than the Madison soils, and their subsoil is a darker red and is finer textured. They have a redder subsoil than the Enon soils and a browner and finer textured surface layer and darker red subsoil than the Cecil soils. They are well drained and have a well-developed, clayey subsoil, whereas the Wilkes soils are excessively drained and have little or no development in the subsoil.

The original vegetation was predominantly forest consisting mostly of oak and hickory, but it included some pines. In many places old, abandoned fields made up of these soils have reseeded to loblolly, shortleaf, or Virginia pines. Although more than 60 percent of the total acreage is in forest, these soils are among the best in the county for growing corn, small grains, dark tobacco, lespedeza, alfalfa, and clover if they are on gentle slopes.

Lloyd loam, undulating phase (2 to 7 percent slopes) (Id).—The following describes a profile in a forested area:

0 to 12 inches, brown, very friable loam; moderate, fine, granular structure.
12 to 42 inches, dark-red, firm clay; moderate, coarse to medium, subangular blocky structure; sticky and slightly plastic when wet.
42 to 66 inches, dark-red, friable silty clay loam mottled with yellow; moderate, medium to fine, subangular blocky structure.
66 to 72 inches +, mottled, yellow and red, friable silt loam; no definite structure.

In a few places there are stones scattered over the surface of this soil. The stones are mainly pieces of dark-colored basic rock. The thickness of the surface layer varies considerably, depending largely on the degree of sheet erosion. In places the subsoil contains very fine flakes of mica.

This soil is medium acid and has a moderate supply of plant nutrients. It is moderately permeable, and the capacity to hold available moisture is moderate. Surface runoff and internal drainage are both medium. Sheet erosion is slight to moderate.

Use and management.—About 60 percent of this soil is in forest, 25 percent is in crops, 10 percent is in pasture, and the rest is idle. The soil is easy to fairly easy to work and fairly easy to conserve. It is suited to many different kinds of crops.

This soil is among the best in the county for corn, small grains, and dark tobacco, and for lespedeza, alfalfa, and clover grown for hay. It is also good for pasture. The soil is especially well suited to alfalfa. Yields are high, and the stands usually last for several years.

Corn is commonly grown in rotation with wheat or barley followed by a hay crop grown for 2 or 3 years. The hay crop is usually lespedeza. Dark tobacco is often substituted for corn in the cropping system and produces good yields. A complete fertilizer is needed for some crops. This soil is in capability unit IIe–1.

Lloyd loam, rolling phase (7 to 12 percent slopes) (Ie).—This soil has stronger slopes than Lloyd loam, undulating phase, and is more likely to erode. It has a thinner surface layer; in some areas nearly all of the original surface layer has been lost. There are a few deep gullies in some areas. Surface runoff is medium to rapid, and internal drainage is medium.

Use and management.—About 68 percent of this soil is in forest, 10 percent is in crops, 14 percent is in pasture, and 8 percent is idle. The soil is fairly easy to work and is fairly easy to difficult to conserve. It has a fairly wide range of suitability for crops.

About the same crops are grown on this soil as are grown on Lloyd loam, undulating phase, and management is similar except for slight differences in tillage practices. The soil needs to be tilled on the contour, and stripcropping should be used if the fields are large enough to make it feasible. The areas that have deep gullies are best kept in pasture. Heavy applications of lime, commercial fertilizer, and manure are needed on gullied areas to get a good stand of grass established. The grass will check gully erosion. This soil is in capability unit IIIe–1.

Lloyd loam, hilly phase (12 to 20 percent slopes) (If).—This soil has much stronger slopes than Lloyd loam, undulating phase, and it is generally shallower and has

a narrower range of suitability for crops. Surface runoff is rapid, and internal drainage is medium. Sheet erosion has removed part of the surface soil in most areas. There are a few deep gullies in some places. A few small areas in which the surface layer is clay loam are mapped with this soil.

Use and management.—Approximately 72 percent of Lloyd loam, hilly phase, is in forest, 20 percent is in pasture, and the rest is idle. This soil is extremely difficult to work and is difficult to conserve. Nevertheless, some areas have been used for crops. If lime is added and a complete fertilizer is applied properly, pastures are good on this soil. If pasture is not needed, however, it is well to leave the soil in trees or to plant such trees as shortleaf pine, black walnut, and yellow-poplar. This soil is in capability unit IVe–2.

Lloyd clay loam, eroded undulating phase (2 to 7 percent slopes) (lc).—This soil differs from Lloyd loam, undulating phase, mainly in having a surface layer of reddish-brown clay loam. This surface layer is the remains of the original surface layer mixed with subsoil material. Some farmers call the soil pushy, because the heavy surface layer is difficult to plow and cultivate under some moisture conditions.

Surface runoff and internal drainage are medium. Most areas have been sheet eroded so that only remnants of the original surface layer remain. There are a few deep gullies in a small part of the acreage.

Use and management.—About 50 percent of this soil is in forest, 24 percent is in crops, 15 percent is idle, and 11 percent is in pasture. The soil is difficult to work and is fairly easy to conserve. It is used for crops that are similar to those grown on Lloyd loam, undulating phase, and management is about the same. Nevertheless, more lime is required to get the same reaction as that obtained in the undulating phase, and larger amounts of fertilizer are needed. Additions of manure will improve the tilth of the soil greatly and will also increase yields.

Hay crops and small grains are more desirable to grow on this soil than row crops. The soil is excellent for alfalfa. If it is limed and fertilized properly, it is good for pasture. This soil is in capability unit IIIe–6.

Lloyd clay loam, eroded rolling phase (7 to 12 percent slopes) (lb).—This soil has steeper slopes than Lloyd loam, undulating phase, and, unlike that soil, it has a reddish-brown to dark-red surface layer of clay loam. The plow layer consists of remnants of the original surface layer mixed with subsoil material. Most areas are cut by deep gullies, and sheet erosion has been severe. In some areas the gullies are far apart. In others, they are numerous and are less than 100 yards apart.

Use and management.—About 62 percent of this soil is in forest, 18 percent is idle, 12 percent is pastured, and 8 percent is cropped. In areas that have not been cut by gullies, yields of alfalfa and lespedeza grown for hay are very good. Yields of small grains on this soil are also good, and yields of corn are fair. If row crops are grown, the soil needs to be tilled on the contour. Hay crops and small grains will help to control erosion.

The areas of this soil that have been cut by gullies can be improved so that pastures will produce good forage on them. The gullies must first be filled and the areas smoothed. Then, adequate ground limestone and large amounts of a complete fertilizer must be added. Manure should be added if it is available. This soil is in capability unit IVe–1.

Lloyd clay loam, eroded hilly phase (12 to 20 percent slopes) (lc).—This soil has much steeper slopes than Lloyd loam, undulating phase. Because of severe erosion, it is also shallower, and it has a reddish-brown to dark-red surface layer of clay loam. Most of the areas have lost the original surface layer, and in many places the present surface layer was originally the lower part of the subsoil.

This soil occupies small areas on the steep breaks near streams. Most of it is cut by deep gullies that are widely spaced in some places and close together in others. In some places there are outcrops of bedrock.

This soil has rapid surface runoff, and the risk of further erosion is great. Internal drainage is medium.

Use and management.—About 80 percent of this soil is in forest, 12 percent is in pasture, and the rest is idle. In most areas that are pastured, the yields of forage are fair. Nevertheless, the cost of establishing and maintaining pastures is so high that generally a better use for this soil is forest. The trees to which the soil is well suited are Virginia and shortleaf pines, and yellow-poplars grow well on areas that have a northern or eastern exposure. The steep slopes, poor tilth, and erosion make this soil unsuitable for crops. The soil is in capability unit VIe–1.

Louisburg Series

The soils of the Louisburg series are shallow and are very strongly acid. They have formed in weathered products of granite, granite gneiss, or pegmatite. The soils occupy undulating to hilly areas in the uplands. They are on fairly steep slopes along streams and intermittent drainageways in nearly all parts of the county. Some of the largest areas are south of the town of Nottoway near the Little Nottoway River.

These soils have a light yellowish-brown to dark grayish-brown surface layer of sandy loam. The underlying material is very pale brown to yellow, loose sandy loam derived from the parent rock. This underlying material is at depths of about 16 inches.

These soils occur in association with Appling, Cecil, and Durham soils. Unlike the Appling and Cecil soils, which are well drained, they are excessively drained and show little or no development in the subsoil. The Durham soils are moderately well drained to well drained and have a well-developed subsoil and a slightly compact layer.

The original vegetation was mainly post, white, and red oaks and hickory, but there were some shortleaf and loblolly pines. In most places old, abandoned fields made up of these soils have reseeded to loblolly, shortleaf, and Virginia pines. The areas of these soils that have gentle slopes are well suited to bright tobacco, but other cultivated crops fail to make good yields, because of the low capacity for holding available moisture. These soils on the steeper slopes are mainly in forest.

Louisburg sandy loam, undulating phase (2 to 7 percent slopes) (Lg).—The following describes a profile in a forested area:

0 to 3 inches, dark grayish-brown, very friable sandy loam; moderate, medium, granular structure.
3 to 16 inches, light yellowish-brown, very friable sandy loam; weak, fine, granular structure.
16 to 26 inches, very pale brown to yellow, loose, light sandy loam from products of highly weathered granite gneiss.
26 to 28 inches +, brownish-yellow, mixed with yellow and light gray, hard granite gneiss that contains many fine, dark-brown and black mica flakes.

The profile varies widely in texture and in depth to bedrock. In a few places loose stones are scattered over the surface, and in a few places there are outcrops of bedrock.

This soil is very strongly acid, and its supply of plant nutrients is low. Permeability is rapid in the surface and subsurface layers. The soil is excessively drained and has a low capacity for holding available moisture. The rate of infiltration is high, and plant nutrients leach out of the soil rapidly. Surface runoff is slow to medium, and internal drainage is rapid. Sheet erosion is slight to moderate.

Use and management.—Approximately 50 percent of this soil is in forest, 25 percent is in crops, 17 percent is idle, and 8 percent is pastured. The soil is easy to work and is fairly easy to easy to conserve. Yields are low to medium.

This soil is considered one of the best in the county for bright tobacco, and that crop is the most widely grown. Tobacco is generally grown year after year and is followed by a winter cover crop of rye. Some farmers allow the fields to remain idle for 1 or 2 years before a new crop of tobacco is planted. Corn, small grains, and lespedeza for hay are grown in a few areas. If there has been adequate rain during the growing season, good yields of corn are obtained. Generally, yields of crops are low, however, because of the low capacity of the soil for holding available moisture. If there has been a rainy growing season so that small grains have adequate moisture, the yields can be increased by applying a topdressing of nitrogen fertilizer.

Definite cropping systems are not widely used on this soil. The one most commonly used is 1 year each of corn, small grains, and lespedeza grown for hay.

The soil is too droughty for good pastures. Lespedeza and tall fescue make the best growth. This soil is in capability unit IVe–3.

Louisburg sandy loam, rolling phase (7 to 12 percent slopes) (Lh).—This soil is mainly on slopes between ridgetops and the sharply breaking, more extensive areas of Louisburg sandy loam, hilly phase. It is a shallow soil. Surface runoff is medium to rapid, and internal drainage is rapid. Sheet erosion is slight to moderate. The risk of further erosion is moderate to high.

Use and management.—About 74 percent of this soil is in forest, 16 percent is in crops, and the rest is idle or in pasture. The soil is easy to work, and it is fairly easy to conserve. The range of suitability for crops is medium, and yields are low to medium.

Many farmers use this soil along with areas of Louisburg sandy loam, undulating phase, and management practices and the crops grown are similar. This soil needs more intensive practices to control erosion. Tillage should be on the contour. If bright tobacco is grown, terraces will be needed so that surface water will be removed with a minimum amount of erosion. This soil is in capability unit IVe–3.

Louisburg sandy loam, eroded rolling phase (7 to 12 percent slopes) (Lk).—Because it has steeper slopes, this soil is more likely to erode than Louisburg sandy loam, undulating phase. Poor management in the past has caused most of the areas to lose at least half of the original surface layer. In all of the areas, there are a few deep gullies. Surface runoff and internal drainage are both rapid. The risk of further erosion is high.

Use and management.—Approximately 80 percent of this soil is in forest, 12 percent is idle, and the rest is in pasture. The soil is difficult to work and conserve, and yields are low.

This soil can be used for pasture. Even though large amounts of a complete fertilizer and adequate lime are used, however, the growth of the pasture grasses will be poor compared to that of the grasses on many of the other soils in the county.

It is better to use this soil for forest than for cultivated crops or pasture. Loblolly pine does well. Before trees are planted, active gully erosion should be checked. One way of doing this is to divert the water at the head of the gully. When the timber is harvested, the trees should be cut sparingly so as to leave enough for a cover. Otherwise, erosion will begin again in the old gullies. This soil is in capability unit IVe–3.

Louisburg sandy loam, hilly phase (12 to 45 percent slopes) (Lm).—This soil has much steeper slopes than Louisburg sandy loam, undulating phase, and it is generally somewhat shallower. It is excessively drained. Surface runoff is rapid to very rapid, and internal drainage is rapid. Sheet erosion has been slight to moderate.

Use and management.—About 86 percent of this soil is in forest, and the rest is about equally distributed between pasture and idle areas. The soil is difficult to work and conserve. It is better used for forest than for tilled crops or pasture. Loblolly and shortleaf pines grow well on this soil, and yellow-poplar makes a good growth near the foot of slopes that have a northern or eastern exposure. This soil is in capability unit VIIe–1.

Louisburg sandy loam, eroded hilly phase (12 to 45 percent slopes) (Ln).—This soil has steeper slopes than Louisburg sandy loam, undulating phase, and is moderately to severely eroded. In places all of the soil has been washed away and the crumbly granitic rock is exposed. Nearly all of the areas have deep gullies, but they are generally few in number. Surface runoff is rapid to very rapid, and internal drainage is rapid.

Use and management.—Nearly all of this soil was once used for crops. Now, about 80 percent of it is in forest; except for a small acreage in pasture, most of the rest is idle. If the cover of plants is removed, little can be done to prevent this soil from washing. It is difficult to work, and very difficult to conserve.

This soil should be used for forest. In the more eroded areas, Virginia pine grows better than other kinds of trees. In the other areas, the same kinds of trees can be grown as are grown on Louisburg sandy loam, hilly phase, but growth will be slower. A major problem on this soil is to check the active erosion in the gullies. The

idle areas should be planted to trees so that they will not become severely eroded. This soil is in capability unit VIIe–1.

Madison Series

The Madison series consists of well-drained, strongly acid to very strongly acid soils formed from quartz mica gneiss. Many mica flakes are mixed throughout the subsoil. The soils occupy undulating to hilly areas in the uplands. The most extensive areas are near the center of the county between Nottoway and Blackstone.

The surface layer is light yellowish-brown sandy loam. The subsoil is red, friable clay.

These soils occur in association with Wilkes, Cecil, Lloyd, Enon, Vance, Helena, and Louisburg soils. In contrast to the Wilkes and Louisburg soils, which have little or no development in the subsoil and are excessively drained, they have a well-developed subsoil. The Madison soils have a coarser textured subsoil than the Cecil soils and a lighter colored and coarser textured subsoil than the Lloyd. In contrast to the Enon soils, which have a subsoil of strong-brown clay, they have a subsoil of red clay loam. In addition, the Enon soils are moderately well drained. Unlike the Madison soils, the Vance soils are moderately well drained, and their subsoil is reddish-yellow to brownish-yellow clay. The Helena are somewhat poorly drained and have a mottled, yellowish-brown and light-gray subsoil of clay.

The original vegetation was mainly hardwoods of the oak-hickory type, but it included some shortleaf and loblolly pines. A number of dairy farms are on these soils. The soils that are on gentle slopes are among the best for dark tobacco of any in the county.

Madison sandy loam, undulating phase (2 to 7 percent slopes) (Mf).—The following describes a profile in a forested area:

0 to 1 inch, pale-olive, very friable sandy loam; weak, fine, granular structure.
1 to 6 inches, light yellowish-brown, very friable sandy loam; weak, fine, granular structure; contains many small to medium-sized mica flakes.
6 to 20 inches, red, friable clay loam; moderate, medium, subangular blocky structure; contains so many mica flakes that when the soil is rubbed between the fingers it has a shiny appearance and a slick, greasy feel.
20 to 28 inches, red, friable, highly micaceous, heavy silt loam; weak, fine, subangular blocky structure; the content of mica is much greater than in the layer immediately above.
28 to 40 inches +, mottled, red, pale-yellow, strong-brown, and white, very friable, very micaceous material from highly weathered quartz mica and gneiss.

In a few areas there are many pieces of angular quartz, 1 to 12 inches in diameter, scattered over the surface. In some places the subsoil is yellowish red or brownish yellow. In some places the surface soil is fine sandy loam, and in others it is coarse sandy loam.

This soil is strongly acid to very strongly acid, and it is generally low in organic matter and plant nutrients. Its surface soil has rapid permeability, and its subsoil, moderate permeability. The capacity for holding available moisture is moderate. Surface runoff is slow to medium, and internal drainage is medium. Sheet erosion is slight to moderate.

Use and management.—About 60 percent of this soil is in forest, 25 percent is in crops, 10 percent is in pasture, and 5 percent is idle. The soil is easy to work and is fairly easy to conserve. The yields of most crops range from medium to moderately high.

This is one of the best soils in the county for dark tobacco. The tobacco is usually grown in a 3-year rotation consisting of tobacco, a small grain, and red clover or lespedeza grown for hay. If the stubble of red clover is turned under in the spring, it makes the tobacco grow faster and increases its weight.

Many of the dairy farms in the county are on this soil. On these farms corn, small grains, and lespedeza for hay are generally grown in a 3-year rotation. Alfalfa, another extensive crop, is grown for 4 or 5 years in the same field. Then, after corn has been grown for 1 year, the field is again used for alfalfa. This soil is in capability unit IIe–2.

Madison sandy loam, eroded undulating phase (2 to 7 percent slopes) (Mg).—This soil differs from Madison sandy loam, undulating phase, in that each area has a few deep gullies and most areas are moderately damaged by sheet erosion. Surface runoff is slow to medium, and internal drainage is medium.

Use and management.—About 45 percent of this soil is in forest, 30 percent is in pasture, 20 percent is idle, and 5 percent is in cultivated crops. If the soil is limed and fertilized properly, it is well suited to pasture. Active gullying must be checked. This can be done by plowing in the sides and heads of the gullies.

If the soil is used for cultivated crops or pasture, similar management practices will be needed as are used for Madison sandy loam, undulating phase. This soil is in capability unit IIe–2.

Madison sandy loam, rolling phase (7 to 12 percent slopes) (Mh).—Because it has stronger slopes, this soil is more likely to erode than Madison sandy loam, undulating phase. Some areas have already lost a large part of the surface soil. Surface runoff is medium to rapid, and internal drainage is medium.

Use and management.—About 53 percent of this soil is in forest, 24 percent is in crops, 15 percent is in pasture, and 8 percent is idle. The soil is fairly easy to work and conserve. The crops are similar to those grown on Madison sandy loam, undulating phase. About the same kinds and amounts of fertilizer are needed, but yields will be lower. This soil needs to be tilled on the contour if it is used intensively for cultivated crops. Stripcropping is desirable if the fields are large enough for it to be feasible (fig. 8). This soil is in capability unit IIIe–1.

Madison sandy loam, eroded rolling phase (7 to 12 percent slopes) (Mk).—This soil has steeper slopes and is more eroded than Madison sandy loam, undulating phase. In nearly all of the areas, there are a few deep gullies. Surface runoff is medium to rapid, and internal drainage is medium. Generally, sheet erosion is moderate, but in a few places it is severe.

Use and management.—About 78 percent of this soil is in forest, 18 percent is in pasture, and a small acreage is idle. The soil is fairly easy to difficult to work and conserve, and yields are medium to low.

Figure 8.—**Hay and small grains grown in strips on Madison sandy loam, rolling phase, and on Madison clay loam, eroded rolling phase.**

This soil is better suited to pasture than to cultivated crops. If pastures are not needed, it should be used for forest. If it is to be pastured, erosion must be checked in the gullies. This can be done by using a bulldozer to fill and smooth the gullies. Then, large amounts of ground limestone and a complete fertilizer should be added before the grass is seeded. Ryegrass or a similar fast-growing grass can be used to keep the soil from washing until other grasses can get started. Shortleaf and loblolly pines do well in areas where trees are to be planted. This soil is in capability unit IIIe–2.

Madison sandy loam, hilly phase (12 to 20 percent slopes) (Ml).—This soil has stronger slopes and is shallower than Madison sandy loam, undulating phase. Surface runoff is rapid to very rapid, and internal drainage is medium. In some places sheet erosion is slight, but in others it is moderate.

Use and management.—About 76 percent of this soil is in forest, 10 percent is in pasture, 6 percent is in crops, and 8 percent is idle. The soil is difficult to work and conserve, and yields are low.

If the soil is limed and fertilized properly, pastures are fair. If they are overgrazed, there is considerable risk of sheet and gully erosion. In the smoother areas, hay will give fair yields. Unless pasture is needed greatly, areas that are now in forest should be left in forest. This soil is in capability unit IVe–2.

Madison sandy loam, eroded hilly phase (12 to 20 percent slopes) (Mm).—This soil has stronger slopes than Madison sandy loam, undulating phase, and is shallower and more eroded. Sheet erosion is moderate, and almost all of the areas have a few deep gullies. Surface runoff is rapid to very rapid, and internal drainage is medium.

Use and management.—About 80 percent of this soil is in forest, 12 percent is in pasture, and 8 percent is idle. The soil is difficult to work and conserve, and yields are low.

This soil can be used for pasture, but the cost of controlling erosion in the gullies and of establishing and maintaining pastures is generally too high. If the cost of establishing pastures is too high to justify the expenditure, the soil is best planted to loblolly pine and kept in forest. This soil is in capability unit IVe–2.

Madison clay loam, eroded undulating phase (2 to 7 percent slopes) (Ma).—This soil differs from Madison sandy loam, undulating phase, in being shallower and in having a surface layer of red to yellowish-red clay loam. Most of the original surface layer has been lost through erosion. The present surface layer consists of remnants of the original surface layer mixed with subsoil material. Deep gullies have formed in some places. Surface runoff and internal drainage are both medium.

Use and management.—About 40 percent of this soil is in crops, 30 percent is in forest, 20 percent is in pasture, and 10 percent is idle. The soil is difficult to work and is fairly easy to difficult to conserve. Yields are medium to low. Because of the heavy texture of the surface layer, the inadequate supply of organic matter, the deep gullies in some places, and the risk of further erosion, the soil is restricted in use for some crops. Nevertheless, it is used fairly widely for corn, small grains, dark tobacco, alfalfa, and hay crops.

The cropping systems used are similar to those used on Madison sandy loam, undulating phase, and the soil will need the same kind of fertilizer. It will need larger amounts of fertilizer, however, and it will require much larger amounts of lime to raise the pH to a desired level. Tilth can be improved and the supply of organic matter increased by adding barnyard manure and by turning under crops as green manure. Cropping systems that consist mainly of small grains and hay crops are better suited to this soil than ones consisting mainly of tobacco or corn.

Good pastures can be obtained on this soil if enough lime is applied to raise the pH to about 6.0 and if large amounts of a complete fertilizer are added. Pasture is a good use if the areas are not needed for crops. This soil is in capability unit IIIe–6.

Madison clay loam, eroded rolling phase (7 to 12 percent slopes) (Mb).—This soil has stronger slopes than Madison clay loam, eroded undulating phase. Surface runoff is medium to rapid, and internal drainage is medium. In many places sheet erosion has removed all or nearly all of the original surface layer. In some places part of the subsoil has been lost. Deep gullies that are fairly widely spaced are in about one-half of the total acreage.

Use and management.—About 65 percent of this soil is in forest, 20 percent is in pasture, 10 percent is in crops, and 5 percent is idle. The soil is difficult to work and conserve, and yields are medium to low. It is not well suited to corn, dark tobacco, and other clean-tilled crops.

The areas that have deep gullies should be used for pasture or forest. Small grains and hay crops can be grown on the areas that do not have deep gullies. The soil needs to be tilled on the contour. If the fields are large enough to make it feasible, stripcropping will help to control further erosion. If pastures are to be established and maintained on this soil, large amounts of ground limestone and a complete fertilizer must be used. This soil is in capability unit IVe–1.

Madison clay loam, severely eroded rolling phase (7 to 12 percent slopes) (Mc).—This soil has stronger slopes than Madison clay loam, eroded undulating phase, and has been eroded more severely. All of it has been cut by many deep gullies. In most of the areas, all of the original surface layer has been lost through erosion and as much as one-half of the subsoil. Surface runoff is rapid, and internal drainage is medium.

Use and management.—About 85 percent of this soil is in forest, 10 percent is idle, and 5 percent is pastured.

The soil has been cut so extensively by gullies that the cost of establishing pasture would be prohibitive. Areas now in forest should not be cleared. Some of the forested areas may need to have a few more desirable trees planted to improve the stand. Shortleaf or Virginia pines are desirable to plant on the areas that are idle or that have been pastured. Virginia pine should be planted in and around the gullies and on areas that have lost a large part of the subsoil. This soil is in capability unit IVe–1.

Madison clay loam, eroded hilly phase (12 to 20 percent slopes) (Md).—This soil is on much steeper slopes than Madison clay loam, eroded undulating phase, and in most places it is shallower. In nearly all of the areas, most of the original surface soil and generally part of the subsoil have been removed by accelerated sheet erosion. Deep gullies that are more than 100 yards apart occur in about 40 percent of the acreage. Surface runoff is rapid to very rapid, and internal drainage is medium. The risk of further erosion is great.

Use and management.—Approximately 74 percent of this soil is in forest, 10 percent is in pasture, 10 percent is idle, and 6 percent is in cultivated crops. The soil is difficult to work and conserve, and yields are low. Good pastures can be obtained on some of the smoother areas that are not gullied, if large amounts of ground limestone and a complete fertilizer are used. Most of the soil is more suitable for forest than for other purposes. This soil is in capability unit VIe–1.

Madison clay loam, severely eroded hilly phase (12 to 20 percent slopes) (Me).—This soil has much steeper slopes than Madison clay loam, eroded undulating phase, and has more severe erosion. In most of the areas, there are many deep gullies. Sheet erosion has removed all of the original sandy loam surface soil, and, in many places, more than half of the subsoil. The soil is shallow over weathered rock. In many places the soft, decomposed, fine-grained, micaceous material is exposed, particularly in the deep gullies.

Use and management.—About 85 percent of this soil is in forest. The rest is idle but has patches of small trees growing on it. The soil is very difficult to work and conserve. It is better to use it for forest than for tilled crops or pasture. When the trees are harvested for sawtimber or pulpwood, cutting should be light. If cutting is heavy, active erosion may start again. This soil is in capability unit VIe–1.

Mixed Alluvial Land

Mixed alluvial land (0 to 2 percent slopes) (Mn).—This land type consists of alluvial materials deposited at frequent intervals on the first bottoms of streams. It is along nearly all of the creeks and smaller drainageways throughout the county. Along the larger streams it occurs with the Wehadkee and Chewacla soils.

The soil materials that make up this land type have not been in place long enough for a profile to have developed. In many places the topmost 1 or 2 inches of material was deposited during the past year. The areas are flooded frequently. They are generally level or nearly level, but there are a few small hummocks or low ridges of sand or other alluvial debris. Surface runoff is slow to very slow. Internal drainage is generally slow, but it ranges from very slow to rapid.

This land type has extreme variations in color and in other characteristics. The color of the surface layer ranges from a brown like that of the Chewacla soil to a mottled light gray and yellowish brown like that of the Wehadkee soils. The texture of the surface layer ranges from coarse sand to heavy silt loam. The underlying material ranges from a brown or yellowish-brown to a mottled light-gray and yellowish-brown, variable mixture of sand, silt, clay, and well-rounded pebbles of quartz.

In many places this land type consists of coarse, sandy materials that overlie Chewacla and Wehadkee soils. The sandy materials were deposited after the stream channel became clogged with sand and silt. After the channel became clogged, the water flowed more rapidly when the stream overflowed its banks and larger particles were transported. These particles were deposited on the Chewacla and Wehadkee soils.

This land type is very strongly acid to strongly acid. The supply of plant nutrients ranges from high to low, and the soil material contains a variable amount of organic matter.

Use and management.—Approximately 80 percent of this land type is in forest, 15 percent is in pasture, 5 percent is idle, and a small acreage is used to grow lespedeza for hay. Nearly all of the acreage has once been cropped. Many of the areas were later abandoned and allowed to revert to forest because of the frequent flooding, low yields, and high cost of keeping drainage ditches open. Most of these abandoned areas now have a dense stand of smooth alder, river birch, sycamore, honeysuckle, smilax, and red-osier dogwood. In a few places there are white ash, yellow-poplar, and other trees of commercial value.

Pastures that have had applications of ground limestone and a complete fertilizer provide good grazing on this land type. In dry years this is especially true of areas that are normally wet. Whiteclover and bluegrass grow well on the finer textured, better drained areas. Kentucky 31 fescue grows best on the poorly drained or very sandy areas. Redtop and lespedeza grow well on some areas. Pastures on this land can be improved so that 3 acres will carry 1 animal unit. This land type is in capability unit IIIw–2.

Seneca Series

The only soil of this series mapped in the county is Seneca sandy loam. This soil is not extensive but occurs in most parts of the county. The Seneca soils are deep and are well drained to moderately well drained. They are medium acid to strongly acid and are well supplied with organic matter. These soils have a seasonally high water table caused by seepage from the adjacent, higher lying soils. They have formed mainly from local alluvial and colluvial materials. The parent materials were washed from light-textured and, in most places, coarse-textured soils that were underlain by granitic rocks.

The surface layer of these soils is dark grayish-brown coarse sandy loam or loam. It overlies brownish-yellow sandy loam.

The soils are in the narrow troughs of intermittent drainageways. They occur to a lesser extent at the foot

of slopes occupied by such soils as the Appling and Louisburg.

Seneca sandy loam (2 to 7 percent slopes) (Sa).—The following describes a profile of this soil in a cultivated area:

0 to 17 inches, dark grayish-brown, very friable sandy loam; weak, fine, granular structure.
17 to 32 inches, brownish-yellow, very friable sandy loam; weak, fine, granular structure.
32 to 36 inches +, yellowish-brown, friable, light sandy clay loam; weak, fine, granular structure.

The texture of the surface soil varies greatly within short distances. Within a distance of 300 to 400 yards, the texture may range from coarse sandy loam to loam. The coarser material is generally nearer the slope from which the soil material was washed. The color ranges from gray through pale yellow to brown. Because the soil has formed in colluvial accumulations, its depth varies from place to place. The soil is generally shallower where it adjoins upland slopes.

This soil is well supplied with organic matter. Permeability is rapid in the surface soil and moderate in the subsurface layer.

A few small spots that are poorly drained are mapped with this soil, but drainage generally ranges from good to somewhat poor. In most places the drainage is moderately good. The capacity for holding available moisture is moderate. Surface runoff is slow to medium, and internal drainage is medium to slow.

Use and management.—About 50 percent of this soil is in crops, 25 percent is in forest, 20 percent is pastured, and 5 percent is idle. The soil is very easy to work and conserve. It is among the best in the county for corn and dark tobacco and is the best for melons and vegetables grown in home gardens. It is also a good soil for most hay crops, but is not a desirable soil for alfalfa. Because of lodging, small grains do not make good yields. This soil is in capability unit IIe–3.

Starr Series

Starr loam is the only soil of this series mapped in the county. The Starr soils are deep and are well drained to moderately well drained. They are strongly acid, but they have a good supply of organic matter and plant nutrients.

The surface soil is brown to reddish-brown loam or clay loam. It overlies red to dark-red silty clay loam.

These soils occur in small, narrow areas along intermittent drainageways. They have formed from local alluvial and colluvial materials, but mostly from materials washed from the surface soils of Madison, Lloyd, Cecil, and other nearby, higher lying soils. The Starr soils have formed from darker colored and finer textured materials than the Seneca.

Starr loam (2 to 7 percent slopes) (Sb).—This soil has gentle slopes. The following describes a profile in a cultivated area:

0 to 8 inches, brown to reddish-brown, very friable loam; weak to moderate, fine, granular structure.
8 to 30 inches, red to dark-red, friable silty clay loam; weak, fine, subangular blocky structure.
30 to 40 inches +, red, friable soil material finely mottled with yellowish brown and reddish yellow.

In some places the texture of the surface soil is silt loam or clay. The thickness of the profile ranges from 22 to 56 inches. Although the soil is moderately well drained, there are a few small, poorly drained spots.

This soil is strongly acid. It has a good supply of organic matter and plant nutrients. The soil is moderately permeable, and the capacity for holding available moisture is moderate. Surface runoff is slow to medium, and internal drainage is medium. During wet seasons there is a high water table because of seepage from higher lying areas.

Use and management.—About 45 percent of this soil is in forest, 35 percent is in crops, 18 percent is in pasture, and the rest is idle. The soil is generally easy to work. In a few places, however, where the texture of the surface layer is clay loam, the soil is difficult to till when it is too wet or too dry. The soil is easy to conserve.

This is one of the best soils in the county for dark tobacco and corn, and it is widely used for home gardens. It is also well suited to red clover and lespedeza. Because of lodging, small grains usually make poor yields. Seepage from areas of higher lying soils damages alfalfa. The alfalfa grows well for 1 or 2 years. After 2 years it starts dying out, and after 3 years it is all gone. Dark tobacco is generally grown in a 3-year rotation with small grains and red clover. The good supply of plant nutrients can be maintained without the use of large amounts of commercial fertilizer. This soil is in capability unit IIe–3.

Stony Land

Stony land (2 to 30 percent slopes) (Sc).—This land type consists largely of loose stones or boulders, and there are many outcrops of rock. Soil materials in various stages of development surround the stones. Most of this land is on the narrow diabase dikes that traverse the county in several places. Some areas on the diabase dikes have gently undulating relief. Steeper areas in which there are many outcrops of granite occur near the larger streams.

Use and management.—Approximately 85 percent of this land type is in forest, 10 percent is in pasture, and the rest is idle. Most of the forest stands are made up mainly of oak and hickory. Cutover areas have reseeded to redcedar and shortleaf pine. Areas where the stones are not too close together can be used to a limited extent for pasture. Clipping to control weeds and bushes is difficult in these areas, and it is hard to apply lime and fertilizer. The land is better used only for forest. This land type is in capability unit VIe–2.

Vance Series

The Vance soils are moderately well drained and are very strongly acid. They have formed from weathered products of granite or granite gneiss mixed with hornblende gneiss or diabase. The largest areas are in the western part of the county near the edges of strips of basic rock.

The surface layer of these soils is grayish-brown fine sandy loam. The subsoil is reddish-yellow to brownish-yellow, firm clay.

These soils occur on undulating to hilly uplands in association with Appling, Enon, and Helena soils. They are more poorly drained and have a finer textured subsoil than the Appling soils. In contrast to the Vance soils, the Enon soils have a strong-brown subsoil, and the Helena soils, a mottled, yellowish-brown or light-gray subsoil.

The original vegetation was hardwoods. The hardwoods were mainly oak and hickory but included a few scattered shortleaf and loblolly pines.

Vance fine sandy loam, undulating phase (2 to 7 percent slopes) (Va).—The following describes a profile in a cultivated area:

0 to 6 inches, grayish-brown, very friable fine sandy loam; weak, fine granular structure; some white, angular pebbles of quartz, ½ to 2 inches in diameter, are on the surface and in this layer.
6 to 10 inches, pale-yellow, very friable fine sandy loam with a few spots and streaks of grayish brown; weak, fine, granular structure.
10 to 13 inches, brownish-yellow, friable fine sandy clay loam; weak, coarse, subangular blocky structure.
13 to 22 inches, reddish-yellow to brownish-yellow, firm clay; plastic and slightly sticky when wet; moderate, coarse, subangular blocky structure.
22 to 32 inches, mottled, brownish-yellow, red, yellow, and white, friable clay loam; moderate, fine, subangular blocky structure.
32 to 42 inches, mottled, yellow, white, and yellowish-brown, friable, heavy loam from highly weathered granite gneiss; no definite structure.

This soil is very strongly acid and is low in organic matter and plant nutrients. Permeability is moderate in the surface layer and moderately slow to slow in the subsoil. The capacity for holding available moisture is moderate. Surface runoff is slow to medium, and internal drainage is slow. Sheet erosion is slight to moderate. In some areas there are a few deep gullies.

Use and management.—About 50 percent of this soil is in crops, 40 percent is in forest, and the rest is about equally distributed between pasture and idle areas. The soil is fairly easy to work and is easy to conserve. It has a medium range of suitability for crops. Corn, bright tobacco, small grains, and lespedeza grown for hay are the principal crops, but yields are medium to low (fig. 9).

Many farmers cultivate and fertilize this soil about the same as Appling fine sandy loam, undulating phase, but, as a rule, yields are slightly lower. This soil has a less permeable subsoil, however; it is, therefore, slightly better suited to pasture. Because of the plastic clay in the subsoil, this soil is not suited to alfalfa.

Where sheet erosion has removed a large part of the surface soil and the clayey subsoil material has been mixed in the plow layer, the soil is much harder to work than Appling fine sandy loam, undulating phase.

The areas of this soil that are moderately sheet eroded and that contain a few deep gullies are better used for pasture or forest than for cultivated crops. If they are used for pasture or forest, active erosion must be checked in the gullies and a cover must be established. One way of doing this is to use a bulldozer to plow or push in the soil materials at the heads and sides of the deep gullies. Then, after the gullies have been filled and smoothed, heavy applications of a complete fertilizer and ground limestone must be used before a grass mixture is seeded. This soil is in capability unit IIIe–4.

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Figure 9.—**Bright tobacco on an eroded area of Vance fine sandy loam in the foreground shows poor growth compared to the tobacco of the same age growing on Appling fine sandy loam in the background.**

Vance fine sandy loam, rolling phase (7 to 12 percent slopes) (Vb).—This soil is on stronger slopes and is shallower than Vance fine sandy loam, undulating phase. Surface runoff is medium to rapid, and internal drainage is slow. Sheet erosion ranges from slight to moderate, and there are a few deep gullies in some areas. The risk of further erosion is moderate to high.

Use and management.—About 70 percent of this soil is in forest, 15 percent is in pasture, 10 percent is in crops, and the rest is idle. The soil is difficult to work, but it is fairly easy to conserve. Crops similar to those grown on Vance fine sandy loam, undulating phase, can be grown on the smoother areas if practices are used to control erosion. These include tilling on the contour, stripcropping, and using long rotations. The more strongly sloping areas are better used for pasture than for cultivated crops. The areas that have moderate sheet erosion and that have a few deep gullies are best used for growing trees. This soil is in capability unit IIIe–5.

Wehadkee Series

The Wehadkee series consists of poorly drained, very strongly acid soils that are flooded frequently. They have formed from recent alluvial materials deposited on nearly level to level first bottoms along the Nottoway River and most of the larger creeks.

The surface layer of these soils is mottled silt loam. It is underlain by mottled soil material that ranges in texture from clay loam to silt loam.

The soils are associated with Mixed alluvial land and with the Chewacla soil. They are not so variable in texture and drainage as Mixed alluvial land, and they are more poorly drained than the Chewacla soil.

The natural vegetation consists of white ash, sycamore, river birch, sweetgum, boxelder, slippery elm, red maple, hackberry, and similar hardwoods. In most places there is an undergrowth of smooth alder, buttonbush, and smilax. In the swampy areas there are no trees, but there a few shrubs, such as buttonbush, that tolerate

water. Most areas of these soils are flooded for long enough periods every 15 to 20 years to kill the larger trees.

Wehadkee silt loam (0 to 2 percent slopes) (Wa).—Some of the largest areas of this soil are southwest of Blackstone along the Little Nottoway River and near the junction of the Little Nottoway and Nottoway Rivers. The following describes a profile in a forested area:

0 to 22 inches, mottled, light-gray, strong-brown, and brownish-yellow, friable silt loam; weak, fine to coarse, granular structure.
22 to 56 inches, mottled, light-gray, brownish-yellow, yellowish-brown, and gray, friable, light silty clay loam to heavy silt loam; massive to weak, coarse, subangular blocky structure.
56 to 64 inches +, mottled, gray and brownish-yellow mixture of sand, silt, and rounded quartz pebbles.

The profile varies considerably in depth. In places the depth to sand and gravel is much less than in the profile described. In a few places recent floods have deposited 1 or 2 inches of sand on the surface.

This soil is very strongly acid. Its supply of organic matter is medium. It has a good supply of plant nutrients. Both surface runoff and internal drainage are very slow. The water table is near the surface most of the time. As a result, water moves slowly through the surface and subsurface layers. The capacity for holding available moisture is high.

Use and management.—At least 100 years ago nearly all of this soil was used for crops. At that time the soil had a good supply of plant nutrients, labor was cheap, and there was a more abundant forest cover on the watershed, which reduced the frequency of flooding. Today, about 10 percent of this soil is used for pasture. The rest has forests growing on part of it. On most of this soil only trees that tolerate water will grow. There is little timber of commercial value. Many of the areas are virtually wasteland and produce nothing of value.

It is better to use this soil for permanent pasture than for crops or forest. Ladino clover and tall fescue will produce good forage. Before the soil can be used successfully for pasture, the excess surface water must be drained off. Wide, V-type ditches provide the most satisfactory drainage. Enough ground limestone should be added to raise the pH to 6.0 before the pastures are seeded. This soil is in capability unit IVw–1.

Wehadkee soils (0 to 1 percent slopes) (Wb).—These soils differ from Wehadkee silt loam because they are covered by water that is at least 1 foot deep during most or all of the year. Some areas are in pockets where the stream channel has shifted. The largest areas are along Deep Creek and West Creek. The soil in these large areas was deposited as the result of flooding caused by beaver dams.

No trees grow on these soils. In some places there are shrubs, such as buttonbush, that grow in water. Nevertheless, much of the acreage consists of open water with no vegetation. The areas are of no value except for wildlife. Wild ducks, otter, beaver, and muskrat are more abundant around the areas than in other parts of the county. These soils are in capability unit VIIIw–1.

Wickham Series

The Wickham series consists of well-drained, strongly acid soils that have formed on narrow stream terraces in young alluvial materials. The parent materials of these soils were washed mainly from Cecil, Madison, Lloyd, and Wilkes soils.

The surface layer of these soils is brown to dark-brown fine sandy loam. The subsoil is red to yellowish-red, friable clay loam.

Wickham fine sandy loam is the only soil of this series mapped in Nottoway County. It occurs in small areas along the Little Nottoway and Nottoway Rivers and to a lesser extent along some of the other large streams. It has better drainage than the Augusta soil, with which it is associated in places, and it has a darker surface layer and a redder subsoil.

Wickham fine sandy loam (2 to 7 percent slopes) (Wc).—The following describes a profile in a cultivated area:

0 to 8 inches, brown to dark-brown, very friable fine sandy loam; weak, fine, granular structure.
8 to 11 inches, light yellowish-brown, very friable fine sandy loam; weak, fine, granular structure.
11 to 33 inches, red, friable clay loam; moderate, medium, subangular blocky structure.
33 to 66 inches, yellowish-red, friable sandy clay loam; weak, fine, subangular blocky structure; has a few highly weathered black and brown concretions.
66 to 77 inches +, mottled, yellowish-red, brownish-yellow, and yellow, very friable fine sandy loam; no definite structure.

In places the profile is less deep than that described. In places angular pieces of white quartz are scattered throughout the profile. In a few small areas, the subsoil is yellowish brown. The slopes in a small acreage are more than 7 percent.

This soil is strongly acid. It has a fairly good supply of organic matter and a moderate supply of plant nutrients. Permeability is moderately rapid in the surface soil and moderate in the subsoil. The capacity for holding available moisture is moderate. Surface runoff is slow to medium, and internal drainage is medium. In most areas sheet erosion has been slight and there are no gullies.

Use and management.—This is the only soil in the county that is well suited to both crops and pasture. Approximately 60 percent of it is used for crops, 20 percent is used for pasture, 15 percent is under forest, and the rest is idle. Most of the soil is easy to work and conserve. The principal crops are corn, dark tobacco, small grains, and alfalfa grown for hay. The soil is not well suited to bright tobacco, because the tobacco fails to cure properly. The management of this soil is similar to that of Cecil fine sandy loam, undulating phase, but yields are generally somewhat higher. This soil is in capability unit IIe–1.

Wilkes Series

The Wilkes series consists of shallow, excessively drained soils that are very strongly acid to medium acid. The soils have formed from various kinds of weathered rock. In places the parent rock is quartz mica gneiss that contains bands of hornblende gneiss; in others, it

is hornblende gneiss with bands of pegmatite or granite gneiss that has been cut by diabase dikes. The parent rock varies every few feet. It ranges from light-colored, acidic rock to dark-colored basic rock. In a few places it is light-colored micaceous rock.

The Wilkes soils have a surface layer of light yellowish-brown to brown sandy loam. At depths of about 17 inches, there is soft material from decomposed acidic and basic rocks.

These soils are on undulating to hilly uplands, mainly in the central and western parts of the county. They occur in association with Enon, Vance, Helena, and Madison soils. They have little or no development in the subsoil. In contrast, the Enon soils have a well-developed, strong-brown subsoil of clay, the Vance soils have a well-developed, reddish-yellow to brownish-yellow subsoil of clay, the Helena have a well-developed, mottled, yellowish-brown and light-gray subsoil of clay, and the Madison soils have a well-developed subsoil of red clay loam. The Enon and Vance soils are moderately well drained to well drained, the Helena are moderately well drained to somewhat poorly drained, and the Madison are well drained.

The original vegetation was mostly hardwoods, mainly oak and hickory, but it included some pines. Most of the total acreage is in forest. The soils are not well suited to cultivation.

Wilkes sandy loam, undulating phase (2 to 7 percent slopes) (Wd).—The following describes a profile in a cleared area:

0 to 8 inches, light yellowish-brown to brown, very friable sandy loam; weak, fine, granular structure.
8 to 17 inches, yellowish-brown to brown, very friable fine sandy loam to sandy loam; no definite structure.
17 to 25 inches, mottled, gray, brown, yellow, and dark-brown, soft, decomposed granite, granite gneiss, mica gneiss, and dark-colored basic rock.

In places loose stones are scattered over the surface. In areas where the micaceous material underlies the soil, the texture is silt loam. In areas where the underlying material is coarse-grained pegmatite, the texture in places is coarse sandy loam. In some places the surface layer is as much as 16 inches thick. In others, the material at depths between 8 and 17 inches is yellowish-brown, firm clay. The clay is mottled in many places with light gray and strong brown and is plastic and sticky when wet.

This soil is very strongly acid to medium acid and is low in organic matter and plant nutrients. Permeability is rapid to depths of 8 inches and is rapid to moderate at depths between 8 and 17 inches. Surface runoff is medium, and internal drainage is medium to rapid. The capacity for holding available moisture is low. Sheet erosion has generally been slight to moderate. There are a few deep gullies in places.

Use and management.—Approximately 60 percent of this soil is in forest, 20 percent is in pasture, 12 percent is in cultivated crops, and 8 percent is idle. The soil is fairly difficult to difficult to work and is fairly easy to conserve. It is medium in its range of suitability for crops.

Small grains, lespedeza grown for hay, and corn are the principal crops. The soil needs manure. The cropping system used by many farmers consists of corn and a small grain and then lespedeza grown for hay for 1 or 2 years. Bright tobacco grown on this soil does not cure properly. This soil is in capability unit IIIe–3.

Wilkes sandy loam, rolling phase (7 to 12 percent slopes) (We).—This soil has stronger slopes than Wilkes sandy loam, undulating phase, and is more likely to erode. Some areas have already lost a large part of the surface soil. Surface runoff is medium to rapid, and internal drainage is rapid.

Use and management.—About 65 percent of this soil is in forest, 18 percent is in pasture, 10 percent is in cultivated crops, and 7 percent is idle. The soil is fairly difficult to work and conserve. Its principal limiting factors for growing crops are its shallow profile and low capacity for holding available moisture.

Many farmers grow corn and small grains in short rotations on this soil. In many places erosion is severe under ordinary management. The soil needs management practices that include tilling on the contour, strip-cropping, and using long rotations consisting mainly of small grains and hay crops. It is better suited to pasture or forest than to row crops. This soil is in capability unit IVe–3.

Wilkes sandy loam, eroded rolling phase (7 to 12 percent slopes) (Wf).—This soil has stronger slopes than Wilkes sandy loam, undulating phase, and all areas have deep gullies. Sheet erosion has been moderate. Surface runoff and internal drainage are both rapid.

Use and management.—About 75 percent of this soil is in forest, 15 percent is idle, and 10 percent is in pasture. The soil is difficult to work and conserve, and yields are low. Nearly all of it has been used for crops.

Most of this soil could be used for pasture. The cost of establishing pastures would be high, however, because the gullies would have to be filled and the areas smoothed, fertilizer and lime added, and grass seeded before sod could be established.

This soil is better used for forest than for crops or pasture. The best kind of tree to plant is Virginia pine. This soil is in capability unit IVe–3.

Wilkes sandy loam, hilly phase (12 to 40 percent slopes) (Wg).—This soil has stronger slopes than Wilkes sandy loam, undulating phase, and it is shallower. Sheet erosion has been slight to moderate. Surface runoff and internal drainage are both rapid.

Use and management.—Approximately 84 percent of this soil is in forest, about 10 percent is in pasture, and 6 percent is idle. The soil is difficult to work and is very difficult to conserve if it is cultivated. Yields are low to very low.

Some partly cleared areas are used for pasture, particularly the ones that lie next to areas of poorly drained bottom lands. If enough ground limestone is added to raise the pH higher than 6.0 and large amounts of a complete fertilizer are added, pastures on the smoother slopes will provide fair grazing.

This soil is better used for forest than for crops or pasture. Unless there is a great need for pasture, areas now in forest should not be cleared. The forests consist mainly of white, red, black, and scarlet oaks, hickory, yellow-poplar, dogwood, and Virginia and shortleaf pines. The yellow-poplar generally grows on the northern and

eastern slopes and at the heads of drains in areas that resemble coves. In managing the stands of timber, yellow-poplar should be favored because the wood is valuable for veneer. This soil is in capability unit VIe–2.

Wilkes sandy loam, eroded hilly phase (12 to 40 percent slopes) (Wh).—This soil is shallower than Wilkes sandy loam, undulating phase, and it has stronger slopes. It also has deep gullies, ranging in number from few to many, in each area. In many places erosion has exposed the parent rock. Surface runoff is rapid to very rapid, and internal drainage is rapid.

Use and management.—Approximately 85 percent of this soil is in forest, about 10 percent is idle, and 5 percent is pastured. The pastures produce little forage, and the cost of establishing and maintaining a good sod will usually exceed the returns obtained from it. The idle areas should be planted to trees. Virginia pine is best for planting on this shallow, eroded soil. This soil is in capability unit VIe–2.

Worsham Series

The soils of the Worsham series are poorly drained and are wet most of the year. They are strongly acid. In some places they have formed from local alluvial and colluvial materials. The soils in low, level areas have formed from weathered granitic rock.

The surface layer is light-gray to mottled, light brownish-gray, yellowish-brown, grayish-brown, and light-gray material ranging in texture from sandy loam to silt loam. It overlies mottled, gray to brownish-yellow material that ranges in texture from silty clay loam to clay.

These soils occupy low, level areas. They occur in long, narrow strips along intermittent drainageways; at the foot of slopes; or in depressions on broad, upland, interstream divides. They are generally not suited to cultivated crops, but, if well managed, they are good for pasture.

Worsham sandy loam (0 to 7 percent slopes) (Wk).—Some areas of this soil have formed from local alluvial and colluvial materials derived from the sandy soils in the county; others, in the low, level areas, have formed from weathered granitic rocks. The largest areas of this soil are in the northeastern tip of the county near the Amelia County line. Relief ranges from nearly level to gently sloping. The following describes a profile in a cleared area:

0 to 8 inches, light-gray, very friable sandy loam; weak, fine, granular structure.
8 to 18 inches, mottled, light-gray, yellowish-brown, and white, very friable sandy loam; weak, fine, granular structure.
18 to 28 inches, mottled, gray, brownish-yellow, and white, firm, heavy clay; plastic when wet; moderate, medium, subangular blocky structure.
28 inches +, mottled, very friable colluvium consisting mainly of a mixture of sand, silt, and clay.

The texture of the surface soil is extremely variable, ranging from coarse sandy loam to loam. The thickness of the surface soil ranges from 10 to 24 inches, depending upon the amount of soil material recently washed onto the soil from nearby areas. In some places angular pebbles of quartz are scattered over the surface.

This soil is strongly acid. It is low in organic matter and plant nutrients. Surface runoff is slow to very slow, and internal drainage is very slow. The soil remains wet throughout the year. In many places water stands on the surface most of the time. In some places the soil is wet because water seeps onto it from higher lying areas. Permeability is slow in the surface layer and slow to very slow in the subsoil. The capacity for holding available moisture is moderate.

Use and management.—About 85 percent of this soil is in forest, 10 percent is in pasture, and 5 percent is idle. The few areas used for crops are part of large fields of other soils used for cultivated crops. The crops on this soil do not grow well. Except in dry seasons, they seldom produce enough to harvest.

This soil is well suited to loblolly pine. In many parts of the county, it is covered by good stands of loblolly pine. Because of the good supply of water, the growth rate of the pine is rapid.

If ladino clover and tall fescue are seeded, pastures on this soil will produce good forage. Before the pasture is seeded, however, V-type ditches should be dug to remove excess surface water. In addition, the soil will need enough ground limestone to raise the pH to 6.5. Unless the soil is needed for pasture, however, it is best to plant it to loblolly pine. This soil is in capability unit Vw–1.

Worsham silt loam (0 to 7 percent slopes) (Wl).—Unlike Worsham sandy loam, this soil has formed from local alluvial and colluvial materials derived from the finer textured soils of the county rather than from the sandy soils. As a result, its profile has a slightly finer texture throughout than Worsham sandy loam. The soil is level to gently sloping. It occurs in small areas near areas of Appling and Herndon very fine sandy loams or areas of Cecil and Georgeville very fine sandy loams. The following decribes a profile in a forested area:

0 to 7 inches, mottled, light brownish-gray, yellowish-brown, dark grayish-brown, and light-gray, friable silt loam; moderate, fine, granular structure.
7 to 10 inches, mottled, brown, light-gray, and yellowish-brown, firm silty clay loam; moderate, medium to coarse, subangular blocky structure.
10 to 46 inches, mottled, brown, gray, light brownish-gray, and yellowish-brown, firm, heavy silty clay loam; moderate, coarse to very coarse, subangular blocky structure.
46 to 62 inches, mottled, yellowish-brown, gray, and light brownish-gray, friable, light clay loam that contains small angular pebbles of quartz.

In some areas the surface layer is 12 or more inches thick. In some it is light gray. In a few places brown or reddish-brown material, 1 or 2 inches thick, has been deposited over the light-gray or mottled surface layer.

Use and management.—Most of this soil is in forest, but a small part is in pasture. Little loblolly or shortleaf pine grows on this soil, but in places 1 or 2 trees are growing along the outer edges of the areas. Willow oaks are the most numerous trees, but there are other hardwoods that tolerate water.

Because of its poor drainage, this soil is not suited to crops. If it is seeded to ladino clover and tall fescue, good pastures can be obtained. Before the pastures are seeded, however, enough open, V-type ditches should be dug to remove the excess surface water. Enough ground limestone will be needed to raise the pH to 6.5. This soil is in capability unit Vw–1.

Genesis, Morphology, and Classification of Soils

Soil is the product of the forces of soil development acting on parent material deposited or accumulated through geologic agencies. These forces are (1) the climate under which the soil material has accumulated and has since existed; (2) the plant and animal life in and on the soil; (3) the relief or lay of the land; (4) the length of time the four forces already mentioned have acted on the soil material; and (5) the physical and mineralogical composition of the parent material.

The interaction of climate and vegetation change the parent material from an inert, heterogeneous mass into a body having more or less definite genetic morphology. The action of these factors on the parent material is accelerated or retarded in a varying degree by the relief, which determines to some extent surface runoff, the movement of water through the soil, natural erosion, and the natural vegetation. Character of the parent material also influences vegetation.

Throughout the genesis of soil, time brings about changes; hence, age is a factor in the development of the soil into a body in equilibrium with its environment. The degree of profile development is the product of the action of climate, living organisms, and vegetation, as conditioned by relief and time.

Factors in Soil Formation

In extreme cases one factor may dominate the formation of the soil and fix most of its properties as is common when the parent material consists of pure quartz sand. Little can happen to quartz sand, and the soils formed from it usually have faint horizons. Even in quartz sand, however, distinct profiles can be formed under certain types of vegetation where the topography is low and flat and a high water table is present. Thus, for every soil the past combination of the five major factors is of the first importance to its present character. In the following pages the factors of soil formation and their effects on soil development in Nottoway County are discussed.

Parent materials

The parent materials of the soils of Nottoway County fall into two classes, according to source. The first class consists of materials derived from the weathering and decay of underlying rocks in place. The second consists of transported materials that have been removed from their original positions and deposited on the lower slopes, in depressions, and along drainageways.

The rocks of the county, all of pre-Cambrian age, form an intricate pattern. In the order of their contribution to soil formation and proportionate extent they are Petersburg granite, Red Oak granite, biotite mica gneiss, hornblende gneiss with injected granite and pegmatite, aporhyolite, Columbia granite, hornblende gneiss, and hornblende schist with injections of granite.

The kinds of rock from which the parent materials of soils are derived influence the processes of soil formation: the soils themselves, however, are the products of the interaction of all the soil-forming factors of which the parent material is only one. Thus, although the distribution of certain soil series is commonly related to the distribution of certain general kinds of rocks, many of the soil series of Nottoway County are found in areas of more than one of the kinds of rock identified above.

Figure 10 shows the location of different kinds of parent rock in Nottoway County. The rocks are identified by numbers, and the names of the soils commonly associated with areas of each kind of rock are shown in parentheses. This map is based on fieldwork done throughout the county by Dr. A. A. Pegau and on information from his unpublished reconnaissance geologic map showing part of Nottoway County.

Petersburg granite is the most extensive and is all in one large area. This area occupies most of the eastern one-fourth of the county. It extends from 1 mile west of Blackstone to the Dinwiddie County line and from the Nottoway River to the Amelia County line. A few dikes of diabase cut through the Petersburg granite in places, but these are generally very narrow. The soils that have formed over Petersburg granite have surface layers of coarse sandy loam. Petersburg granite is the principal rock formation underlying the Appling, Cecil, Durham, Colfax, Louisburg, and Worsham soils.

Red Oak granite covers more than half of the county, but much of it is mixed with hornblende gneiss. Narrow dikes of diabase cut across the granite, and in places biotite mica gneiss is mixed with it. Recently, two different types of Red Oak granite have been classified in this county. One is Burkeville granite, which was mapped north and south of the granite quarry near Burkeville and was named for that town. This is a fine-grained granite that in the past has been used for monuments and paving stones to some extent. The other is Mecklune granite, which was first mapped near the Mecklenburg and Lunenburg County lines but has also been identified east of The Falls. Red Oak granite underlies the Appling, Louisburg, Cecil, Durham, Colfax, and Worsham soils. Also, near the place where the Red Oak granite adjoins areas of diabase and hornblende gneiss, there are Helena, Vance, and Wilkes soils.

Biotite mica gneiss is in the central part of the county. It extends from the Amelia County line to the Lunenburg County line and passes through the town of Nottoway. The strip occupied by the biotite mica gneiss ranges in width from 1 to 5 miles but is widest in the southern part of the county. The soils that have formed over this kind of rock are the Cecil, Madison, and Wilkes.

Hornblende gneiss, injected with granite and pegmatite, is the most complex of the underlying rocks in the county. One of the two large areas of hornblende gneiss is north of Burkeville, and the other is north of Blackstone. In addition, many small areas are scattered throughout the western half of the county. The hornblende gneiss is so mixed with the other rocks that the kind of underlying rock changes within distances of 10 to 20 feet. The soils that have formed over these rocks occur in intricate patterns, and, as a result, they could not be mapped separately. Therefore, most of them are mapped as complexes of Enon-Vance-Helena soils. On the steeper slopes, the Wilkes soils were mapped.

The rocks shown as aporhyolite on the Geologic Map of Virginia are a northern extension of the volcanic-

sedimentary rocks of the Virgilina group of Virginia and North Carolina. This extension, which is often called the Virgilina slate belt, lies next to an area where sericite schist gradually merges and fingers in with the Red Oak granite. It is all in one area in the southwestern part of the county along the Lunenburg County line west of The Falls. The merging is so gradual and the mixing so complete that the soils formed over this material are in a complex pattern. They were, therefore, mapped as undifferentiated soil groups of Appling and Herndon and of Cecil and Georgeville soils.

Columbia granite occupies a narrow strip along the western edge of the county. This area is an eastern extension of an area of Columbia granite that occurs in

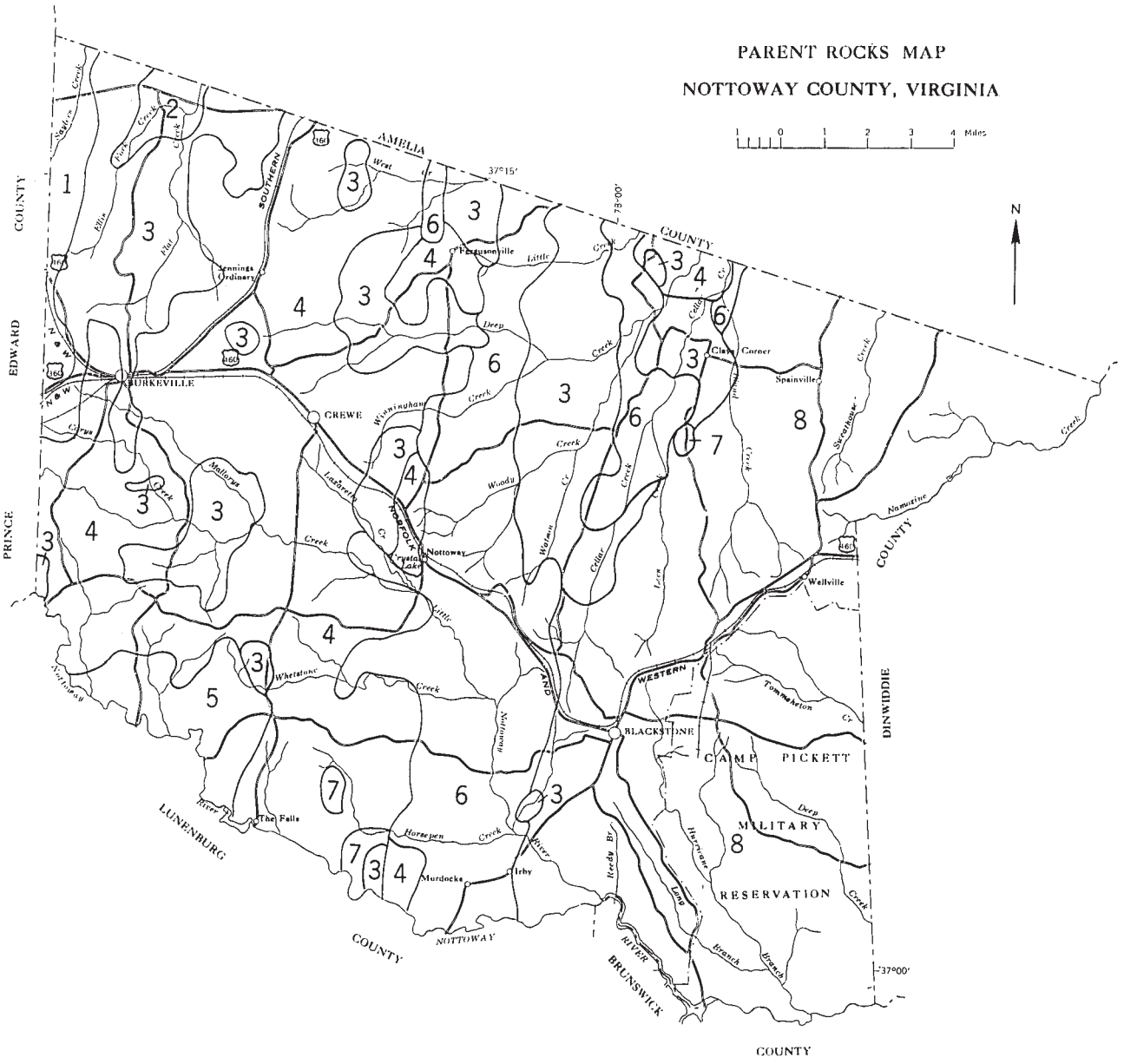

Figure 10.—Map of Nottoway County showing the location of the different kinds of rocks from which the soils have formed.

(1) Columbia granite (Appling, Louisburg, Durham, and Cecil).
(2) Hornblende gneiss (Iredell-Mecklenburg complexes and Bremo).
(3) Hornblende gneiss with injections of granite and pegmatite (Enon-Vance-Helena undifferentiated soils and Wilkes).
(4) Red Oak granite that contains facies of Burkeville and Mecklune granite (Appling, Louisburg, Cecil, Durham, Colfax, and Worsham).
(5) Aporhyolite that contains sericite schist with injections of hornblende schist (Cecil and Georgeville, and Appling and Herndon undifferentiated soils).
(6) Biotite mica gneiss (Madison, Wilkes, and Cecil).
(7) Hornblende schist with injections of granite (Lloyd, Cecil, and Wilkes).
(8) Petersburg granite (Appling, Cecil, Durham, Colfax, Louisburg, and Worsham).

Prince Edward County. It is from this kind of rock that nearly all of the Appling angular cobbly sandy loams have formed. Other soils formed over Columbia granite are the Cecil, Durham, and Louisburg.

Hornblende gneiss that has little other material mixed with it occurs in one small area in the northwestern part of the county along the Amelia County line. Soils of the Iredell and Mecklenburg series, which overlie the hornblende gneiss, were mapped as a complex because they occurred in such a complex pattern that they could not be mapped separately. On the hilly and steep areas, Bremo soils were mapped.

Hornblende schist in which there are injections of granite occupies a small acreage in the county. Most of it is in small areas between State Highways Nos. 40 and 49, near the Lunenburg County line. Soils formed from the hornblende schist are members of the Cecil, Lloyd, and Wilkes series.

Climate

Nottoway County has a warm, continental climate. The average annual rainfall is about 40.88 inches. The average temperature in summer is about 76.3° F., and the average temperature in winter is about 38.7°.

The climate is so uniform throughout the county that differences among the soils cannot be explained on the basis of differences in climate. The rainfall is fairly well distributed throughout the year, but it is slightly greater in spring and summer than at other times. This type of climate causes soluble material in the soil to leach out rapidly. As a result, many of the soils are highly leached and have a low content of organic matter in the A horizon.

Weathering has broken down the rocks so that other forces of soil formation have a chance to act. All of the normal soils show well-developed podzolic features. The short periods during which the soils are frozen and the shallow depths to which they are frozen intensify the action of weathering and the translocation of insoluble materials. Even though calcium is present in the mineral components of many of the rocks, free carbonate of lime has not accumulated in the soils, because it has leached out. Practically all of the soils are acid. They range from very strongly acid to slightly acid.

Living organisms

The constant activity of plants and animals helps to break down the rocks and to form soil. The solum, or the part of the profile above the parent material, is generally the most affected by plants and animals. Soil bacteria and other microscopic organisms are important. They convert decomposed plant materials into a form of organic matter that can be used by plants. Larger plants eventually decay and add organic matter to the soils. Their disintegrating roots and leaves return plant nutrients to the soil.

Plant life is affected by climate, so that climate here has an indirect influence on soil formation. Generally, soils that have a well-developed profile are the result of the greatest effects of climate and living organisms on parent material.

Nottoway County is in the oak-pine subdivision of the southern hardwood forest of the eastern forest region of the United States (*3*). This forest consists of shortleaf, loblolly, and Virginia pines and southern hardwoods. Except for the soils on first bottoms, where all of the trees were hardwoods, the soils in the county have formed under this mixed forest. Leaching has prevented organic matter from building up in the soils. All of the soils have once been cultivated. Therefore, the effect of living organisms on the soils is approximately the same throughout the county.

Relief

The relief or topography of the county ranges from nearly level on the first bottoms to steep near the streams. The relief somewhat modifies the effects of climate and vegetation on soil formation because it affects internal drainage, surface runoff, and erosion. Where the effects of relief have been favorable, normal soils have formed. Most of these have formed in undulating to rolling, well-drained areas where the soil profile is in equilibrium with its environment.

Erosion is severe on strong slopes where the surface runoff is rapid. As a result, as much soil is lost through erosion as is added through soil formation. Thus, the soil does not remain in place long enough for well-defined horizons to develop. Also, not much water percolates through the soil. Therefore, only a small amount of leaching and transference of material takes place.

Undulating to nearly level soils may have slightly retarded internal drainage and faintly or distinctly mottled B horizons. If the soils are level or nearly level and have poor drainage, they have prominently mottled A and B horizons. In places relief and climate have modified the parent material to such an extent that several different soils have formed from the same parent material.

Time

Some soils have been in place for only a short time, and as a result well-defined, genetically related horizons have not had time to develop. These soils are said to be young. Other soils have been in place for a long time and are in equilibrium with their environment, and these soils are said to be mature or old.

Most of the soils of colluvial lands and bottom lands are said to be young because the soil materials have been in place for only a comparatively short time. Likewise, the soil materials on steep slopes are being removed constantly by geologic erosion, and the soils do not have time to develop genetically related horizons. These soils are also said to be young.

In nearly level or undulating areas, where internal drainage is slow and the parent material has been in place for a long time, the soils have characteristics that are not typical of well-drained soils. Their B horizon may be mottled, and it may contain a firm or compact claypan. Geologic erosion is generally slow so that a highly leached A horizon may have formed. Such soils are said to be old.

Classification of Soils

Soils are classified in progressively more inclusive categories. The two lowest categories—soil type and soil series—are defined in the section, Soil Survey Methods and Definitions. Briefly, a soil type is the

TABLE 9.—*Classification of the soil series by great*

Great soil group and soil series	Topographic position	Parent material
Red-Yellow Podzolic soils:		
Appling	Uplands	Residuum from the weathering of— Granite and granite gneiss
Augusta (intergrading toward Low-Humic Gley soils).	Terraces	General alluvium washed from soils underlain by granite, granite gneiss, quartz mica gneiss, and hornblende gneiss.
Cecil	Uplands	Granite and granite gneiss
Durham	Uplands	Granite and granite gneiss
Enon (intergrading toward Planosols)	Uplands	Hornblende gneiss
Georgeville	Uplands	Fine-grained schist
Herndon	Uplands	Fine-grained schist
Lloyd (intergrading toward Reddish-Brown Lateritic soils).	Uplands	Granite gneiss and hornblende gneiss
Madison	Uplands	Quartz mica gneiss
Vance	Uplands	Granite, granite gneiss, hornblende gneiss, or diabase
Wickham	Terraces	General alluvium washed from soils underlain by granite, granite gneiss, quartz mica gneiss, and hornblende gneiss.
Reddish-Brown Lateritic soils:		
Mecklenburg (intergrading toward Red-Yellow Podzolic soils).	Uplands	Residuum from the weathering of hornblende gneiss
Planosols:		
Soils with fragipans:		Residuum from the weathering of—
Colfax (intergrading toward Red-Yellow Podzolic soils).	Uplands	Granite and granite gneiss
Soils with claypans:		
Helena	Uplands	Granite gneiss and hornblende gneiss
Iredell	Uplands	Hornblende gneiss or diabase
Low-Humic Gley soils:		
Worsham	Colluvial lands	Local alluvium and colluvium washed from uplands
Alluvial soils:		
Chewacla	Bottom lands	Recent general alluvium washed from uplands
Seneca	Colluvial lands	Local alluvium and colluvium washed from soils that are underlain by granite rocks.
Starr	Colluvial lands	Local alluvium and colluvium washed from higher lying soils that are underlain by quartz, mica gneiss, granite gneiss, and hornblende gneiss.
Wehadkee (intergrading toward Low-Humic Gley soils).	Bottom lands	Recent general alluvium washed from uplands
Lithosols:		Residuum from the weathering of—
Bremo (intergrading toward Red-Yellow Podzolic soils).	Uplands	Hornblende gneiss
Louisburg (intergrading toward Red-Yellow Podzolic soils).	Uplands	Granite, granite gneiss, or pegmatite
Wilkes (intergrading toward Red-Yellow Podzolic soils).	Uplands	Granite, granite gneiss, hornblende gneiss, diabase, quartz mica gneiss, and pegmatite.

Profiles described not materially affected by erosion.

primary unit of soil classification, and a soil series consists of one or more soil types. Most of the units shown on the detailed soil map are phases of soil types.

The next higher category above the soil series is the great soil group. Each great soil group is made up of soils that have certain internal characteristics in common. In Nottoway County the great soil groups are the Red-Yellow Podzolic soils, the Reddish-Brown Lateritic soils, the Planosols, Low-Humic Gley soils, Alluvial soils, and Lithosols. The soil series of the county are classified by great soil groups in table 9, and their important characteristics are summarized. The classification is made primarily on the basis of characteristics observed in the field. Modifications may become necessary as more is learned about the soils.

The county lies wholly within the Red-Yellow Podzolic soil region of the eastern United States (*2*). The soils show evidence of both podzolization and laterization. The A horizons are predominantly loamy, and the B horizons are predominantly clayey. In some areas fragments of rock are scattered over the surface, and in a few places there are outcrops of rock.

soil groups and some of their important characteristics

Drainage	Slope range	Generalized descriptions of soils when moist [1]
	Percent	
Good	2 to 20	Pale-yellow to brownish-yellow coarse sandy loam to very fine sandy loam surface layer, underlain by a reddish-yellow to yellowish-red, friable clay loam subsoil.
Somewhat poor	0 to 2	Yellowish-brown loam surface layer and yellowish-brown, firm clay loam to clay subsoil mottled with light gray and yellowish red; underlain by sandy loam material that becomes harder and more compact with increasing depth.
Good	2 to 20	Light yellowish-brown coarse sandy loam to very fine sandy loam surface layer, underlain by a red, firm clay subsoil.
Moderately good	2 to 12	Thick layer of pale-yellow coarse sandy loam to fine sandy loam surface soil and brownish-yellow, friable sandy clay loam subsoil, underlain by a fragipan at a depth of about 29 inches.
Moderately good	2 to 20	Brown fine sandy loam surface layer, underlain by a strong-brown, very firm clay subsoil.
Good	2 to 20	Brownish-yellow very fine sandy loam to silt loam surface layer, underlain by a red, firm silty clay subsoil.
Good	2 to 20	Pale-yellow very fine sandy loam to silt loam surface layer, underlain by a yellowish-red, friable to firm silty clay loam to silty clay subsoil.
Good	2 to 20	Brown loam surface layer, underlain by a dark-red, firm clay subsoil.
Good	2 to 20	Light yellowish-brown sandy loam surface layer, underlain by a red, friable clay loam subsoil.
Moderately good	2 to 20	Grayish-brown fine sandy loam surface layer, underlain by a reddish-yellow to brownish-yellow, firm clay subsoil.
Good	2 to 7	Brown to dark-brown fine sandy loam surface layer, underlain by a red to yellowish-red, friable clay loam subsoil.
Moderately good	2 to 20	Brown to yellowish-brown loam surface layer, underlain by a yellowish-red, firm clay subsoil.
Somewhat poor	0 to 12	Pale-yellow sandy loam surface layer and mottled brownish-yellow, friable sandy clay loam subsoil, underlain by a fragipan at a depth of about 19 inches.
Somewhat poor	0 to 20	Yellowish-brown to light yellowish-brown fine sandy loam surface layer, underlain by a mottled yellowish-brown and light-gray, very firm clay subsoil.
Somewhat poor	2 to 20	Dark yellowish-brown loam to fine sandy loam surface layer, underlain by a yellowish-brown, very firm clay subsoil.
Poor	0 to 7	Light-gray sandy loam to silt loam surface layer, underlain by a mottled gray to brownish-yellow, firm silty clay loam to clay material.
Somewhat poor	0 to 2	Brown silt loam surface layer, underlain by friable heavy silt loam material mottled with yellowish brown and gray.
Moderately good	2 to 7	Dark grayish-brown coarse sandy loam to loam surface layer, underlain by brownish-yellow, very friable sandy loam material.
Moderately good	2 to 7	Brown to reddish-brown loam to clay loam surface layer, underlain by red to dark-red, friable silty clay loam material.
Poor	0 to 2	Mottled light-gray, strong-brown, and brownish-yellow silt loam surface layer, underlain by mottled gray, brownish-yellow, and yellowish-brown silty clay loam to silt loam material.
Excessive	7 to 25+	Olive to light olive-brown loam surface layer, underlain by partially weathered hornblende gneiss material at depths of about 17 inches.
Excessive	2 to 45+	Light yellowish-brown sandy loam surface layer, underlain by very pale brown to yellow loose sandy loam derived from granite, granite gneiss, or pegmatite material, at depths of about 16 inches.
Excessive	2 to 40	Light yellowish-brown to brown sandy loam surface layer, underlain by soft decomposed mixed acidic and basic rock material at a depth of about 17 inches.

In classifying the soils, the normal profile of a soil serves as a basis for comparison. In this county the profile generally has a relatively light-colored A horizon of coarse to moderately fine texture. The B horizon is colored uniformly, is moderately fine textured to fine textured, and is firm to friable. The C horizon is light colored. It consists of parent material that is typically coarser textured than the B horizon and finer textured than the A horizon.

Soils that have normal, or mature, profiles have formed in most parts of the county on the gently sloping to smooth, interstream divides. Soils that have postmature profiles generally occur on level interstream divides, where stream valleys are shallow and internal drainage is slow. Young soils that have little profile development generally occupy hilly or steep areas near drainageways or occur on first bottoms where new materials are left by the floodwaters.

Red-Yellow Podzolic soils

The Red-Yellow Podzolic soils are well-drained, acid soils that have well-developed profiles. These soils have

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formed under a deciduous, coniferous, or mixed forest in warm-mesothermal to tropical, humid to subhumid climates. Associated with the Red-Yellow Podzolic soils are other well-drained, red and yellow soils that have well-developed profiles. These associated soils do not have distinct A_2 horizons, however, so were not classified as Red-Yellow Podzolic soils.

The Red-Yellow Podzolic soils have a thin, organic (A_0) and an organic-mineral (A_1) horizon over a light-colored, bleached (A_2) horizon. The bleached horizon, in turn, overlies a red, yellowish-red, or yellow, more clayey (B) horizon. The parent materials are all more or less siliceous. Coarse, reticulate streaks or mottles of red, yellow, brown, and light gray occur in deep horizons where the parent materials are thick (*5*). These streaks generally occur higher in the profiles that have yellow B horizons than in those in which the B horizon is red. In a few of the soils, especially in the very sandy ones, the streaks may be absent.

In cultivated areas the A_0 and A_1 horizons of these soils are incorporated in the plow layer. Accelerated erosion has removed all or nearly all of the A horizon in some places and has left the B horizon exposed. In the more clayey horizon, the clay fraction is dominated by kaolinite but contains considerable amounts of free ferric oxides or hydroxides and, in places, a relatively small proportion of aluminum hydroxide. Hydrous mica and montmorillonite dilute the clay fraction in some of the soils, but they are not considered typical.

Cecil series.—Representative of the red soils in the Red-Yellow Podzolic great soil group is Cecil fine sandy loam, undulating phase. The following describes a profile observed near United States Highway No. 460, 1¼ miles east of Burkeville.

A_{00} 3 to 1 inches, forest litter of leaves, pine needles, and twigs.
A_0 1 to 0 inch, very dark gray (5YR 3/1), light, fluffy, organic layer of partly decomposed leaves and pine needles.
A_1 0 to 1 inch, grayish-brown (10YR 5/2), very friable fine sandy loam; weak, fine, granular structure.
A_2 1 to 7 inches, light yellowish-brown (10YR 6/4), very friable fine sandy loam; weak, fine, granular structure; has a few, brown, angular pebbles of quartz that are 1 to 3 inches in diameter.
B_1 7 to 11 inches, yellowish-red (5YR 5/6), friable fine sandy clay loam; weak, medium, subangular blocky structure; has a few, brown, angular pebbles of quartz that are ½ to 2 inches in diameter.
B_2 11 to 21 inches, red (2.5YR 4/6), firm clay; slightly sticky and slightly plastic when wet; moderate to strong, fine, subangular blocky structure; contains a few very fine mica flakes.
B_3 21 to 38 inches, red (2.5YR 4/8), friable silty clay loam with a few, fine, faint mottles of brownish yellow (10YR 6/6); moderate, fine to very fine, subangular blocky structure; contains a few very fine mica flakes.
C 38 to 50 inches +, mottled red (2.5YR 5/6), reddish-yellow (7.5YR 7/6), and white, friable, heavy silt loam weathered from granite gneiss; common, coarse, distinct mottles; contains many very fine mica flakes.

All of the horizons contain roots of trees. In the C horizon the roots are fine to very fine.

Table 10 gives the results of mechanical analyses of samples taken from five soils of Nottoway County. All of these soils are in the Red-Yellow Podzolic great soil group.

Georgeville, Madison, and Wickham series.—Like the Cecil soils, the Georgeville, Madison, and Wickham are all red soils of the Red-Yellow Podzolic great soil group. The Georgeville soils are somewhat similar to the Cecil except that the color, structure, and relationship between horizons differ. In general, they have formed from material weathered from finer grained rocks, and they contain more silt.

The Madison soils have formed largely from weathered products of quartz mica gneiss. They are generally a little shallower over bedrock than the Cecil soils and have a greater number of mica particles throughout, especially in the B and C horizons. The subsoils of the Madison soils are generally more friable than those of the Cecil.

The Wickham soils are on terraces near streams where they have formed in deposits of relatively young alluvium. They have darker surface layers and more

TABLE 10.—*Mechanical analyses of samples of five soils*

Soil and sample No.	Horizon	Depth	Class and size of particles (in mm.)							Other classes (in mm.)		
			Very coarse sand 2.0–1.0	Coarse sand 1.0–0.5	Medium sand 0.5–0.25	Fine sand 0.25–0.1	Very fine sand 0.1–0.05	Silt 0.05–0.002	Clay less than 0.002	0.02–0.002	Less than 0.005	Greater than 2.0
		Inches	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*		*Percent*	*Percent*
Appling coarse sandy loam, undulating phase (S49 Va–68–2–1).	A_2	0–8	15. 8	15. 1	7. 9	15. 6	9. 8	28. 6	7. 2	18. 0	12. 5	10. 0
Appling fine sandy loam, undulating phase (S50 Va–68–3–1).	A_2	0–10	4. 3	11. 8	10. 1	29. 4	14. 4	22. 9	7. 1	15. 0	-------	1. 0
Cecil fine sandy loam, undulating phase (S50 Va–68–2–1).	A_2	0–9	2. 7	7. 6	8. 8	29. 6	17. 8	25. 8	7. 7	17. 3	-------	7. 0
Durham coarse sandy loam, undulating phase (S49 Va–68–1–1).	A_1	0–8	10. 0	17. 7	12. 1	23. 3	10. 5	22. 2	4. 2	13. 8	8. 2	2. 0
Durham fine sandy loam, undulating phase (S50 Va–68–1–1).	A_2	0–12	2. 3	11. 1	12. 4	30. 5	15. 8	21. 8	6. 1	14. 0	-------	. 5

friable subsoils than the Cecil soils and differ from those soils chiefly in the type of parent material. The Wickham soils have characteristics similar to those of soils of the Gray-Brown Podzolic great soil group, which is not represented in this county.

Lloyd series.—The Lloyd series is classified as Red-Yellow Podzolic, but the soils have characteristics similar to those of the Reddish-Brown Lateritic soils. The similarity of these soils to soils of the Reddish-Brown Lateritic great soil group appears to be related to the amount of basic rock in the parent material.

The following describes a profile of Lloyd loam, undulating phase, observed in an area near State Highway No. 613, 4 miles east of Fergusonville. This soil was formed in mixed materials from acidic and basic rocks.

A_{00} 3 to 1 inches, forest litter of leaves and twigs.
A_0 1 to 0 inch, dark-gray layer consisting of light, fluffy, organic material from leaf mold that contains a network of very fine roots.
A_2 0 to 12 inches, brown (7.5YR 5/4), very friable loam; moderate, fine, granular structure; roots of trees are so close together in uppermost 3 inches of this horizon that they form a thick mat that can be cut and lifted out; abrupt lower boundary.
B_2 12 to 42 inches, dark-red (2.5YR 3/6), firm clay; slightly plastic and sticky when wet, and hard when dry; moderate, coarse to medium, subangular blocky structure.
B_3 42 to 66 inches, dark-red (2.5YR 3/6), friable silty clay loam mottled and streaked with yellow (2.5Y 8/6); common, fine, distinct mottles; moderate, medium to fine, subangular blocky structure.
C 66 to 76 inches, predominantly yellow (2.5Y 8/8), friable silt loam from highly weathered parent material that has no definite structure; streaked and mottled with red (10R 4/6) and yellow (2.5Y 8/6).

Appling series.—The soils of the Appling series are members of the Red-Yellow Podzolic great soil group. These soils have less red, more friable subsoils than the Cecil soils. Their parent material is similar to that of the Cecil soils, but it generally has a lower content of dark-colored minerals.

Representative of the soils of this group is Appling coarse sandy loam, undulating phase. The following describes a profile of this soil near the junction of State Highways 639 and 640, 3¾ miles northeast of Wellville. This profile was in an area occupied by a mixed stand of pines and hardwoods.

A_{00} 3 to 1 inches, forest litter of leaves, pine needles, and twigs.
A_0 1 to 0 inch, very dark gray (10YR 3/1) layer consisting of light, fluffy, organic material from partly decomposed leaves and twigs.
A_1 0 to 3 inches, light yellowish-brown (10YR 6/4), very friable coarse sandy loam; weak, fine, crumb structure.
A_2 3 to 10 inches, brownish-yellow (10YR 6/6), very friable coarse sandy loam; weak, fine, crumb structure.
B_2 10 to 24 inches, yellowish-red (5YR 5/8), friable clay loam with a few specks of brownish yellow (10YR 6/8); hard when dry; moderate, medium, subangular blocky structure.
B_3 24 to 32 inches, yellowish-red (5YR 5/8), friable, light clay loam with common, fine, distinct mottles of yellow (10YR 7/8) and red (2.5YR 5/6); moderate, fine, subangular blocky structure; has a few fine mica flakes.
C 32 to 46 inches +, very friable silt loam to loam from highly weathered granite; common, fine, distinct mottles of yellow (2.5Y 8/6), red (2.5YR 4/8), and dark red (2.5YR 3/6); no definite structure; fine to very fine mica flakes common.

Herndon and Vance series.—These members of the Red-Yellow Podzolic great soil group are similar to the Appling soils in profile development. The Herndon soils resemble the Appling in color and structure and are similar in arrangement of horizons. They generally have finer textured A and B horizons; the B horizon is more compact, and, as a rule, they were formed from materials derived mostly from finer grained rocks.

The Vance soils have many characteristics that are similar to those of the Appling soils. They have a finer textured B horizon, however, that is more plastic when wet, and they are not so well drained as the Appling soils. Their parent material was a mixture of granitic and basic materials. The basic materials were mainly hornblende gneiss or diabase. In contrast, the Appling soils have formed from acidic parent materials, mainly granite or granite gneiss.

Durham series.—The Durham soils—also yellow members of the Red-Yellow Podzolic great soil group—have formed from granite and granite gneiss. They have a thick, pale-yellow A horizon and a thick, brownish-yellow B horizon, which distinguishes them from the Appling soils. The compact layer, at a depth of about 29 inches, suggests that the Durham soils may be grading toward the Planosol great soil group.

The following describes a profile of Durham coarse sandy loam, undulating phase, near the junction of State Highways 153 and 612. This profile was in an area covered by a mixed stand of hardwoods and loblolly pine and was 2¼ miles northeast of Wellville. The area was cultivated at one time, probably about 50 years ago.

A_{00} 2 to 1 inches, forest litter of pine needles, leaves, and twigs.
A_0 1 to 0 inch, very dark brown (10YR 2/2), layer consisting of light, fluffy, organic material from partly decomposed leaves and pine needles.
A_1 0 to 1 inch, light-gray to gray (5YR 6/1), very friable coarse sandy loam; weak, fine, crumb structure. (Micro-Podzol formed under the acid pine needles.)
A_2 1 to 13 inches, pale-yellow (2.5Y 8/4), very friable coarse sandy loam; weak, fine, crumb structure; uppermost 6 inches stained a shade darker, or pale yellow (5Y 7/4), by organic matter; horizon contains many small balls of clay.
A_3 13 to 16 inches, mottled pale-yellow (5Y 7/3) and brownish-yellow (10YR 6/6), friable coarse sandy loam; common, medium, faint mottles; weak, medium, crumb structure; although friable, this horizon is also compacted and brittle at times, and has many fine holes that give it a porous appearance; abrupt lower boundary.
B_1 16 to 19 inches, yellowish-brown (10YR 5/8), friable, light sandy clay loam with a few, medium, faint mottles of pale yellow (5Y 7/3); weak, coarse, subangular blocky structure.
B_{21} 19 to 29 inches, brownish-yellow (10YR 6/6), friable sandy clay loam with a few spots and specks of red (2.5YR 5/8); weak, medium to coarse, subangular blocky structure.
B_{22} 29 to 35 inches, mottled brownish-yellow (10YR 6/6), red (10R 5/8), and pale-yellow (2.5Y 7/4), friable to compact sandy clay loam; common, medium, distinct mottles; weak, thick platy to angular blocky structure.
B_3 35 to 52 inches, mottled brownish-yellow (10YR 6/8), yellowish-brown (10YR 5/8), and red (2.5YR 5/8), friable, light sandy clay loam; many, medium, distinct mottles; weak, medium, subangular blocky structure; no roots present.
C 52 to 65 inches, mottled reddish-yellow (5YR 6/6), light-gray (2.5Y 7/2), yellow (10YR 7/8), and red (2.5YR 5/8), very friable sandy loam from weathered granite; no definite structure; many, fine, distinct mottles.

Most of the tree roots in this soil are in the uppermost 10 inches, but some small to medium-sized roots extend through all of the layers to a depth of 29 inches. Many of the roots spread out laterally on top of the B_{22} horizon.

Augusta series.—The Augusta soils are somewhat poorly drained Red-Yellow Podzolic soils formed in alluvial deposits on low stream terraces; because of the restricted drainage, these soils have developed some characteristics of the Low-Humic Gley soils. The A horizon consists of yellowish-brown, very friable loam with a weak, medium, granular structure. The upper part of the B horizon is brownish-yellow, friable clay loam mottled with yellowish brown, light gray, and yellowish red; in the lower part is firm, heavy clay loam or clay. The B horizon, which has moderate, medium to coarse, subangular blocky structure, overlies mottled young alluvium that becomes harder and more compact with increasing depth.

Enon series.—The Enon soils are members of the Red-Yellow Podzolic great soil group with some characteristics of claypan Planosols. They have a firm, plastic clay B horizon, but lack the abrupt textural change from the A to the B horizon and evidence of wetness common to claypan Planosols. These soils have formed over hornblende gneiss or schist that in most places is mixed with a small amount of material from granite or granite gneiss. In this county most of these soils were mapped in a complex with soils of the Vance and Helena series.

The Enon soils are well drained to moderately well drained. Their A horizon consists of brown, very friable fine sandy loam and has a moderate, medium, granular structure. The upper part of the B horizon is brownish-yellow, friable sandy clay loam, and the lower part is strong-brown, very firm clay. The clay is plastic and slightly sticky when wet and hard when dry. The structure of the B horizon is weak, very coarse, subangular blocky to massive. Underlying the B horizon is mottled, friable fine sandy loam from weathered hornblende gneiss. The firmness and heavy clay texture of the lower part of the B horizon are similar to such characteristics in the Planosols; the Enon soils are only intergrading toward the Planosol group, however, inasmuch as they lack the abrupt boundary and sharp contrast at the upper surface of the B horizon and the evidence of wetness in the B horizon that are characteristic of the typical Planosols.

Reddish-Brown Lateritic soils

The soils of the Reddish-Brown Lateritic great soil group have a dark reddish-brown, granular surface soil, a red, friable, clay B horizon, and red or reticulated, mottled, lateritic parent material. They have formed under a tropical climate in which there are wet and dry seasons, and under a forest cover (*5*).

Laterization with little or no podzolization has dominated in the development of these soils. Laterization is the process by which silica is removed, the content of aluminum and iron is increased, and the base-exchange capacity of the soil is decreased. The Reddish-Brown Lateritic soils do not have the podzolic morphology, with the light-gray A_2 horizon, typical of the associated Red-Yellow Podzolic soils formed from siliceous parent material.

The Mecklenburg is the only series of the Reddish-Brown Lateritic great soil group in this county, and this series intergrades to the Red-Yellow Podzolic soils. The following describes a profile of Mecklenburg loam, undulating phase, ⅛ mile south of the junction of State Highways 307 and 628 and 4½ miles northwest of Jennings. This profile was in an area covered by a mixed stand of hardwoods.

- A_{00} 3 to 1 inches, forest litter of leaves and twigs.
- A_0 1 to 0 inch, dark-gray (5Y 4/1) layer consisting of light, fluffy, organic material from partly decomposed leaves and twigs.
- A_1 0 to 2 inches, brown (10YR 5/3), very friable loam; weak, medium, granular structure; angular pebbles of quartz are common.
- A_2 2 to 8 inches, yellowish-brown (10YR 5/4), very friable loam; weak, medium, granular structure; contains small, black concretions.
- B_1 8 to 12 inches, dark-brown (7.5YR 4/4), friable clay loam; moderate, medium, subangular blocky structure; a few black concretions are scattered throughout.
- B_2 12 to 27 inches, yellowish-red (5YR 4/6) clay that is firm when moist and plastic when wet; strong, coarse to medium, subangular blocky structure; has black coatings on the cleavage planes; contains many black concretions as much as one-quarter inch in diameter.
- C_1 27 to 30 inches, mottled yellowish-red, light-yellow, dark-brown, and black, friable, heavy clay loam; no definite structure.
- C_2 30 to 36 inches +, mottled strong-brown, light-yellow, dark-brown, and black, very friable material from hornblende gneiss.

Because the B horizons of this soil contain so much more clay than the A horizons, the soil is considered an intergrade to the Planosols great soil group.

Planosols

Planosols may be defined as soils that have one or more horizons abruptly separated from, and sharply contrasting with, an adjacent horizon because of cementation, compaction, or high content of clay. They occur under forest or grass in mesothermal to tropical, humid to subhumid climates, and they generally have a fluctuating water table. In many places the cemented or compacted horizons lie beneath a moderately well developed or well developed B horizon that has a higher proportion of clay than the A horizon (*5*).

The Planosols in Nottoway County contain either fragipans or claypans. Fragipans are very compact horizons that contain a large amount of silt, sand, or both, and that usually are relatively low in clay. They occur below the B horizon and commonly interfere with the penetration of water and roots. Fragipans are found in soils formed both from weathered rocks and from transported parent materials (*7*). Claypans are compact soil horizons, or layers, that have much clay and are separated more or less abruptly from the layer above.

In Nottoway County only the Colfax soils are classified as Planosols that have a fragipan. The Planosols that have claypans belong to the Helena and Iredell series. The Colfax soils have characteristics intergrading toward the Red-Yellow Podzolic great soil group.

Colfax series.—The Colfax soils are on smooth divides between major drainage systems, at the foot of slopes, and at the heads of intermittent drainageways. They are classified as Planosols, but have some characteristics

of the Red-Yellow Podzolic great soil group. In the low-lying areas, the water table is generally high.

The following describes a profile of Colfax sandy loam, undulating phase, observed 4 miles southwest of Nottoway near the junction of State Highways 49 and 625. This soil was in a mixed stand of pines and hardwoods.

A_{00} 3 to 1 inches, forest litter of leaves, pine needles, and twigs.
A_0 1 to 0 inch, dark-gray (10YR 4/1), light, fluffy, organic layer of partly decomposed leaves and pine needles.
A_1 0 to 6 inches, light brownish-gray (10YR 6/2), very friable sandy loam with a few, fine, faint mottles of pale yellow (2.5Y 7/4); weak, fine, crumb structure; many, fine, round holes make horizon appear very porous; most of the tree roots are in this horizon.
A_2 6 to 12 inches, pale-yellow (2.5Y 7/4), very friable sandy loam with some medium, faint mottles of brownish yellow (10YR 6/6); weak, fine, crumb structure.
B_1 12 to 15 inches, yellowish-brown (10YR 5/8), friable sandy clay loam with some medium, distinct mottles of pale yellow (2.5Y 7/4); weak, fine subangular blocky structure.
B_2 15 to 22 inches, mottled brownish-yellow (10YR 6/8), light-gray (10YR 7/1), and yellowish-brown (10YR 5/8), friable sandy clay loam with many, coarse, prominent mottles; weak, medium, subangular blocky structure; contains some small pockets, as much as 4 inches in diameter, of light-gray clay of moderate to strong, coarse, subangular blocky structure.
B_{2m} 22 to 44 inches, mottled light-gray (10YR 7/1), white (10YR 8/2), and yellowish-brown (10YR 5/8), compact to friable sandy loam; very hard and brittle when dry; weak, very thick, platy structure; when dry this horizon is difficult to penetrate with a soil auger, spade, or shovel; there are no tree roots in or below this horizon.
C 44 to 50 inches +, light-gray and white, friable sandy loam derived from weathered granite gneiss; no definite structure.

In places the top part of the B_{2m} horizon has a 3-inch layer of brown, angular pebbles of quartz, from ½ to 4 inches in diameter. Many pebbles are partly cemented together with silica.

Helena series.—The following describes a profile of Helena fine sandy loam, undulating phase. This profile is typical of the claypan Planosols that have formed from weathered products of mixed acidic and basic rocks.

A_{00} 3 to 1 inches, forest litter of leaves and twigs.
A_0 1 to 0 inch, dark grayish-brown (10YR 4/2), light, fluffy, organic layer of partly decomposed leaves and twigs.
A_1 0 to 3 inches, grayish-brown (10YR 5/2), very friable fine sandy loam; weak, fine, granular structure.
A_2 3 to 10 inches, light yellowish-brown (10YR 6/4), very friable fine sandy loam; weak, fine, crumb structure; many, fine round holes give this horizon a very porous appearance; contains a few, small, dark-brown concretions in lower part.
B_1 10 to 15 inches, yellowish-brown (10YR 5/8), friable, light fine sandy clay loam mottled with some medium to coarse, faint mottles of pale yellow (2.5Y 8/4); moderate, medium, subangular blocky structure; contains a few, small, brown concretions; boundary between this horizon and that immediately below is very abrupt.
B_{2m} 15 to 27 inches, yellowish-brown (10YR 5/8), very firm clay; many, medium, distinct mottles of light gray (2.5Y 7/2); sticky and very plastic when wet, very hard when dry; massive (structureless).
B_3 27 to 36 inches, mottled yellowish-brown (10YR 5/8), pale-yellow (5Y 7/4), and white (10YR 8/2), friable to firm, heavy clay loam to clay; a few, fine, faint mottles; slightly plastic when wet, hard when dry; massive (structureless); contains a few, fine tree roots.
C 36 to 48 inches +, mottled yellowish-brown, brown, pale-yellow, and white, friable fine sandy loam mixed with highly weathered hornblende gneiss and granite gneiss.

Iredell series.—The Iredell series consists of claypan Planosols that have formed from residuum of basic rocks, mostly hornblende gneiss. In Nottoway County the Iredell soils are mapped in association with the Mecklenburg soils as soil complexes.

The following describes a profile of Iredell fine sandy loam, undulating phase:

A_{00} 1 to 0 inch, forest litter of pine needles, leaves, twigs, and some lichens.
A_0 This layer absent, probably because of the many forest fires in the past.
A_1 0 to 3 inches, dark grayish-brown (2.5Y 4/2), very friable fine sandy loam; weak, fine, granular structure; has many, fine to medium, round holes that make layer resemble a sponge.
A_2 3 to 8 inches, dark yellowish-brown (10YR 4/4), very friable fine sandy loam; weak, fine, granular structure; contains a few, small, dark-brown concretions; many fine holes make horizon appear very porous.
A_3 8 to 9 inches, pale-yellow (5Y 8/3), very friable fine sandy loam with some medium, distinct mottles of yellowish brown (10YR 5/8); weak, fine, granular structure; contains many angular pebbles of quartz, from ⅛ to ½ inch in diameter; very abrupt boundary between this horizon and the horizon immediately below.
B_{2m} 9 to 26 inches, yellowish-brown (10YR 5/6), very firm clay; very plastic and very sticky when wet, extremely hard when dry; massive (structureless); tree roots of medium to small size are common.
C 26 to 31 inches, highly weathered material derived from hornblende gneiss; predominantly olive brown (2.5Y 4/4) but mottled with olive gray (5Y 4/2), pale yellow (5Y 8/4), and yellow (5Y 7/6).

Low-Humic Gley soils

Low-Humic Gley soils are imperfectly drained to poorly drained soils that have a very thin surface layer moderately high in organic matter. Below this are mottled, gray and brown, gleylike mineral horizons with a low degree of textural differentiation. Low-Humic Gley soils range in texture from sand to clay, and the parent materials vary widely. These soils occur largely under a natural cover of swamp forest. In some places they have a cover of moist plants. Most of them are medium to very strongly acid. Few are neutral or alkaline (*5*). The soils of the Worsham series are the only Low-Humic Gley soils in Nottoway County.

Worsham series.—The soils of the Worsham series are poorly drained. They have formed mainly from local colluvium and alluvium that washed down from the uplands and accumulated in depressed areas of wide interstream divides. The A horizon of these soils is light-gray, very friable sandy loam mottled with yellowish brown and white. It has a weak, fine, granular structure. The B horizon is mottled light-gray, brownish-yellow, and white, firm clay of moderate, medium, blocky structure; the mottles are common, medium to coarse, and prominent; the clay is plastic when wet. Beneath the B horizon is mottled, very friable colluvium or weathered granite.

Alluvial soils

Alluvial soils have formed from materials that have been transported by water and deposited fairly recently. Some are still subject to occasional additions of fresh alluvial deposition. Alluvial soils show only weak or

no modification of the original material by soil-forming processes. The factors of climate and living organisms have had relatively little effect in soil formation because of the comparatively short time that has elapsed since deposition of the parent materials. Differences among the various series of Alluvial soils in Nottoway County, therefore, arise mainly from differences in parent materials and in natural drainage conditions. In Nottoway County, the Seneca, Starr, Chewacla, and Wehadkee soils are members of this great soil group.

Seneca and Starr series.—The Seneca and Starr soils have formed from local colluvial and alluvial materials that were washed or sloughed from uplands and deposited at the bases of slopes, in depressions, and along intermittent drainageways. The profiles of these soils are not well developed; in most places the horizons are not distinct. These soils are on undulating to gently sloping topography and are well drained to moderately well drained. In places they receive new materials from soils on the higher slopes, and these additions keep the soils young.

The Seneca soils have formed in materials washed mainly from the yellowish, sandy soils of the uplands, such as the Appling and Durham coarse sandy loams; most of these materials have washed or sloughed down since the Appling and Durham soils were first cultivated. The Starr soil is similar to the Seneca soils but is finer textured and has the red or reddish colors of the upland soils from which the parent materials were washed.

The following describes a profile of Seneca sandy loam in a cultivated field near State Highway 607, 2 miles south of Crewe:

1. 0 to 17 inches, dark grayish-brown (10YR 4/2), very friable sandy loam; weak, fine, granular structure.
2. 17 to 32 inches, brownish-yellow (10YR 6/6), very friable sandy loam; weak, fine, granular structure.
3. 32 to 43 inches, yellowish-brown (10YR 5/6), friable sandy clay loam with a few, medium, distinct mottles of light gray (10YR 7/1); very weak, fine to medium, subangular blocky structure.

Chewacla series.—The Chewacla soil is on first bottoms where it is flooded periodically; most of this soil is near the larger streams where it occurs in association with the Wehadkee soils. The Chewacla soil is somewhat poorly drained to moderately well drained. The surface layer is brown, friable silt loam with a weak, fine, granular structure. The subsurface layer is mottled brown, yellowish-brown, and gray, friable, heavy silt loam with a weak, fine, subangular blocky structure. The underlying material is mottled yellowish-brown and light-gray, fine-textured alluvial material that contains small, waterworn pebbles and fragments of rock.

Wehadkee series.—The Wehadkee soils are on first bottoms that are flooded intermittently by adjacent streams. These soils are poorly drained; the water table is generally high, but it fluctuates somewhat, depending on the season of the year. Many areas of these soils remain wet and marshy throughout the year. Because of the effects of poor drainage on the soil profile, the Wehadkee soils have some characteristics intergrading toward the Low-Humic Gley soils.

The following describes a profile of Wehadkee silt loam observed on a first bottom under a swamp-hardwood type of forest:

A_{00} and A_0 These horizons are absent because recent floods had removed all forest litter.

A_2 0 to 22 inches, mottled light-gray (10YR 7/2), strong-brown (7.5YR 5/6), and brownish-yellow (10YR 6/6), very friable silt loam; many, medium, distinct mottles; weak, fine to coarse, crumb structure; many cleavage planes are coated with a black film.

GB 22 to 56 inches, mottled light-gray (10YR 7/2), brownish-yellow (10YR 6/8), yellowish-brown (10YR 5/8), and gray (10YR 5/1), light silty clay loam; many, coarse, prominent mottles; massive to weak, coarse, subangular blocky structure; a few, small, round, black concretions, less than half an inch in diameter, throughout this horizon.

C 56 inches +, alluvial deposits consisting mainly of sand, silt, and clay.

In addition to the soils described as in the Alluvial great soil group, one miscellaneous land type, Mixed alluvial land, has characteristics similar to the soils of this group. This land type is composed of undifferentiated soil materials washed from the uplands onto first bottoms and overflowed periodically by the adjacent streams. The drainage and texture of this miscellaneous land type vary considerably.

Lithosols

The soils of the Lithosols great soil group have no clearly expressed soil morphology. They are made up of freshly and imperfectly weathered masses of rock fragments and are largely on steep slopes (*6*). The Bremo, Louisburg, and Wilkes soils are in this great soil group. These soils are extensive in the county. All of them have some characteristics similar to those of the soils in the Red-Yellow Podzolic great soil group.

Bremo series.—The Bremo soils have formed from weathered products of hornblende gneiss. They are less strongly acid than the Louisburg and Wilkes soils. The following describes a profile of Bremo loam one-eighth of a mile west of the junction of State Highways 307 and 628 and 7 miles north of Burkeville. This profile was observed in an area covered by a forest of hardwoods.

A_{00} 3 to 1 inches, forest litter of leaves and twigs.

A_0 1 to 0 inch, dark-gray (5Y 4/1) layer consisting of light, fluffy, organic material from partly decomposed leaves and twigs.

A_1 0 to 3 inches, olive (5Y 4/4), very friable loam; moderate, fine, granular structure.

A_2 3 to 17 inches, light olive-brown (2.5Y 5/4), friable loam; moderate, medium, granular structure; contains a few angular pieces of quartz as much as 5 inches in diameter and a few, small black concretions.

C 17 to 21 inches, mottled olive-gray (5Y 4/2), yellow (2.5Y 8/6), and yellowish-brown (10YR 5/8), friable soil material from partly weathered hornblende gneiss.

D 21 to 23 inches +, hard hornblende gneiss that is only slightly weathered.

Louisburg series.—The Louisburg soils are shallow. They have formed over granite, granite gneiss, and pegmatite. The following describes a profile of Louisburg sandy loam, undulating phase, near State Highway 633 three-fourths of a mile southwest of Crewe. This profile was in an area covered by a mixed stand of pines and hardwoods.

A_{00} 2 to 1 inches, forest litter of leaves, pine needles, and twigs.

A_0 1 to 0 inch, very dark gray (10YR 3/1) layer consisting of light, fluffy, organic material from partly decomposed leaves and twigs.

A_1 0 to 3 inches, dark grayish-brown (10YR 4/2), very friable sandy loam; weak, fine, granular structure.

A_2 3 to 16 inches, light yellowish-brown (10YR 6/4), very friable sandy loam; weak, fine, granular structure.
C 16 to 26 inches, very pale brown (10YR 7/4) to yellow (10YR 7/6), loose sandy material from highly weathered granite gneiss.
D 26 inches +, pale-brown, mixed with yellow and light gray, hard granite gneiss.

Wilkes series.—The Wilkes soils are less extensive than the Louisburg but are more extensive than the Bremo. Their parent material was derived from many different kinds of rocks. As a result, the Wilkes soils vary in profile characteristics. In many places they are made up of a mixture of Louisburg and Bremo soils that occur in alternating bands across the slope. In other areas there are alternating strips of micaceous materials, and in places there is a subsurface layer of very firm clay mottled with brownish yellow and light gray. The layer of clay is 8 to 12 inches thick and is plastic when wet and hard when dry. The Louisburg and Bremo soils do not have this clayey subsurface layer.

Miscellaneous land types.—In addition to the Bremo, Louisburg, and Wilkes soils, there are two miscellaneous land types that resemble the Lithosols. These are Stony land and Gullied land. Stony land has many boulders and small fragments of rock on the surface and many outcrops of bedrock. The soil around the outcrops varies in color and texture and ranges in depth from shallow to moderately deep.

Gullied land consists largely of land that was once cultivated. Accelerated erosion has changed the original soil so that this land type is now made up of an intricate system of gullies. In many places the original soil profile is truncated or nearly all of it washed away.

Additional Facts About the County

The preceding sections have discussed the general nature of Nottoway County and have given detailed descriptions of the characteristics and management of each soil mapped there. The following section gives some additional facts about the county, including information about the organization and population, transportation and markets, and industries.

Organization and Population

Nottoway County was formed from a part of Amelia County in 1788. It was named for the Nottoway River.

In 1950, the population of the county was 15,479, of which 22.8 percent was urban, 35 percent was rural farm, and 42.2 percent was rural nonfarm. The areas that are the most thickly populated are near Crewe and Blackstone. The areas that are the least thickly populated are in the northern part of the county, north and east of Fergusonville.

The soils that are the least desirable for agriculture have the largest rural population because these soils were the cheapest and the most easily obtained when the county was first settled. The most productive soils are generally part of a large dairy farm or tobacco farm and are not densely populated.

Blackstone is the largest town in the county. It is also the most important trading center and the principal outlet for farm products. Other towns are Crewe, Burkeville, Jennings Ordinary, Wellville, Fergusonville, and Spainville.

Community Facilities

A high school is located at Blackstone, and consolidated high schools are at Crewe and Nottoway. There are churches in the various towns.

Electricity is available to all of the farms. Telephones were reported on 131 farms in 1954, and telephone service is available to most of the towns and communities.

In a large part of the county the houses have been painted and many of the homes have running water. A large number of farms have television sets.

Transportation and Markets

Nottoway County has good transportation facilities. The main line of the Norfolk and Western Railway, which runs from Norfolk to Roanoke, crosses the county. At Crewe this railway has a large shop and yard where repairs are made. The town is also a changing point for the train crews.

A branch line of the Southern Railway, which runs between Richmond, Va., and Durham, N. C., crosses the northwestern corner of the county. It passes through Burkeville and Jennings Ordinary. Pulpwood and lumber are the principal products shipped out of the county.

United States Highways Nos. 460 and 360 and primary State highways Nos. 40, 46, 49, 153, and 307 cross the county. In addition to the Federal and State highways, there are many miles of hard-surfaced secondary roads that are maintained by the county. Some of the secondary roads are hard surfaced, but others are sand and clay with a gravel surface. Regular buslines operate over the highways.

The close network of roads greatly facilitates the marketing of farm products. Milk is collected daily and is shipped to the city markets; hogs and cattle are transported to market by truck or in trailers pulled by cars. All of the tobacco is transported by truck or by trailer. Forest products are hauled by truck to one of the loading points at Burkeville, Crewe, Blackstone, or Wellville.

Industries

Nottoway County is primarily agricultural and has relatively few industrial workers. According to the Federal census, 5,577 persons were employed in industries in the county in 1950. Two flourmills and feedmills use some of the agricultural products. The nonagricultural industries in 1955 consisted of 3 small planingmills, 6 semipermanent sawmills, 12 portable sawmills, 3 plants that manufacture apparel and related products, 1 mill that manufactures textiles, 1 fertilizer plant, 1 stone quarry, 2 plants for processing tobacco, 1 railroad repair shop, and 1 veneer plant.

One of several rock quarries in the county is now in operation at Burkeville. It produces crushed stone for road material and concrete.

Water Supply

In normal years springs, wells, and streams provide adequate water for home use and for livestock. In 1930, 1953, and 1954, however, many of the springs, streams, and shallow wells became dry; many of the farmers had to haul water long distances for home use and for livestock. Since 1953, many of the wells have been made deeper or new wells have been drilled, and many of the farms have ponds to provide water for livestock. There were 146 artificial ponds, reservoirs, and earth tanks on 96 farms in the county in 1954.

There are many springs throughout the county. The rock formations of granite, granite gneiss, hornblende gneiss, and mica gneiss that underlie the county have good water-bearing potential because they contain many fissures or closely spaced joints. Except during prolonged droughts, the large streams maintain a steady flow. These streams originate as springs near the main divide marked by United States Highway No. 460.

Most of the old wells in the county were dug by hand and were walled up with rocks that were picked up locally and roughly chipped and broken to fit together. Sometimes mortar was used to hold the rocks in place, but this was not the usual practice. Most of the wells today are drilled and have steel casings or are dug by using an earth-boring machine that cuts a hole 30 inches in diameter. The casing used in bored wells is made of concrete pipe that is cemented at the joints. Bored wells are generally less than 50 feet deep. In contrast, drilled wells are normally more than 60 feet deep.

Several of the large dairies have built a large concrete storage tank below a good spring and have piped the water to the dairy. This is less expensive than drilling a deep well. This system is also used to supply water for some of the farm homes.

The town of Blackstone gets its water supply from the Nottoway River through the Camp Pickett water system, which includes a large reservoir. The water supply for the town of Crewe comes from the Little Nottoway River, but this supply was inadequate during the dry years of 1953 and 1954. The town of Burkeville depends on three deep wells for its water supply, but in recent years the wells have not supplied adequate water. Plans are being made to build an additional reservoir.

The Norfolk and Western Railroad has two reservoirs in the county to supply water. Crystal Lake, near Nottoway, is on Laxaretta Creek, and Hobbs Mill Ponds, on Namozine Creek, is near Wilson in Dinwiddie County.

Agriculture

Little is known about early agriculture in Nottoway County. The Indians grew maize and tobacco, but they were essentially hunters instead of farmers. The early settlers grew corn, oats, and wheat for use on the farm and tobacco as a cash crop to export to England. Tobacco was also used in place of money in the earliest white settlements.

After the Civil War, much of the land that had been under cultivation was allowed to return to forest. More livestock was raised, and a smaller acreage was used for tobacco. Nevertheless, tobacco is still the most important cash crop.

In the following pages the more outstanding features of agriculture as it is practiced at the present time are pointed out. Unless stated otherwise, the statistics used are from reports published by the United States Bureau of the Census.

Land Use

Nottoway County covers about 197,120 acres, of which approximately 59.4 percent was land in farms in 1954. Of the land in farms, only about 16.8 percent was cropland harvested. The land in farms according to use in 1949 and 1954, respectively, is shown in table 11.

TABLE 11.—*Land in farms according to use*

Use	1949		1954	
	Farms reporting	Acres	Farms reporting	Acres
Cropland:				
Harvested	1,084	21,639	967	19,697
Pastured	691	10,340	356	6,620
Not harvested or pastured	687	10,190	488	6,406
Woodland:				
Pastured	532	15,521	463	19,071
Not pastured	855	49,419	657	49,788
Other land in pasture	336	7,362	514	12,876
Other land (house lots, roads, wasteland, etc.)	1,139	4,900	1,019	2,648

Types and Sizes of Farms

In 1954, 529 of the farms in the county were miscellaneous and unclassified. The rest were listed by type as follows:

Field crop other than vegetable and fruit and nut	384
Cash-grain	21
Other field crop	363
Dairy	41
Poultry	35
Livestock farms other than dairy and poultry	45
General	55

Farms ranged in size from less than 10 acres to more than 1,000 acres in 1954. Approximately 80.5 percent of the farms were less than 50 acres in size, and an additional 9 percent were 50 to 199 acres in size.

The number of farms decreased from 1,595 in 1940 to 1,089 in 1954. The reason for the decrease was that in 1940 the Federal government bought 20,000 acres of farmland.

Most of the small farms are near Blackstone and Crewe. The largest farms are in the northeastern part of the county near the Amelia County line.

Crops

The principal crops grown in the county are about the same as those grown 25 years ago, but the acreage of each crop has changed considerably. The acreage of the principal crops and the number of fruit trees in the county are shown in table 12.

TABLE 12.—*Acreage and yields of principal crops and number of fruit trees of bearing age* [1]

Crops	1929		1939		1949		[2] 1954	
	Acres	*Bu.*	*Acres*	*Bu.*	*Acres*	*Bu.*	*Acres*	*Bu.*
Corn harvested for grain	9, 171	165, 183	9, 386	186, 044	5, 560	197, 313	4, 328	109, 148
Small grains (threshed or combined):								
Barley	[3]	[3]	304	6, 350	1, 221	38, 748	1, 235	43, 463
Oats	132	2, 929	108	2, 001	1, 102	36, 478	1, 219	50, 309
Wheat	3, 070	42, 428	2, 919	40, 737	2, 666	54, 469	2, 379	62, 589
Soybeans harvested for beans	[3]	[3]	33	597	49	1, 178	179	1, 809
Sweetpotatoes harvested for home use or for sale	163	15, 435	188	22, 935	[4] 54	9, 575	[5] 21	4, 470
Hay:		*Tons*		*Tons*		*Tons*		*Tons*
Alfalfa	522	1, 065	608	1, 398	1, 884	5, 053	1, 878	3, 958
Lespedeza	[3]	[3]	6, 558	9, 284	6, 018	7, 181	5, 114	4, 322
Soybeans	[3]	[3]	[3]	[3]	76	84	334	415
Clover or timothy	564	604	346	411	500	714	614	680
Small grains	163	173	277	372	447	667	1, 100	1, 587
Fruit trees:	*Number* [6]		*Number* [6]		*Number* [6]		*Number*	
Apple	40, 890		11, 340		8, 579		3, 799	
Cherry	1, 280		3, 798		306		79	
Peach	11, 581		6, 626		8, 669		3, 266	
Pear	1, 977		1, 448		753		144	
Plum and prune	1, 137		309		222		37	

[1] For yields of tobacco, see table 13.
[2] 1954 was an unusually dry year.
[3] Data not reported.
[4] Does not include acreage for farms with less than 15 bushels harvested.
[5] Does not include acreage for farms with less than 20 bushels harvested.
[6] One year later than year at head of column.

Tobacco is the main cash crop. Corn and wheat are sold to some extent but are generally grown for home use. In total acreage, lespedeza is still the most important hay crop.

On dairy farms the cropping system most commonly used is 1 year each of corn, small grains, and hay. Some farmers grow corn, a small grain, and a hay crop for 1 year each and then pasture the areas for 1 year.

The acreage planted to corn has decreased, but yields are higher than formerly. Increased use of fertilizer, the use of hybrid varieties, and the trend toward using the best suited soils, for example, the Seneca, Starr, Chewacla, Lloyd, and Cecil, to grow corn, have all helped to increase yields. In 1954, corn was grown for silage on 655 acres. In that year 5,140 tons of silage was produced.

Corn is planted about the first of May after the soils have been plowed in spring. On the Appling, Durham, and other sandy soils, a nitrogen fertilizer is commonly added several times during the growing season. If corn is grown on the Cecil, Lloyd, and other finer textured soils, generally only one application of nitrogen fertilizer is needed.

The acreage planted to wheat has decreased since 1919, probably partly because of the Federal wheat allotment program. Most of the wheat is grown on the Cecil, Madison, and Appling soils.

During recent years oats have been grown much more extensively than formerly and yields are much higher. In addition to the oats that were harvested in 1954, oats and other small grains were grown for hay on approximately 1,000 acres. The acreage used to grow barley has increased to some extent during the past few years, and yields have increased. The oats and barley are grown almost entirely for feed and are used on the farm. A large part of the oats crop is cut early for hay.

Rye is used principally as a winter cover crop. On some farms it is pastured early in spring. In 1954, rye was grown on 158 acres and produced 3,307 bushels of grain.

As a rule, wheat is planted about the first of November, and barley, about the middle of October. Oats are generally seeded 30 days before the average date of the last killing frost in spring. Combines are ordinarily used to harvest the small grains.

The acreage planted to tobacco is controlled by Federal allotment. Bright tobacco is grown much more extensively than any other kind. Table 13 shows the number of acres used to grow bright and dark tobacco. respectively, and the yields of each of these crops.

The highest yields and the best quality of bright tobacco are produced on the Durham and Appling soils. Of the soils of these two series, the Durham are the most desirable for bright tobacco. Dark tobacco grows best on the Starr, Lloyd, Cecil, and Madison soils. Only a few acres of burley tobacco are grown. The yields are low compared to those in southwestern Virginia. Sun-cured tobacco is also grown on only a small acreage.

TABLE 13.—*Acreages and yields of bright and dark tobacco*

Year	Bright, or flue-cured, tobacco		Dark, or fire-cured, tobacco	
	Acres	*Lbs.*	*Acres*	*Lbs.*
1954	[1] 1, 768	[1] 2, 276, 817	[1] 390	[1] 399, 044
1953	1, 704	2, 203, 755	361	553, 540
1952	1, 651	2, 521, 025	346	443, 284
1951	1, 829	2, 508, 531	354	492, 916
1950	1, 547	2, 226, 202	431	479, 353
1949	1, 467	1, 640, 073	417	573, 674
1948	1, 410	1, 839, 737	466	532, 670

[1] Data taken from records at Nottoway, Va., December 1955.

Generally, the area to be planted to bright tobacco is plowed about the first of April. Preparation of the soil for planting is completed early in May. At that time a complete fertilizer is added. Then the plants are set by hand or with a mechanical planter. The crop is commonly kept free of weeds and grass by cultivating frequently. When the tobacco begins to ripen, the leaves are pulled, one or several at a time, beginning at the bottom of the plant. The leaves higher up the plant are picked in consecutive pullings. Normally, the leaves are harvested once a week. Locally, this operation is called saving tobacco.

The tobacco seed is sown about the first of March in well-drained soil that has a southern exposure. The land preferably has been cleared recently, or it has not been cropped for many years. After the beds have been fertilized, worked, and seeded, they are covered with a light canvas cloth until the danger of cold weather has passed.

Dark tobacco usually follows red clover in the cropping system, and the cropping system also includes a small grain. Bright tobacco, on the other hand, is often grown year after year and is followed in winter by a cover crop of rye. Recently, bright tobacco has been grown frequently in a cropping system that consists of 1 year each of tobacco, a small grain, and redtop. Growing the tobacco only once in 3 years helps control diseases.

The soils on which most of the dark tobacco is grown contain more clay and can be worked within a much narrower range of moisture than soils planted to bright tobacco. Cecil, Lloyd, and Madison clay loams and other more clayey soils are generally plowed late in fall. This allows the soil to freeze and thaw during the winter, which breaks the large clods and makes the soil more granular. If stable manure is available, a heavy covering of it is added. The field is disked and harrowed early in May. Before the middle of May, the fertilizer is applied in the row, and the plants are set by hand or with a mechanical planter. Dark tobacco plants are grown in beds similar to those used for bright tobacco.

The crop is cultivated frequently to control weeds. Dark tobacco is harvested by cutting the plant and splitting the stalk. Four or more plants are put on a stick that is hung on a rack in the field from one to several days, until the leaves are partly wilted.

Hay crops are important on the dairy farms and on farms where beef cattle are raised. Alfalfa is grown on most of the dairy farms, where the soils receive a large amount of fertilizer. The acreage has increased greatly during the past few years. In total acreage, lespedeza is still the most important hay crop, but the total yield of alfalfa is almost as high as that of lespedeza.

After the alfalfa crop has become established, the alfalfa is cut for hay over a period of 3 to 6 years, or as long as the stand is good enough to make cutting profitable. Then, corn and small grains are grown before alfalfa is again seeded. If the alfalfa makes a poor stand in spring, the field may be plowed and reseeded to alfalfa in August.

Lespedeza generally follows a small grain in the cropping system. It is sown in February or March. A large part of the crop is cut for hay. In 1954, however, lespedeza was grown for seed on 139 acres, and a total of 22,350 pounds of seed was produced.

Irish potatoes and sweetpotatoes are grown on practically all of the farms, but the total acreage is small. Most of the potatoes not used on the farm are sold at local markets. Large areas of Durham and Appling soils are well suited to potatoes.

Garden vegetables are grown chiefly for home use. A small acreage is used to grow tomatoes, sweet corn, cantaloups, and watermelons for sale at local markets.

On most farms there are a few fruit trees, but most of the fruit is used on the farm. There are three commercial orchards in the county. Apple trees have decreased in number since 1929. Peaches are second to apples in importance. Strawberries are grown on a small acreage for sale at local markets.

Livestock and Livestock Products

Approximately half of the income from farm products sold in Nottoway County in 1954 was derived from the sale of livestock and livestock products. The number of domestic animals on farms in stated years is shown in table 14.

TABLE 14.—*Number of livestock on farms*

Livestock	1930	1940	1950	1954
Horses and colts	1, 003	[1] 728	676	428
Mules and mule colts	983	[1] 1, 101	757	541
Cattle and calves	4, 129	[1] 4, 863	7, 616	9, 521
Sheep and lambs	960	[2] 432	355	430
Hogs and pigs	4, 816	[3] 3, 340	4, 254	4, 345
Chickens	[1] 43, 110	[3] 38, 351	[3] 48, 819	[3] 45, 128

[1] Over 3 months old.
[2] Over 6 months old.
[3] Over 4 months old.

In 1954, there were 9,521 cattle and calves in the county. Of this number, 3,602 were milk cows. Most of the dairy farms are near the town of Crewe, but dairy farms are scattered throughout the county. Dairying has been important in the county for many years. The dairy cattle are chiefly grades of Holstein-Friesian, but there are several herds of purebred Guernseys. The beef cattle are mainly Herefords, but some are Aberdeen-Angus or Shorthorn. Only a few farmers fatten and market finished cattle. Instead, they ship feeder calves out by truck to be sold in other parts of the State.

In addition to cattle and calves sold, 14,449,321 pounds of whole milk and 18,949 pounds of butterfat were sold in 1954. Most of the milk is shipped to Norfolk by tank truck.

The number of hogs in the county at various times reflects the corn-hog price ratio. The surplus corn is sold as grain when the returns are greater from that source than they would be if the corn were fed to hogs. Poland China, Hampshire, Berkshire, and Chester are popular breeds of hogs. The hogs that are grown for

market are usually sold at the Blackstone or Petersburg markets.

The total number of sheep and lambs in the county decreased from 960 in 1930 to 430 in 1954. This decrease has been caused partly by the hazard of roving dogs. The principal breeds of sheep are Hampshire and Shropshire. Spring lambs are marketed in Petersburg. The 2,455 pounds of wool shorn in 1954 was marketed through a wool pool.

Poultry and poultry products are important sources of cash income. In 1954, 236,616 broilers, 20,254 other chickens, and 228,364 dozen chicken eggs were sold. In addition to the 35 poultry farms in the county in 1954, poultry is raised on many farms as an additional source of income or for use on the farm. Most of the eggs produced for hatcheries are sold locally.

Turkeys and ducks have not been raised extensively in the county. A total of 3,167 turkeys and 208 ducks was raised in 1954. There have been as many as several thousand turkeys at one time on some poultry farms, but the profits were too small for the grower to continue raising turkeys. In addition to chickens, turkeys, and ducks, there are a few geese and guineas in the county.

Mules are favored as work animals, but their number has decreased sharply during the past few years. Some of the horses are not used as work animals but are used for riding or for show purposes.

The decline in the number of work animals has not been so great in Nottoway County as in some other parts of the State. Some of the farms are too small to justify using a tractor. In the past, work animals have been necessary for harvesting bright tobacco. Mechanical harvesters are replacing work animals on some of the larger tobacco farms.

Pastures

Approximately 32.9 percent of the farmland in the county was in pasture in 1954. Of this, 19,071 acres, or 16.3 percent of the farmland, was in woodland pasture. A total of 6,566 acres of permanent improved pasture was reported on 272 farms. Most of this improved pasture is on the Appling, Cecil, Seneca, and Madison soils, but a small acreage is on the Wehadkee, Chewacla, Bremo, Wilkes, and Louisburg soils and on Mixed alluvial land. At least 20 acres of woodland pasture is needed to provide as much forage for livestock as 1 acre of improved permanent pasture.

The small acreage of pasture that has a high carrying capacity is on the Appling, Seneca, Cecil, and Madison soils and on Mixed alluvial land. These soils do not have a good natural supply of plant nutrients, but they respond well to good management.

The pastures that produce the best yields have received 2 tons or more of ground limestone per acre. They have also received an initial application and a topdressing of a complete fertilizer and have been topdressed with manure. The practice on most of the dairy farms is to put all of the manure available on the pastures.

On some of the dairy farms and on farms where beef cattle are raised, there are old, established stands of bluegrass and whiteclover. Many of the improved pastures have been seeded to orchardgrass and ladino clover. If this mixture is seeded, however, the clover must be reseeded frequently, rotational grazing practiced, and fertilizer added each year to maintain the stand.

Most of the pastures are managed poorly. On farms where tobacco is the main cash crop, the pastures are large and 15 to 25 acres are allowed for each animal unit. Most of these areas are woodland pastures. The plants on the open areas in the woodland pastures do not include many desirable pasture plants. Many of these pastures were seeded to Korean lespedeza the first year, but the plants were grazed too closely and failed to reseed. In the poorer pastures, the plants are mainly sheep sorrel, poverty oatgrass, broomsedge, rabbit tobacco, cheat, narrowleaf plantain, goldenrod, and dewberry briers.

Farm Equipment

The dairy farms in the county are more mechanized than the tobacco farms. Most of the large dairy farms have two or more tractors, and turning plows, disks, harrows, mowers, side-delivery rakes, wheat drills, fertilizer spreaders, pickup hay balers, silage cutters or field choppers, silo fillers or blowers, manure spreaders, and one or more wagons. Many have combines and corn-pickers. On most of the dairy farms there are silos and large barns, but some farmers use a milking parlor and milk only a few cows at a time.

On most of the tobacco farms, the equipment includes a tractor, a turning plow, a disk, and spike-tooth harrows. On some of the tobacco farms, there are one or more work animals and a turning plow, cultivator, wagon, fertilizer distributor, tobacco planter, and corn planter. There are two or more curing barns on the tobacco farms, depending on the size of the farm, and a packing shed in which the tobacco is stored after it is cured. On the farms that grow bright tobacco, there are fuel tanks and oil burners for use in the curing of the tobacco.

If small grains are grown, they are harvested by using combines that are rented on an hourly or acreage basis. Hay is generally baled by using a pickup hay baler that is also rented on an hourly basis.

Farm Tenancy

In 1954, 79.6 percent of the farms were farmed by owners or part owners, and most of the rest were operated by tenants. Since 1945, a greater number of farms has been operated by part owners than formerly. In 1954, 209 farms were operated by part owners, as compared to 137 in 1950. The number of full owners decreased, however, during that period. In 1954, 658 farms were operated by full owners, as compared to 884 in 1950. In that year, 20.3 percent of the farms were operated by tenants.

Only 8 tenants paid cash rent in 1954. In that year there were 42 crop-share tenants in the county and 3 livestock-share tenants, 1 share-cash tenant, and 133 croppers.

Nearly all of the tenants are on tobacco farms. When the crop is divided on a 50–50 basis, the owner of the land agrees to furnish the land, equipment, one-half the fertilizer and the spray or dust used, the canvas for

covering the beds, and fuel used to cure the crop. In addition, most of the owners advance credit to the tenants until the crop is sold. They also guarantee medical expenses for the tenant and his family. Each tenant is furnished a house, fuel, and garden space if he lives on the farm. As a rule, he is allowed to keep one or more head of livestock.

A few of the owners furnish only the land and one-half the cost of fertilizer, spray, canvas, and fuel. Then, they get one-fourth of the crop, and the tenant keeps three-fourths. Under all systems of tenancy, the owner supplies any lime that is used.

Woodlands of Nottoway County

A large part of Nottoway County is covered by forest. The proper reseeding or planting of new stands of timber and good management of the present stands are the major problems of timber production.

The original forests on the uplands consisted mainly of hardwoods of the oak-hickory type with a few shortleaf, loblolly, and Virginia pines. The hardwoods growing on the stream bottoms were of a different type than those growing on uplands. They were mainly white ash, hackberry, redgum, sycamore, and river birch. Yellow-poplar grew along the foot slopes near the edges of the bottom lands and along many of the smaller streams. Little of this original forest remains.

The early settlers soon learned that the land cleared for farming became less productive each year. After a tract had been cultivated for several years, it became unprofitable to continue cultivating it. The fields were then abandoned, and additional land was cleared. The abandoned fields soon reseeded to shortleaf, loblolly, or Virginia pines, according to the kind of pine growing nearest the field. This was the beginning of the pure stands of pine now growing in the county.

The present forests in Nottoway County are of two major kinds. The first consists of cutover, second-growth hardwoods. For the most part, the cutting in these stands has been by the method known as high grading. When this method is used, the trees that are straight and of a volume great enough to sell are cut and the undesirable trees are left standing. After this process has been repeated several times, little is left in the stand but scrubby, second-growth hardwoods and stunted pines of little value either for lumber or as protection for the soils.

The second major kind of forest consists of nearly pure stands of pine. This type has reseeded on abandoned farmlands that once supported the original upland forests of oak, hickory, and other hardwoods, and scattered pines. The present pine forests are made up of loblolly, shortleaf, or Virginia pines or of mixed stands of these trees.

Virginia, or scrub pine, reseeds rapidly, and it also makes much better growth on areas that are severely eroded than do the shortleaf and loblolly pines. Lumber from Virginia pines is knotty, however, and is of low to fair grade. When the trees are cut, the Virginia pines are often left standing and the shortleaf and loblolly pines are all cut.

The following lists the most desirable native trees in the county and the soils on which they grow the best.

Trees	*Soils*
Loblolly pine (*Pinus taeda*)	Appling fine sandy loams. Appling coarse sandy loams. Cecil fine sandy loams. Cecil coarse sandy loams. Durham fine sandy loams. Durham coarse sandy loams. Louisburg sandy loams. Madison sandy loams. Worsham sandy loam.
Shortleaf pine (*P. echinata*)	Appling soils. Bremo loams. Cecil soils. Enon fine sandy loams. Enon-Vance-Helena soils. Madison soils. Wilkes sandy loams.
Yellow-poplar (*Liriodendron tulipifera*).	Lloyd loams. Mixed alluvial land. Seneca sandy loam. Starr loam.
Redgum (*Liquidambar styraciflua*).	Augusta loam. Chewacla silt loam. Colfax sandy loam. Mixed alluvial land. Worsham silt loam.
Black walnut (*Juglans nigra*)	Cecil fine sandy loams. Lloyd loams. Madison sandy loams. Seneca sandy loam. Starr loam. Wickham fine sandy loam.
Eastern redcedar (*Juniperus virginiana*).	Iredell-Mecklenburg loams. Enon fine sandy loams. Helena fine sandy loams. Vance fine sandy loams.
Virginia pine (*P. virginiana*)	Enon fine sandy loam, eroded undulating phase. Enon fine sandy loam, eroded rolling phase. Helena fine sandy loam, eroded undulating phase. Helena fine sandy loam, eroded rolling phase. Madison clay loams. Wilkes sandy loam, eroded rolling phase. Wilkes sandy loam, eroded hilly phase. Enon-Vance-Helena soils, eroded undulating phases. Enon-Vance-Helena soils, eroded rolling phases. Enon-Vance-Helena soils, eroded hilly phases.

In the past, little woodland management was practiced in the county. The wooded areas were cut over once and then were used as brush pasture. From 25 to 50 acres of this brush pasture was needed to support one cow, horse, or steer. During the last few years, however, some farmers have improved the management of their woodlands so that now they can obtain a cash crop from them periodically.

As an example of woodland management, a stand of loblolly pine was planted in an abandoned field of Wilkes sandy loam, rolling phase, in 1931, and the stand was thinned in 1955.[2] Of the approximately 28.5 cords of wood in the tract before thinning, 13.5 cords was removed and the rest was left uncut. The wood was sold for $74.25, which was an average of $3.09 profit per year.

[2] MARLER, R. L. EARLY TREE PLANTING STARTING TO PAY. Occasional Rept. No. 3, Va. Div. of Forestry, 3 pp. 1955.

Only the less desirable trees were cut, and more than half of the stand was left. Therefore, profits from this tract will continue for many more years. The same or better returns can be expected from a forest that is managed so that it reseeds naturally after cutting.

Forest fires in this county are generally brought under control quickly. The increase in the value of sawtimber, installation of fire wardens, enforcement of the brush-burning law, and a change in the attitude of the people of the county toward forest fires have all helped to reduce the number of fires and number of acres burned over. The following list, taken from the records of the District Forester in Farmville, Va., shows the number of fires and the acreage burned over in the county during the years from 1950 to 1955, inclusive.

Year	*Number*	*Acres burned*
1950	23	288. 4
1951	15	100. 1
1952	19	297. 6
1953	15	232. 4
1954	22	158. 0
1955	24	63. 2

The forests in the Camp Pickett Military Reservation are well managed and are protected from fires. The trees have been cut selectively. Many seed trees were left to restock the areas. The smaller trees were not disturbed, so they should produce a large supply of sawtimber. All former cuttings have been supervised by professional foresters.

Other forest areas in the county are being well managed by paper and pulp companies, by mills that make veneers, and by permanent lumber companies. Farmers interested in woodland management should visit these tracts that are managed professionally. With the help of the soil map, it will be easy to compare the soils, trees, and management in farm wooded areas with those in the commercial forests. Also, these forest stands will demonstrate what can be expected from various trees grown on different soils.

The prices of lumber have increased steadily for more than 30 years; yet, during that time the quality of the forests has declined. This is primarily because the owner does not manage the tracts efficiently. He can build up the quality of his forest by gradually eliminating the unprofitable trees. In time, he can develop a forest of high-grade timber for market.

Some soils in the county will probably never be profitable as woodland in their present condition. The Wehadkee soils, for example, are under water most of the year so that no trees of commercial value grow on them. Areas of Wehadkee silt loam are flooded once every 8 to 10 years for periods long enough to kill most trees of commercial value. If drained, pastures are fairly good on this soil.

Other soils that do not produce valuable timber are Gullied land; Cecil clay loam, severely eroded rolling phase; Madison clay loam, severely eroded rolling phase; Madison clay loam, severely eroded hilly phase; Enon-Vance-Helena soils, eroded hilly phases; Wilkes sandy loam, eroded hilly phase; and some areas of Appling coarse sandy loam, eroded rolling phase, that have been severely gullied. All of these soils have been damaged severely by sheet and gully erosion. Most of the areas have lost all of the original surface layer and have many deep gullies that are still active. Of these soils, Gullied land has been damaged the most. It is practically a network of bare, connecting gullies.

With care, all of these eroded soils probably could be used for pasture, but they are less suitable for timber. If the returns are worth the cost to the owner, most of the gullies can be smoothed, treated with large amounts of lime, manure, and commercial fertilizer, and planted to grass. If these severely eroded areas are to be put in forest, the gully and sheet erosion will have to be checked before trees can be planted. Stands of timber in these eroded areas would have to be cut lightly to prevent the areas from beginning to erode again.

Glossary

Acidity. The degree of acidity of the soil mass expressed in pH values or in words as follows:

	pH
Extremely acid	Below 4. 5
Very strongly acid	4. 5–5. 0
Strongly acid	5. 1–5. 5
Medium acid	5. 6–6. 0
Slightly acid	6. 1–6. 5
Neutral	6. 6–7. 3
Mildly alkaline	7. 4–7. 8
Moderately alkaline	7. 9–8. 4
Strongly alkaline	8. 5–9. 0
Very strongly alkaline	9.1 and higher

Aggregate, soil. A single mass or cluster consisting of many primary soil particles held together, such as a prism, crumb, or granule.

Alluvium. Sand, silt, clay, or other sediments deposited on land by streams.

Bedrock. The solid rock underlying soils.

Catena, soil. A group of soils, within a specific soil zone, formed from similar parent materials but with unlike soil characteristics because of differences in relief or drainage.

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

Colluvium. Mixed deposits of soil materials and fragments of rock at the bases of steep slopes. The deposits have accumulated as the result of soil creep, slides, and local wash.

Concretions. Hard grains, pellets, or nodules resulting from concentrations of compounds that cement grains of soil together. The composition of some concretions is unlike that of surrounding soil material. Concretions are of various sizes, shapes, and colors. They commonly form where there are local accumulations of calcium carbonate, iron, and manganese oxides.

Consistence, soil. The combination of properties of soil material that determine its resistance to crushing and its ability to be molded or changed in shape. Soil consistence varies with moisture content, and terms have been established to define the consistence when the soil is wet, moist, or dry. Following are definitions for the terms most frequently used in this report:

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

Friable. When moist, soil material crushes easily under gentle to moderate pressure between thumb and forefinger and coheres when pressed together.

Hard. When dry, soil material is moderately resistant to pressure, can be broken in hands without difficulty, but is barely breakable between thumb and forefinger.

Loose. Soil material is noncoherent when moist and when dry.

Plastic. When soil is wet, wire can be formed by rolling the soil between the hands, but moderate pressure is required to deform the soil mass.

Sticky. When wet, soil adheres to both thumb and forefinger after pressure and tends to stretch somewhat and to pull apart rather than pulling from either finger.

Very firm. When moist, soil material crushes under strong pressure; barely can be crushed between thumb and forefinger.

Very friable. When moist, soil material crushes under very gentle pressure but coheres when pressed together.

Cemented. When dry, and frequently when moist or wet, the material is brittle and hard. A *weakly cemented* mass can be broken in the hand. A *strongly cemented* mass cannot be broken in the hand but is easily broken with a hammer.

Contour tillage. Plowing or working the soil at right angles to the direction of slope, and at the same level throughout.

Cropland. Land regularly used for crops, except forest crops. It includes rotation pasture, cultivated summer fallow, or other land ordinarily used for crops but temporarily idle.

Drainage. *See* Natural drainage.

Eluviation. The movement of soil material from one place to another within the soil, either in solution or in suspension, when there is an excess of rainfall over evaporation. Horizons that have lost soil material through eluviation are called eluvial; those that have received material are called illuvial.

Erosion, soil. The wearing away or removal of soil material by water or wind. The two main types of erosion are *gully* erosion and *sheet* erosion. In gully erosion, water produces channels larger than rills. These channels form where the water is concentrated and carry water immediately after rains or when snow melts. *Sheet* erosion is the removal of a more or less uniform layer of soil material by overland flow of water. The eroding surface consists mainly of many small rills.

Fertility, soil. The inherent ability of a soil to provide proper compounds, in adequate amounts and in proper balance, for the growth of specified plants.

First bottom. The normal flood plain of a stream; land along the stream subject to frequent or occasional flooding.

Forest. Land not in farms that bears a stand of trees. The trees may be of any age or stature, including seedlings (reproduction), but of species that attain a minimum average height of 6 feet at maturity. Forest is also land from which the stand has been removed and that is not now restocking and on which no other use has been substituted. Forests on farms are called farm woodlands or farm forests.

Genesis, soil. The mode of origin of the soil, particularly the processes responsible for the development of the solum, or true soil, from the unconsolidated parent material.

Great soil group. A broad group of soils having internal soil characteristics in common. A great soil group normally contains several soil series. *See also* Series, Type, Phase.

Green-manure crop. Any crop grown and plowed under to improve the soil by adding organic matter.

Horizon, soil. A layer in the soil profile, approximately parallel to the land surface, and having well-defined characteristics.

A horizon. The upper horizon of the soil mass in which biological activity is maximum and from which material has been removed by percolating waters; the eluviated part of the solum; the surface soil. This horizon may be divided into two or more subhorizons, of which the A_0 is not a part of the mineral soil but the accumulation of organic debris on the surface. Other subhorizons are designated A_1, A_2, and so on.

B horizon. The soil horizon, usually beneath the A horizon, or surface soil, in which (1) clay, iron, or aluminum, with accessory organic matter, have accumulated; (2) the structure is blocky or prismatic; or (3) there is some combination of the features mentioned in 1 and 2. In soils with distinct profiles, the B horizon is roughly equivalent to the term "subsoil". This horizon may be divided into several subhorizons, depending on the color, structure, consistence, or character of the material. These layers are designated B_1, B_2, B_3, and so on. *See also* Subsoil.

C horizon. The unconsolidated rock material in the lower part of the soil profile; the substratum; usually the parent material of the soil.

Illuviation. *See* Eluviation.

Infiltration. The downward movement of water into the soil.

Internal drainage. The rate of movement of water through the soil profile. It is affected by the texture and structure of the surface soil and subsoil, by other characteristics of the soil profile, and by the height of the ground water table, either permanent or perched. Relative terms expressing internal drainage are *very rapid, rapid, medium, slow, very slow,* and *none.*

Leaching. The removal of material in solution by the passage of water through the soil.

Massive. Large, uniform masses of cohesive soil, sometimes with ill-defined and irregular cleavage, as in some of the fine-textured, alluvial soils; structureless. *See also* Structure, soil.

Morphology, soil. The constitution of the soil, including the texture, structure, consistence, color, and other physical, chemical, and biological properties of the various soil horizons that make up the soil profile.

Mottling, soil. Irregular marking of soil horizons with spots of color. A common cause of mottling is imperfect or impeded drainage, although there are other causes such as soil development from an unevenly weathered rock. Different kinds of minerals may cause mottling. Description of the mottling in soil horizons requires notations for abundance, size, and contrast. The terms for abundance are *few, common,* and *many;* for size, *fine, medium,* and *coarse;* and for contrast, *faint, distinct,* and *prominent.* The size measurements are the following: *Fine,* commonly less than 5 mm. (about 0.2 in.) in diameter along the greatest dimension; *medium,* commonly between 5 and 10 mm. (about 0.2 to 0.16 in.) along the greatest dimension; and *coarse,* commonly more than 15 mm. (about 0.9 in.) along the greatest dimension (*4*).

Natural drainage. Refers to conditions that existed during the development of the soil as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but results from other causes, as sudden deepening of channels or sudden blocking of drainage outlets. The following relative terms are used to express natural drainage: *Excessively drained, somewhat excessively drained, well drained, moderately well drained, imperfectly or somewhat poorly drained, poorly drained,* and *very poorly drained.*

Excessively drained. Water is removed from the soil very rapidly. Excessively drained soils commonly are shallow over bedrock and may be steep, very porous, or both. Enough of the water from precipitation is commonly lost from these soils to make them unsuitable for growing the ordinary crops.

Somewhat excessively drained. Water is removed from the soil rapidly so that only a relatively small part is available to plants. Only a narrow range of crops can be grown on these soils, and yields are usually low without irrigation.

Well drained. Water is removed from the soil readily but not rapidly. A well-drained soil has "good" drainage.

Moderately well drained. Water is removed from the soil somewhat slowly, so that the soil is wet for a small, but significant, part of the time.

Imperfectly or *somewhat poorly drained.* Water is removed from the soil slowly enough so that the soil is wet for significant periods, but not all of the time.

Poorly drained. Water is removed so slowly that the soil remains wet for a large part of the time. The water table is commonly at or near the surface during a considerable part of the year.

Very poorly drained. Water is removed from the soil so slowly that the water table remains at or on the surface the greater part of the time.

Normal soil. A soil having a profile in near equilibrium with its environment; developed under good, but not excessive, drainage from material of mixed mineral, physical, and chemical composition. In its characteristics the soil expresses the full effects of the forces of climate and living matter.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in elaboration of its food and tissue. These include nitrogen, phosphorus, calcium, potassium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps others obtained from the soil; and carbon, hydrogen, and oxygen, obtained largely from the air and water.

Parent material. The unconsolidated mass of rock material (or peat) from which the soil profile develops.

Permeability, soil. That quality of a soil horizon that enables water or air to move through it. The permeability of a soil may be limited by the presence of one nearly impermeable horizon, even though the others are permeable. Terms used to express relative permeability are *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Phase, soil. The subdivision of a soil type having variations not significant to classification of the soil in its natural landscape but significant to the use and management of the soil. Examples of the variations recognized in soil phases are differences in slope, stoniness, and thickness because of accelerated erosion.

Productivity, soil. The present capability of a soil to produce a specified plant or sequence of plants under a defined set of management practices. It is measured in terms of the outputs, or harvests, in relation to the inputs of production factors

for a specific kind of soil under a physically defined system of management.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction. *See* Acidity.

Relief. Elevations or inequalities of the land surface, considered collectively.

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Usually, sand grains consist chiefly of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more of sand and not more than 10 percent of clay.

Series, soil. A group of soils that, except for texture of the surface soil, are similar in profile characteristics and in arrangement of horizons. The soils of one series have developed from a particular type of parent material.

Silt. (1) Individual mineral particles of soil that range in diameter between the upper size of clay, 0.002 millimeter, and the lower size of very fine sand, 0.05 millimeter. (2) Soil of the textural class called silt contains 80 percent or more of silt and less than 12 percent of clay.

Soil. The natural medium for the growth of land plants. A soil is a natural, three-dimensional body on the surface of the earth, unlike the adjoining bodies.

Soil separates. The individual size groups of soil particles, as sand, silt, and clay.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soils includes the A and B horizons. Usually, the characteristics of the material in these horizons are quite unlike those of the underlying parent material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from the adjoining aggregates. The principal forms of soil structure are *platy, prismatic, columnar, blocky,* and *granular.* Structureless soils are (1) *single grain*—each grain by itself as in dune sand, or (2) *massive*—the particles adhering together without any regular cleavage as in many claypans and hardpans. Structure is defined in terms of distinctness, size, and shape of the soil aggregates. For example, "moderate, medium, subangular blocky," means moderately distinct, medium-sized aggregates of subangular blocky shape.

Subsoil. The B horizons of soils with distinct profiles. In soils with weak profile development, the subsoil can be defined as the soil below plow depth in which roots grow. Although a common term, subsoil cannot be defined accurately. It has been carried over from early days when *soil* was conceived to be only the plowed part of the profile, and all material underneath was called *subsoil.*

Substratum. Any layer underlying the solum, or true soil. The term is applied both to parent materials and to other layers unlike the parent material that are below the B horizon, or subsoil.

Surface runoff. The surface flow of water from an area. Runoff is affected by such factors as texture and structure of the surface soil, the vegetative covering, the prevailing climate, and the slope. Relative degrees of runoff are expressed as follows: *Very rapid, rapid, medium, slow, very slow,* and *ponded.*

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness.

Terrace. (1) Agricultural: A broad channel or embankment constructed across sloping lands, at or approximately on a contour line. Terraces are spaced at regular intervals on a slope so as to intercept and control runoff. They check runoff so that more water will infiltrate, and they carry surplus water to an outlet at a velocity that will not erode the soil. (2) Geologic: A flat or undulating plain, commonly rather narrow and usually with a steep front, that borders a river, lake, or the sea. Many old terraces have become more or less hilly through dissection by streams, but they are still regarded as terraces.

Texture, soil. The proportions of the various size groups of individual soil grains in a mass of soil. Specifically, it refers to the proportions of sand, silt, and clay.

Topsoil. Presumably fertile soil material used to dress roadbanks, gardens, and lawns.

Upland, geologic. Land consisting of material that has not been worked by water in recent geologic time. In a general sense, the term "upland" means high ground; ground elevated above the lowlands along the rivers or the lowlands between hills.

Variegated. Marked with streaks or spots of different colors. Used primarily to designate pattern or colors in well-drained soils.

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GUIDE TO MAPPING UNITS AND CAPABILITY UNITS[1]

Map symbol	Soil name	Page	Capability unit	Page
Aa	Appling angular cobbly sandy loam, undulating phase	42	IIIe–2	10
Ab	Appling angular cobbly sandy loam, rolling phase	42	IIIe–2	10
Ac	Appling coarse sandy loam, undulating phase	41	IIe–4	9
Ad	Appling coarse sandy loam, eroded undulating phase	41	IIe–4	9
Ae	Appling coarse sandy loam, rolling phase	41	IIIe–2	10
Af	Appling coarse sandy loam, eroded rolling phase	41	IIIe–2	10
Ag	Appling fine sandy loam, undulating phase	42	IIe–5	10
Ah	Appling fine sandy loam, eroded undulating phase	43	IIe–4	9
Ak	Appling fine sandy loam, rolling phase	43	IIIe–2	10
Al	Appling fine sandy loam, eroded rolling phase	43	IIIe–2	10
Am	Appling and Herndon very fine sandy loams, undulating phases	43	IIe–5	10
An	Appling and Herndon very fine sandy loams, rolling phases	44	IIIe–2	10
Ao	Augusta loam	44	IIIw–1	12
Ba	Bremo loam, eroded rolling phase	45	IVe–3	13
Bb	Bremo loam, eroded hilly phase	45	VIe–2	14
Ca	Cecil clay loam, eroded undulating phase	47	IIIe–6	12
Cb	Cecil clay loam, eroded rolling phase	47	IVe–1	13

GUIDE TO MAPPING UNITS AND CAPABILITY UNITS—Continued

Map symbol	Soil name	page	Capability unit	page
Cc	Cecil clay loam, severely eroded rolling phase	47	IVe–1	13
Cd	Cecil clay loam, eroded hilly phase	47	VIe–1	14
Ce	Cecil coarse sandy loam, undulating phase	45	IIe–2	8
Cf	Cecil coarse sandy loam, rolling phase	46	IIIe–2	10
Cg	Cecil coarse sandy loam, hilly phase	46	IVe–2	13
Ch	Cecil fine sandy loam, undulating phase	46	IIe–1	8
Ck	Cecil fine sandy loam, rolling phase	46	IIIe–1	10
Cl	Cecil fine sandy loam, hilly phase	47	IVe–2	13
Cm	Cecil and Georgeville very fine sandy loams, undulating phases	48	IIe–1	8
Cn	Cecil and Georgeville very fine sandy loams, rolling phases	48	IIIe–1	10
Co	Chewacla silt loam	48	IIIw–2	12
Cp	Colfax sandy loam, undulating phase	49	IIIw–1	12
Da	Durham coarse sandy loam, undulating phase	50	IIe–4	9
Db	Durham coarse sandy loam, rolling phase	50	IIIe–2	10
Dc	Durham fine sandy loam, undulating phase	50	IIe–5	10
Dd	Durham fine sandy loam, rolling phase	51	IIIe–2	10
Ea	Enon fine sandy loam, undulating phase	51	IIIe–4	11
Eb	Enon fine sandy loam, eroded undulating phase	51	IIIe–4	11
Ec	Enon fine sandy loam, rolling phase	51	IIIe–5	11
Ed	Enon fine sandy loam, eroded rolling phase	52	IIIe–5	11
Ee	Enon-Vance-Helena soils, undulating phases	52	IIIe–4	11
Ef	Enon-Vance-Helena soils, eroded undulating phases	52	IIIe–4	11
Eg	Enon-Vance-Helena soils, rolling phases	53	IIIe–5	11
Eh	Enon-Vance-Helena soils, eroded rolling phases	53	IIIe–5	11
Ek	Enon-Vance-Helena soils, hilly phases	53	VIe–2	14
El	Enon-Vance-Helena soils, eroded hilly phases	53	VIe–2	14
Ga	Gullied land	53	VIIIe–1	15
Ha	Helena fine sandy loam, undulating phase	54	IIIe–4	11
Hb	Helena fine sandy loam, eroded undulating phase	54	IIIe–5	11
Hc	Helena fine sandy loam, rolling phase	54	IIIe–5	11
Hd	Helena fine sandy loam, eroded rolling phase	54	IIIe–5	11
Ia	Iredell-Mecklenburg loams, undulating phases	55	IIIe–4	11
Ib	Iredell-Mecklenburg loams, rolling phases	55	VIe–3	14
Ic	Iredell-Mecklenburg loams, eroded rolling phases	55	VIe–3	14
La	Lloyd clay loam, eroded undulating phase	57	IIIe–6	12
Lb	Lloyd clay loam, eroded rolling phase	57	IVe–1	13
Lc	Lloyd clay loam, eroded hilly phase	57	VIe–1	14
Ld	Lloyd loam, undulating phase	56	IIe–1	8
Le	Lloyd loam, rolling phase	56	IIIe–1	10
Lf	Lloyd loam, hilly phase	56	IVe–2	13
Lg	Louisburg sandy loam, undulating phase	58	IVe–3	13
Lh	Louisburg sandy loam, rolling phase	58	IVe–3	13
Lk	Louisburg sandy loam, eroded rolling phase	58	IVe–3	13
Lm	Louisburg sandy loam, hilly phase	58	VIIe–1	15
Ln	Louisburg sandy loam, eroded hilly phase	58	VIIe–1	15
Ma	Madison clay loam, eroded undulating phase	60	IIIe–6	12
Mb	Madison clay loam, eroded rolling phase	60	IVe–1	13
Mc	Madison clay loam, severely eroded rolling phase	60	IVe–1	13
Md	Madison clay loam, eroded hilly phase	61	VIe–1	14
Me	Madison clay loam, severely eroded hilly phase	61	VIe–1	14
Mf	Madison sandy loam, undulating phase	59	IIe–2	8
Mg	Madison sandy loam, eroded undulating phase	59	IIe–2	8
Mh	Madison sandy loam, rolling phase	59	IIIe–1	10
Mk	Madison sandy loam, eroded rolling phase	59	IIIe–2	10
Ml	Madison sandy loam, hilly phase	60	IVe–2	13
Mm	Madison sandy loam, eroded hilly phase	60	IVe–2	13
Mn	Mixed alluvial land	61	IIIw–2	12
Sa	Seneca sandy loam	62	IIe–3	9
Sb	Starr loam	62	IIe–3	9
Sc	Stony land	62	VIe–2	14
Va	Vance fine sandy loam, undulating phase	63	IIIe–4	11
Vb	Vance fine sandy loam, rolling phase	63	IIIe–5	11
Wa	Wehadkee silt loam	64	IVw–1	13
Wb	Wehadkee soils	64	VIIIw–1	15
Wc	Wickham fine sandy loam	64	IIe–1	8
Wd	Wilkes sandy loam, undulating phase	65	IIIe–3	11
We	Wilkes sandy loam, rolling phase	65	IVe–3	13
Wf	Wilkes sandy loam, eroded rolling phase	65	IVe–3	13
Wg	Wilkes sandy loam, hilly phase	65	VIe–2	14
Wh	Wilkes sandy loam, eroded hilly phase	66	VIe–2	14
Wk	Worsham sandy loam	66	Vw–1	14
Wl	Worsham silt loam	66	Vw–1	14

[1] See table 2, p. 18, for ratings of the soils according to productivity and table 8, p. 40, for the acreage and proportionate extent of the soils. See p. 17 to learn about the engineering properties of the soils.

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