Series 1958 No. 25 Issued February 1963

Soil Survey

Oconee County

South Carolina

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service,
In cooperation with
SOUTH CAROLINA AGRICULTURAL EXPERIMENT STATION

HOW TO USE THE SOIL SURVEY REPORT

This survey of Oconee 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; serve as a reference for students and teachers; aid foresters in managing woodland; help county planning or development boards to decide on future development of the area; and add to our knowledge of soils.

Locating the soils

Turn to the index to map sheets at the back of this report to locate areas on the large map. The index is a small map of the county on which numbered rectangles have been drawn to show what part of the county each sheet of the large map covers. When you have found the correct sheet of the large map, you will note that the soil areas are outlined and that each soil is designated by a symbol. To locate your farm on the soil map, look for roads, streams, towns, and other familiar landmarks.

All areas marked with the same symbol are the same kind of soil. Suppose, for example, an area you have located on the map has the symbol CdB. The legend for the detailed map shows that this symbol identifies Cecil sandy loam, 2 to 6 percent slopes. This soil and all others mapped in the county are described in the section "Descriptions of Soils." The Guide to Mapping Units at the back of the report gives the map symbol for each soil, the name of the soil, and the capability unit and woodland group in which it has been placed.

Finding information

Some readers will be more interested in one part of the report than in others.

Farmers and those who work with farmers will want to refer to the section "Descriptions of Soils" to learn about the soils on their farm. They can then turn to the section "Management of the Soils" to find how these soils can be managed and what yields can be expected. Within this section the soils are placed in capability units, or groups of soils that respond in about the same way. The last two parts of this section show the estimated yields of certain crops and the relative suitability of the different soils for specified crops.

Foresters and those interested in woodland and wildlife can refer to the sections "Woodland" and "Wildlife." The first tells of the hazards involved in growing trees and what yields can be expected of commercially valuable kinds of pine. The second concerns the use of the soils for growing food for wildlife and includes some suggestions for managing ponds.

Engineers will find useful information in the section "Engineering Properties of the Soils," which evaluates the mapping units in terms of soil mechanics.

Students, teachers, and other users will find information about soils and their management in various parts of the report, depending on their particular interest. Those not familiar with the county may want to refer to the section "Soil Associations," which gives a broad summary of the soils in the county. They may also want to refer to the section "Additional Facts About the County."

* * *

This soil survey was made as part of the technical assistance furnished by the Soil Conservation Service to the Oconee County Soil Conservation District. The fieldwork was completed in 1958. Unless otherwise indicated, all statements refer to conditions at the time the survey was in progress.

***Cover picture.*—Typical landscape of capability unit B10–IIIe–1. Wheat on Cecil sandy loam, 6 to 10 percent slopes, eroded. Pasture in background. Soils are suitable for construction of ponds.**

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SOIL SURVEY OF OCONEE COUNTY, SOUTH CAROLINA

REPORT BY HUGER S. BYRD, SOIL CONSERVATION SERVICE

FIELDWORK BY HUGER S. BYRD, EDWIN A. BURGESS, R. L. BISHOP, S. BRUCE ROCHESTER, W. E. JONES, JACK BENNETT, R. B. FICKLING, W. D. LEE, ALBERT H. COLE, P. W. LANGFORD, R. D. MCDILL, AND A. A. KLINGEBIEL, SOIL CONSERVATION SERVICE

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

Oconee County, "a place of springs," derived its name from its Indian heritage. Its many streams are among its greatest resources. The county is in the extreme northwestern part of the State (fig. 1). Anderson County is along its southeastern border, and Pickens County is along its eastern border. On the north it is bordered by two counties in North Carolina, and on the northwest and southwest, by five counties in Georgia. The Seneca, Keowee, and Toxaway Rivers form most of its eastern boundary; the Chattooga River, its northwestern boundary; and the Tugaloo River, its southwestern boundary. The total area of the county is 670 square miles. About 65 percent of the acreage is in forest.

Oconee County lies in three physiographic areas—the Piedmont Plateau, the foothills, and the Blue Ridge Mountains (fig. 2).

The southern part of the county, including about 42 percent of the total acreage, is in the Piedmont. In this area the drainage pattern is intricate and well defined, and the elevation averages about 690 feet. The line of demarcation between the Piedmont and the foothills is indistinct.

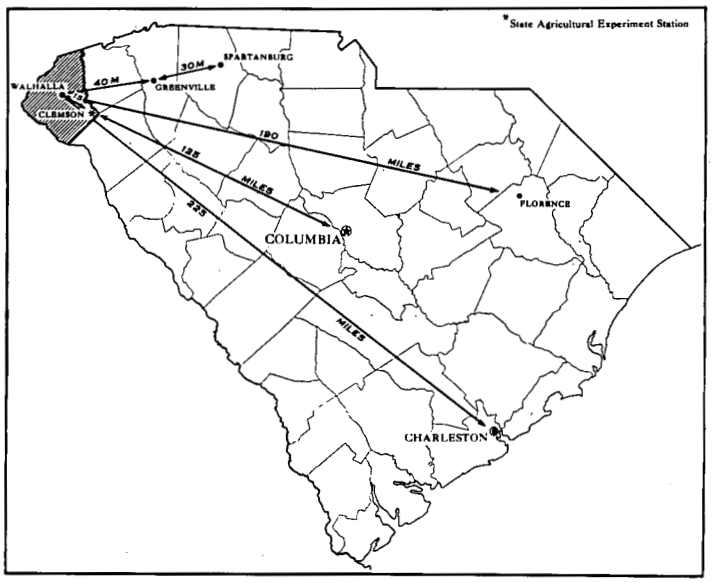

Figure 1.—Location of Oconee County in South Carolina.

The foothills extend from southwest to northeast, paralleling the Blue Ridge Mountains to the north and the Piedmont Plateau to the south (fig. 3). This area makes up about 35 percent of the county. In places the foothills join the mountains abruptly, but in other places they blend in smoothly. The elevation ranges from 780 feet to about 2,200 feet. The soils in this area generally are transitional in character between Piedmont and mountain soils. The soils on northern exposures are less eroded and have a higher organic-matter content than those on southern exposures.

The Blue Ridge Mountains make up about 23 percent of the county. They extend from southwest to northeast across the northern part. The elevation ranges from about 2,200 to 3,400 feet. Some of this area is in the Sumter National Forest (fig. 4).

Walhalla is the county seat. The county has a population of more than 40,000. Agriculture is the main occupation. The favorable climate and the variety of soils offer many opportunities for diversified farming.

How Soils are Named, Mapped, and Classified

Soil scientists made this survey to learn what kinds of soils are in Oconee County, where they are located, and how they can be used. They went into the county knowing they likely would find many soils they had already seen, and perhaps some they had not. As they traveled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug or bored many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down to the rock material that has not been changed much by leaching or by roots of plants.

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

Soils that have profiles almost alike make up a soil series.

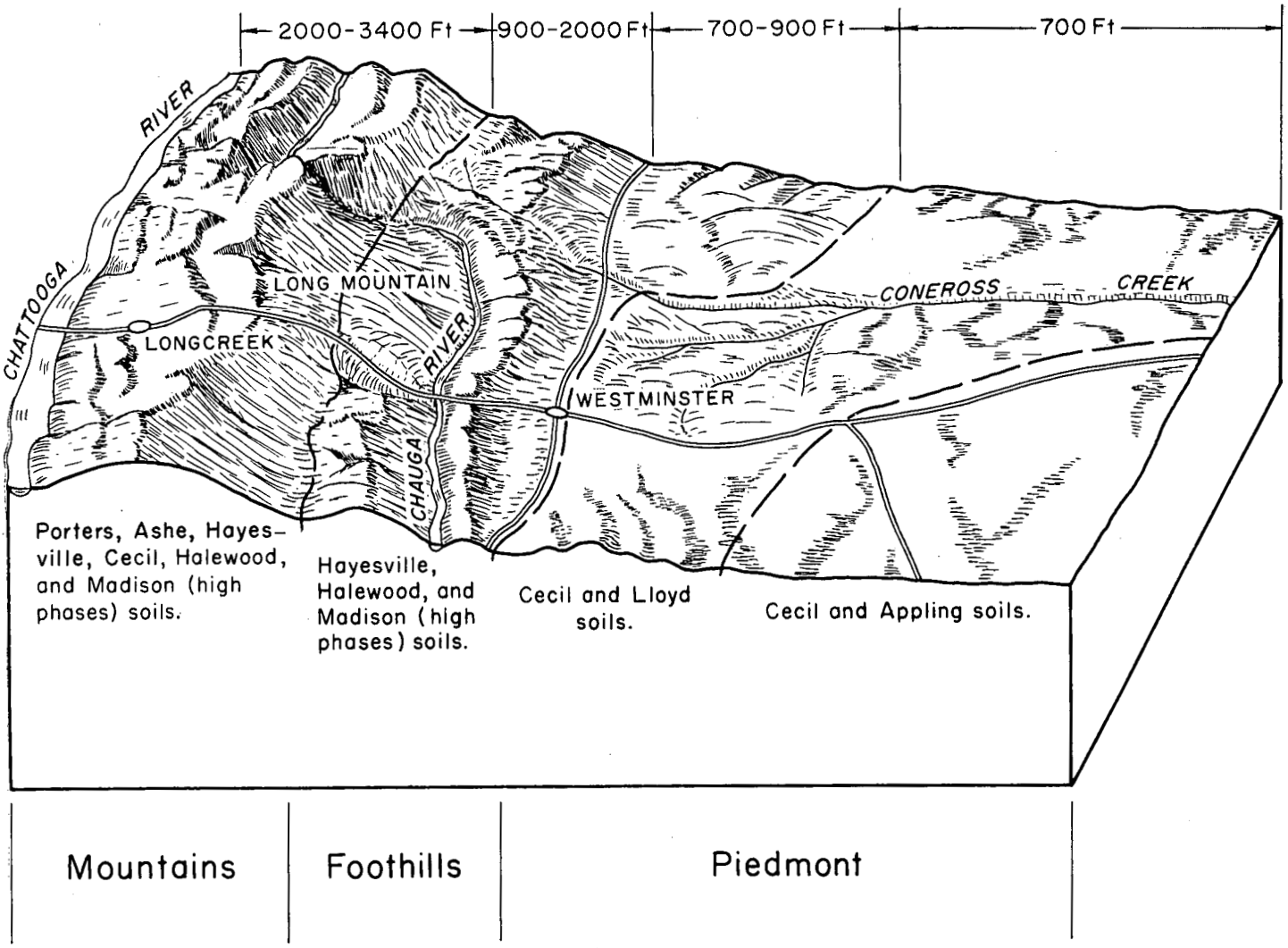

Figure 2.—**Cross section showing relation of soils to physiography in Oconee County.**

Except for different texture in the surface layer, the major horizons of all the soils of one series are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Cecil and Lloyd, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in natural characteristics.

Many soil series contain soils that differ in the texture of their surface layer. According to this difference in texture, separations called soil types are made. Within a series, all the soils having a surface layer of the same texture belong to one soil type. Cecil sandy loam and Cecil clay loam are two soil types in the Cecil series. The difference in texture of their surface layer is apparent from their names.

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

After a fairly detailed guide for classifying and naming the soils had been worked out, the soil scientists drew soil boundaries on aerial photographs. Photos are used for a base map because they show woodlands, buildings, field borders, trees, and other details that greatly help in drawing boundaries accurately. The soil map in the back of this report was prepared from the aerial photographs.

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

Occasionally, two or more recognized soils that are not regularly associated geographically may be mapped together as an undifferentiated mapping unit, if the differ-

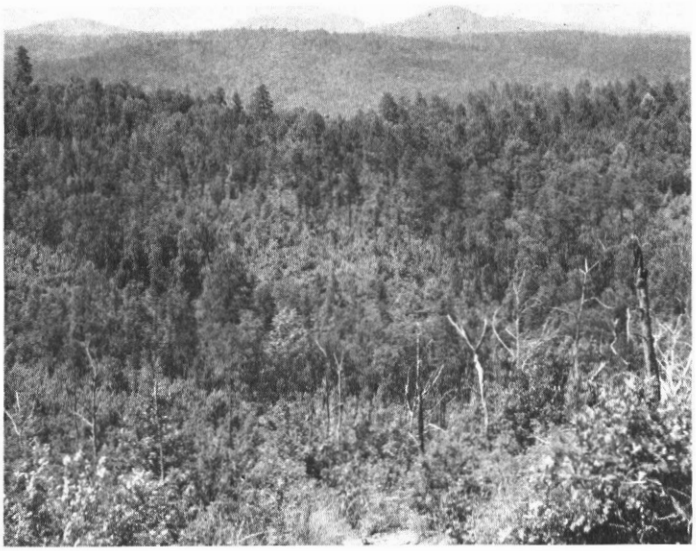

Figure 3.—**Landscape of Hayesville and Cecil fine sandy loams, 25 to 45 percent slopes; foothills blending into mountains in background.**

ences between them are too small to justify separate mapping; for example, Hayesville, Cecil, and Halewood sandy loams, shallow, 15 to 25 percent slopes. Also, in most mapping, there are areas to be shown that are so rocky, so shallow, or so frequently worked by wind and water that they cannot be called soils. These areas are shown on a soil map like other mapping units, but they are given descriptive names, such as Gullied land or Stony land, and are called land types rather than soils.

Only part of the soil survey was done when the soil scientist had named and described the soil series and mapping units and had shown the location of the mapping units on the soil map. The mass of detailed information he had recorded then needed to be presented in different ways for different groups of users, among them farmers, managers of woodlands, and engineers.

To do this efficiently, he had to consult with persons in other fields of work and jointly with them prepare groupings that would be of practical value to different users. Such groupings are the capability classes, subclasses, and units, designed primarily for those interested in producing short-lived crops and tame pasture; woodland suitability groups, for those who need to manage wooded tracts; and the classifications used by engineers who build highways or structures to conserve soil and water.

Soil Associations

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

The soils within any one association are likely to differ greatly among themselves in some properties; for example, slope, depth, stoniness, or natural drainage. Thus, the general map does not show the kind of soil at any particular place, but a pattern that has in it several kinds of different soils.

The soil associations are named for the major soil series in them, but, as already noted, soils of other series may also be present. The major soil series of one soil association may also be present in other associations but in a different pattern.

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

1. Cecil association

Deep, well-drained, gently sloping to sloping soils that have red subsoil

The soils in this association are on the uplands in the Piedmont section. They make up 18.9 percent of the county and are mostly in the southern and eastern parts. The slope range is 2 to 10 percent. In many large areas the slope is only 4 to 5 percent, and these areas are well suited to mechanized farming. The steeper and shorter slopes are adjacent to streams.

The Cecil soils are dominant. They developed in residuum derived from granite and gneiss and are moderately permeable. The surface layer characteristically is grayish-brown to very dark brown, friable sandy loam. The subsoil is red sandy clay loam to clay loam. The parent material is deeply weathered, and the depth to bedrock generally is more than 25 feet.

Local alluvial land is in depressions and along the base of slopes, and Worsham soils are around the heads of drains. Their combined acreage is small.

About 85 percent of this soil association is used for farming. The soils are among the best in the county for agriculture. They are suited to most crops commonly grown in the area and are intensively farmed. Management practices generally are good. Fertility of the soils is moderately high, and they are medium acid.

The principal crops are cotton, corn, small grain, and lespedeza. Yields generally are high. Beef cattle and dairy cattle are also important. Truck crops and poultry provide an additional source of income.

Erosion is a hazard, mainly because the soils are sloping. Some areas that have been used too intensively for row crops are severely eroded.

2. Lloyd association

Deep, well-drained, gently sloping to sloping soils that have dark-red subsoil

The soils in this association make up 16.1 percent of the county and are on the uplands in the Piedmont section. They are well suited to mechanized farming. The slope range is 2 to 10 percent, except for some steep slopes adjacent to drainageways.

The Lloyd soils are dominant. They developed in residuum derived from basic rock, mainly hornblende that

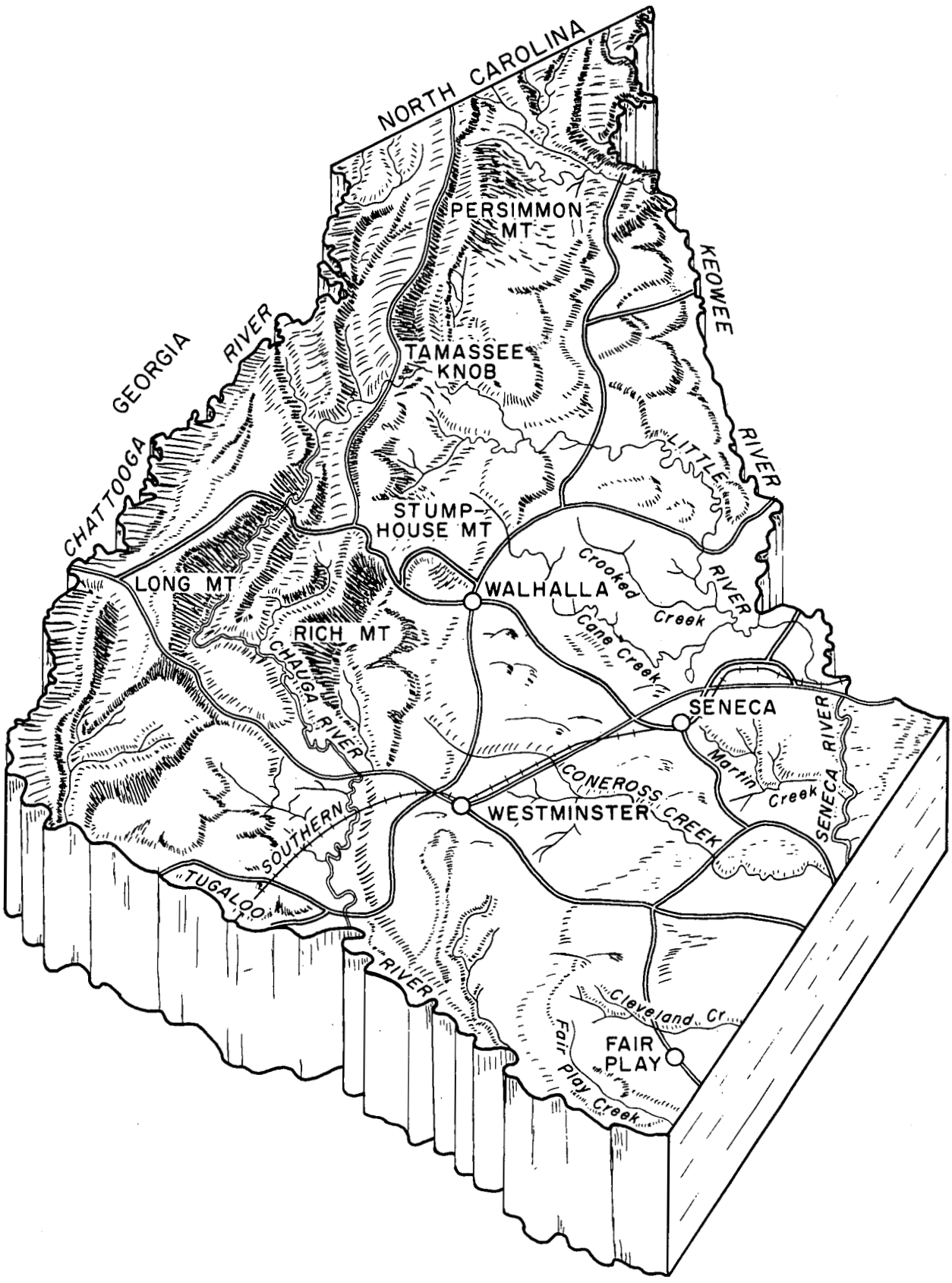

Figure 4.—**Relief map of Oconee County.**

contains a mixture of diorites. They have a surface layer of friable sandy loam and a moderately permeable, dark-red, clayey subsoil that is relatively high in moisture-holding capacity. The depth to bedrock generally is more than 10 feet.

The Cecil and Appling soils make up 3 to 5 percent of the association. These soils developed in residuum derived from granite, gneiss, and schist. In the Cecil soils the subsoil is red, and in the Appling soils it is yellowish brown to yellowish red. There are some poorly drained Worsham soils around the heads of small drains.

Most of the acreage is in capability classes II and III. More than 70 percent of the acreage is cleared. The farms are about 80 acres in size and are mostly general farms. There are other types of farms, including poultry and livestock farms. The steeper slopes are used mainly for woodland and pasture.

3. *Cecil-Appling association*

Deep, well-drained, gently sloping to sloping soils that have red to yellowish-brown subsoil

The soils in this association are on the uplands in the Piedmont section. They make up 1.8 percent of the county. They are moderate in permeability, moderate in moisture-holding capacity, and low in organic-matter content. The reaction is strongly acid.

The Cecil and Appling soils are dominant. These soils developed in residuum derived from granite and gneiss. Their surface layer is friable and is easily tilled. In the Cecil soils the subsoil is red, and in the Appling soils it is yellowish brown. The depth to bedrock generally is more than 30 feet.

Local alluvial land and Worsham soils make up about 0.5 percent of the association. Local alluvial land is in depressions and at the base of slopes, and Worsham soils are adjacent to the head of streams.

The soils of this association respond to good management, and about 80 percent of the acreage is used for general farming. Farms are about 80 acres in size, and little of the acreage is idle. The principal crops are cotton, corn, small grain, lespedeza, and pasture plants.

Complete water-control systems are needed in this area because of the serious erosion hazard. Some of the steeper slopes adjacent to drainageways are severely eroded and are now used for woodland or pasture.

4. *Cecil-Lloyd association*

Deep, well-drained, gently sloping to sloping soils that have red and dark-red subsoil

The soils in this association are on broad uplands in the Piedmont section. They make up 4.4 percent of the county. The slope generally is less than 10 percent, but some shorter, steeper slopes border the well-defined drainageways that dissect the area.

The Cecil and Lloyd soils are dominant. Their surface layer generally is sandy loam, but in severely eroded areas it is clay loam. The Cecil soils developed in residuum derived from granite and gneiss and have red, clayey subsoil. The Lloyd soils developed in residuum derived from hornblende gneiss mixed with diorite and have dark-red, clayey subsoil. The depth to bedrock generally is more than 12 feet.

Local alluvial land and Worsham soils make up about 8 percent of the association. Local alluvial land occurs in draws and depressions and is well drained. The Worsham soils are adjacent to small drainageways and are poorly drained.

Most of the soils of this association are in capability subclasses IIe and IIIe, but some are in subclasses IVe, VIe, and VIIe. About 70 percent of the acreage is cleared. The farms are about 80 acres in size, and most are operated by the owners. Most farming is of the general type. The soils are moderately fertile and are used extensively to grow cotton, corn, small grain, and pasture.

The hazard of erosion is moderate to severe because of the slope and the amount of precipitation. The supply of pure water is more than sufficient for both domestic and industrial needs.

5. *Talladega-Madison (high phases) association*

Excessively drained soils on narrow ridges and on steep to very steep, broken slopes; and well-drained soils on broad ridgetops and more gentle slopes

The soils in this association make up about 9.5 percent of the county. They extend in a discontinuous pattern across the foothills and mountains from the southwestern part of the county to the northeastern part.

The Talladega soils and the Madison (high phases) soils are dominant. These soils formed in material derived mainly from schist and phyllite. The excessively drained Talladega soils have steeper slopes than the Madison. They are shallow and have little or no subsoil development. The well-drained Madison (high phases) soils are deeper than the Talladega and have a distinct subsoil of yellowish-red clay loam.

Local alluvial land makes up about 0.4 percent of the association. It is in slight depressions and along the base of slopes. This soil formed in material washed from soils at higher elevations.

Most of the acreage of the Talladega soils is in forest and should remain in forest. The growth of trees, however, is slow, and windthrow is a hazard.

Only about 15 percent of the acreage of the Madison soils is cleared. Large wooded tracts are common. Farms are 40 to 150 acres in size. Except for cotton, most of the general farm crops are grown. Many gently sloping areas now in woods could be used for crops, including corn, small grain, and forage and pasture crops, or could be used for orchards. Apple orchards do well in some areas.

6. *Ashe-Hayesville-Cecil-Halewood association*

Shallow to moderately deep, well-drained to excessively drained soils in moderately steep to steep areas

The soils in this association make up about 2.7 percent of the county. They occur mostly in the northeastern part.

The excessively drained Ashe soils and the well-drained Cecil, Hayesville, and Halewood soils in this area are generally shallow and have a thin subsoil. The moisture-holding capacity is low, and fertility is low.

Most of the acreage is in forest, but the growth of trees is slow. Windthrow is a serious hazard. Roads are difficult to construct because of rocks and rock outcrops.

7. *Porters-Halewood association*

Shallow to moderately deep, well-drained soils in very steep, rough, broken areas; yellowish-brown to dark-brown subsoil

The soils in this association make up 1.7 percent of the county and are in the northern part.

The Porters and Halewood soils are dominant. They developed mainly in residuum derived from granite and gneiss and in a cooler climate with more abundant rainfall than many of the other soils in the county. They commonly have a dark brown or very dark brown surface soil. The Porters soils ordinarily are on northern slopes. They generally have a strong-brown or dark-brown subsoil, whereas the Halewood soils have a yellowish-brown subsoil.

The organic-matter content is high, infiltration is moderately high, permeability is moderately rapid, the moisture-holding capacity is moderate, and fertility is relatively high.

Because of the steep, broken topography, the soils in this association are best suited to trees. The parent material generally is deeply weathered. Consequently, the site index for pine and hardwoods is high. Hardwoods predominate, except in areas that have been subjected to fire.

Fire prevention is important in these almost inaccessible areas. The understory of rhododendron and mountain-laurel helps to reduce the intensity of fires. Where this protective cover is destroyed, erosion is a hazard. This area has an abundant supply of pure water.

8. *Hayesville-Cecil-Halewood association*

Moderately shallow to deep, well-drained soils in gently sloping to steep areas; red to yellowish-brown subsoil

The soils in this association make up 41.2 percent of the county. They extend from the southwestern part to the northeastern part and are on the foothills and mountains in the northern half of the county (fig. 5).

The soils developed in residuum weathered from granite and gneiss. The Hayesville and Cecil soils have a red subsoil, and the Halewood soils have a yellowish-brown subsoil. The depth to bedrock ranges from 10 to 40 feet but generally is about 20 feet.

Rainfall normally is more abundant and better distributed than in the lower areas. The soils are relatively fertile and respond to good management.

Only about 19 percent of the acreage is cleared. The principal crops are corn, small grain, and pasture crops. Many areas now in forest are gently sloping. They could be cleared and farmed.

9. *Congaree-Mixed alluvial land association*

Well-drained soils on flood plains

The soils in this association make up 3.7 percent of the county. They occur on narrow first bottoms along the larger streams and are subject to occasional flooding.

The Congaree soils and Mixed alluvial land are dominant. The Congaree soils have a medium-textured surface layer that is underlain by yellowish-brown fine sandy loam. Mixed alluvial land consists of recent alluvium of various textures, but it is mostly silt loam to sandy loam.

***Figure 5.*—The Hayesville-Cecil-Halewood watershed area is well protected by trees. The Toxaway River is one of many streams contributing to the water resources of the county.**

The Chewacla soils occur in the somewhat poorly drained areas, and Mixed wet alluvial land is in the poorly drained areas on the flood plains.

More than 80 percent of the acreage in this association is cleared. Most of it is in capability subclass IIw. The soils are among the most productive in the county, and corn is one of the principal crops. Moisture conditions are favorable for most crops.

Management of the Soils

This section has two main parts. In the first, the kinds of soils mapped in the county are placed in capability units. Most of the capability units consist of several soils that are similar; others are made up of only one soil.

In the second part, there are two tables. One shows the estimated average acre yields of certain crops grown on each soil under two levels of management, and the other rates each soil in the county according to its suitability for specified crops.

Capability Groups of Soils

The capability classification is a grouping of soils that shows, in a general way, how suitable they are for most kinds of farming. It is a practical grouping based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment.

In this system all the kinds of soil are grouped at three levels—the capability class, the subclass, and the unit. The eight capability classes in the broadest grouping are designated by Roman numerals I through VIII. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used.

The soils in the other classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, shallow, or otherwise limited that they do not produce worthwhile yields of crops, grazing, or wood products.

The subclasses indicate major kinds of limitations within the classes. Within most of the classes there can be up to four subclasses. The subclass is indicated by adding a small letter *e*, *w*, *s*, or *c* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* means that water in or on the soil will interfere with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the country, indicates that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few or no limitations. Class V can contain, at the most, only subclasses *w*, *s*, and *c*, because the soils in it have little or no erosion hazard but have other limitations that limit their use largely to pasture, range, woodland, or wildlife.

Within the subclasses are the capability units, groups of soils enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping of soils for many statements about their management. Capability units are generally identified by numbers assigned locally, for example, IIe–1 or IIIe–2.

Soils are classified in capability classes, subclasses, and units according to the degree and kind of permanent limitations, but without consideration of major and generally expensive land-forming that would change the slope, depth, or other characteristics of the soils; and without consideration of possible but unlikely major reclamation projects.

The eight classes in the capability system, and the subclasses and units in Oconee County, are described in the list that follows.

Two National Soil Resource areas are represented in the county, B10 and B13. B10 includes the soils that are in the Piedmont section, and B13 those that are in the mountains. These symbols, B10 and B13, precede the capability symbols in the list that follows.

Class I. Soils that have few limitations that restrict their use.
- Unit B10–I–1. Deep, well-drained, nearly level soils in draws and depressions.
- Unit B10–I–3. Deep, well-drained, nearly level soils on second bottoms or low terraces.

Class II. Soils that have some limitations that reduce the choice of plants or require moderate conservation practices.
- Subclass IIe. Soils that have a moderate risk of erosion if they are not protected.
  - Unit B10–IIe–1. Deep, well-drained, gently sloping soils that are moderately permeable.
  - Unit B10–IIe–2. Deep, moderately well drained soils that are moderately slow in permeability.
  - Unit B13–IIe–2. Moderately deep, well-drained, gently sloping soils on foothills and mountains.
  - Unit B13–IIe–3. Moderately deep, well-drained, gently sloping soils that have a firm, clayey subsoil.
- Subclass IIw. Soils that have moderate limitations because of excess water.
  - Unit B10–IIw–2. Deep soils on first bottoms and low terraces, mostly along large streams.

Class III. Soils that have severe limitations that reduce the choice of plants, or require special conservation practices, or both.
- Subclass IIIe. Soils that have a severe risk of erosion if they are cultivated and not protected.
  - Unit B10–IIIe–1. Deep, gently sloping and sloping soils with a clayey upper subsoil that is subject to compaction.
  - Unit B10–IIIe–2. Deep, sloping soils that have a clayey lower subsoil that restricts the percolation of water.
  - Unit B13–IIIe–2. Moderately deep, sloping soils on broad ridges in the foothills and mountains.
  - Unit B13–IIIe–3. Moderately deep, sloping soils on ridges and mountain uplands.
- Subclass IIIw. Soils that have severe limitations because of excess water.
  - Unit B10–IIIw–2. Nearly level, moderately deep soils that have a well-drained surface layer and a poorly drained subsoil.
- Subclass IIIs. Soils that have severe limitations of moisture capacity or tilth.
  - Unit B10–IIIs–1. Deep, droughty, sandy soils on wide flood plains.

Class IV. Soils that have very severe limitations that restrict the choice of plants or require very careful management, or both.
- Subclass IVe. Soils that have a very severe risk of erosion if they are cultivated and not protected.
  - Unit B10–IVe–1. Deep, droughty, sloping and moderately steep soils that have poor tilth.
  - Unit B13–IVe–1. Moderately deep, moderately steep and steep soils that are moderately rapid in permeability.
  - Unit B13–IVe–2. Moderately deep soils that are moderately permeable.
- Subclass IVw. Soils that have very severe limitations for cultivation because of excess water.
  - Unit B10–IVw–1. Poorly drained soils subject to frequent overflow.

Class V. Soils that have little or no erosion hazard but have other limitations that are impractical to remove without major reclamation and that limit their use largely to pasture, range, woodland, or wildlife food and cover.
- Subclass Vw. Soils too wet for cultivation; drainage or protection not feasible.
  - Unit B10–Vw–1. Moderately deep soils that commonly have good surface drainage but poor internal drainage and that generally receive runoff from adjacent, higher areas.

Class VI. Soils that have severe limitations that make them generally unsuitable for cultivation and limit their use largely to pasture, range, woodland, or wildlife food and cover.
- Subclass VIe. Soils severely limited, chiefly by risk of erosion if protective cover is not maintained.

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Unit B13–VIe–1. Moderately deep soils that are steep to very steep.
Unit B10–VIe–2. Deep soils that are too steep or too eroded for cultivation.
Unit B13–VIe–2. Shallow, droughty, moderately steep to steep soils.

Class VII. Soils that have very severe limitations that make them unsuitable for cultivation without major reclamation and that restrict their use largely to grazing, woodland, or wildlife.
Subclass VIIe. Soils very severely limited, chiefly by risk of erosion if protective cover is not maintained.
Unit B10–VIIe–1. Mostly deep, rolling to steep soils or severely gullied soils that have rapid runoff.
Unit B13–VIIe–1. Moderately deep, steep to very steep soils on foothills and mountains.
Unit B13–VIIe–2. Shallow, steep to very steep soils that have hard rock near the surface.

Class VIII. Soils and landforms that have limitations that preclude their use, without major reclamation, for commercial production of plants and restrict their use to recreation, wildlife, water supply, or esthetic purposes. (There are no class VIII soils in Oconee County.)

In the following pages, each capability unit is described, the soils in each are listed, and some suggestions for use and management are given.

Capability unit B10–I–1

This unit consists of one miscellaneous land type, Local alluvial land. The total area is 1,729 acres. This land type occurs in shallow draws and depressions. It consists of deep, well-drained, fertile, moderately permeable loam and sandy loam.

This land type is highly productive. It is particularly desirable for home gardens (fig. 6) and can be used continuously for row crops if enough fertilizer and lime are applied. Well-suited crops include truck crops, corn, cotton, small grain, common lespedeza, sericea lespedeza, alfalfa, and the pasture grasses and clovers commonly grown in the county. The site index for pine trees is high.

***Figure 6.*—Local alluvial land, in foreground, is particularly desirable for home gardens.**

Capability unit B10–I–3

There is only one soil in this capability unit, State fine sandy loam. The total area is 334 acres. This soil is deep and well drained. It occurs on second bottoms and low terraces and is seldom flooded. The slope range is 0 to 2 percent. The surface layer to a depth of about 18 inches is very friable fine sandy loam. The subsoil is friable, premeable loam.

This soil is medium in organic-matter content, relatively high in fertility, and medium acid to slightly acid. The rate of infiltration is moderate, and the moisture-holding capacity is moderate. Tilth is excellent.

This is one of the most productive soils in the county. Under good management, it can be used continuously for row crops. Suitable crops include corn, cotton, soybeans, small grain, grain sorghum, common lespedeza, sericea lespedeza, grapes, truck crops, and all the grasses and legumes locally grown.

Capability unit B10–IIe–1

This unit consists of deep, well-drained, gently sloping soils in the Piedmont. The total area is 26,266 acres. These soils have a dark grayish-brown to dark reddish-brown surface layer that is 4 to 10 inches thick. They have a red to dark-red, moderately permeable subsoil that is predominantly clay loam but ranges to clay. The soils in this unit are—

Cecil sandy loam, 2 to 6 percent slopes.
Cecil sandy loam, 2 to 6 percent slopes, eroded.
Davidson loam, 2 to 10 percent slopes, eroded.
Hiwassee sandy loam, 2 to 6 percent slopes, eroded.
Lloyd sandy loam, 2 to 6 percent slopes, eroded.
Wickham sandy loam, 2 to 6 percent slopes.
Wickham sandy loam, 2 to 6 percent slopes, eroded.

These soils are moderate in fertility, high in moisture-holding capacity, and moderately high in rate of infiltration.

The soils in this unit are well suited to cotton, corn, small grain, pimiento peppers, Turkish tobacco, grain sorghum, forage crops including alfalfa, and pasture plants. Because of the moderate hazard of erosion, however, row crops should be grown in strips on the contour or in terrace intervals, and close-growing crops should be grown on half the acreage each year. For example, row crops can be grown on half the contour strips, and small grain overseeded with lespedeza on the alternate strips. Then, the following year reverse the crops. Small fields can be planted entirely to row crops if small grain and lespedeza are seeded the next year.

Crops respond to lime and fertilizer. Enough crop residues should be left to supply a moderate amount of organic matter. All drainageways should be kept in permanent sod.

Capability unit B10–IIe–2

This unit consists of deep, moderately well drained soils. These soils total 1,558 acres. Their surface layer is friable sandy loam, and their subsoil is yellowish-brown to yellowish-red sandy clay loam. Infiltration is moderate, but permeability is moderately slow. There

is some mottling in the lower part of the subsoil. The soils in this unit are—

Altavista sandy loam, 0 to 6 percent slopes, eroded.
Appling sandy loam, 2 to 6 percent slopes.
Appling sandy loam, 2 to 6 percent slopes, eroded.

These coarse-textured soils are more easily tilled than the soils in capability unit B10–IIe–1 but are lower in moisture-holding capacity. They require more fertilizer and organic matter. Erosion is a moderate hazard.

The soils in this unit are well suited to truck crops, cotton, corn, sweetpotatoes, soybeans, grapes, grain sorghum, and small grain. They are not well suited to alfalfa and are only moderately well suited to clover. Bahiagrass, tall fescue, and Coastal bermudagrass are suitable pasture plants.

Rotations should keep half the acreage in close-growing crops. Crops can be grown in contour strips so as to have row crops in half the strips and close-growing crops, such as small grain topseeded with lespedeza, in the alternate strips. Another system is to grow cotton on half the acreage and small grain and lespedeza on the other half the first year, then reverse these crops the following year (fig. 7). Contour stripcropping is preferred, however, because it provides the needed cover to disperse runoff. All water outlets and drainageways should be in permanent sod.

Traffic pans often develop, as a result of compaction. Subsoiling or growing deep-rooted perennials in the cropping system will help to break the pans.

Capability unit B13–IIe–2

This unit consists of moderately deep, well-drained, gently sloping soils on foothills and mountains (fig. 8). The total area of these soils is 1,756 acres. Their surface layer is friable fine sandy loam and is 4 to 10 inches thick. Their subsoil is firm to friable fine sandy clay loam to clay loam. The soils in this unit are—

Halewood fine sandy loam, 2 to 6 percent slopes.
Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes.
Watauga fine sandy loam, 2 to 6 percent slopes, eroded.

These soils are moderate in infiltration and are moderately rapid in permeability. They are moderately fertile and easily tilled. The organic-matter content is moderately high, and the moisture-holding capacity is moderate. Erosion is only a moderate hazard, although rainfall is higher in this area than in the Piedmont.

Figure 7.—**Contour strips of corn and cotton, following small grain and lespedeza, on Appling sandy loam, 2 to 6 percent slopes.**

Figure 8.—**Topographic view of Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes. Mountains in background.**

Suitable crops include corn, grain sorghum, small grain, apples, truck crops, alfalfa, cowpeas, grapes, and pasture plants. Cotton can be grown at the lower elevations along the southern border of the foothills.

Rotations should keep half the acreage in close-growing crops. Contour stripcropping is advisable because of the erosion hazard. Row crops can be grown in half the strips, and close-growing crops in the alternate strips. Then, reverse the crops the following year. All draws should be kept in close-growing plants. They can be seeded to hay crops.

Fertilizer and lime should be applied according to crop needs and soil tests.

Capability unit B13–IIe–3

There is only one soil in this capability unit, Madison fine sandy loam, high, 2 to 6 percent slopes. The total area is only 156 acres. This moderately deep, well-drained soil occurs under a forest cover on foothills and mountains, mainly on gently sloping uplands and ridges (fig. 9). It developed from residuum derived chiefly from talcose, chloritic, and mica schists. The surface layer of very dark grayish-brown, friable sandy loam is 8 to 10 inches thick. It is underlain by red, firm but brittle clay. Included are some areas that have a loam surface layer.

Rainfall is relatively high and is well distributed throughout the growing season. The organic-matter content is moderate, the moisture-holding capacity is moderate, and the reaction is medium acid.

This soil is well suited to corn, small grain, apples, grapes, grain sorghum, and pasture plants. It is fairly well suited to common lespedeza, clover, alfalfa, and truck crops. Moderate to moderately high yields can be expected. Fertilizer and lime should be applied according to crop needs and soil tests.

Because of the moderate erosion hazard, half the cultivated acreage should be kept in close-growing crops. Crops should be grown in contour strips and rotated. All draws should be in close-growing vegetation.

Figure 9.—**Pine and hardwoods on Madison fine sandy loam, high, 2 to 6 percent slopes. Good ground cover protects surface layer from erosion.**

This soil is well suited to wildlife plantings. Many sites are suitable for ponds that can be used for wildlife, irrigation, or recreation.

Capability unit B10–IIw–2

This unit consists of deep, well-drained soils on first bottoms and low terraces, mostly along the larger streams. The soil material was transported by floods from areas within the watershed. The slope range is 0 to 3 percent. The total area is 17,763 acres. The soils in this unit are—

Congaree fine sandy loam.
Congaree silt loam.
Mixed alluvial land.

These soils are occasionally flooded. The floods deposit mineral material and thereby help to maintain fertility at a relatively high level.

These soils are desirable for home gardens. They are well suited to corn, peas, beans, truck crops, pasture grasses, grain sorghum, potatoes, and small grain. They are particularly well suited to crops that have high moisture requirements. Crops are seldom lost because of drought, but an occasional crop loss from flooding is to be expected. Yields generally are adequate, however, to compensate for this loss.

Row crops can be grown continuously without hazard of erosion, but either green-manure crops or crops that leave enough residue to maintain the organic-matter content should be grown occasionally. Moderate amounts of fertilizer are needed. The reaction is medium acid.

Capability unit B10–IIIe–1

This unit consists of deep, well-drained, moderately permeable soils in the Piedmont section. Most of these soils developed in residuum derived from granite, gneiss, hornblende gneiss, and quartz mica schist. A few developed in alluvial deposits on terraces along streams. The surface layer is sandy loam to clay loam. The subsoil commonly is yellowish-red to dark-red clay loam but ranges to clay. The upper part is subject to compaction. These soils occupy 37,015 acres. They are—

Cecil clay loam, 2 to 6 percent slopes, severely eroded.
Cecil sandy loam, 6 to 10 percent slopes.
Cecil sandy loam, 6 to 10 percent slopes, eroded.
Hiwassee sandy loam, 6 to 10 percent slopes, eroded.
Lloyd clay loam, 2 to 6 percent slopes, severely eroded.
Lloyd clay loam, 6 to 10 percent slopes, severely eroded.
Lloyd sandy loam, 6 to 10 percent slopes.
Lloyd sandy loam, 6 to 10 percent slopes, eroded.
Madison sandy loam, 6 to 10 percent slopes, eroded.
Wickham sandy loam, 6 to 10 percent slopes, eroded.

The soils in this unit are moderate in moisture-holding capacity, low in organic-matter content, and strongly acid.

These soils are well suited to cotton, pimiento peppers, small grain, cowpeas, lespedeza, corn, forage crops, pasture mixtures, and grain sorghum and are fairly well suited to alfalfa and truck crops.

About 65 percent of the acreage has been cleared. Two-thirds of the cultivated acreage should be kept in close-growing crops because of the severe erosion hazard. Crops should be grown in contour strips and rotated. Other means of controlling erosion include diversion terraces, lateral terraces, vegetated waterways, and W-type ditches.

Traffic pans commonly develop as a result of compaction by heavy equipment. Occasional deep tillage and the growing of deep-rooted legumes help to break the pans.

Fertilizer and lime should be applied according to crop needs and soil tests. Boron generally is applied when alfalfa is initially seeded. The organic-matter content should be maintained at a relatively high level, particularly in the soils having a clay loam texture.

Capability unit B10–IIIe–2

There is only one soil in this capability unit, Appling sandy loam, 6 to 10 percent slopes, eroded. This deep, well-drained soil makes up 675 acres in the Piedmont section. It has lost about half of the original surface layer through erosion. The present surface layer, however, is still a friable sandy loam and is from 3 to 7 inches thick. The red, clayey subsoil is firm but friable. The lower part of the subsoil is very dense and is moderately slow in permeability. Consequently, in periods of heavy rainfall, this soil becomes waterlogged, runoff becomes excessive, and the hazard of erosion is severe. The rate of infiltration is moderate, the organic-matter content is low, and the reaction is medium acid.

This soil is well suited to truck crops and fairly well suited to row crops, small grain, bermudagrass, bahiagrass, sericea lespedeza, and other hay crops. It is poorly suited to alfalfa because of the tendency of the subsoil to become waterlogged.

Two-thirds of the acreage should be kept in close-growing crops because of the severe erosion hazard. Crops should be grown in contour strips and rotated. In many places terraces with graded rows are essential.

Rotations should include crops that supply enough residue to maintain the organic-matter content at a relatively high level. Fertilizer and lime should be applied according to crop needs and soil tests.

This soil is fairly well suited to loblolly pine and Virginia pine. Bicolor lespedeza and grain sorghum can be planted along the borders of fields and in open spaces in wooded areas to provide food and cover for wildlife. The soil material is suitable for the construction of ponds.

Capability unit B13–IIIe–2

This unit consists of well-drained, moderately deep soils that generally occur on broad ridges in the foothills and mountains. These soils occupy 8,262 acres. Their surface layer is 3 to 10 inches thick and is friable fine sandy loam. Their subsoil is firm to friable fine sandy clay loam to clay loam. The soils in this unit are—

Halewood fine sandy loam, 6 to 10 percent slopes, eroded.
Hayesville and Cecil fine sandy loams, 6 to 10 percent slopes.
Hayesville and Cecil fine sandy loams, 6 to 10 percent slopes eroded.
Watauga fine sandy loam, 6 to 10 percent slopes, eroded.

These soils are moderately high in organic-matter content, relatively high in rate of infiltration, moderately rapid in permeability, and medium acid. Generally, they are only moderate in water-holding capacity. The hazard of erosion is moderately severe.

Suitable crops include corn, grain sorghum, small grain, apples, truck crops, alfalfa, cowpeas, grapes, tall fescue, sericea lespedeza, bermudagrass, and clover. Orchardgrass is suited to the mountainous areas.

About 50 percent of the acreage is in forest, and the rest is in crops (fig. 10). Because of the moderately severe erosion hazard, two-thirds of the cultivated acreage should be in close-growing crops. Crops should be planted in contour strips and rotated. All drainageways should be in close-growing perennial vegetation.

There are many good sites for ponds. Bicolor lespedeza can be planted along field borders and in open spaces in wooded areas for wildlife food and cover.

Capability unit B13–IIIe–3

This unit consists of moderately deep, well-drained soils on the foothills and mountains. The total area is 1,755 acres. The surface layer of very dark grayish-brown, friable fine sandy loam is 3 to 10 inches thick. It is underlain by red, friable clay loam. The soils in this unit are—

Madison fine sandy loam, high, 6 to 10 percent slopes.
Madison fine sandy loam, high, 6 to 10 percent slopes, eroded.

These soils are only moderately fertile. They are moderate in moisture-holding capacity, moderate in organic-matter content, moderate in infiltration, and moderate in permeability. The reaction is medium acid. Rainfall is relatively high and is well distributed throughout the growing season. The high rate of rainfall increases the erosion hazard but helps to compensate for the limited capacity for storage of water.

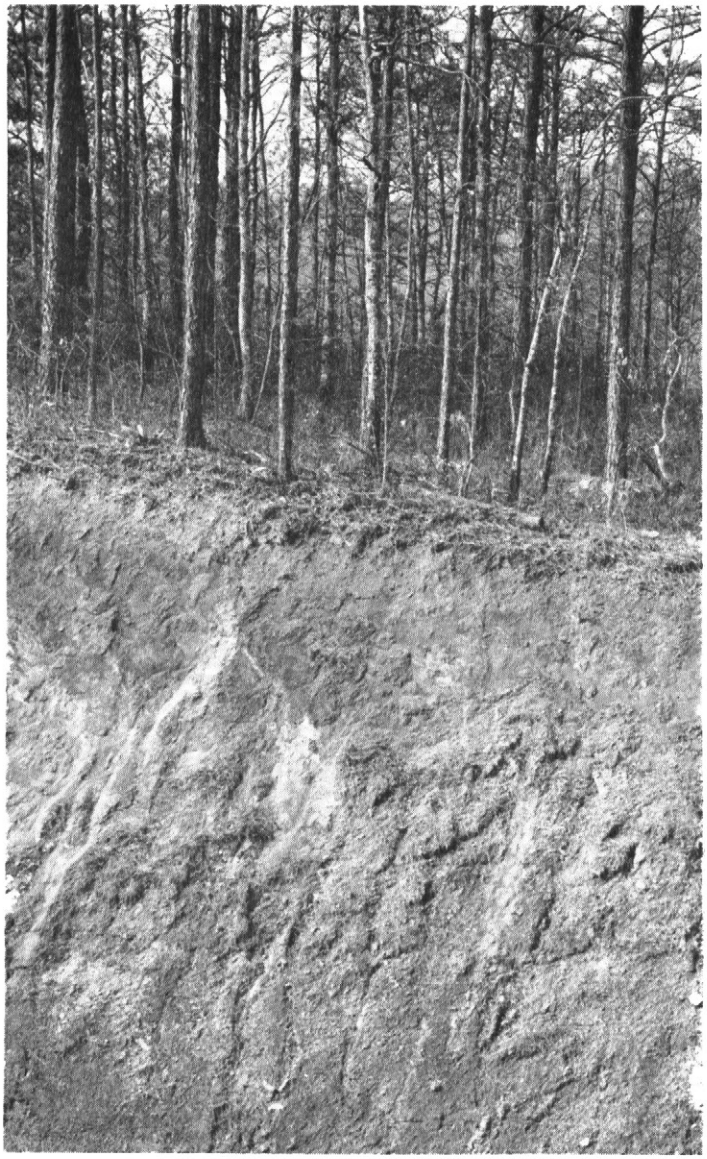

Figure 10.—**Second-growth shortleaf pine on Hayesville and Cecil fine sandy loams, 6 to 10 percent slopes. Parent material is deeply weathered.**

Well-suited crops include corn, grain sorghum, small grain, apples, grapes, and pasture grasses. Lespedeza, clover, alfalfa, and truck crops are fairly well suited. Crops respond to fertilizer and lime. Under good management, moderate to moderately high yields can be expected.

About 50 percent of the acreage is used for agriculture. Because of slope and the moderate rate of permeability, erosion is a moderately severe hazard. Two-thirds of the cultivated acreage should be kept in close-growing crops. Crops should be planted in contour strips and rotated. The strips should be narrower than those on soils that are more permeable or that have less rainfall. Apple orchards should be planted on the contour and should have a permanent ground cover. All draws should be kept in close-growing perennial vegetation.

These soils are suitable for ponds. Field borders can be planted to bicolor lespedeza for wildlife food and cover.

Capability unit B10-IIIw-2

The one soil in this capability unit, Chewacla silt loam, has a total area of 3,013 acres. It is a nearly level, moderately deep soil on first bottoms along large streams. The surface layer is well drained, but the subsoil is a mottled, fine-textured clay or loam that has been poorly drained for a long time. The moisture-holding capacity is high, and the reaction is strongly acid.

This soil has a high water table and is subject to frequent overflow. Without supplemental drainage, it is only fairly well suited to corn, pasture grasses, and small grain. With supplemental drainage, good yields of corn, grain sorghum, and pasture grasses, can be expected, and moderate yields of small grain.

Even with supplemental drainage, however, this soil will be subject to overflow. This hazard can be lessened by improvement of the stream channels and by the flood-control measures provided under the watershed development program. If the flood hazard is controlled, this soil can be used continuously for row crops.

Capability unit B10-IIIs-1

There is only one soil in this capability unit, Buncombe loamy sand. Its total area is 475 acres. This deep, droughty, sandy soil occurs mainly on bottom lands at bends along large streams. It consists of recent coarse-textured alluvium deposited by relatively swift currents. It has little or no profile development. The underlying material ranges from excessively drained, coarse-textured, gravelly sand to poorly drained, fine-textured material. The slope range is 0 to 6 percent. The depth to the water table ranges from 4 to 12 feet. Permeability is rapid, infiltration is rapid, the organic-matter content is low, and the moisture-holding capacity is low. The reaction is medium acid.

About two-thirds of the acreage is in forest, and the rest is in crops. Although this soil is only mildly subject to erosion, it is excessively leached and is low in fertility. It is only fairly well suited to truck crops, corn, beans, apples, bermudagrass, sudangrass, sericea lespedeza, bicolor lespedeza, cowpeas, rye, fescue, and sweetclover.

Cover crops should be grown 3 out of 4 years to increase the organic-matter content and the moisture-holding capacity. Turning under green-manure crops and the residue from fescue, sericea lespedeza, rye, and crotalaria will supply organic matter. The soil needs a complete fertilizer but is especially responsive to nitrogen.

Capability unit B10-IVe-1

This unit consists of deep, droughty, sloping to moderately steep soils that have poor tilth and are subject to severe erosion. These soils make up 29,082 acres in the Piedmont section of the county. They range in texture from sandy loam to clay loam. These soils are—

Appling sandy loam, 10 to 15 percent slopes, eroded.
Cecil clay loam, 6 to 10 percent slopes, severely eroded.
Cecil sandy loam, 10 to 15 percent slopes.
Cecil sandy loam, 10 to 15 percent slopes, eroded.
Hiwassee clay loam, 10 to 15 percent slopes, severely eroded.
Lloyd clay loam, 10 to 15 percent slopes, severely eroded.
Lloyd sandy loam, 10 to 15 percent slopes, eroded.
Madison sandy loam, 10 to 15 percent slopes, eroded.
Wickham clay loam, 6 to 10 percent slopes, severely eroded.
Wickham sandy loam, 10 to 15 percent slopes, eroded.

Because of erosion, these soils have lost much of their capacity to produce (fig. 11). They are low in fertility, very low in organic-matter content, and medium acid. Infiltration generally is slow, and runoff is rapid. Tilth normally is very poor, and good tilth is difficult to obtain. Periods when moisture conditions are favorable for tillage are short. Many seedlings die.

Traffic pans are prevalent in these soils. They have been caused by shallow tillage or compaction by heavy equipment. The slow permeability of these pans increases runoff and reduces the amount of water that normally would be stored in the subsoil. Even a heavy rain moistens only the top few inches of the surface layer. Consequently, crops are quickly affected by dry weather.

The soils in this unit generally are not well suited to row crops. They are poorly suited to corn and only fairly well suited to small grain, annual lespedeza, sericea lespedeza, pasture grasses and clovers, grain sorghum, Turkish tobacco, peppers, cotton, and peaches.

Row crops can be grown about once in 4 years. Crops should be planted in contour strips. Row crops can be planted in every fourth strip, then rotated each year to the next strip.

There are few peach orchards in the county, but commercial peach orchards do well on similar soils in other counties.

Farms on which these soils make up a large percentage of the acreage generally depend on small grain and beef and dairy cattle for income. Sericea lespedeza can be grown as a forage crop, or fescue, dallisgrass, and bermudagrass can be grown in combination with white clover, annual lespedeza, or crimson clover for pasture.

Fertilizer and lime should be applied according to crop needs and soil tests. Most crops need liberal amounts of both.

All waterways and draws should be kept in perennial vegetation. There are many sites suitable for ponds.

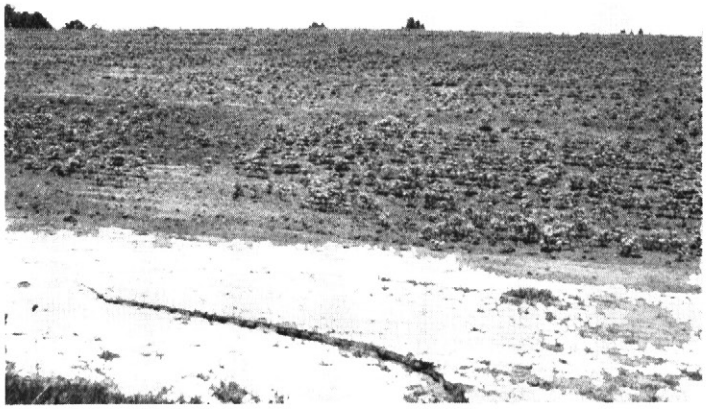

Figure 11.—**Adequate cover has not been established on Lloyd clay loam, 10 to 15 percent slopes, severely eroded, and runoff is rapid. Siltation in foreground resulted from one rain of moderate intensity.**

Capability unit B13–IVe–1

This unit consists of moderately deep, moderately steep and steep soils that are moderately rapid in permeability and are subject to severe erosion. The total area is 37,696 acres. These soils occur on the foothills and mountains in the northern part of the county. They formed in a climate of higher rainfall and cooler temperatures than the soils in the Piedmont section. Their surface layer is friable fine sandy loam or loam. Their subsoil generally is red to brownish-red, firm to friable fine sandy clay loam to clay loam. Depth to bedrock commonly is 12 to 24 feet. The soils in this unit are—

Halewood fine sandy loam, 10 to 15 percent slopes.
Halewood fine sandy loam, 10 to 15 percent slopes, eroded.
Halewood fine sandy loam, 15 to 25 percent slopes.
Hayesville and Cecil fine sandy loams, 10 to 15 percent slopes.
Hayesville and Cecil fine sandy loams, 10 to 15 percent slopes, eroded.
Hayesville and Cecil fine sandy loams, 15 to 25 percent slopes.
Hayesville and Cecil loams, 6 to 10 percent slopes, severely eroded.
Hayesville and Cecil loams, 10 to 15 percent slopes, severely eroded.
Watauga fine sandy loam, 10 to 25 percent slopes, eroded.

These soils are moderate in fertility, moderate in organic-matter content, generally moderate in moisture-holding capacity, and medium acid. Infiltration and permeability rates are moderately rapid. Rainfall is well distributed throughout the growing season. This tends to compensate for the moderate moisture-holding capacity. Crops are seldom affected by drought.

Suitable crops include corn, grain sorghum, small grain, annual lespedeza, sericea lespedeza, peppers, Turkish tobacco, apples, truck crops, tall fescue, dallisgrass, bermudagrass, white clover, crimson clover, and alfalfa.

About 20 percent of the acreage is in crops, 13 percent is in pasture, 2 percent is idle, and the rest is in forest. Because of the severe erosion hazard, three-fourths of the cultivated acreage should be kept in close-growing crops. The slopes generally are too steep for terracing but should be stripcropped on the contour. A perennial ground cover should be established in apple orchards to control erosion. All draws should be kept in close-growing vegetation. Crops respond to lime and fertilizer.

These soils generally are adaptable to irrigation. They are well suited to forestry and to bicolor lespedeza for wildlife food and cover.

Many sites are suitable for ponds, but excavations should not extend into the parent material. A good core seal in the dam is essential.

Capability unit B13–IVe–2

This unit consists of well-drained, moderately deep, moderately permeable soils that occur on the foothills and mountains. The surface layer is very dark grayish-brown, friable fine sandy loam. It is underlain by red, friable clay loam. In places small fragments of schist occur on the surface or throughout the profile. The total area is 2,749 acres. The soils in this unit are—

Madison fine sandy loam, high, 10 to 15 percent slopes.
Madison fine sandy loam, high, 10 to 15 percent slopes, eroded.

These soils are moderate in fertility, moderate in organic-matter content, and medium acid. They are moderate in water-holding capacity and moderate in rate of infiltration. Rainfall is plentiful and is well distributed throughout the growing season. Erosion is a severe hazard because of slope, rainfall, and moderate permeability.

About 30 percent of the acreage is used for crops. Suitable crops include corn, grain sorghum, small grain, apples, grapes, pasture grasses, lespedeza, clover, alfalfa, and truck crops. Under good management, moderate to moderately high yields can be expected (fig. 12).

Three-fourths of the cultivated acreage should be kept in close-growing crops because of the severe erosion hazard. Crops should be planted in contour strips and rotated. Row crops can be planted in every fourth strip and rotated each year to the next strip. These strips should be narrower than the strips on similar soils that have the same amount of rainfall but are more permeable. Except for small areas, all fields should be stripcropped on the contour. Apple orchards also should be planted on the contour. All draws should be kept in close-growing perennial vegetation.

Fertilizer and lime should be applied according to crop needs and soil tests. Enough crop residues should be left to supply organic matter.

Ponds are fewer in these soils because they are in an area of adequate rainfall. These soils are fairly well suited to ponds, but care should be taken to avoid excavating into the porous parent material.

Capability unit B10–IVw–1

This capability unit consists of one miscellaneous land type, Mixed wet alluvial land. This land type is on poorly drained first bottoms along large streams and is subject to frequent overflow. It is commonly fine textured throughout and heavily mottled below a depth of 4 to 6 inches. The slope range is 0 to 3 percent. The water table generally is a few inches below the surface. The total area is 3,189 acres.

This land type is moderately fertile and strongly acid. It is high in organic-matter content and high in moisture-holding capacity. Infiltration is moderately slow, and permeability is slow to very slow.

Because of wetness, these areas are poorly suited to crops or pasture. Tame grass and clover cannot compete

Figure 12.—**Rotation of crops is not an established practice on Madison fine sandy loam, high, 10 to 15 percent slopes, eroded. This soil would respond quickly to crop rotation and other good management.**

with wild sedge and marsh grass. Sweetgum, pine, sycamore, poplar, and water oak are fairly well suited.

Generally, it is not economically feasible to reclaim these areas for agricultural purposes. The fine texture causes difficulty in draining, and many of the available drainage outlets are clogged. Extensive tile lines or drainage ditches would be necessary. If adequately drained, however, this land can be used for corn, grain sorghum, tall fescue, cowpeas, annual lespedeza, bicolor lespedeza, and browntop millet.

Capability unit B10–Vw–1

There is only one soil in this capability unit, Worsham sandy loam, 0 to 6 percent slopes. The total area is 934 acres. This moderately deep alluvial soil occurs at the head of drainageways and on lower slopes along drainageways. It receives seepage water from adjacent upland soils. The surface layer is olive-gray to grayish-brown sandy loam, and the subsoil is mottled, brownish-gray silty clay loam. Surface drainage generally is good, but internal drainage is poor.

Because of continuous leaching, this soil is low in fertility. It is relatively high in organic-matter content, moderate in moisture-holding capacity, and strongly acid. Infiltration is moderate, and permeability is moderately slow to slow. Seepage causes the moisture supply to be adequate to excessive throughout the year.

This soil is not well suited to crops but can be used for pasture. Although not well suited, carpetgrass, dallisgrass, and fescue can be grown. All clovers are difficult to maintain. Whiteclover is the most suitable of the clovers. Fertilizer and lime should be applied according to crop needs and soil tests.

This soil should be kept under close-growing vegetation to control erosion, as a large volume of water runs off the higher areas.

There are many sites that are excellent for ponds. An ample supply of water is assured. A good core seal in a dam is essential. Some sites are suitable for excavated ponds.

Capability unit B13–VIe–1

This unit consists of moderately deep, steep to very steep soils on foothills and mountains. The total area is 115,957 acres. These soils developed in a climate of cooler temperatures and more rainfall than the soils in the Piedmont section. They have a friable surface layer of loam or fine sandy loam and a firm to friable subsoil of clay loam. Erosion is a serious hazard. The soils in this unit are—

Halewood fine sandy loam, 15 to 25 percent slopes, eroded.
Halewood fine sandy loam, 25 to 45 percent slopes.
Hayesville and Cecil fine sandy loams, 15 to 25 percent slopes, eroded.
Hayesville and Cecil fine sandy loams, 25 to 45 percent slopes.
Hayesville and Cecil fine sandy loams, 25 to 45 percent slopes, eroded.
Lloyd loam, moderately shallow, 15 to 25 percent slopes, eroded.
Lloyd loam, moderately shallow, 25 to 40 percent slopes.
Madison fine sandy loam, high, 15 to 25 percent slopes.
Madison fine sandy loam, high, 15 to 25 percent slopes, eroded.
Porters loam, 25 to 45 percent slopes.
Porters stony loam, 25 to 45 percent slopes.
Watauga fine sandy loam, 25 to 40 percent slopes.

These soils are relatively high in fertility and in organic-matter content. They are relatively rapid in infiltration rate, moderately rapid to rapid in permeability, and medium acid. Rainfall is well distributed throughout the growing season.

The soils in this unit are well suited to apples, alfalfa, sericea lespedeza, and the grasses and other legumes commonly grown in the area. If used for pasture, they are best suited to tall fescue, dallisgrass, and orchardgrass. White clover and crimson clover are commonly grown, but other clovers are also suitable. Pine is well suited.

About 20 percent of the acreage is cleared, and the rest is in forest. Because of the severe erosion hazard, all of the acreage should be kept in close-growing crops or forest.

Apple orchards should be planted on the contour, and a ground cover established to control erosion.

On slopes of more than 20 percent, grass must be grown with alfalfa, sericea lespedeza, and tall fescue for effective erosion control.

On long slopes initial seeding and reseeding should be in contour strips over a 2-year period. Only half the strips should be planted the first year, and the alternate strips the next year. The plants selected should need reseeding only once in 6 years.

Fertilizer and lime should be applied according to crop needs and soil tests. Applications should be adequate to insure the dense ground cover needed to control erosion.

These soils are suitable for ponds or lakes, and many large lakes have been constructed. Because of the steep topography, however, only a few sites have sufficient soil material for the construction of dams.

Capability unit B10–VIe–2

This unit consists of deep, well-drained soils that are too eroded or too steep for cultivation. Their total area is 51,807 acres. These soils are in the Piedmont section, mostly in the southern part of the county. The surface layer is sandy loam or clay loam. The subsoil generally is clay loam but ranges to clay. In places there is some fine quartz gravel. These soils seldom develop traffic pans but become compacted if used for grazing. The depth to bedrock generally is from 20 to 35 feet. The soils in this unit are—

Appling sandy loam, 15 to 30 percent slopes.
Cecil clay loam, 10 to 15 percent slopes, severely eroded.
Cecil sandy loam, 15 to 25 percent slopes.
Cecil sandy loam, 15 to 25 percent slopes, eroded.
Hiwassee sandy loam, 15 to 25 percent slopes, eroded.
Lloyd clay loam, 15 to 35 percent slopes, severely eroded.
Lloyd sandy loam, 15 to 25 percent slopes, eroded.
Madison sandy loam, 15 to 30 percent slopes, eroded.
Wickham sandy loam, 15 to 25 percent slopes, eroded.
Worsham sandy loam, 6 to 15 percent slopes, eroded.

These soils are moderate in fertility, low to moderate in organic-matter content, moderate in moisture-holding capacity, and medium acid. Runoff is rapid, infiltration is slow to moderate, and permeability is moderate.

About 38 percent of the acreage has been cleared. Because of the severe erosion hazard, these soils should be kept in a permanent vegetative cover. Plants should be selected that need reseeding only once in 6 years. Alfalfa, sericea lespedeza, fescue, bermudagrass, bahiagrass, white clover, and crimson clover are suitable. On long slopes, initial seeding and reseeding should be done in contour strips over a 2-year period. Only half the strips should be planted the first year, and the alternate strips the next

year. Fertilizer and lime should be applied according to crop needs and soil tests.

If these soils are used for pasture, grazing should be rotated so that a good vegetative cover is maintained to control erosion.

These soils are suitable for pine, but the production of wood crops may be restricted by the steep slopes and hazard of erosion (fig. 13).

There are many areas suitable for the construction of ponds that can be used for recreation, watering stock, and irrigation. The soil material is suitable for dams.

Capability unit B13–VIe–2

This unit consists of shallow, droughty, moderately steep to steep soils on mountains. The depth to hard rock generally is less than 3 feet. Because of the limited space for the storage of water, the hazard of erosion is severe. The total area is 1,074 acres. The soils in this unit are—

Hayesville, Cecil, and Halewood sandy loams, shallow, 15 to 25 percent slopes.
Talladega and Chandler loams, 10 to 25 percent slopes.

These soils are moderate in rate of infiltration, low in moisture-holding capacity, moderate in organic-matter content, and medium acid. Runoff is rapid.

Most of the acreage is in forest. Because of the severe erosion hazard, these soils should be kept in a permanent vegetative cover. They are fairly well suited to pasture or forage crops that have relatively low moisture requirements and that need reseeding only once in 6 years. Such crops include fescue, whiteclover, and sericea lespedeza.

Split applications of lime and fertilizer are advisable because plant nutrients are readily leached. Boulders may be encountered in tillage.

Pine trees are only fairly well suited.

These soils are not suitable for the construction of ponds.

Capability unit B10–VIIe–1

This unit consists of gullied, severely eroded, or steep soils in the Piedmont section. The total area is 37,297 acres. These soils have a sandy loam or clay loam surface layer and generally a firm, reddish, clayey subsoil. Runoff is rapid, and the reaction is strongly acid. The soils in this unit are—

Cecil clay loam, 15 to 25 percent slopes, severely eroded.
Cecil sandy loam, 25 to 35 percent slopes.
Cecil sandy loam, 25 to 35 percent slopes, eroded.
Gullied land, rolling.
Gullied land, hilly.
Lloyd sandy loam, 25 to 35 percent slopes.

These soils are suited only to forest. Diversion of water may be required to stabilize gullies in eroded areas. Information on the management of forests is in the section "Woodland."

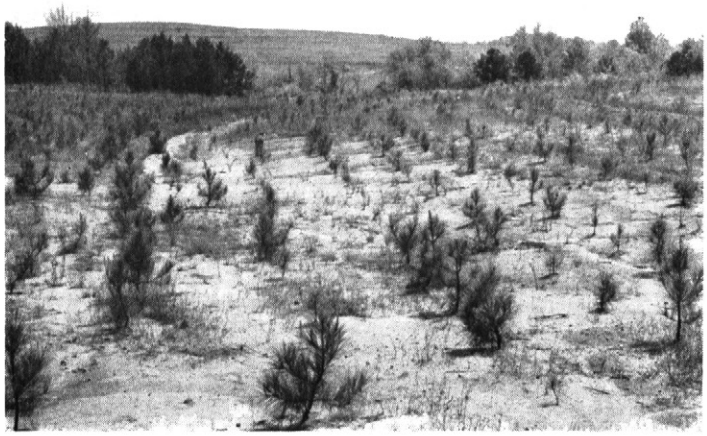

Figure 13.—Pine seedlings on Cecil clay loam, 10 to 15 percent slopes, severely eroded.

Capability unit B13–VIIe–1

This unit consists of moderately deep, steep to very steep soils on foothills and mountains. These soils are susceptible to severe erosion. The surface layer is friable fine sandy loam or loam, and the subsoil commonly is firm to friable, reddish clay loam. The depth to bedrock is about 20 feet. The total acreage is 14,794 acres. The soils in this unit are—

Hayesville and Cecil loams, 15 to 45 percent slopes, severely eroded.
Madison fine sandy loam, high, 25 to 40 percent slopes.
Madison loam, high, 15 to 25 percent slopes, severely eroded.

These soils are moderate in fertility, moderate in moisture-holding capacity, moderate in organic-matter content, and medium acid. The rate of infiltration is moderate, and permeability is moderate.

Because of the severe erosion hazard, these soils are best suited to forest.

Capability unit B13–VIIe–2

This unit consists of shallow, steep to very steep, droughty soils on mountains. These soils have little or no subsoil development. Hard rock generally occurs at a depth of 3 feet. The total area is 33,464 acres. The soils in this unit are—

Ashe sandy loam, 25 to 50 percent slopes.
Hayesville, Cecil, and Halewood sandy loams, shallow, 25 to 60 percent slopes.
Stony land.
Talladega and Chandler loams, 25 to 60 percent slopes.

These soils are susceptible to severe erosion. They have only limited space for the storage of water. They are low in moisture-holding capacity but relatively high in organic-matter content. Runoff generally is rapid, infiltration is moderately high to high, and permeability is moderately high to high.

The best use for these soils is forest (fig. 14). The site index for trees is low. Detailed information on forest management is in the section "Woodland."

These soils are valuable as a water-resource area. They are not suitable for the construction of ponds.

Estimated Yields and Relative Suitability

The first part of this subsection gives the estimated average acre yields of principal crops on the different soils in the county and some suggestions for management.

The second part shows the relative suitability of the soils in the county for crops that are commonly grown or that are known to be suited to the soils and to the climate.

Figure 14.—Stony land suited only to forest.

Estimated yields and general management

Table 1 gives the average acre yields of the principal crops grown in Oconee County under two levels of management. Listed in columns A are the yields to be expected under prevailing management. Yields in columns B are those to be expected under improved management.

The figures in columns A and B are based largely on observations made by members of the soil survey party and on information obtained by interviews with farmers and other agricultural workers who have had experience with the soils and crops of the area. For some crops, actual yield data are available. Also available are some experimental test data on yields on eroded and sloping soils. Irrigation was not considered in any of the estimates.

The requirements for good management vary according to the soils, but the following practices are considered requisite to obtaining the yields in columns B: (1) Proper choice and rotation of crops; (2) correct use of fertilizer, lime, manure, and trace elements; (3) use of proper tillage methods; (4) maintenance of organic-matter content; (5) adequate control of water; (6) maintenance and improve-

TABLE 1.—*Estimated average acre yields of the*

[Yields in columns A are those obtained under prevailing management; those in columns B are yields

Map symbol	Soil	Cotton (lint)		Corn		Oats	
		A	B	A	B	A	B
		Lb.	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
AdB2	Altavista sandy loam, 0 to 6 percent slopes, eroded	350	540	40	80	30	70
ApB	Appling sandy loam, 2 to 6 percent slopes	380	620	20	60	33	75
ApB2	Appling sandy loam, 2 to 6 percent slopes, eroded	340	600	15	45	30	70
ApC2	Appling sandy loam, 6 to 10 percent slopes, eroded	335	600	13	40	28	65
ApD2	Appling sandy loam, 10 to 15 percent slopes, eroded	300	525	12	35	27	55
ApE	Appling sandy loam, 15 to 30 percent slopes						
AsF	Ashe sandy loam, 25 to 50 percent slopes						
Bu	Buncombe loamy sand						
CdB	Cecil sandy loam, 2 to 6 percent slopes	450	750	30	80	45	85
CdB2	Cecil sandy loam, 2 to 6 percent slopes, eroded	420	700	25	60	40	75
CdC	Cecil sandy loam, 6 to 10 percent slopes	445	700	28	70	42	80
CdC2	Cecil sandy loam, 6 to 10 percent slopes, eroded	400	650	22	50	37	70
CdD	Cecil sandy loam, 10 to 15 percent slopes	400	650	26	58	40	75
CdD2	Cecil sandy loam, 10 to 15 percent slopes, eroded	375	625	18	37	25	45
CdE	Cecil sandy loam, 15 to 25 percent slopes						
CdE2	Cecil sandy loam, 15 to 25 percent slopes, eroded						
CdF	Cecil sandy loam, 25 to 35 percent slopes						
CdF2	Cecil sandy loam, 25 to 35 percent slopes, eroded						
CcB3	Cecil clay loam, 2 to 6 percent slopes, severely eroded	220	500	20	40	20	45
CcC3	Cecil clay loam, 6 to 10 percent slopes, severely eroded	200	450	10	30	18	40
CcD3	Cecil clay loam, 10 to 15 percent slopes, severely eroded					10	18
CcE3	Cecil clay loam, 15 to 25 percent slopes, severely eroded						
Ch	Chewacla silt loam			25	55	20	75
Co	Congaree fine sandy loam			40	110	40	95
Cs	Congaree silt loam			40	110	45	100
DaC2	Davidson loam, 2 to 10 percent slopes, eroded	390	580	25	60	42	85
Gh	Gullied land, hilly						
Gr	Gullied land, rolling						
HaB	Halewood fine sandy loam, 2 to 6 percent slopes	330	600	25	60	32	60
HaC2	Halewood fine sandy loam, 6 to 10 percent slopes, eroded	300	550	20	50	30	55
HaD	Halewood fine sandy loam, 10 to 15 percent slopes	300	550	20	45	28	54
HaD2	Halewood fine sandy loam, 10 to 15 percent slopes, eroded	285	500	17	38	25	45
HaE	Halewood fine sandy loam, 15 to 25 percent slopes	285	500	17	38	20	40
HaE2	Halewood fine sandy loam, 15 to 25 percent slopes, eroded						
HaF	Halewood fine sandy loam, 25 to 45 percent slopes						

See footnote at end of table.

ment of productivity and tilth; (7) conservation of soil material, plant nutrients, and soil moisture; (8) use of highest quality seed; (9) control of insects and disease; (10) observance of proven planting dates; (11) thorough and timely preparation of soils; (12) maintenance of a deep root zone to prevent traffic pans; and (13) effective control of weeds.

Soils should be tested to determine their needs for fertilizer and lime. Consult your local Soil Conservation Service representative or your county agent for information on soil testing.

Frequent tillage destroys soil structure and organic matter. Till only enough to prepare good seedbeds and to control weeds. To prevent pans from forming, vary the depth of plowing and of other tillage operations. Do not till when the soils are too moist.

Deep-rooted legumes should be included in rotations to improve soil structure, increase the penetration of moisture, prevent the formation of pans, and supply organic matter and nitrogen. Most upland soils need 1 to 2 tons of agricultural limestone per acre to produce good yields of legumes. Legumes are likely to deplete the moisture reserve of the soils, and this may affect the growth of crops that follow.

Crop residues should not be burned. If turned under, they improve soil structure, fertility, and tilth and also help to keep the soils porous and permeable.

Manure is especially valuable in establishing grass in eroded areas and in waterways. It supplies plant nutrients and acts as a mulch.

Practices to control water erosion include (1) terracing if slopes are not more than 6 percent; (2) establishing native and tame grasses in waterways and outlets; (3) diverting water that runs off higher areas; (4) tilling and planting on the contour or parallel to terraces; (5) utilizing crop residues; and (6) installing dams, grade-stabilization structures, or other structures where needed.

Relative suitability of the soils for crops

In table 2 the degree of suitability of the soils in the county for certain crops is expressed by index numbers. Number 1 indicates that the soil is well suited; numbers 2 and 3, that it is progressively less well suited; and number 4, that it is not at all suited.

principal crops under two levels of management

to be expected under improved management. Absence of figure indicates crop is not commonly grown]

Wheat		Grain sorghum		Pasture		Peppers		Tobacco		Capability unit
A	B	A	B	A	B	A	B	A	B	
Bu.	*Bu.*	*Bu.*	*Bu.*	*Acres per animal unit*[1]	*Acres per animal unit*[1]	*Tons*	*Tons*	*Lb.*	*Lb.*	
20	35	37	70	2. 50	1. 25	1	2. 75			B10–IIe–2
25	37	30	60	3	1. 50	1. 25	3	600	1, 000	B10–IIe–2
25	35	30	55	3	1. 50	1. 25	3	700	1, 050	B10–IIe–2
25	35	30	50	3	1. 50	1. 25	2. 75	700	1, 000	B10–IIIe–2
22	33	32	60	3	1. 75	1	2. 50	650	850	B10–IVe–1
				3. 75	2. 25					B10–VIe–2
										B13–VIIe–2
				4	3					B10–IIIs–1
28	45	42	80	2	1. 25	1	3. 25	900	1, 200	B10–IIe–1
25	42	40	75	2	1. 30	1. 50	3	950	1, 300	B10–IIe–1
27	44	40	75	2	1. 50	1	3. 50	900	1, 300	B10–IIIe–1
22	38	37	56	2. 50	1. 75	. 90	3	850	1, 200	B10–IIIe–1
25	42	40	75	2. 25	1. 75	. 90	3	900	1, 300	B10–IVe–1
18	35	20	38	3	2	. 80	2. 50	750	1, 050	B10–IVe–1
				3	2					B10–VIe–2
				3. 25	2. 25					B10–VIe–2
										B10–VIIe–1
										B10–VIIe–1
18	28	25	50	2. 50	1. 50	1. 25	2. 50	600	750	B10–IIIe–1
16	27	20	45	3	2	1	2	500	700	B10–IVe–1
12	22			4	2. 50					B10–VIe–2
										B10–VIIe–1
		20	60	2	1. 25					B10–IIIw–2
30	60	40	70	1. 50	1					B10–IIw–2
28	58	42	75	1. 50	1					B10–IIw–2
29	60	35	70	2	1. 50	. 70	2	650	800	B10–IIe–1
										B10–VIIe–1
										B10–VIIe–1
18	38	25	60	3	1. 50	1	2. 50	700	1, 200	B13–IIe–2
16	33	22	55	3	1. 50	. 90	2. 30	750	1, 250	B13–IIIe–2
16	30	22	55	3	1. 50	. 80	2. 20	700	1, 100	B13–IVe–1
12	25	18	40	3. 50	2	. 60	1. 75	600	950	B13–IVe–1
15	30	18	35	3	2					B13–IVe–1
				3	2					B13–VIe–1
				4	3					B13–VIe–1

TABLE 1.—*Estimated average acre yields of the*

Map symbol	Soil	Cotton (lint)		Corn		Oats	
		A	B	A	B	A	B
		Lb.	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
HcB	Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes	410	760	40	95	35	80
HcC	Hayesville and Cecil fine sandy loams, 6 to 10 percent slopes	375	700	35	80	30	70
HcC2	Hayesville and Cecil fine sandy loams, 6 to 10 percent slopes, eroded	365	675	30	70	25	65
HcD	Hayesville and Cecil fine sandy loams, 10 to 15 percent slopes	365	675	28	65	24	60
HcD2	Hayesville and Cecil fine sandy loams, 10 to 15 percent slopes, eroded	350	625	18	55	22	55
HcE	Hayesville and Cecil fine sandy loams, 15 to 25 percent slopes	300	550	18	55	20	50
HcE2	Hayesville and Cecil fine sandy loams, 15 to 25 percent slopes, eroded						
HcF	Hayesville and Cecil fine sandy loams, 25 to 45 percent slopes						
HcF2	Hayesville and Cecil fine sandy loams, 25 to 45 percent slopes, eroded						
HdC3	Hayesville and Cecil loams, 6 to 10 percent slopes, severely eroded	350	500	12	35	18	40
HdD3	Hayesville and Cecil loams, 10 to 15 percent slopes, severely eroded	200	400	12	30	16	30
HdF3	Hayesville and Cecil loams, 15 to 45 percent slopes, severely eroded						
HhE	Hayesville, Cecil, and Halewood sandy loams, shallow, 15 to 25 percent slopes.						
HhF	Hayesville, Cecil, and Halewood sandy loams, shallow, 25 to 60 percent slopes.						
HsB2	Hiwassee sandy loam, 2 to 6 percent slopes, eroded	380	660	20	50	45	85
HsC2	Hiwassee sandy loam, 6 to 10 percent slopes, eroded	350	625	18	45	40	75
HsE2	Hiwassee sandy loam, 15 to 25 percent slopes, eroded						
HmD3	Hiwassee clay loam, 10 to 15 percent slopes, severely eroded	225	375	12	30	17	35
LdB2	Lloyd sandy loam, 2 to 6 percent slopes, eroded	350	585	24	65	40	80
LdC	Lloyd sandy loam, 6 to 10 percent slopes	400	680	30	65	45	90
LdC2	Lloyd sandy loam, 6 to 10 percent slopes, eroded	350	600	22	60	40	70
LdD2	Lloyd sandy loam, 10 to 15 percent slopes, eroded	175	380	10	30	25	40
LdE2	Lloyd sandy loam, 15 to 25 percent slopes, eroded						
LdF	Lloyd sandy loam, 25 to 35 percent slopes						
LcB3	Lloyd clay loam, 2 to 6 percent slopes, severely eroded	200	425	12	30	25	45
LcC3	Lloyd clay loam, 6 to 10 percent slopes, severely eroded	175	350	8	22	20	35
LcD3	Lloyd clay loam, 10 to 15 percent slopes, severely eroded						
LcE3	Lloyd clay loam, 15 to 35 percent slopes, severely eroded						
LmE2	Lloyd loam, moderately shallow, 15 to 25 percent slopes, eroded						
LmF	Lloyd loam, moderately shallow, 25 to 40 percent slopes						
Lo	Local alluvial land	420	650	60	110	60	110
MfB	Madison fine sandy loam, high, 2 to 6 percent slopes			30	65	40	80
MfC	Madison fine sandy loam, high, 6 to 10 percent slopes			28	63	38	75
MfC2	Madison fine sandy loam, high, 6 to 10 percent slopes, eroded			25	60	35	70
MfD	Madison fine sandy loam, high, 10 to 15 percent slopes			27	60	33	65
MfD2	Madison fine sandy loam, high, 10 to 15 percent slopes, eroded			20	40	25	38
MfE	Madison fine sandy loam, high, 15 to 25 percent slopes						
MfE2	Madison fine sandy loam, high, 15 to 25 percent slopes, eroded						
MfF	Madison fine sandy loam, high, 25 to 40 percent slopes						
MhE3	Madison loam, high, 15 to 25 percent slopes, severely eroded						
MaC2	Madison sandy loam, 6 to 10 percent slopes, eroded	430	790	30	65	45	90
MaD2	Madison sandy loam, 10 to 15 percent slopes, eroded	280	425	12	40	30	60
MaE2	Madison sandy loam, 15 to 30 percent slopes, eroded						
Mv	Mixed alluvial land			60	110	60	100
Mw	Mixed wet alluvial land						
PoF	Porters loam, 25 to 45 percent slopes						
PsF	Porters stony loam, 25 to 45 percent slopes						
Sf	State fine sandy loam	350	540	45	85	60	90
St	Stony land						
TcE	Talladega and Chandler loams, 10 to 25 percent slopes						
TcF	Talladega and Chandler loams, 25 to 60 percent slopes						
WaB2	Watauga fine sandy loam, 2 to 6 percent slopes, eroded			30	70	40	60
WaC2	Watauga fine sandy loam, 6 to 10 percent slopes, eroded			25	65	35	55
WaE2	Watauga fine sandy loam, 10 to 25 percent slopes, eroded			18	45	30	50
WaF	Watauga fine sandy loam, 25 to 40 percent slopes						
WkB	Wickham sandy loam, 2 to 6 percent slopes	425	745	40	85	55	80
WkB2	Wickham sandy loam, 2 to 6 percent slopes, eroded	400	700	35	70	50	75
WkC2	Wickham sandy loam, 6 to 10 percent slopes, eroded	350	650	25	60	40	65
WkD2	Wickham sandy loam, 10 to 15 percent slopes, eroded	275	450	16	35	30	55
WkE2	Wickham sandy loam, 15 to 25 percent slopes, eroded						
WcC3	Wickham clay loam, 6 to 10 percent slopes, severely eroded	200	400			20	35
WoB	Worsham sandy loam, 0 to 6 percent slopes						
WoD2	Worsham sandy loam, 6 to 15 percent slopes, eroded						

[1] Acres per animal unit is the number of acres needed to afford the equivalent of 365 days of grazing for one animal unit. One animal

principal crops under two levels of management—Continued

Wheat		Grain sorghum		Pasture		Peppers		Tobacco		Capability unit
A	B	A	B	A	B	A	B	A	B	
Bu.	*Bu.*	*Bu.*	*Bu.*	*Acres per animal unit* [1]	*Acres per animal unit* [1]	*Tons*	*Tons*	*Lb.*	*Lb.*	
25	45	40	90	2	1. 25	1	2. 80	900	1, 350	B13–IIe–2
20	40	35	75	2	1. 50	. 80	2. 70	800	1, 200	B13–IIIe–2
17	37	30	65	2. 25	1. 75	. 70	2. 50	750	1, 150	B13–IIIe–2
16	35	28	62	2. 25	1. 75	. 60	2	700	1, 050	B13–IVe–1
14	32	25	50	3	2	. 50	2	600	850	B13–IVe–1
14	30	20	45	3	2. 25	. 50	. 70	550	750	B13–IVe–1
				4	3					B13–VIe–1
				4	3					B13–VIe–1
				5	4					B13–VIe–1
12	28	18	36	4	2. 50	. 50	1. 50	450	600	B13–IVe–1
10	20	12	22	5	3	. 40	65	350	525	B13–IVe–1
										B13–VIIe–1
				5	4					B13–VIe–2
										B13–VIIe–2
24	38	35	70	3	1. 50	. 80	2. 25	850	1, 400	B10–IIe–1
22	35	28	65	3. 50	2	. 80	2	750	1, 200	B10–IIIe–1
				4	3					B10–VIe–2
12	26	17	30	4	2. 50	. 40	1. 25	450	625	B10–IVe–1
25	35	25	65	3	1. 50	. 80	2. 75	750	1, 200	B10–IIe–1
28	40	28	75	3	1. 50	. 80	2. 75	700	1, 100	B10–IIIe–1
17	32	22	60	3. 50	2	. 90	2. 25	570	800	B10–IIIe–1
10	20	10	22	5	3	. 50	2	400	650	B10–IVe–1
				4	3					B10–VIe–2
				4	4					B10–VIIe–1
12	24	16	28	3	2	. 60	2	450	675	B10–IIIe–1
8	20	12	18	4	3	. 50	1. 75			B10–IIIe–1
				5	4					B10–IVe–1
		5	4							B10–VIe–2
		4	3							B13–VIe–1
		4	3							B13–VIe–1
30	45	40	85	2	1. 50	. 60	3. 25			B10–I–1
18	32	25	40	2. 50	1. 50	. 80	2. 50	1, 000	1, 200	B13–IIe–3
15	30	22	37	2. 50	1. 50	. 70	2. 40	1, 000	1, 200	B13–IIIe–3
12	28	20	35	2. 50	1. 66	. 70	2. 25	1, 100	1, 300	B13–IIIe–3
13	30	22	36	2. 50	1. 50	1	2	1, 000	1, 200	B13–IVe–2
12	27	18	28	3	2	. 80	1. 75	950	1, 200	B13–IVe–2
				3	2					B13–VIe–1
				3	2. 25					B13–VIe–1
										B13–VIIe–1
										B13–VIIe–1
22	40	30	80	2	1. 50	. 70	2. 75	800	1, 200	B10–IIIe–1
16	28	18	40	3	2	. 50	2. 25	450	600	B10–IVe–1
				4	3					B10–VIe–2
30	40	60	90	2	1	. 80	1. 10			B10–IIw–2
										B10–IVw–1
				2. 50	1. 50					B13–VIe–1
				4	3					B13–VIe–1
25	40	40	85	2	1	1	3	900	1, 200	B10–I–3
										B13–VIIe–2
				4	3					B13–VIe–2
										B13–VIIe–2
20	38	30	75	2. 50	1. 50			700	1, 200	B13–IIe–2
18	32	25	65	2. 50	2			700	1, 150	B13–IIIe–2
15	25	12	30	3	2. 50					B13–IVe–1
				3	2. 50					B13–VIe–1
25	42	40	75	2	1	1	3. 50	700	1, 200	B10–IIe–1
22	37	35	70	2	1	1	3. 40	750	1, 250	B10–IIe–1
17	28	25	60	3	1. 50	. 80	3	700	1, 100	B10–IIIe–1
12	24	16	40	3	2	. 60	2. 25	450	700	B10–IVe–1
				3	2					B10–VIe–2
10	22	12	25	4	2	. 50	1. 75			B10–IVe–1
				4	2					B10–Vw–1
				5	4					B10–VIe–2

unit is considered to consume 16 pounds of total digestible nutrients per day.

TABLE 2.—*Relative suitability of the soils for specified crops*

[Number 1 means well suited; 2, fairly well suited; 3, less well suited; and 4, not suited]

Soil and capability unit	Cotton [1]	Corn [2]	Oats	Wheat	Pasture		Grain sorghum	Peppers	Tobacco	Grapes	Apples	Alfalfa	Annual lespedeza
					Summer	Winter							
Altavista sandy loam, 0 to 6 percent slopes, eroded (B10-IIe-2)	2	1	2	2	2	2	1	3	4	2	4	4	2
Appling sandy loam, 2 to 6 percent slopes (B10-IIe-2)	1	2	2	2	2	3	2	3	3	2	4	4	2
Appling sandy loam, 2 to 6 percent slopes, eroded (B10-IIe-2)	2	3	2	2	2	2	2	3	2	2	4	3	2
Appling sandy loam, 6 to 10 percent slopes, eroded (B10-IIIe-2)	2	3	2	2	2	2	2	3	2	3	4	3	2
Appling sandy loam, 10 to 15 percent slopes, eroded (B10-IVe-1)	2	3	2	2	2	2	2	3	3	4	4	3	2
Appling sandy loam, 15 to 30 percent slopes (B10-VIe-2)	4	4	4	4	2	3	4	4	4	4	4	4	3
Ashe sandy loam, 25 to 50 percent slopes (B13-VIIe-2)	4	4	4	4	4	4	4	4	4	4	4	4	4
Buncombe loamy sand (B10-IIIs-1)	4	4	4	4	3	4	4	4	4	3	4	4	4
Cecil sandy loam, 2 to 6 percent slopes (B10-IIe-1)	1	1	1	1	1	1	1	1	2	1	3	2	2
Cecil sandy loam, 2 to 6 percent slopes, eroded (B10-IIe-1)	1	2	1	1	2	1	1	1	1	1	3	2	2
Cecil sandy loam, 6 to 10 percent slopes (B10-IIIe-1)	1	2	1	1	2	2	1	1	2	1	3	2	2
Cecil sandy loam, 6 to 10 percent slopes, eroded (B10-IIIe-1)	1	3	2	2	2	2	2	2	1	1	3	2	2
Cecil sandy loam, 10 to 15 percent slopes (B10-IVe-1)	1	2	2	2	2	2	1	2	2	2	3	2	2
Cecil sandy loam, 10 to 15 percent slopes, eroded (B10-IVe-1)	1	3	2	2	2	2	2	2	2	2	3	2	2
Cecil sandy loam, 15 to 25 percent slopes (B10-VIe-2)	4	4	4	4	2	2	4	4	4	3	3	3	3
Cecil sandy loam, 15 to 25 percent slopes, eroded (B10-VIe-2)	4	4	4	4	2	2	4	4	4	3	3	3	3
Cecil sandy loam, 25 to 35 percent slopes (B10-VIIe-1)	4	4	4	4	4	4	4	4	4	4	4	4	4
Cecil sandy loam, 25 to 35 percent slopes, eroded (B10-VIIe-1)	4	4	4	4	4	4	4	4	4	4	4	4	4
Cecil clay loam, 2 to 6 percent slopes, severely eroded (B10-IIIe-1)	2	3	2	2	2	2	2	2	2	2	3	2	2
Cecil clay loam, 6 to 10 percent slopes, severely eroded (B10-IVe-1)	2	4	2	3	2	2	3	3	3	3	3	3	2
Cecil clay loam, 10 to 15 percent slopes, severely eroded (B10-VIe-2)	4	4	3	3	3	3	4	4	4	4	4	4	3
Cecil clay loam, 15 to 25 percent slopes, severely eroded (B10-VIIe-1)	4	4	4	4	4	4	4	4	4	4	4	4	4
Chewacla silt loam (B10-IIIw-2)	4	2	3	4	2	2	2	4	4	4	4	4	2
Congaree fine sandy loam (B10-IIw-2)	4	1	1	2	1	1	1	4	4	4	4	4	1
Congaree silt loam (B10-IIw-2)	4	1	2	2	1	1	1	4	4	4	4	4	1
Davidson loam, 2 to 10 percent slopes, eroded (B10-IIe-1)	2	2	2	1	1	1	1	1	3	1	4	1	1
Gullied land, rolling (B10-VIIe-1)	4	4	4	4	4	4	4	4	4	4	4	4	4
Gullied land, hilly (B10-VIIe-1)	4	4	4	4	4	4	4	4	4	4	4	4	4
Halewood fine sandy loam, 2 to 6 percent slopes (B13-IIe-2)	2	2	2	2	2	2	2	3	3	1	2	3	2
Halewood fine sandy loam, 6 to 10 percent slopes, eroded (B13-IIIe-2)	2	3	2	2	2	2	2	2	3	2	2	2	2
Halewood fine sandy loam, 10 to 15 percent slopes (B13-IVe-1)	2	3	3	3	2	2	2	3	3	2	2	3	3
Halewood fine sandy loam, 10 to 15 percent slopes, eroded (B13-IVe-1)	2	3	3	3	2	2	2	3	3	2	2	3	3
Halewood fine sandy loam, 15 to 25 percent slopes (B13-IVe-1)	2	3	3	3	2	2	3	4	4	2	2	4	4

See footnotes at end of table.

TABLE 2.—*Relative suitability of the soils for specified crops*—Continued

Soil and capability unit	Cotton [1]	Corn [2]	Oats	Wheat	Pasture		Grain sorghum	Peppers	Tobacco	Grapes	Apples	Alfalfa	Annual lespedeza
					Summer	Winter							
Halewood fine sandy loam, 15 to 25 percent slopes, eroded (B13–VIe–1)	4	4	4	4	2	2	4	4	4	2	2	4	4
Halewood fine sandy loam, 25 to 45 percent slopes (B13–VIe–1)	4	4	4	4	3	3	4	4	4	3	3	4	4
Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes (B13–IIe–2)	1	1	2	1	2	1	1	1	2	1	1	2	2
Hayesville and Cecil fine sandy loams, 6 to 10 percent slopes (B13–IIIe–2)	1	1	2	1	2	1	1	1	2	1	1	2	2
Hayesville and Cecil fine sandy loams, 6 to 10 percent slopes, eroded (B13–IIIe–2)	1	2	2	2	2	2	1	1	1	2	1	2	2
Hayesville and Cecil fine sandy loams, 10 to 15 percent slopes (B13–IVe–1)	1	2	2	2	2	2	1	2	2	2	1	2	2
Hayesville and Cecil fine sandy loams, 10 to 15 percent slopes, eroded (B13–IVe–1)	1	2	2	2	2	2	2	2	2	2	2	2	2
Hayesville and Cecil fine sandy loams, 15 to 25 percent slopes (B13–IVe–1)	2	2	3	3	2	2	3	3	3	2	1	3	3
Hayesville and Cecil fine sandy loams, 15 to 25 percent slopes, eroded (B13–VIe–1)	4	4	4	4	2	2	4	4	4	4	2	4	4
Hayesville and Cecil fine sandy loams, 25 to 45 percent slopes (B13–VIe–1)	4	4	4	4	2	2	4	4	4	4	2	4	4
Hayesville and Cecil fine sandy loams, 25 to 45 percent slopes, eroded (B13–VIe–1)	4	4	4	4	3	3	4	4	4	4	3	4	4
Hayesville and Cecil loams, 6 to 10 percent slopes, severely eroded (B13–IVe–1)	2	3	3	3	3	3	3	3	3	3	3	3	3
Hayesville and Cecil loams, 10 to 15 percent slopes, severely eroded (B13–IVe–1)	3	4	3	3	3	3	3	3	3	4	3	4	4
Hayesville and Cecil loams, 15 to 45 percent slopes, severely eroded (B13–VIIe–1)	4	4	4	4	4	4	4	4	4	4	4	4	4
Hayesville, Cecil, and Halewood sandy loams, shallow, 15 to 25 percent slopes (B13–VIe–2)	4	4	4	4	3	3	4	4	4	3	3	4	4
Hayesville, Cecil, and Halewood sandy loams, shallow, 25 to 60 percent slopes (B13–VIIe–2)	4	4	4	4	4	4	4	4	4	4	3	4	4
Hiwassee sandy loam, 2 to 6 percent slopes, eroded (B10–IIe–1)	1	3	1	1	1	1	1	1	2	2	3	2	1
Hiwassee sandy loam, 6 to 10 percent slopes, eroded (B10–IIIe–1)	1	3	2	2	2	2	2	2	3	2	3	2	2
Hiwassee sandy loam, 15 to 25 percent slopes, eroded (B10–VIe–2)	4	4	4	4	3	3	4	4	4	3	3	4	4
Hiwassee clay loam, 10 to 15 percent slopes, severely eroded (B10–IVe–1)	3	4	3	3	3	3	3	3	3	4	4	4	3
Lloyd sandy loam, 2 to 6 percent slopes, eroded (B10–IIe–1)	2	2	1	1	1	1	1	2	2	1	3	1	1
Lloyd sandy loam, 6 to 10 percent slopes (B10–IIIe–1)	1	2	1	1	1	1	1	2	2	1	3	2	1
Lloyd sandy loam, 6 to 10 percent slopes, eroded (B10–IIIe–1)	2	2	2	2	1	1	1	2	2	2	3	2	2
Lloyd sandy loam, 10 to 15 percent slopes, eroded (B10–IVe–1)	3	4	2	2	2	2	2	2	3	2	3	2	2
Lloyd sandy loam, 15 to 25 percent slopes, eroded (B10–VIe–2)	4	4	4	4	2	2	4	4	4	3	3	3	3
Lloyd sandy loam, 25 to 35 percent slopes (B10–VIIe–1)	4	4	4	4	4	4	4	4	4	3	3	4	4

See footnotes at end of table.

TABLE 2.—*Relative suitability of the soils for specified crops*—Continued

Soil and capability unit	Cotton [1]	Corn [2]	Oats	Wheat	Pasture		Grain sorghum	Peppers	Tobacco	Grapes	Apples	Alfalfa	Annual lespedeza
					Summer	Winter							
Lloyd clay loam, 2 to 6 percent slopes, severely eroded (B10–IIIe–1)	2	4	3	3	3	3	3	3	3	4	4	3	3
Lloyd clay loam, 6 to 10 percent slopes, severely eroded (B10–IIIe–1)	3	4	3	3	3	3	3	3	4	4	4	3	3
Lloyd clay loam, 10 to 15 percent slopes, severely eroded (B10–IVe–1)	4	4	4	4	3	3	4	4	4	4	4	4	4
Lloyd clay loam, 15 to 35 percent slopes, severely eroded (B10–VIe–2)	4	4	4	4	3	3	4	4	4	4	4	4	4
Lloyd loam, moderately shallow, 15 to 25 percent slopes, eroded (B13–VIe–1)	4	4	4	4	3	3	4	4	4	3	3	4	4
Lloyd loam, moderately shallow, 25 to 40 percent slopes (B13–VIe–1)	4	4	4	4	3	3	4	4	4	4	4	4	4
Local alluvial land (B10–I–1)	1	1	1	1	1	1	1	2	4	4	4	2	1
Madison fine sandy loam, high, 2 to 6 percent slopes (B13–IIe–3)	4	2	2	2	2	1	2	2	2	2	1	2	2
Madison fine sandy loam, high, 6 to 10 percent slopes (B13–IIIe–3)	4	2	2	2	2	1	2	2	2	2	1	2	2
Madison fine sandy loam, high, 6 to 10 percent slopes, eroded (B13–IIIe–3)	4	2	2	2	2	2	2	2	1	2	2	2	2
Madison fine sandy loam, high, 10 to 15 percent slopes (B13–IVe–2)	4	2	2	2	2	2	2	2	2	2	2	2	2
Madison fine sandy loam, high, 10 to 15 percent slopes, eroded (B13–IVe–2)	4	3	2	2	2	3	2	3	2	2	2	2	2
Madison fine sandy loam, high, 15 to 25 percent slopes (B13–VIe–1)	4	4	4	4	2	2	4	4	4	3	2	3	3
Madison fine sandy loam, high, 15 to 25 percent slopes, eroded (B13–VIe–1)	4	4	4	4	2	2	4	4	4	3	2	4	4
Madison fine sandy loam, high, 25 to 40 percent slopes (B13–VIIe–1)	4	4	4	4	4	4	4	4	4	3	2	4	4
Madison loam, high, 15 to 25 percent slopes, severely eroded (B13–VIIe–1)	4	4	4	4	4	4	4	4	4	3	2	4	4
Madison sandy loam, 6 to 10 percent slopes, eroded (B10–IIIe–1)	1	2	1	1	2	2	1	2	1	1	3	2	2
Madison sandy loam, 10 to 15 percent slopes, eroded (B10–IVe–1)	2	3	2	2	2	2	2	2	2	2	3	2	2
Madison sandy loam, 15 to 30 percent slopes, eroded (B10–VIe–2)	4	4	4	4	3	3	4	4	4	3	3	4	4
Mixed alluvial land (B10–IIw–2)	4	1	1	2	1	1	1	2	4	4	4	4	1
Mixed wet alluvial land (B10–IVw–1)	4	4	4	4	4	4	4	4	4	4	4	4	4
Porters loam, 25 to 45 percent slopes (B13–VIe–1)	4	4	4	4	2	2	4	4	4	2	1	4	3
Porters stony loam, 25 to 45 percent slopes (B13–VIe–1)	4	4	4	4	2	2	4	4	4	2	2	4	4
State fine sandy loam (B10–I–3)	2	1	1	1	1	1	1	2	2	4	4	2	1
Stony land (B13–VIIe–2)	4	4	4	4	4	4	4	4	4	4	4	4	4
Talladega and Chandler loams, 10 to 25 percent slopes (B13–VIe–2)	4	4	4	4	3	3	4	4	4	4	3	4	4
Talladega and Chandler loams, 25 to 60 percent slopes (B13–VIIe–2)	4	4	4	4	4	4	4	4	4	4	4	4	4

See footnotes at end of table.

TABLE 2.—*Relative suitability of the soils for specified crops*—Continued

Soil and capability unit	Cotton [1]	Corn [2]	Oats	Wheat	Pasture		Grain sorghum	Peppers	Tobacco	Grapes	Apples	Alfalfa	Annual lespedeza
					Summer	Winter							
Watauga fine sandy loam, 2 to 6 percent slopes, eroded (B13–IIe–2)	4	2	2	2	2	2	2	4	2	2	2	3	2
Watauga fine sandy loam, 6 to 10 percent slopes, eroded (B13–IIIe–2)	4	2	2	2	2	2	2	4	2	2	2	3	2
Watauga fine sandy loam, 10 to 25 percent slopes, eroded (B13–IVe–1)	4	3	3	3	2	2	3	4	4	2	2	4	4
Watauga fine sandy loam, 25 to 40 percent slopes (B13–VIe–1)	4	4	4	4	3	3	4	4	4	3	3	4	4
Wickham sandy loam, 2 to 6 percent slopes (B10–IIe–1)	1	1	1	1	1	1	1	1	2	2	4	1	1
Wickham sandy loam, 2 to 6 percent slopes, eroded (B10–IIe–1)	1	2	1	1	1	1	1	1	2	2	4	2	2
Wickham sandy loam, 6 to 10 percent slopes, eroded (B10–IIIe–1)	1	2	2	2	2	2	2	2	2	2	4	2	2
Wickham sandy loam, 10 to 15 percent slopes, eroded (B10–IVe–1)	2	3	3	3	3	3	3	3	3	4	4	3	3
Wickham sandy loam, 15 to 25 percent slopes, eroded (B10–VIe–2)	4	4	4	4	2	2	4	4	4	4	4	4	4
Wickham clay loam, 6 to 10 percent slopes, severely eroded (B10–IVe–1)	3	4	3	3	2	2	3	3	4	4	4	3	3
Worsham sandy loam, 0 to 6 percent slopes (B10–Vw–1)	4	4	4	4	3	3	4	4	4	4	4	4	3
Worsham sandy loam, 6 to 15 percent slopes, eroded (B10–VIe–2)	4	4	4	4	3	3	4	4	4	4	4	4	4

[1] The suitability ratings for cotton are based on yields to be expected under improved management (see table 1). Number 1 indicates an average acre yield of more than 600 pounds; 2, 401 to 600 pounds; 3, 251 to 400 pounds; and 4, 0 to 250 pounds.

[2] The suitability ratings for corn are based on yields to be expected under improved management (see table 1). Number 1 indicates an average acre yield of more than 70 bushels; 2, 51 to 70 bushels; 3, 31 to 50 bushels; and 4, 0 to 30 bushels.

Woodland

The original forest of Oconee County consisted of hardwoods and some pine. The mature trees were commonly of massive size because of the deep, friable soils and ample, well-distributed rainfall.

As land was cleared and subsequently abandoned, the original hardwood forest was replaced by pure pine stands (*7*).[1] Now, pine is being replaced by hardwoods. Better protection from fire and the heavy cutting of pine in mixed stands have speeded up the natural succession of hardwoods. In places the cutting of pine in mixed stands is leaving an overstory of poor-quality hardwoods. Littleleaf disease of pine has been partly responsible for the conversion of some stands to hardwoods (*4*).

About 65 percent of the total acreage of Oconee County is now in woodland. Interest in woodland management has been stimulated by the rapid expansion of the pulp and paper industry in South Carolina. There are several certified tree farms in the county, totaling approximately 65,000 acres of well-managed woodland.

Forest industries are numerous in the county and are of vast economic importance (fig. 15). Markets exist for pulpwood, veneer belts, sawlogs, and other forest products.

***Figure 15.*—Woodland industries in Oconee County provide a source of income for many families.**

In the Piedmont, the most important conifers are loblolly pine, shortleaf pine, Virginia pine, and redcedar. Important hardwoods are yellow-poplar, sweetgum, cottonwood, blackgum, ash, and oak.

[1] Italic numbers in parentheses refer to Literature Cited, p. 85.

In the Blue Ridge Mountains the most important conifers are white pine, pitch pine, shortleaf pine, Virginia pine, hemlock, and redcedar. Commercial Appalachian hardwoods are numerous. These include chestnut oak, white oak, northern red oak, southern red oak, scarlet oak, black oak, black locust, black walnut, black cherry, white ash, and yellow-poplar.

Woodland Suitability Groups

The soils of Oconee County have been placed in 20 woodland suitability groups. The soils in each group are similar in major characteristics. Groups 1 through 10 include soils of the Piedmont. Groups 11 through 19 include soils of the Blue Ridge Mountains. Miscellaneous

TABLE 3.—*Woodland suitability groups and*

Woodland group	Site index [1]				
	Loblolly pine	Shortleaf pine	Virginia pine	White pine	Pitch pine
Group 1 Somewhat poorly drained soils on first bottoms.	110	90			
Group 2 Deep, friable, well-drained soils on first bottoms.	90 to 100	70 to 100			
Group 3 Deep, well-drained soils that have a firm, yellowish-brown subsoil and are on second terraces.	90				
Group 4 Deep, moderately well drained and well drained soils that have a firm, mottled subsoil.	80 to 90	60 to 70	70		
Group 5 Poorly drained soils on first bottoms.	80 to 90	70 to 80			
Group 6 Deep, mostly well-drained soils that have a friable sandy loam surface layer and a firm, red, clayey subsoil.	80 to 90	60 to 80	70 to 80		
Group 7 Moderately deep to deep, severely eroded soils that have a clay loam surface layer and a firm, red, clayey subsoil.	80	60	70		
Group 8 Deep, well-drained soils that have a friable loam or sandy loam surface layer and a firm, dark-red, clayey subsoil.	70 to 80	60 to 70			
Group 9 Moderately deep to deep soils that have a loam or sandy loam surface layer and a firm, clayey subsoil, and that have slopes of more than 15 percent; and moderately deep soils that have a clay loam surface layer and a very firm subsoil.	70 to 80	60 to 70	60		
Group 10 Deep, excessively drained soils on stream terraces.		50			
Group 11 Droughty, shallow soils that have a thin or discontinuous, weakly developed B horizon and have slopes of 10 to 60 percent.					
Group 12 Moderately deep soils that have a friable, dark-gray surface layer and a firm to friable, red clay loam subsoil.		70 to 80	70 to 80		
Group 13 Slightly to moderately eroded soils that have a friable, dark-gray surface layer and a firm to friable, red clay loam subsoil.		70	70		
Group 14 Severely eroded soils that have a firm to friable, red clay loam subsoil.					
Group 15 Moderately deep, well-drained soils that have a friable, dark-brown loam or stony loam surface layer and a firm, yellowish-red to strong-brown fine sandy clay loam to clay loam subsoil.					

See footnotes at end of table.

land types that are limited in use because of stones or gullies are in group 20.

In table 3 the groups are listed and some factors that affect woodland management are given. The seriousness of a management problem is indicated by the rating *slight*, *moderate*, or *severe*.

Following table 3 is a description of each group. In each description is a list of the soils in the group and facts concerning plant competition, seedling mortality, limitation on use of equipment, windthrow hazard, and other information affecting the suitability of the soils for trees. Some suggestions for woodland management are also given.

factors affecting woodland management

Important species	Interpretations for woodland management					Remarks
	Plant competition [2]	Seedling mortality [3]	Equipment limitation [4]	Windthrow hazard [5]	Erosion hazard [6]	
Bottomland hardwoods, loblolly pine, shortleaf pine.	Severe	Slight to severe.	Moderate	Slight	Slight	Drainage may be required to establish pine and yellow-poplar.
Bottomland hardwoods, loblolly pine, shortleaf pine, white pine.	Severe	Slight	Slight	Slight	Slight	Slash pine is suitable but may be affected by ice damage.
Bottomland hardwoods, loblolly pine, white pine.	Severe	Slight	Slight	Slight	Slight	Slash pine is suitable but may be affected by ice damage.
Loblolly pine, shortleaf pine, Virginia pine, upland hardwoods.	Severe	Slight	Slight	Slight	Slight to moderate.	
Bottomland hardwoods, loblolly pine.	Severe	Slight to severe.	Moderate	Slight	Slight	
Loblolly pine, shortleaf pine, Virginia pine.	Severe	Slight	Moderate to severe.	Slight	Slight to severe.	
Loblolly pine, Virginia pine, shortleaf pine.	Moderate	Slight to severe.	Moderate to severe.	Moderate to severe.	Severe	
Loblolly pine, shortleaf pine, Virginia pine, redcedar.	Severe	Slight	Slight	Slight	Slight to severe.	
Loblolly pine, shortleaf pine, Virginia pine, redcedar.	Moderate	Moderate	Moderate to severe.	Slight to severe.	Slight to severe.	
Loblolly pine, shortleaf pine	Slight	Slight	Slight	Slight	Slight	Subject to occasional overflow.
Shortleaf pine, Virginia pine, pitch pine, Appalachian hardwoods.	Moderate	Moderate to severe.	Severe	Very severe	Moderate to severe.	
Shortleaf pine, Virginia pine, white pine, hemlock, Appalachian hardwoods.	Severe	Slight	Slight	Slight	Moderate	
Shortleaf pine, Virginia pine, white pine, hemlock, Appalachian hardwoods.	Moderate	Moderate	Moderate to severe.	Moderate to severe.	Severe	
Virginia pine, shortleaf pine	Severe	Moderate to severe.	Moderate to severe.	Moderate to severe.	Very severe	
In mountains: Appalachian hardwoods, white pine, hemlock, shortleaf pine, pitch pine. *In foothills:* Shortleaf pine, Virginia pine, loblolly pine.	Severe	Slight	Severe	Slight	Very severe	

See footnotes at end of table.

TABLE 3.—*Woodland suitability groups and*

Woodland group	Site index [1]				
	Loblolly pine	Shortleaf pine	Virginia pine	White pine	Pitch pine
Group 16 Moderately deep, well-drained soils that have a friable fine sandy loam surface layer and a friable, red to yellowish-brown clay loam subsoil.					
Group 17 Shallow, well-drained soils that have a friable fine sandy loam or loam surface layer and a friable, red to yellowish-brown clay loam subsoil.					
Group 18 Moderately deep, well-drained soils that have a friable fine sandy loam surface layer and a firm to friable, yellowish-brown to yellowish-red, silty clay loam to clay loam subsoil.					
Group 19 Moderately deep to shallow, well-drained to excessively drained soils that have a friable fine sandy loam surface layer and a firm to friable, yellowish-brown to yellowish-red clay loam to silty clay loam subsoil.					
Group 20 Miscellaneous land types that are limited in use because of stones or gullies.					

[1] The site index is the height, in feet, that a tree of a given species, growing on a given soil, in an even-aged, well-managed stand, will attain in 50 years. The figures are rounded to the nearest 10-foot site class. The site indexes are tentative and are subject to revision. They are based on field studies by the Soil Conservation Service and the South Carolina State Commission of Forestry.

[2] The rating of slight indicates that plant competition does not impede the natural regeneration of the designated species; a rating of moderate, that competition may delay but does not prevent regeneration; and a rating of severe, that natural regeneration cannot be relied upon to restock the site and that seedlings must be planted and measures taken to remove competing plants.

[3] A rating of slight indicates that ordinarily no more than 25 percent of either planted or naturally occurring seedlings will die, and that one planting will probably produce a satisfactory stand; a rating of moderate indicates that losses will be between 25 and 50 percent; and a rating of severe, that more than half the seedlings will die.

Group 1

Somewhat poorly drained soils on first bottoms

There is only one soil in this group, Chewacla silt loam. This nearly level, moderately deep soil has a well-drained surface layer that is underlain by poorly drained clayey material. This soil is frequently flooded but usually only for short periods. It is moderate in organic-matter content, moderate in fertility, and moderate in water-holding capacity. Infiltration is slow, and permeability is slow. The depth to the water table is about 30 inches.

If supplemental drainage is provided, this soil is suited to loblolly pine and shortleaf pine. Adequate outlets, however, generally are not available. Sweetgum, blackgum, sycamore, ash, elm, water oak, and hickory are important hardwoods. The production potential is high for sawtimber and pulpwood.

Undesirable hardwoods and other vegetation compete severely with pine and selected hardwoods. Intensive treatment is needed to eliminate or control competing vegetation and to prepare sites for restocking with desirable species. Such treatment includes draining sites, clearing sites, cutting brush, disking, furrowing, prescribed burning, and applying herbicides.

The severity of seedling mortality during floods depends on the duration of the floods, the season of the year, and the species involved.

The use of equipment is moderately restricted by the texture of the surface layer, the high water table, and the overflow hazard.

The windthrow hazard and the erosion hazard are slight.

Group 2

Deep, friable, well-drained soils on first bottoms

The soils in this group are nearly level. They consist of mixed alluvial material. They are—

Congaree fine sandy loam.
Congaree silt loam.
Local alluvial land.
Mixed alluvial land.

These soils are moderate in fertility and moderate in organic-matter content. They are moderately low in moisture-holding capacity, but the moisture supply is excellent. Infiltration is moderately rapid, and permeability is moderately rapid.

The preferred species are loblolly pine, shortleaf pine, white pine, yellow-poplar, and sweetgum. The highest site indexes occur on the Congaree soils. Shortleaf pine has a site index of 70 on Local alluvial land and 90 on Mixed alluvial land.

Undesirable hardwoods and other vegetation compete severely with pine and selected hardwoods. Intensive treatment is needed to eliminate or control competing veg-

factors affecting woodland management—Continued

Important species	Interpretations for woodland management					Remarks
	Plant competition [2]	Seedling mortality [3]	Equipment limitation [4]	Windthrow hazard [5]	Erosion hazard [6]	
Virginia pine, shortleaf pine, white pine, Appalachian hardwoods.	Severe	Slight to moderate.	Slight to moderate.	Slight to moderate.	Slight to moderate.	Pine species better suited.
Virginia pine, shortleaf pine	Severe	Moderate to severe.	Severe	Moderate to severe.	Severe	
Shortleaf pine, Virginia pine, white pine, Appalachian hardwoods.	Severe	Slight to moderate.	Slight to moderate.	Slight to moderate.	Slight to moderate.	
Shortleaf pine, Virginia pine, white pine.	Severe	Moderate to severe.	Moderate to severe.	Moderate to severe.	Severe	
Varied	Varied	Varied	Varied	Varied	Varied	

[4] A rating of slight indicates that any kind of equipment commonly used in crop tending or tree harvesting can be used at any time of the year; a rating of moderate, that most types of equipment can be used and that there are periods of no more than 3 months when the use of equipment is restricted; a rating of severe, that the kinds of equipment that can be used are limited and that, for periods of 3 months or more, equipment cannot be used without danger of serious damage to the soil.

[5] A rating of slight indicates that individual trees will withstand normal winds, even when released on all sides; a rating of moderate, that trees will remain standing unless the wind is of high velocity or the soil is excessively wet; a rating of severe, that the soil does not allow adequate rooting for stability.

[6] Refers to potential erosion hazard when the area is managed according to current acceptable standards.

etation and to prepare sites for restocking with desirable species. Such treatment includes clearing sites, cutting brush, disking, furrowing, prescribed burning, and applying herbicides.

Seedling mortality, limitations on use of equipment, and the windthrow and erosion hazards are slight.

During droughts, sweetgum may be affected by dieback.

Group 3

Deep, well-drained soils that have a firm, yellowish-brown subsoil and are on second terraces

There is only one soil in this group, State fine sandy loam. This soil is subject to overflow only when the water is unusually high. It is moderate in organic-matter content, moderate in fertility, and moderate in water-holding capacity. The rate of infiltration is moderate, and permeability is moderate.

Loblolly pine, white pine, yellow-poplar, and sweetgum are the preferred species, but hemlock and numerous hardwoods are suitable. The production potential for sawtimber, poles, piling, veneer, and pulpwood is high.

Undesirable hardwoods and other vegetation compete severely with pine and selected hardwoods. Intensive treatment is needed to eliminate or control competing vegetation and to prepare sites for restocking with desirable species. Such treatment includes clearing sites, cutting brush, disking, furrowing, prescribed burning, and applying herbicides.

Seedling mortality, limitations on use of equipment, and the windthrow and erosion hazards are slight.

During droughts, sweetgum may be affected by dieback.

Group 4

Deep, moderately well drained and well drained soils that have a firm, mottled subsoil

The soils in this group are low to moderately low in organic-matter content, low to moderate in fertility, and moderately low to moderate in water-holding capacity. The rate of infiltration is moderately slow, and permeability is moderately slow. The soils in this group are—

Altavista sandy loam, 0 to 6 percent slopes, eroded.
Appling sandy loam, 2 to 6 percent slopes.
Appling sandy loam, 2 to 6 percent slopes, eroded.
Appling sandy loam, 6 to 10 percent slopes, eroded.
Appling sandy loam, 10 to 15 percent slopes, eroded.
Appling sandy loam, 15 to 30 percent slopes.

These soils are well suited to species preferred for saw logs and pulpwood. Interest in the production of hardwoods has been increased by a recent trend to use mixed hardwoods for fiber. The highest site indexes shown in table 3 apply where erosion is slight.

The Altavista soil is on second bottoms and terraces along the larger streams. It is flooded only during ex-

tremely high water. This soil has a high potential for the production of timber. Loblolly pine and white pine, as well as sweetgum, yellow-poplar, and other desirable lowland hardwoods, are preferred for saw-log rotations.

The Appling soils are on uplands. Their subsoil and parent material are high in potassium. Upland hardwoods grow profusely on these soils, but the preferred species for saw-log rotations are loblolly pine and shortleaf pine.

Undesirable hardwoods and other vegetation compete severely with pine and selected hardwoods. Intensive treatment is needed to eliminate or control competing vegetation and to prepare sites for restocking with desirable species. Such treatment includes clearing sites, cutting brush, disking, furrowing, prescribed burning, and applying herbicides.

In planted stands, the survival of more than 75 percent of the seedlings can be expected if proper planting techniques are used.

On the steeper slopes there is a moderate restriction on the use of equipment; elsewhere, there is no restriction.

Windthrow is not a hazard during winds of normal velocity. Erosion is a moderate hazard on slopes of more than 10 percent. If possible, operations that would disturb the protective ground cover in these areas should be avoided.

Attacks by insects and disease are not serious, but during droughts sweetgum may be affected by diebeck.

Group 5

Poorly drained soils on first bottoms

The soils in this group are moderately deep and have a firm subsoil. They are subject to frequent overflow. They are—

Mixed wet alluvial land.
Worsham sandy loam, 0 to 6 percent slopes.

These soils are slow in infiltration, slow in permeability, moderate in water-holding capacity, moderately low in organic-matter content, and low in fertility. Seepage from higher areas collects on these soils, and the water table is near the surface.

If drainage is adequate, the production potential for pine is medium to high. Loblolly pine and shortleaf pine are the preferred species. Generally, drainage is not adequate, and sweetgum, blackgum, oaks, maples, and other hardwoods predominate. These soils are suited to timber rotations.

Undesirable hardwoods and other vegetation compete severely with pine and selected hardwoods. Intensive treatment is needed to eliminate or control competing vegetation and to prepare sites for restocking with desirable species. Such treatment includes draining sites, clearing sites, cutting brush, disking, furrowing, prescribed burning, and applying herbicides.

The rate of seedling mortality depends on the duration of excessive seepage or overflow, the season of the year, and the species involved.

The use of equipment is moderately restricted by excess seepage and poor drainage.

The windthrow hazard and the erosion hazard are slight.

Group 6

Deep, mostly well-drained soils that have a friable sandy loam surface layer and a firm, red clayey subsoil

The soils in this group are in the Piedmont. They are—

Cecil sandy loam, 2 to 6 percent slopes.
Cecil sandy loam, 2 to 6 percent slopes, eroded.
Cecil sandy loam, 6 to 10 percent slopes.
Cecil sandy loam, 6 to 10 percent slopes, eroded
Cecil sandy loam, 10 to 15 percent slopes.
Cecil sandy loam, 10 to 15 percent slopes, eroded.
Cecil sandy loam, 15 to 25 percent slopes.
Cecil sandy loam, 15 to 25 percent slopes, eroded.
Cecil sandy loam, 25 to 35 percent slopes.
Cecil sandy loam, 25 to 35 percent slopes, eroded.
Madison sandy loam, 6 to 10 percent slopes, eroded.
Madison sandy loam, 10 to 15 percent slopes, eroded.
Madison sandy loam, 15 to 30 percent slopes, eroded.
Wickham sandy loam, 2 to 6 percent slopes.
Wickham sandy loam, 2 to 6 percent slopes, eroded.
Wickham sandy loam, 6 to 10 percent slopes, eroded.
Wickham sandy loam, 10 to 15 percent slopes, eroded.
Wickham sandy loam, 15 to 25 percent slopes, eroded.
Worsham sandy loam, 6 to 15 percent slopes, eroded.

Infiltration generally is moderate where erosion is slight and moderately slow where erosion is moderate and slopes are more than 15 percent. Permeability is moderate in all of the soils in this group except the Worsham soil, which is slowly permeable. The water-holding capacity is high where erosion is slight and slopes are less than 10 percent. It is moderately high both where erosion is slight and slopes are from 10 to 25 percent and where erosion is moderate and slopes are 15 percent or less. The water-holding capacity is moderate both where erosion is slight and slopes are more than 25 percent and where erosion is moderate and slopes are 15 percent or more.

These soils are suited to species that can be used for sawtimber and pulpwood, but loblolly pine and shortleaf pine are the preferred species. The Worsham soil, which receives seepage, is suited to sweetgum, blackgum, oaks, and maples.

Generally, the higher site indexes shown in table 3 apply only to soils that have slopes of less than 6 percent, but occasionally they apply to steeper soils that have an adequate water supply.

Undesirable hardwoods and other vegetation compete severely with pine and selected hardwoods. Intensive treatment is needed to eliminate or control competing vegetation and to prepare sites for restocking with desirable species. Such treatment includes clearing sites, cutting brush, disking, furrowing, prescribed burning, and applying herbicides.

The seedling mortality is slight.

The use of equipment is moderately restricted both on moderately eroded soils that have slopes of 10 to 25 percent and on slightly eroded soils that have slopes of more than 25 percent. The restriction is severe on moderately eroded soils that have slopes of more than 25 percent. The use of some types of equipment is moderately restricted by seepage on the Worsham soil and by occasional overflow on the Wickham soils.

The windthrow hazard generally is slight. The erosion hazard is slight on slightly eroded soils that have slopes of less than 15 percent; moderate both on slightly eroded soils that have slopes of 15 to 25 percent and on moderately eroded soils that have slopes of less than 15 percent; and

severe both on slightly eroded soils that have slopes of more than 25 percent and on moderately eroded soils that have slopes of 15 percent or more. Where possible, operations that destroy the protective ground cover or disturb the surface soil should be avoided. Roads or firebreaks should be constructed on the contour.

Group 7

Moderately deep to deep, severely eroded soils that have a clay loam surface layer and a firm, red clayey subsoil.

This group consists of well-drained soils that are low in fertility, very low in organic-matter content, and very low in water-holding capacity. Infiltration is slow, and permeability is moderate. These soils are—

Cecil clay loam, 2 to 6 percent slopes, severely eroded.
Cecil clay loam, 6 to 10 percent slopes, severely eroded.
Cecil clay loam, 10 to 15 percent slopes, severely eroded.
Cecil clay loam, 15 to 25 percent slopes, severely eroded.
Wickham clay loam, 6 to 10 percent slopes, severely eroded.

These soils are suited to species that can be used for sawtimber and pulpwood, but their production potential is decreased because of severe erosion. The preferred species are loblolly pine, shortleaf pine, and Virginia pine.

These soils are not suited to hardwoods. The competition of undesirable hardwoods and other vegetation with pine is moderate. Some preparation of seedbeds or control of undesirable vegetation may facilitate the establishment of pine, but ordinarily its establishment is only delayed and not prevented by competing vegetation.

On soils that have slopes of 10 to 25 percent, seedling mortality generally is more than 50 percent of the planted stock. Special treatment, such as site improvement and replanting, is needed. On the other soils in this group, seedling mortality usually is slight.

The use of equipment is restricted to some extent by slope and erosion. This restriction is moderate on soils that have slopes of less than 15 percent and severe on soils that have slopes of 15 percent or more.

On soils that have slopes of 15 to 25 percent, the windthrow hazard is severe. On the other soils, the hazard is moderate, but individual trees that have been exposed by thinning or cutting operations may be blown over during winds of highest normal velocity.

The erosion hazard is severe on all of the soils in this group. Any operation that destroys the protective ground cover should be avoided if possible. Roads or firebreaks should be constructed on the contour.

Shortleaf pine is susceptible to considerable damage by littleleaf disease.

Group 8

Deep, well-drained soils that have a friable loam or sandy loam surface layer and a firm, dark-red clayey subsoil

The soils in this group are moderate to high in fertility, moderate in organic-matter content, and moderate to high in water-holding capacity. Infiltration is moderately slow, and permeability is moderately slow. These soils are—

Davidson loam, 2 to 10 percent slopes, eroded.
Hiwassee sandy loam, 2 to 6 percent slopes, eroded.
Hiwassee sandy loam, 6 to 10 percent slopes, eroded.
Lloyd sandy loam, 2 to 6 percent slopes, eroded.
Lloyd sandy loam, 6 to 10 percent slopes.
Lloyd sandy loam, 6 to 10 percent slopes, eroded.
Lloyd sandy loam, 10 to 15 percent slopes, eroded.

These soils are suited to species that can be used for sawtimber and pulpwood. Upland hardwoods are suitable, but loblolly pine and shortleaf pine are the preferred species.

Undesirable hardwoods and other vegetation compete severely with pine and selected hardwoods. Intensive treatment is needed to eliminate or control competing vegetation and to prepare sites for restocking with desirable species. Such treatment includes controlling drainage, clearing sites, cutting brush, disking, furrowing, prescribed burning, and applying herbicides.

Seedling mortality, limitations on use of equipment, and the windthrow hazard are slight.

The erosion hazard is slight on most of the soils in this group. It is moderate on Lloyd sandy loam, 6 to 10 percent slopes, eroded, and severe on Lloyd sandy loam, 10 to 15 percent slopes, eroded. Where the hazard is severe, any operation that destroys the protective ground cover should be avoided. Where roads or firebreaks are necessary, they should be constructed on the contour.

Shortleaf pine is susceptible to littleleaf disease.

Group 9

Moderately deep to deep soils that have a loam or sandy loam surface layer and a firm, clayey subsoil, and that have slopes of more than 15 percent; and moderately deep soils that have a clay loam surface layer and a very firm subsoil

This group consists of well-drained soils that are moderate to low in fertility, moderate to low in organic-matter content, and moderate to moderately low in water-holding capacity. Infiltration is moderately slow, and permeability is moderately slow. The soils are—

Hiwassee clay loam, 10 to 15 percent slopes, severely eroded.
Hiwassee sandy loam, 15 to 25 percent slopes, eroded.
Lloyd sandy loam, 15 to 25 percent slopes, eroded.
Lloyd sandy loam, 25 to 35 percent slopes.
Lloyd clay loam, 2 to 6 percent slopes, severely eroded.
Lloyd clay loam, 6 to 10 percent slopes, severely eroded.
Lloyd clay loam, 10 to 15 percent slopes, severely eroded.
Lloyd clay loam, 15 to 35 percent slopes, severely eroded.
Lloyd loam, moderately shallow, 15 to 25 percent slopes, eroded.
Lloyd loam, moderately shallow, 25 to 40 percent slopes.

These soils are suited to species that can be used for sawtimber and pulpwood. Loblolly pine and shortleaf pine are the preferred species.

These soils are not well suited to hardwoods. The competition of undesirable hardwoods and other vegetation with pine is moderate. Some preparation of seedbeds and control of vegetation may be beneficial in establishing pine, but generally the growth of pine is only slowed by competing vegetation.

On most of these soils, seedling survival ranges from 50 to 75 percent of the planted stock, but on severely eroded clay loams that have slopes of more than 10 percent it is 50 percent or less of the planted stock. These severely eroded soils need to be carefully prepared for planting, and replanting may be necessary.

The use of equipment is moderately restricted on eroded loams and sandy loams that have slopes of less than 25 percent and on severely eroded clay loams that have slopes

of less than 10 percent. The restriction is severe on loams and sandy loams that have slopes of more than 25 percent and on severely eroded clay loams that have slopes of more than 10 percent.

The windthrow hazard is slight on sandy loams that have slopes of less than 15 percent, moderate on loams and sandy loams that have slopes of 15 to 40 percent, and severe on clay loams. Where windthrow is common, salvage cuttings and shorter rotations may be necessary.

The erosion hazard is generally severe. Operations that destroy the protective ground cover should be avoided, if possible. Roads and firebreaks should be constructed on the contour.

Group 10

Deep, excessively drained soils on stream terraces

There is only one soil in this group, Buncombe loamy sand. This very friable soil is subject to occasional overflow. It is low in fertility, low in organic-matter content, and low in water-holding capacity. Infiltration is rapid, and permeability is rapid.

This soil is not suited to commercial hardwoods. The preferred species are shortleaf pine and loblolly pine. The production potential is low, however, and it is more economical to use smaller species for saw logs and pulpwood.

Plant competition, seedling mortality, limitations on use of equipment, and windthrow and erosion hazards are slight. Some preparation of seedbeds may facilitate the regeneration of the preferred species.

Group 11

Droughty, shallow soils that have a thin or discontinuous, weakly developed B horizon and have slopes of 10 to 60 percent

This group consists of friable soils that are moderately low in fertility, moderate in organic-matter content, and low to very low in water-holding capacity. They are moderately rapid to very rapid in rate of infiltration, and moderately rapid to rapid in permeability. These soils are—

Ashe sandy loam, 25 to 50 percent slopes.
Hayesville, Cecil, and Halewood sandy loams, shallow, 15 to 25 percent slopes.
Hayesville, Cecil, and Halewood sandy loams, shallow, 25 to 60 percent slopes.
Talladega and Chandler loams, 10 to 25 percent slopes.
Talladega and Chandler loams, 25 to 60 percent slopes.

On northerly exposures or on cool, moist sites, the preferred species are beech, yellow-poplar, hemlock, white pine, shortleaf pine, redcedar, northern red oak, southern red oak, white oak, and white ash. On southerly exposures or on warm, dry sites, the preferred species are Virginia pine, shortleaf pine, pitch pine, black oak, scarlet oak, chestnut oak, and Spanish oak. Northerly exposures are more favorable to timber production than the warmer, drier southerly exposures.

The production potential for these soils is comparatively low, because the moisture supply is generally inadequate. Average site indexes have not been determined. Local field inspections will indicate the site potential.

Competition is so severe that selection of specific species may not be feasible because of the intensive treatment required. Controlling undesirable species is difficult because of the steep slopes, the variety of species, the heavy brush cover, and the low production potential. Girdling, cutting, and applying herbicides are the best control measures.

Seedling mortality varies from moderate for drought-tolerant species, such as oaks, to very severe for intolerant species, such as yellow-poplar. The limited moisture supply and the shallow surface layer make it difficult for seedlings to become established. Special site treatment and replanting are necessary to establish selected species.

The use of equipment is severely restricted by the steep slopes. Extreme difficulties are encountered during logging and other operations. Some areas are inaccessible to ground equipment.

The erosion hazard is severe because of the shallow solum and steep slopes. Roads should be constructed on the contour and should be graded to permit excess water to run off without causing serious erosion. Ground cover and humus help to stabilize these soils and should be disturbed as little as possible.

The windthrow hazard is moderate to severe, depending on the thickness of the surface layer and the species of trees. In some places, the underlying rock is within 4 inches of the surface. The hazard is not severe in areas where fractures in the underlying rock are common or where the root zone is thicker.

Group 12

Moderately deep soils that have a friable, dark-gray surface layer and a firm to friable, red clay loam subsoil

The soils in this group are well drained and are slightly to moderately eroded. They are moderately high in fertility, moderately high in organic-matter content, and high in water-holding capacity. Infiltration is moderate, and permeability is moderately rapid. These soils are—

Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes.
Hayesville and Cecil fine sandy loams, 6 to 10 percent slopes.
Hayesville and Cecil fine sandy loams, 6 to 10 percent slopes, eroded.
Hayesville and Cecil fine sandy loams, 10 to 15 percent slopes.

These soils are suited to species that can be used for saw logs. Their production potential is determined by the species, topographic position, and exposure. Northerly exposures generally are more productive than the warmer, drier southerly exposures. On northerly exposures the preferred species are white pine, hemlock, yellow-poplar, northern red oak, southern red oak, white oak, and ash. On southerly exposures the preferred species are Virginia pine, shortleaf pine, chestnut oak, black oak, scarlet oak, and Spanish oak.

Undesirable hardwoods and other vegetation compete severely with pine and selected hardwoods. Intensive treatment is needed to eliminate or control competing vegetation and to prepare sites for restocking with desirable species. Such treatment includes clearing sites, cutting brush, disking, and applying herbicides.

Seedling mortality is slight. The survival of 75 percent or more of the planted stock can be expected if proper planting techniques are used and weather conditions are normal. Natural regeneration is satisfactory if sites are prepared and the seed supply is adequate.

The use of equipment is not restricted, except immediately after rains. Windthrow is no special problem.

The erosion hazard is moderate. Ground cover and humus help to stabilize these soils. Consequently, road construction and other operations that disturb the ground cover should be avoided, if possible. Where necessary, construction should be on the contour.

Group 13

Slightly to moderately eroded soils that have a friable, dark-gray surface layer and a firm to friable, red clay loam subsoil

Most of the soils in this group are moderately deep and well drained. The eroded soils that have slopes of more than 25 percent are shallow to moderately deep. The soils in this group are—

Hayesville and Cecil fine sandy loams, 10 to 15 percent slopes, eroded.
Hayesville and Cecil fine sandy loams, 15 to 25 percent slopes.
Hayesville and Cecil fine sandy loams, 15 to 25 percent slopes, eroded.
Hayesville and Cecil fine sandy loams, 25 to 45 percent slopes.
Hayesville and Cecil fine sandy loams, 25 to 45 percent slopes. eroded.

Infiltration is moderate on the soils that have slopes of less than 25 percent. It is moderately slow on soils that have slopes of more than 25 percent. Fertility is moderate on soils that have slopes of more than 25 percent and moderately high on the other soils in this group. The water-holding capacity is moderate, and the organic-matter content is high.

The production potential of these soils is determined by the species, topographic position, and exposure. Northerly exposures generally are more productive than the warmer, drier, southerly exposures. On northerly exposures the preferred species are white pine, hemlock, yellow-poplar, northern red oak, southern red oak, and ash. On southerly exposures the preferred species are Virginia pine, shortleaf pine, chestnut oak, black oak, scarlet oak, and Spanish oak.

Undesirable hardwoods and other vegetation compete with pine and selected hardwoods. Intensive treatment is needed to eliminate or control competing vegetation and to prepare sites for restocking with desirable species. Such treatment includes clearing sites, cutting brush, disking, and applying herbicides.

Seedling mortality is moderate because of the moderate water-holding capacity. The expected survival of seedlings ranges from 50 to 75 percent of the planted stock. Because of the severe erosion hazard, the preparation of sites for planting must be limited, but other intensive treatment, such as mulching, is necessary. The natural regeneration of desirable species cannot be relied on to restock stands.

The use of equipment is moderately restricted on slightly eroded soils having slopes of less than 25 percent. It is severely restricted on steeper slopes. Access to these sites is limited, and road construction is necessary. Logging equipment must be suited to steep slopes.

The windthrow hazard is severe on moderately eroded soils that have slopes of more than 25 percent and a shallow root zone. Salvage cutting generally is needed where individual trees have been exposed by cutting operations. On the other soils, the windthrow hazard is moderate. Windthrow may occur only during winds of highest normal velocity.

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The erosion hazard is severe. The ground cover and humus help to stabilize these soils and should be disturbed as little as possible. Roads should be constructed on the contour and should be graded to permit excess water to run off without causing serious erosion.

Group 14

Severely eroded soils that have a firm to friable, red clay loam subsoil

This group consists of shallow to moderately deep, well-drained soils that have lost most or all of their original surface layer through erosion. These soils are moderately low to low in fertility, moderately low to low in organic-matter content, and moderately low to low in water-holding capacity. Infiltration is moderately slow, and permeability is moderately rapid. The soils in this group are—

Hayesville and Cecil loams, 6 to 10 percent slopes, severely eroded.
Hayesville and Cecil loams, 10 to 15 percent slopes, severely eroded.
Hayesville and Cecil loams, 15 to 45 percent slopes, severely eroded.

The low moisture supply restricts the growth of trees and limits the production potential of these soils. Shortleaf pine, Virginia pine, white pine, hemlock, and Appalachian hardwoods occur on these sites, but their site indexes have not been determined.

Plant competition is severe. Intensive treatment, including applying herbicides, cutting brush, or clearing sites, is needed to control competing vegetation and to prepare sites for planting seed or seedlings.

The expected survival of seedlings ranges from 75 percent to less than 50 percent of the planted stock. Preparing sites, mulching, replanting, or other intensive treatment may be needed to restock stands.

The use of equipment is moderately restricted on soils that have slopes of 15 percent or less. The restriction is severe where the slopes are more than 15 percent.

The windthrow hazard is moderate to severe. Windthrow can be expected where individual trees are exposed by cutting or other operations. The erosion hazard is very severe because of the strong slopes.

Group 15

Moderately deep, well-drained soils that have a friable, dark-brown loam or stony loam surface layer and a firm, yellowish-red to strong-brown fine sandy clay loam to clay loam subsoil

The soils in this group are high in fertility, high in organic-matter content, and moderate in water-holding capacity. Infiltration is moderately rapid, and permeability is moderately rapid to rapid. These soils are—

Porters loam, 25 to 45 percent slopes.
Porters stony loam, 25 to 45 percent slopes.

On the mountains, suitable species are Appalachian hardwoods, pitch pine, shortleaf pine, white pine, and hemlock. On the foothills, suitable species are loblolly pine, shortleaf pine, and Virginia pine.

Average site indexes have not been determined, but the production potential of these soils for selected species is good.

Undesirable hardwoods and other vegetation compete severely with selected species. Intensive treatment, including cutting brush and applying herbicides, is needed.

The survival of 75 percent or more of planted seedlings can be expected if proper planting techniques are used and weather conditions are normal.

The use of equipment is limited by the steep slopes. The windthrow hazard is slight, but the erosion hazard is severe. Operations that disturb the protective ground cover should be avoided, if possible. Roads and firebreaks should be constructed on the contour.

Group 16

Moderately deep, well-drained soils that have a friable fine sandy loam surface layer and a friable, red to yellowish-brown clay loam subsoil

The soils in this group are moderate to moderately low in fertility and moderate to moderately low in organic-matter content. The water-holding capacity is moderate on slopes of 10 percent or less and moderately low on slopes of more than 10 percent. Infiltration is moderate, and permeability is moderate. These soils are—

Madison fine sandy loam, high, 2 to 6 percent slopes.
Madison fine sandy loam, high, 6 to 10 percent slopes.
Madison fine sandy loam, high, 6 to 10 percent slopes, eroded.
Madison fine sandy loam, high, 10 to 15 percent slopes.
Madison fine sandy loam, high, 10 to 15 percent slopes, eroded.
Madison fine sandy loam, high, 15 to 25 percent slopes.
Madison fine sandy loam, high, 15 to 25 percent slopes, eroded.

These soils are suited to Appalachian hardwoods and pine, but the production potential and average site indexes have not been determined.

Plant competition is severe. Intensive treatment is needed to control or eliminate competing vegetation and to prepare sites for planting seed or seedlings. Such treatment includes clearing sites, disking, cutting brush, and applying herbicides.

On the steeper slopes, the low water-holding capacity contributes to seedling mortality, especially during dry spells.

The use of equipment is slightly to moderately restricted on the steeper slopes.

The windthrow hazard is slight. The erosion hazard is slight on slopes of 10 percent or less. On slopes of more than 10 percent, the hazard is moderate, and operations that disturb the protective ground cover should be kept to a minimum.

Group 17

Shallow, well-drained soils that have a friable fine sandy loam or loam surface layer and a friable, red to yellowish-brown clay loam subsoil

The soils in this group are low in fertility, moderate to low in organic-matter content, and low in water-holding capacity. Infiltration is moderately slow to slow, and permeability is moderate. These soils are—

Madison fine sandy loam, high, 25 to 40 percent slopes.
Madison loam, high, 15 to 25 percent slopes, severely eroded.

Virginia pine is the preferred species on the severely eroded soil, and Appalachian hardwoods, shortleaf pine, and white pine are the preferred species on the slightly eroded soil. The production potential for these soils has not been determined.

Competition by undesirable hardwoods and other vegetation is severe. Applying herbicides, girdling, cutting brush, or other intensive treatment is needed to control or eliminate competing vegetation.

On the severely eroded soil, seedling mortality is severe. Less than 50 percent of the planted stock can be expected to survive.

The use of equipment is severely restricted by the steep slopes and erosion. The windthrow hazard is severe on the severely eroded soil and moderate on the slightly eroded soil. The shallow root zone restricts the development of a root system adequate for stability in exposed locations. The erosion hazard is severe because of the shallow solum, previous erosion, and steep slopes.

Group 18

Moderately deep, well-drained soils that have a friable fine sandy loam surface layer and a firm to friable, yellowish-brown to yellowish-red silty clay loam to clay loam subsoil

The soils in this group are moderate in fertility, moderate to moderately high in organic-matter content, and moderate in water-holding capacity. Infiltration is moderate, and permeability is moderately rapid. These soils are—

Halewood fine sandy loam, 2 to 6 percent slopes.
Halewood fine sandy loam, 6 to 10 percent slopes, eroded.
Halewood fine sandy loam, 10 to 15 percent slopes.
Halewood fine sandy loam, 10 to 15 percent slopes, eroded.
Halewood fine sandy loam, 15 to 25 percent slopes.
Watauga fine sandy loam, 2 to 6 percent slopes, eroded.
Watauga fine sandy loam, 6 to 10 percent slopes, eroded.

Appalachian hardwoods, white pine, hemlock, shortleaf pine, and Virginia pine are suitable species. The average site indexes for these trees have not been determined, but from preliminary observations, shortleaf pine would have a site index of 60 to 70; white pine, a maximum of 120; and Virginia pine, 90.

Plant competition is severe, and intensive treatment is needed to control or eliminate competing vegetation and to prepare sites for planting seed or seedlings. Such treatment includes cutting brush, girdling, clearing sites, and applying herbicides.

Seedling mortality is moderate on the eroded soils that have slopes of more than 10 percent. The survival of 50 to 75 percent of the planted stock is expected. Some replanting may be needed to fill large openings in the stands. On the other soils in this group, seedling mortality is slight.

The use of equipment is moderately restricted on soils that have slopes of more than 15 percent. On less sloping soils, the restriction is slight.

The windthrow hazard is moderate on eroded soils. Exposed trees are subject to windthrow during winds of highest normal velocity. There is no special problem on slightly eroded soils.

The erosion hazard is severe both on soils that have slopes of 15 to 25 percent and on eroded soils that have

slopes of 10 to 15 percent; it is moderate both on slightly eroded soils that have slopes of 10 to 15 percent and on eroded soils that have slopes of 6 to 10 percent; and slight on all soils that have slopes of 2 to 6 percent. The protective ground cover should be disturbed as little as possible where the erosion hazard is severe, and roads and firebreaks should be constructed on the contour.

Group 19

Moderately deep to shallow, well-drained to excessively drained soils that have a friable fine sandy loam surface layer and a firm to friable, yellowish-brown to yellowish-red clay loam to silty clay loam subsoil

The soils in this group are low to moderate in fertility, moderate to moderately high in organic-matter content, and low in water-holding capacity. Infiltration is moderate, and permeability is moderately rapid. These soils are—

Halewood fine sandy loam, 15 to 25 percent slopes, eroded.
Halewood fine sandy loam, 25 to 45 percent slopes.
Watauga fine sandy loam, 10 to 25 percent slopes, eroded.
Watauga fine sandy loam, 25 to 40 percent slopes.

Appalachian hardwoods and conifers are suited to these soils, but conifers are preferred on the excessively drained soils that have slopes of 25 to 45 percent. Site indexes and production potentials have not been determined.

Competition is severe, and intensive treatment, such as cutting brush, girdling, and applying herbicides, is needed to eliminate or control competing vegetation.

On eroded soils, the expected survival of seedlings is less than 50 percent of the planted stock. Considerable replanting may be necessary to fill large openings in the stands. On the other soils in this group, the expected survival is 50 to 75 percent of the planted stock.

The use of equipment is moderately to severely restricted, depending on the amount of erosion and the steepness of the slopes. Logging and other operations may be extremely difficult or may not be economical on some sites.

The erosion hazard is very severe. Operations that destroy or disturb the protective ground cover should be avoided. Roads and trails should be constructed on the contour.

The windthrow hazard is moderate to severe, depending on the depth of the root zone. Salvage operations may not be economical.

Group 20

Miscellaneous land types that are limited in use because of stones or gullies

This group consists of miscellaneous land types so varied in characteristics that no detailed descriptions are given. They are—

Gullied land, hilly.
Gullied land, rolling.
Stony land.

Gullied land consisting of friable material generally is suited to species that can be used for sawtimber and pulpwood.

Gullied land consisting of firm material is not suited to species that can be used commercially.

Stony land may be suited to timber production, but the use of equipment is restricted.

Production and Yields

Grano (*5*) states that if the variation in soil quality in the mid-South is considered, stands that are reasonably well-stocked and carefully managed should produce 400 to 500 board feet of sawtimber or 1 to 1½ cords of pulpwood an acre a year. Under favorable conditions, this rate of growth may be exceeded.

Height growth is primarily a function of site and age. Diameter growth is a function of site, age, and spacing. Cutting cycles can be determined with considerable accuracy for each site index. Mitchell (*11*) found that the length of the cutting cycle for all of the important southern pines is about the same for a given site.

Table 4 contains detailed production and yield data for loblolly, longleaf, shortleaf, and slash pines in unmanaged stands.

Table 5 is a composite stand and yield table for natural, fully stocked stands of Virginia pine.

Table 6 is a composite stand and yield table for second-growth upland oaks.

Mackinney and Chaiken (*8*) developed growth, yield, and volume relationships for loblolly pine.

Schumacher and Coile (*15*) present yield tables of well-stocked, natural, even-aged stands, and graphs predicting future yields for understocked and overstocked stands. The species included are slash pine, loblolly pine, longleaf pine, shortleaf pine, pond pine, and sand pine.

Slocum and Miller (*17*) developed a yield table for average, fully stocked stands of Virginia pine in the Hill Demonstration Forest in North Carolina. They also formulated a yield table, in terms of cubic feet, for site indexes 40 to 80.

Olson and Della-Bianca (*12*) show that yellow-poplar is highly sensitive to the various site factors found in the Virginia-Carolina Piedmont. Using yellow-poplar as an index species, equations were completed to estimate the site indexes of seven major species.

Investigations indicate better growth of yellow-poplar on lower slopes and bottoms than on upper slopes. Schomaker (*14*) suggests plantings be confined to the bottoms, the lower two-thirds of northern aspects, and the lower one-third of southern aspects of upland draws. In moister but well-drained areas, plantings may be satisfactory at higher elevations on the slope. On drier sites, plantings should be restricted to the bottoms and the lower slopes of northern aspects, and south-facing slopes should be avoided.

Minckler (*10*) states that it is nearly impossible to grow high-quality hardwoods on poor sites. This is probably related to greater branchiness, slower healing of branch stub knots, and greater susceptibility to defect-producing insects and diseases on poor sites.

Woods and Shanks (*23*) report that oaks comprise at least 41 percent of all replacements in openings where the American chestnut trees were killed by the chestnut blight.

TABLE 4.—*Stand and yield information per acre for well-stocked, unmanaged, normally growing loblolly, longleaf, shortleaf, and slash pines*

[Statistics in this table are compiled from United States Department of Agriculture Miscellaneous Publication No. 50 (*20*)]

LOBLOLLY PINE

Site index	Age	Total merchantable volume			Total height of average dominant trees	Average diameter at breast height	Basal area at breast height	Trees
	Years	*Cu. ft.*	*Cords*	*Bd. ft. (Scribner)*	*Feet*	*Inches*	*Sq. ft.*	*Number*
60	20	1, 500	12	----------	32	3. 6	121	1, 600
	30	2, 750	25	1, 250	45	5. 4	138	850
	40	3, 700	35	4, 500	54	6. 8	147	585
	50	4, 300	41	8, 550	60	7. 9	152	440
	60	4, 700	46	12, 250	64	8. 9	156	360
	70	5, 000	49	15, 250	67	9. 7	158	310
	80	5, 200	51	17, 550	69	10. 4	160	275
70	20	1, 900	17	100	38	4. 3	125	1, 185
	30	3, 350	31	3, 500	52	6. 5	143	640
	40	4, 500	42	9, 400	63	8. 1	151	435
	50	5, 200	50	15, 200	70	9. 4	157	325
	60	5, 700	55	19, 600	75	10. 6	160	270
	70	6, 000	59	22, 550	78	11. 5	163	230
	80	6, 200	62	24, 600	80	12. 3	165	205
80	20	2, 350	22	700	43	5. 0	129	950
	30	4, 000	38	6, 500	59	7. 4	147	510
	40	5, 300	51	14, 800	72	9. 2	156	345
	50	6, 150	60	21, 700	80	10. 7	162	255
	60	6, 650	66	26, 400	85	12. 0	165	210
	70	7, 000	70	29, 500	89	13. 1	168	185
	80	7, 300	73	31, 550	92	14. 0	170	160
90	20	2, 850	27	1, 000	48	5. 6	133	790
	30	4, 700	46	10, 700	67	8. 2	152	420
	40	6, 200	61	20, 550	81	10. 2	162	290
	50	7, 200	71	28, 250	90	12. 0	167	220
	60	7, 800	78	33, 100	96	13. 4	171	180
	70	8, 200	82	36, 600	100	14. 6	174	150
	80	8, 550	85	39, 100	103	15. 6	176	135
100	20	3, 300	32	2, 750	54	6. 1	138	690
	30	5, 400	53	14, 800	74	9. 0	158	375
	40	7, 150	71	26, 700	90	11. 2	168	255
	50	8, 400	84	35, 050	100	13. 1	174	190
	60	9, 150	92	41, 000	107	14. 6	178	155
	70	9, 600	96	44, 750	112	15. 9	181	135
	80	9, 950	100	47, 400	115	17. 1	182	115
110	20	3, 850	37	4, 300	59	6. 6	145	615
	30	6, 200	62	19, 200	81	9. 7	166	335
	40	8, 200	82	32, 800	99	12. 1	176	225
	50	9, 650	96	42, 500	110	14. 1	182	170
	60	10, 500	106	49, 200	118	15. 9	186	140
	70	11, 150	112	53, 100	122	17. 3	189	120
	80	11, 500	116	55, 900	126	18. 4	191	105
120	20	4, 400	42	6, 500	64	7. 1	152	560
	30	7, 150	70	24, 350	89	10. 4	174	305
	40	9, 400	93	39, 600	108	13. 0	185	205
	50	11, 000	110	50, 100	120	15. 1	192	155
	60	12, 050	121	57, 250	128	17. 0	196	125
	70	12, 700	128	62, 000	133	18. 5	199	105
	80	13, 150	134	65, 000	137	19. 7	201	95

LONGLEAF PINE

50	20	500	4	----------	26	2. 8	64	1, 410
	30	1, 150	11	200	37	4. 1	78	900
	40	1, 700	17	900	45	5. 1	88	625
	50	2, 150	21	2, 100	50	5. 9	95	505
	60	2, 550	25	3, 700	55	6. 6	100	430
	70	2, 850	28	5, 400	58	7. 2	104	375
	80	3, 150	31	7, 250	61	7. 8	106	335

TABLE 4.—*Stand and yield information per acre for well-stocked, unmanaged, normally growing loblolly, longleaf, shortleaf, and slash pines*—Continued

[Statistics in this table are compiled from United States Department of Agriculture Miscellaneous Publication No. 50 (*20*)]

Site index	Age	Total merchantable volume			Total height of average dominant trees	Average diameter at breast height	Basal area at breast height	Trees
	Years	*Cu. ft.*	*Cords*	*Bd. ft. (Scribner)*	*Feet*	*Inches*	*Sq. ft.*	*Number*
LONGLEAF PINE								
60	20	1,000	8	50	31	3.3	79	1,290
	30	1,900	19	900	44	4.9	97	815
	40	2,750	27	2,800	53	6.0	108	575
	50	3,450	34	5,900	60	7.0	118	465
	60	4,000	40	9,300	65	7.8	124	395
	70	4,500	45	12,350	70	8.5	128	345
	80	4,900	49	15,000	73	9.1	131	305
70	20	1,500	14	200	36	3.8	92	1,150
	30	2,700	28	2,000	52	5.5	113	730
	40	3,800	39	6,100	62	6.8	127	515
	50	4,750	48	11,400	70	7.9	138	415
	60	5,600	55	16,400	77	8.8	145	355
	70	6,200	62	20,400	82	9.6	150	305
	80	6,800	67	23,700	86	10.3	153	270
80	20	2,050	20	550	41	4.3	102	1,050
	30	3,500	36	3,800	59	6.1	124	655
	40	4,900	49	10,800	71	7.6	140	465
	50	6,000	61	17,600	80	8.8	152	375
	60	7,000	70	23,500	87	9.8	160	315
	70	7,850	78	28,300	93	10.6	166	270
	80	8,550	85	32,100	98	11.5	169	240
90	20	2,250	26	1,000	46	4.7	109	910
	30	4,250	43	6,500	66	6.7	134	575
	40	5,800	59	15,800	80	8.3	150	405
	50	7,150	72	24,100	90	9.6	162	330
	60	8,350	84	31,000	98	10.7	170	275
	70	9,400	94	36,200	105	11.6	176	240
	80	10,250	103	40,600	110	12.5	180	210
100	20	2,950	30	1,700	52	5.2	114	790
	30	4,900	49	10,150	74	7.4	140	500
	40	6,600	66	20,200	89	9.0	158	355
	50	8,200	82	29,550	100	10.5	170	285
	60	9,500	96	37,400	109	11.7	179	240
	70	10,700	108	43,000	110	12.7	185	205
	80	11,600	118	48,100	123	13.7	189	185
110	20	3,250	34	2,550	57	5.6	118	690
	30	5,350	54	13,000	81	7.9	144	445
	40	7,200	73	24,440	98	9.8	162	315
	50	8,950	90	34,200	110	11.4	176	250
	60	10,500	106	42,100	120	12.7	185	210
	70	11,700	119	48,600	128	13.8	192	180
	80	12,700	130	54,000	135	14.9	196	160
SHORTLEAF PINE								
50	20	----------	----------	----------	25	2.5	139	3,425
	30	2,040	23	50	35	3.9	158	1,855
	40	2,980	33	1,450	44	5.1	162	1,085
	50	3,970	43	4,400	50	6.1	162	760
	60	4,430	48	8,150	55	6.9	162	590
	70	4,780	51	11,600	59	7.6	162	485
	80	5,050	53	14,400	62	8.3	162	420
60	20	1,060	12	----------	30	2.9	142	2,520
	30	2,880	32	750	42	4.6	162	1,370
	40	4,200	46	4,400	52	6.0	166	815
60	50	5,080	54	10,600	60	7.2	166	570
	60	5,690	60	15,850	66	8.2	166	445
	70	6,170	65	19,700	71	9.0	166	370
	80	6,520	68	22,600	74	9.8	166	315

TABLE 4.—*Stand and yield information per acre for well-stocked, unmanaged, normally growing loblolly, longleaf, shortleaf, and slash pines*—Continued

[Statistics in this table are compiled from United States Department of Agriculture Miscellaneous Publication No. 50 (*20*)]

Site index	Age	Total merchantable volume			Total height of average dominant trees	Average diameter at breast height	Basal area at breast height	Trees
	Years	*Cu. ft.*	*Cords*	*Bd. ft. (Scribner)*	*Feet*	*Inches*	*Sq. ft.*	*Number*
SHORTLEAF PINE								
70	20	1, 600	18	----------	34	3. 5	145	1, 965
	30	3, 720	41	2, 400	49	5. 4	165	1, 060
	40	5, 210	56	9, 900	61	7. 0	169	625
	50	6, 250	66	17, 850	70	8. 3	169	440
	60	7, 000	73	23, 450	77	9. 4	169	345
	70	7, 580	79	27, 550	82	10. 4	169	285
	80	8, 020	83	30, 700	86	11. 2	169	240
80	20	2, 190	25	200	39	4. 1	147	1, 495
	30	4, 420	48	5, 200	56	6. 2	167	815
	40	6, 100	65	16, 200	70	8. 0	171	485
	50	7, 380	77	24, 900	80	9. 5	171	335
	60	8, 250	85	30, 900	88	10. 8	171	260
	70	8, 920	92	35, 200	94	11. 9	171	215
	80	9, 460	97	38, 550	99	12. 9	171	185
90	20	2, 660	30	1, 100	44	5. 0	148	1, 080
	30	5, 050	54	11, 200	63	7. 3	169	590
	40	7, 000	73	23, 400	78	9. 4	173	345
	50	8, 450	87	32, 400	90	11. 2	173	245
	60	9, 500	98	38, 700	99	12. 8	173	185
	70	10, 280	105	43, 000	106	14. 1	173	160
	80	10, 910	112	46, 500	111	15. 3	173	140
100	20	3, 040	33	3, 200	49	6. 0	149	740
	30	5, 720	60	17, 700	70	8. 8	170	405
	40	7, 940	82	30, 600	87	11. 3	174	235
	50	9, 650	89	40, 000	100	13. 5	174	170
	60	10, 860	111	46, 400	110	15. 3	174	130
	70	11, 780	121	50, 900	117	17. 0	174	110
	80	12, 500	128	54, 400	123	18. 5	174	90
SLASH PINE								
60	20	1, 850	20	----------	36	3. 5	143	2, 035
	30	3, 150	32	1, 050	48	5. 0	152	1, 140
	40	4, 050	40	4, 100	55	6. 3	155	710
	50	4, 750	45	7, 500	60	7. 2	157	550
	60	4, 900	48	10, 500	64	7. 9	158	470
70	20	2, 750	28	----------	42	4. 2	146	1, 445
	30	4, 000	40	3, 500	56	6. 0	156	820
	40	4, 850	49	9, 300	64	7. 5	159	500
	50	5, 850	55	14, 250	70	8. 6	161	390
	60	6, 050	59	17, 400	74	9. 4	162	335
80	20	3, 400	35	900	48	4. 9	148	1, 090
	30	4, 850	48	7, 300	63	7. 0	158	610
	40	5, 850	58	15, 150	73	8. 7	161	380
	50	6, 900	65	20, 350	80	10. 0	163	295
	60	7, 150	69	23, 600	85	10. 8	164	250
90	20	4, 050	41	2, 750	54	5. 6	149	835
	30	5, 550	54	12, 300	71	8. 0	159	470
	40	6, 650	66	20, 600	83	10. 0	163	295
	50	7, 850	73	25, 900	90	11. 4	165	220
	60	8, 100	78	29, 600	95	12. 5	166	195
100	20	4, 600	46	5, 050	61	6. 4	150	625
	30	6, 100	59	16, 850	79	9. 1	160	365
	40	7, 350	72	25, 450	92	11. 4	164	225
	50	8, 700	81	31, 250	100	13. 1	166	175
	60	8, 950	86	35, 400	160	14. 2	167	150

TABLE 5.—*Stand and yield information for natural, fully stocked stands of Virginia pine*

[Statistics in this table compiled from Technical Bulletin No. 100, North Carolina State College, and from Research Note No. 135, SE Forest Experiment Station]

Age	Total height of average dominant trees	Trees per acre	Average diameter at breast height	Basal area per acre	Potential yields per acre			Mean annual growth per acre		
Years	*Feet*	*Number*	*Inches*	*Sq. ft.*	*Cu. ft.*	*Cords* [1]	*Bd. ft.* [2]	*Cu. ft.*	*Cords*	*Bd. ft.* [3]
SITE INDEX 40										
20	19	2, 500	2. 1	60	390	4	----------	19	0. 2	----------
30	29	1, 660	3. 4	104	1, 250	14	5, 900	42	. 5	197
40	36	1, 300	4. 2	125	1, 630	18	7, 700	41	. 4	192
50	40	1, 110	4. 7	133	1, 820	20	8, 600	37	. 4	172
60	42	1, 010	5. 0	138	1, 980	22	9, 400	33	. 4	156
70	43	910	5. 3	139	2, 100	23	9, 900	30	. 3	141
SITE INDEX 50										
20	25	2, 000	2. 8	86	960	11	----------	48	. 5	----------
30	37	1, 320	4. 2	127	2, 000	22	9, 500	67	. 6	317
40	45	970	5. 2	142	2, 700	30	12, 800	67	. 7	320
50	50	790	5. 9	151	3, 100	34	14, 700	62	. 7	294
60	52	750	6. 1	153	3, 400	38	16, 100	57	. 6	268
70	54	700	6. 4	156	3, 600	40	17, 100	51	. 6	244
SITE INDEX 60										
20	31	1, 710	3. 4	108	1, 600	18	7, 600	80	. 9	380
30	44	1, 030	5. 0	140	2, 650	29	12, 500	85	1. 0	417
40	54	720	6. 3	156	3, 630	40	17, 200	88	1. 0	430
50	60	580	7. 2	164	4, 300	47	21, 000	86	. 9	420
60	63	520	7. 7	168	4, 720	52	22, 400	79	. 9	373
70	65	490	8. 0	170	5, 050	56	23, 900	72	. 8	341
SITE INDEX 70										
20	37	1, 460	4. 0	127	1, 700	19	8, 100	85	. 9	405
30	52	790	6. 0	154	3, 200	35	15, 200	107	1. 2	509
40	63	540	7. 5	167	4, 360	48	21, 400	109	1. 2	535
50	70	410	8. 9	176	5, 200	58	24, 600	104	1. 2	492
60	73	360	9. 6	179	5, 700	63	27, 000	95	1. 0	450
70	75	340	9. 8	180	6, 150	68	29, 200	88	1. 0	419
SITE INDEX 80										
20	42	1, 230	4. 5	136	1, 950	22	9, 200	98	1. 1	460
30	59	630	6. 9	163	3, 500	39	16, 600	117	1. 3	553
40	72	380	9. 3	178	4, 900	54	23, 200	123	1. 4	580
50	80	230	12. 2	186	5, 800	64	27, 400	116	1. 3	548
60	83	190	13. 6	189	6, 430	72	30, 400	107	1. 2	506
70	85	160	14. 6	191	6, 900	77	32, 800	98	1. 1	469

[1] Converting factor: 90 cubic feet per cord.
[2] International ¼-inch rule. Converting factor: 4.74 board feet per cubic foot.
[3] International ¼-inch rule.

TABLE 6.—*Stand and yield information for second-growth upland oaks*

[Statistics in this table compiled from USDA Technical Bulletin 560]

Age	Total height of average dominant trees	Average diameter at breast height	Trees per acre	Potential yields per acre			Mean annual growth per acre		
Years	*Feet*	*Inches*	*Number*	*Cords*[1]	*Bd. ft.*[2]	*Cu. ft.*[1]	*Cords*[1]	*Bd. ft.*[2]	*Cu. ft.*[1]
SITE INDEX 40									
20	17	1.8	3,260	0.24	----------	20	0.01	----------	1
30	25	2.9	1,610	3.18	100	270	.11	3	9
40	33	3.8	1,020	8.00	600	680	.20	15	17
50	40	4.5	802	12.47	1,400	1,060	.25	28	21
60	45	5.2	651	16.71	2,700	1,420	.28	45	24
70	48	5.8	541	20.59	4,250	1,750	.29	61	25
80	50	6.4	483	24.12	5,900	2,050	.30	74	26
90	52	6.9	447	27.41	7,600	2,330	.30	84	26
100	53	7.4	411	30.47	9,200	2,590	.30	92	26
SITE INDEX 50									
20	23	2.2	2,520	82	----------	70	.04	----------	4
30	33	3.4	1,246	6.35	350	540	.21	12	18
40	42	4.5	789	12.82	1,400	1,090	.32	35	27
50	50	5.3	623	18.82	3,250	1,600	.38	65	32
60	56	6.1	507	24.47	5,600	2,080	.41	93	35
70	60	6.9	419	29.53	8,150	2,510	.42	116	36
80	62	7.5	375	34.12	10,450	2,900	.43	131	36
90	64	8.1	346	38.00	12,600	3,230	.42	140	36
100	65	8.7	320	41.41	14,700	3,520	.41	147	35
SITE INDEX 60									
20	30	2.5	1,945	2.00	----------	170	.10	----------	8
30	41	4.0	965	10.35	850	880	.34	28	29
40	51	5.3	611	18.59	3,200	1,580	.46	80	40
50	60	6.3	482	26.24	6,300	2,230	.52	126	45
60	67	7.2	390	32.94	9,700	2,800	.55	162	47
70	71	8.0	326	38.71	12,800	3,290	.55	183	47
80	75	8.8	292	43.88	15,650	3,730	.55	196	47
90	77	9.4	268	48.47	18,300	4,120	.54	203	46
100	79	10.1	248	52.71	20,900	4,480	.53	209	45
SITE INDEX 70									
20	36	2.9	1,500	4.24	150	360	.21	8	18
30	48	4.6	743	14.94	1,750	1,270	.50	58	42
40	60	6.0	472	24.59	5,500	2,090	.61	138	52
50	70	7.2	374	33.29	9,750	2,830	.67	195	57
60	78	8.3	304	40.94	13,900	3,480	.68	232	58
70	83	9.3	252	47.41	17,700	4,030	.68	253	58
80	87	10.2	224	53.06	21,200	4,510	.66	265	56
90	90	11.0	207	58.35	24,500	4,960	.65	272	55
100	92	11.7	192	63.53	27,650	5,400	.64	276	54
SITE INDEX 80									
20	43	3.4	1,160	7.29	350	620	.36	18	31
30	56	5.3	578	19.88	3,350	1,690	.66	112	56
40	69	6.9	366	30.71	8,600	2,610	.77	215	65
50	80	8.3	290	40.59	13,750	3,450	.81	275	69
60	89	9.5	235	48.94	18,600	4,160	.82	310	69
70	95	10.7	1,196	56.12	23,100	4,770	.80	330	68
80	99	11.7	174	62.82	27,250	5,340	.79	341	67
90	103	12.7	161	69.06	30,950	5,870	.77	344	65
100	105	13.6	148	75.06	34,400	6,380	.75	344	64

[1] To a 4-inch top outside bark.
[2] To a 5-inch top inside bark, International ⅛-inch rule.

Conservation

In this subsection are suggestions for the protection of woodland, the control of some diseases, and the treatment needed for improvement of sites.

Woodland protection

Burning, erosion, overgrazing, and other land abuses have seriously damaged the forest soils of this county. The results of mismanagement include lowered fertility, increased acidity, deterioration of structure, decline in water-holding capacity, and a decided change in the biological population that generally favors fungi over bacteria (*4*). In the Piedmont and mountainous sections, the elimination of hardwoods by mechanical means has had disastrous effects because of the importance of humus in soil stabilization.

Minckler (*10*) states that a cover of hardwoods profoundly affects microclimate, soil structure, and soil flora and fauna. A hardwood forest cover creates conditions that promote maximum water percolation into the soil. Site quality and soil fertility are maintained or increased through the annual return of large amounts of nutrients to the surface soil in the leaf litter. The nutrient content in leaves is relatively high and often basic in reaction. For that reason the litter characteristically decomposes quickly. Nitrogen, however, can be depleted by removal of wood, twigs, and leaves or by repeated fires.

The development of a fire-prevention system is influenced to a large extent by natural barriers and physiographic features. The spacing and location of firebreaks depend on the location of roads and streams and on erosion and slope. The ease or difficulty of operating equipment influences the type of fire-fighting equipment selected.

Overgrazing is injurious to any kind of forest. If the soil is trampled and packed, rain runs off quickly and tree roots are deprived of water and air (*19*). In the Piedmont Uplands, primarily suited to pine, grazing need not interfere with forest production, but continuous heavy grazing should be prevented.

In eroded areas, any disturbance of the surface layer may encourage further erosion. Where erosion is a serious problem, litter should be disturbed as little as possible, even during logging operations. Roads and skid trails should be constructed across, instead of up and down, the steeper slopes. Brush and limbs thrown on slopes help to stabilize the soils (*19*).

Where the soils have not been damaged by fire, overgrazing, or logging, even heavy cutting usually does not upset the basic ecological relationships. Soil characteristics remain relatively unchanged after heavy cutting, and water yields are temporarily increased without lowering quality.

Control of forest insects and diseases

Oak wilt is a major killing disease of oaks. Riker (*13*) reports that the fungus, *Ceratocystis fagacearum*, has a broad host range. All species of oaks inoculated were susceptible to the disease; red oaks were rapidly killed. Chestnuts wilted following inoculation. Jonathan apple trees were killed. In sassafras trees the fungus survived for more than 2½ years.

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Boyce (*2*) reports that the fungus spreads locally through root connections between infected and healthy trees. The overland spread of oak wilt is influenced by the population of insect carriers and by the amount and distribution of inoculum. Riker (*13*) designates fruit flies and some sap-feeding insects as carriers of the fungus spores. Bark beetles, certain birds, and squirrels have been suspected as carriers.

Once the fungus has invaded a tree, no control is known. Control measures depend on preventing the spread of the disease. In some cases, spread through roots has been prevented by breaking root connections with a root cutter or digger within 2 weeks after the symptoms appeared. Where the disease has affected roots beyond cutting range, control depends on preventing its long-distance spread by sap-feeding insects and other vectors. A local-control measure, and the one most frequently used, has been to poison all trees within 25 to 50 feet of an infected tree. Some success has been achieved in sandy soils by injecting methyl bromide into the ground at frequent intervals.

Littleleaf is a disease that affects shortleaf pine and, to a lesser degree, loblolly pine. Campbell and Copeland (*4*) report that littleleaf results from a nitrogen deficiency and is associated with the dying of new root tips and fine roots. A parasitic root fungus, *Phytophthora cinnamoni*, probably is responsible, but soil factors, including poor aeration, low fertility, and adverse moisture conditions, also cause damage to the fine roots. Other theories suggest that toxic conditions or an imbalance of ions such as iron and manganese in the soil solution is the primary cause. Littleleaf is practically unknown on well-drained soils, especially those that have a fairly deep surface layer.

The effects of diseases, insects, and injuries generally are more severe where root zones are shallow and moisture conditions are unfavorable.

Site improvement

Soil rehabilitation.—The most feasible way to rehabilitate forest soils is to favor soil-building species in the forest stands. Some species, including dogwood, hickory, yellow-poplar, redbud, and redcedar, return large quantities of plant nutrients to the soil in the leaf litter.

Metz (*9*) reports on the quantity of the various elements returned to the forest floor annually in leaf material under stands of pine, stands of pine and hardwoods, and stands of hardwoods. In the Piedmont the annual litter fall, by weight, from each kind of stand, is approximately the same—from 4,000 to 5,000 pounds per acre, oven-dry weight. Analyses of freshly fallen leaf material show that the litter from the hardwoods common in this region contains about twice as much nitrogen as that from shortleaf pine, that the calcium content is 2 to 3 percent in the hardwood litter, compared to only 0.59 percent in the pine litter. Pine returns the smallest amounts of nitrogen, calcium, and magnesium to the soil. A mixed stand of pine and hardwoods returns approximately twice as much of all three elements as a pure pine stand, and a hardwood stand returns about twice as much nitrogen and about four times as much calcium and magnesium as a pine stand. In any program of site improvement, these major differences in amounts of nutrient elements returned to the soil cannot be ignored.

There are other benefits from an increase in hardwood vegetation. The nitrification rate increases, and the bacterial count increases. Acidity decreases. Plant nutrients become more readily available. The number of soil animals tends to increase. Ammoniacal nitrogen is utilized. The structure of the soil is improved through the incorporation of organic matter and the formation of a mull-type humus. Such improvements would help restore the forest soils of Oconee County to nearer their original productivity.

Water impoundment.—Shallow water impoundments have been built in recent years to attract migrating water fowl. These impoundments are created by constructing low dikes and dams in flats or sloughs. The impoundment of water increases the amount of moisture absorbed by the soils. This extra moisture is especially beneficial to trees during dry periods in summer, but the water should be drained promptly each spring to prevent damage to trees (*3*).

Wildlife

The northern part of Oconee County is in the Blue Ridge Mountains. The southern part is in the Piedmont. In the mountains several species of birds that are migratory in other parts of the State are permanent residents. These include the Appalachian rufted grouse, Carolina junco, Mississippi song sparrow, and goldfinch. Other birds, such as the scarlet tanager and Baltimore oriole, breed here. Bear, deer, squirrel, raccoon, quail, turkey, grouse, rabbit, and opossum are native to the mountainous section. In the southern part of the county, the principal game animals are rabbit, squirrel, quail, opossum, and raccoon.

In the mountains there are many clear streams that are well suited to trout. The temperature of the water does not exceed 75° F. at any season of the year, and numerous waterfalls provide ample oxygen. The upper waters of the Chattooga, Chauga, Horsepasture, and Toxaway Rivers also afford good trout fishing.

In the southern part of the county, where much of the acreage is cultivated, the streams are silty and muddy. Consequently, carp and catfish are the principal fish. There is little pollution of streams by sewage or industrial waste.

Deer and wild turkeys, once present in large numbers in the county, had almost disappeared by the early part of the twentieth century. Now, through efforts in the Sumter National Forest and the Clemson College wildlife management areas, they are again increasing.

Strips of multiflora rose provide suitable habitats for rabbit, the most abundant game animal in the county.

Bicolor lespedeza or japonica lespedeza, planted in strips 15 feet wide by 350 feet long, will provide adequate food for a covey of quail. Such plantings can be on field borders or in openings in the woods. On the Coneross Creek Watershed, plantings are on the rights-of-way under power lines. Both bicolor lespedeza and japonica lespedeza are suited to most soils in the county. In mountainous areas where early frosts are likely, japonica lespedeza is to be preferred.

The Hartwell reservoir, currently being enlarged so that it will flood about 11,000 acres, will probably attract more ducks to the area and thus help to ensure the success of duck fields constructed on suitable soils on bottom lands. Duck fields are made by constructing a dike or a low levee around fields; planting an annual crop, such as browntop millet; and then in fall and winter shallowly flooding the fields. This produces proper feeding conditions for ducks. The sale of hunting privileges on duck fields is a source of farm income.

The Hartwell reservoir also is creating a demand for minnows for bait. Suitable sites for minnow ponds are on soils of capability subclasses IIe, IIIe, IVe, VIe, and VIIe. Soils in subclasses VIe and VIIe are not suitable for larger ponds. There are, however, many sites in the county suitable for larger ponds that can be stocked with fish to provide food, recreation, and income.

The suitability of the soils in Oconee County as sources of food or as habitats for wildlife can be considered on the basis of land capability classes and subclasses.

The soils in class I are well suited to most plants that produce wildlife food or cover. They are particularly well suited to sericea lespedeza, bicolor lespedeza, japonica lespedeza, tick clover, millet, fescue, small grain, and grain sorghum. Generally, they are not suitable sites for ponds.

The soils in subclass IIe are suited to the same plants as the soils in class I (fig. 16). Fertilizer is needed to maintain fertility. Only a few sites are suitable for ponds.

The soils in subclass IIw are suited to the same plants as the soils in class I but are subject to occasional overflow. Plants that provide grazing for deer or food for wild turkeys are particularly well suited. A few sites are suitable for duck fields.

The soils in subclass IIIe are suited to the same plants as the soils in class I, but fertilizer is needed to maintain fertility. Sericea lespedeza, fescue, bahiagrass, or other plants not easily damaged by farm machinery are suitable for planting on field and road borders. Good pond sites are common, but the ponds will become silty and muddy unless adjacent cultivated fields are carefully managed.

Figure 16.—**Bicolor lespedeza along woodland border on Cecil sandy loam, 2 to 6 percent slopes.**

The soils in subclass IIIw are not suited to perennial plants, such as bicolor lespedeza and japonica lespedeza, because of the high water table. If drained, they are well suited to annual plants, such as millet and small grain. Some areas have sites suitable for duck fields.

The soils in subclass IIIs occur on sandy flood plains. Their use for wildlife is limited, but japonica lespedeza, sericea lespedeza, abruzzi rye, and wild grapes can be grown.

The soils in subclass IVe are subject to erosion. Bicolor lespedeza, japonica lespedeza, and sericea lespedeza are suited to soils that are severely eroded. Sericea lespedeza, fescue, bahiagrass, or other plants not easily damaged by farm machinery are suitable for road borders. There are good pond sites on these soils.

The soils in subclass IVw generally are suited to ponds for wild ducks. Low dikes can be constructed on these soils to impound water. Japanese millet and smartweed are suitable vegetation. Browntop millet is suitable for drained areas. Oak trees provide acorns for turkeys, deer, and squirrels.

The soils in subclass Vw are excellent for ponds. Seepage from higher areas helps to maintain the water level in ponds. The soil material is suitable for dams. These soils are too wet for quail, but some areas can be used for duck fields. Suitable plants for duck fields are browntop millet, Japanese millet, and smartweed. Hardwoods furnish food and habitats for squirrels.

The soils in subclass VIe generally are not suited to cultivation but have a potential for some kinds of wildlife. There are some sites that are favorable for ponds, but generally slopes are steep and runoff is rapid. Seed from sumac, pine, and beech trees provides food for ruffed grouse. Pine and hardwood forests provide habitats for deer. Acorns and hickory nuts furnish food for deer, squirrels, and wild turkeys.

The soils in subclass VIIe are steep, rocky, or gullied. Any kind of planting is difficult. Mast from hardwoods is the principal wildlife food. Rock outcrops generally are surrounded by brambles and brush. These soils should be left in their natural state to provide wildlife refuge.

Engineering Properties of the Soils[2]

This report contains information that can be used by engineers to—

1. Make soil and land use studies that will aid in selecting and developing industrial, business, residential, and recreational sites.
2. Make estimates of the engineering properties of the soils to aid in planning agricultural drainage systems, farm ponds, irrigation systems, and diversion terraces.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting highway, airport, and pipeline locations and in planning detailed investigations of the selected locations.
4. Locate probable sources of sand and gravel for use in construction.
5. Determine the suitability of soil units for cross-country movements of vehicles and construction equipment.
6. Correlate performance of engineering structures with soil mapping units and thus develop information that will be useful in designing and maintaining the structures.
7. Supplement information obtained from other published maps, reports, and aerial photographs for the purpose of making soil maps and reports that can be used readily by engineers.
8. Develop other preliminary estimates for construction purposes pertinent to the particular area.

This report will not eliminate the need for sampling and testing at the site of specific engineering works. It should be used primarily in planning more detailed field investigations to determine the in-place condition of the soil at the proposed construction site. The depth of sampling must be considered a limiting factor by the engineer. Excavations generally extend to much greater depths.

Terms that have one meaning to agricultural soil scientists and another to engineers are defined in the Glossary.

To make the best use of the soil map and the soil survey report, the engineer should know the physical properties of the soil materials and the in-place condition of the soil. After testing the soil materials and observing the behavior of each soil when used in the engineering structures and foundations, the engineer can develop recommendations for each soil unit designated on the map.

Engineering Classification Systems

Most highway engineers classify soil materials in accordance with the AASHO method (*1*). In this system, there are seven principal groups. They range from A–1, which consists of gravelly soils of high bearing capacity, to A–7, which consists of clay soils having low strength when wet. Within each group, the relative engineering value of the soil material is indicated by a group index number. These numbers range from 0 for the best materials to 20 for the poorest. The group index number is shown in parentheses.

Some engineers prefer the Unified soil classification system (*21*). In this system soil materials are identified as coarse grained (8 classes), fine grained (6 classes), or highly organic.

Engineering Descriptions and Physical Properties

Table 7 gives, for the representative soils, some soil characteristics significant in engineering. The physical properties shown are estimated on basis of laboratory test data, field observation, and experience and apply only to Oconee County.

Generally, only one soil is shown for each soil series. For variations among soils within the series, refer to the section "Descriptions of Soils." The variations are mainly in the thickness, texture, and color of the surface layer.

[2] Engineers of the South Carolina State Highway Department collaborated with soil scientists of the Soil Conservation Service in preparing this section.

TABLE 7.—*Estimated physical properties*

Map symbol	Soil	Depth to seasonally high water table [1]	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)
		Feet	*Feet*		*Inches*
AdB2	Altavista sandy loam, 0 to 6 percent slopes, eroded.	6 to 12	(6)	9 inches of sandy loam over 3 feet of sandy clay loam. Moderately well drained soil on terraces.	0 to 9 9 to 38+
ApB	Appling sandy loam, 2 to 6 percent slopes.	30	35	1 foot of sandy loam over 3 feet of clay loam. Moderately well drained Piedmont soil derived from granite and gneiss.	0 to 11 11 to 42 42 to 60
AsF	Ashe sandy loam, 25 to 50 percent slopes.	60	2 to 12	1 to 2 feet of sandy loam over hard rock. Shallow mountain soil.	0 to 18 18+
Bu	Buncombe loamy sand (0 to 6 percent slopes).	3+	4 to 10	3 to 6 feet of well-drained loamy sand on flood plains.	0 to 40+
CdB2	Cecil sandy loam, 2 to 6 percent slopes, eroded.	36	36	1 foot of sandy loam over 3 feet of sandy clay loam to clay loam. Well-drained Piedmont soil formed from granite, gneiss, and schist.	0 to 11 11 to 44 44+
Ch	Chewacla silt loam (0 to 3 percent slopes).	0 to 4	3 to 8	1 to 2 feet of silt loam over poorly drained plastic clayey material on first bottoms.	0 to 13 13 to 58+
Co	Congaree fine sandy loam (0 to 3 percent slopes).	3+	(6)	3 to 4 feet of well-drained fine sandy loam on stream bottoms.	0 to 48 48+
DaC2	Davidson loam, 2 to 10 percent slopes, eroded.	30	10 to 20	6 inches of loam overlying 3½ feet of well-drained clay. Derived from basic rocks, such as diorite, gabbro, and hornblende.	0 to 6 6 to 51 51+
HaB	Halewood fine sandy loam, 2 to 6 percent slopes.	20+	7 to 20	10 inches of fine sandy loam over 2 feet of well-drained fine sandy clay loam. Derived from granite and gneiss.	0 to 11 11 to 32 32 to 50+
HcB	Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes.	20+	10 to 20	10 inches of fine sandy loam over 2 feet of well-drained clay loam to silty clay loam. Derived from granite and gneiss.	0 to 9 9 to 34 34 to 80+
HsB2	Hiwassee sandy loam, 2 to 6 percent slopes, eroded.	(6)	(6)	11 inches of sandy loam, underlain by 4 feet of sandy clay loam, over weathered bedrock. On stream terraces.	0 to 7 7 to 55 55+
LdB2	Lloyd sandy loam, 2 to 6 percent slopes, eroded.	(6)	(6) 10 to 20	Reddish-brown sandy loam over dark-red clayey subsoil. Derived from hornblende gneiss and diorite.	0 to 6 6 to 38 40 to 60
LmE2	Lloyd loam, moderately shallow, 15 to 25 percent slopes, eroded.	25 to 40	5 to 12	0 to 6 inches of thick loam over 24 inches of clay loam. Well-drained mountain soil derived from hornblende gneiss.	0 to 6 6 to 32 32 to 50+
Lo	Local alluvial land	3+	10 to 40	Alluvial deposit	0 to 18
MaC2	Madison sandy loam, 6 to 10 percent slopes, eroded.	25+	10 to 30	Sandy loam over clayey subsoil derived from quartz mica schist. Well-drained soil of the Piedmont.	18 to 50+ 0 to 9 9 to 34
MfB	Madison fine sandy loam, high, 2 to 6 percent slopes.	20+	8 to 16	Reddish-brown fine sandy loam over dark-red clay loam. 2½ feet deep, well drained. Derived from phyllite, mica schist, talcose schist, and chloritic schist.	34 to 80 0 to 7 7 to 27 27+
Mv	Mixed alluvial land (0 to 3 percent slopes).	3+	(6)	Well-drained alluvial land of mixed texture on stream terraces. About 40 inches thick. Underlain by firm-textured alluvium.	0 to 40 40+
PoF	Porters loam, 25 to 45 percent slopes.	15 to 60	6 to 25	6 to 11 inches of thick loam over 24 inches of clay loam. Well-drained mountain soil derived from granite and gneiss.	0 to 5 5 to 30 30+
Sf	State fine sandy loam (0 to 2 percent slopes).	3+	(6)	36 to 48 inches of fine sandy loam to loam. Well-drained soil on stream terraces.	0 to 18 18 to 50 50+
St	Stony land	15 to 60	2 to 20	Miscellaneous	(6)
TcE	Talladega and Chandler loams, 10 to 25 percent slopes.	25 to 40	1 to 4	8 to 20 inches of loam over rock. Steep, shallow, mountain soil. Derived from mica schist, phyllite, and talcose schist.	0 to 16 16+

See footnotes at end of table.

of a representative soil of each series

Classification			Percentage passing[2]—			Permeability of uncompacted soil[3]	Available water capacity[4]	Reaction	Shrink-swell potential[5]
USDA texture	Unified	AASHO	No. 4 sieve (4.76 mm.)	No. 10 sieve (2.0 mm.)	No. 200 sieve (0.074 mm.)				
						Inches per hour	*Inches per inch of depth*	*pH*	
Sandy loam	SM	A-2, A-4	100	100	25 to 40	3.0 to 4.0	0.09	5.5 to 6.0	Low.
Sandy clay loam	CL	A-6	100	100	55 to 65	0.3 to 0.8	.19	5.0 to 5.5	Moderate.
Sandy loam	SM	A-2, A-4	100	95 to 100	25 to 40	3.0 to 4.0	.09	5.0 to 5.5	Low.
Clay loam	CL	A-7	100	95 to 100	55 to 65	0.3 to 0.8	.19	5.0 to 5.5	Moderate.
(7)	MH	A-7	100	100	55 to 65	3.0 to 3.5	.11	5.0	Low.
Sandy loam	SM	A-2	100	90 to 95	25 to 35	8.0 to 15.0	.04	5.0 to 5.5	Low.
(7)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	5.0 to 5.5	(6).
Loamy sand	SM	A-2	100	100	20 to 30	7.0 to 10.0	.05	5.5 to 6.5	Low.
Sandy loam	SM	A-2, A-4	100	95 to 100	25 to 40	3.0 to 4.0	.10	5.0 to 5.5	Low.
Clay loam	CL-CH	A-6, A-7	100	100	60 to 70	1.0 to 2.5	.15	5.5 to 6.0	Moderate.
(7)	(6)	(6)	(6)	(6)	(6)	3.0 to 3.5	.08	5.0	Low.
Silt loam	OL	A-4	100	100	70 to 80	1.0 to 1.5	.11	5.0 to 5.5	Low.
Silty clay loam	OH, CH	A-7	100	100	90 to 95	0.3 to 0.8	.13	4.7 to 5.5	Moderate to high.
Fine sandy loam	SM	A-4	100	100	35 to 50	4.0 to 5.0	.08	6.4 to 6.7	Low.
Loamy sand	SM	A-2, A-4	100	95 to 100	20 to 40	3.0 to 4.0	.08	6.4 to 6.5	Low.
Loam	CL	A-4	95 to 100	95 to 100	55 to 70	2.50 to 5.0	.11	6.0 to 6.5	Low.
Clay loam	CH	A-6, A-7	95 to 100	95 to 100	60 to 70	0.80 to 2.5	.15	6.5 to 7.0	Moderate to high.
(7)	CH	A-7	(6)	(6)	85 to 100	0.80 to 2.5	.10	6.5	Low.
Fine sandy loam	SM to CL.	A-2, A-6	100	100	30 to 50	0.80 to 2.5	.06	5.5 to 6.0	Low.
Fine sandy clay loam to silty clay loam.	SC, CL	A-4, A-6, A-7.	100	100	45 to 55	0.80 to 2.5	.14	5.0 to 5.5	Moderate.
(7)	SM, SC	A-4	100	100	35 to 50	0.80 to 2.5	.14	5.0 to 5.5	Moderate.
Fine sandy loam	SM	A-4	95 to 100	90 to 100	35 to 50	5.0 to 10.0	.12	5.6 to 6.0	Low.
Clay loam to silty clay loam.	ML, CL	A-4	95 to 100	90 to 100	55 to 65	2.5 to 5.0	.14	5.1 to 6.0	Moderate.
(7)	SM, SC	A-4	95 to 100	85 to 100	35 to 50	5.0 to 10.0	.06	5.1 to 6.0	Low.
Sandy loam	SM	A-2, A-4	95 to 100	90 to 100	25 to 40	2.5 to 5.0	.04	5.6 to 6.0	Low.
Sandy clay loam	CL	A-6	95 to 100	95 to 100	50 to 60	0.8 to 2.5	.13	5.1 to 5.5	Moderate.
(7)	SM	A-4	95 to 100	90 to 100	35 to 40	2.5 to 5.0	.06	5.1 to 5.5	Low.
Sandy loam	SM, SC	A-2, A-4	95 to 100	90 to 95	30 to 50	2.50 to 5.0	.11	5.5 to 6.0	Low.
Sandy clay loam to clay loam.	MH, CH	A-7	100	100	65 to 75	0.20 to 0.8	.14	5.5 to 6.0	Moderate.
Sandy clay loam	SM, SC	A-4	100	100	35 to 45	2.50 to 5.0	.10	5.5 to 6.0	Moderate.
Loam	ML-CL	A-4	100	100	55 to 75	3.0 to 4.0	.10	5.5 to 6.0	Moderate.
Clay loam to silty clay loam.	CH	A-7	100	100	60 to 80	0.4 to 0.8	.11	6.0	High.
(7)	(6)	(6)	(6)	(6)	(6)	1.0 to 2.0	.09	6.0	Low
Loam to sandy loam.	SM, ML	A-4	100	100	35 to 60	5.0 to 10.0	.08	6.0 to 6.5	Low.
Sandy clay loam	SM, ML	A-4, A-6	100	100	40 to 60	2.50 to 5.0	.12	5.5 to 6.0	Moderate.
Sandy loam	SM, SC	A-2, A-4	95 to 100	95 to 100	30 to 50	2.50 to 5.0	.11	5.5 to 6.0	Low.
Clay to clay loam	CL, CH	A-7	100	100	60 to 80	2.50 to 5.0	.13	5.0 to 5.5	Moderate.
(7)	SM, SC	A-4	95 to 100	95 to 100	35 to 50	2.50 to 5.0	.08	5.0 to 5.5	Low.
Fine sandy loam	SM	A-4	95 to 100	95 to 100	40 to 50	2.50 to 5.0	.12	5.0 to 5.5	Low.
Clay loam to loam	CL	A-4, A-7	95 to 100	95 to 100	60 to 70	0.80 to 2.5	.14	5.0 to 5.5	Moderate.
(7)	SM	A-4	95 to 100	95 to 100	35 to 40	5.00 to 10.0	.06	5.0	Low.
Sandy loam	SM	A-2, A-4	100	100	30 to 45	2.5 to 5.0	.10	6.0 to 6.5	Low.
(7)	ML	A-4	100	100	70 to 80	2.5 to 5.0	.14	5.0 to 6.5	Low.
Loam	ML	A-4	100	100	50 to 60	4.0 to 5.0	.11	5.0 to 5.5	Low.
Fine sandy clay loam.	CL	A-4	100	100	50 to 65	4.0 to 5.0	.12	5.0 to 5.5	Moderate.
(7)	(6)	(6)	(6)	(6)	(6)	3.0 to 4.0	.08	5.0	Low.
Fine sandy loam	SM	A-4	100	100	35 to 50	2.5 to 5.0	.16	6.0 to 6.5	Low.
Loam	CL	A-4	100	100	50 to 65	0.8 to 2.5	.08	6.0 to 6.5	Low.
(7)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6).
(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6).
Loam	ML	A-4, A-6	100	100	55 to 75	3.0 to 4.0	.12	4.5 to 5.0	Moderate.
(7)	(6)	(6)	(6)	(6)		1.0 to 2.5	.08	5.0	Low.

TABLE 7.—*Estimated physical properties*

Map symbol	Soil	Depth to seasonally high water table [1]	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)
		Feet	*Feet*		*Inches*
WaB2	Watauga fine sandy loam, 2 to 6 percent slopes, eroded.	25 to 40	2 to 10	10 inches of fine sandy loam over 2 feet of sandy clay loam. Well-drained mountain soils. Derived from quartz mica schist, talcose schist, and granite with high mica content.	0 to 12 12 to 28 28+
WkB	Wickham sandy loam, 2 to 6 percent slopes.	14 to 25	(6)	8 inches of sandy loam over 48 inches of clay loam. Well-drained soil on stream terraces. Partly weathered rock at variable depths.	0 to 9 9 to 39 39+
WoB	Worsham sandy loam, 0 to 6 percent slopes.	0 to 4	2 to 20	10 inches of sandy loam over 36 inches of poorly drained clay. Derived from granite, gneiss, and schist (partly alluvial).	0 to 6 6 to 32 32+

[1] Normally, the water table on flood plains and in depressions along creeks can be expected to rise to a point near the surface during winter months.

[2] The percentages shown indicate the normal range to be expected.

[3] Permeability of the uncompacted soil refers to the rate of movement of water through the soil in its undisturbed state. Permeability depends largely on soil texture and structure.

[4] Water available for plant consumption; the difference between the amount of water in a soil at field capacity and the amount in the same soil at the permanent wilting point.

Features Affecting Engineering

Table 8 gives the soil characteristics most likely to affect engineering practices. These soil characteristics are evaluated on the basis of estimates, test data shown in table 9, or actual field experience and performance.

TABLE 8.—*Engineering*

Soil series	Adaptability to winter or wet-weather grading	Suitability of soil material for—		Suitability as source of—	
		Road subgrade [2]	Road fill [3]	Topsoil	Sand and gravel
Altavista	Poor	Poor	Fair	Poor	Unsuitable
Appling	Fair	Fair	Fair	Good	Poor
Ashe	Good	Good	Good	Good	Poor; shallow to bedrock.
Buncombe	Good	Good	Good	Good	Poor
Cecil	Fair	Good in surface soil; fair in subsoil.	Good	Good	Poor
Chewacla	Poor	Poor	Poor	Poor	Unsuitable
Congaree	Fair	Good	Good	Poor	Unsuitable
Davidson	Fair to poor	Poor	Fair	Poor	Unsuitable

See footnotes at end of table.

of a representative soil of each series—Continued

Classification			Percentage passing [2]—			Permeability of uncompacted soil [3]	Available water capacity [4]	Reaction	Shrink-swell potential [5]
USDA texture	Unified	AASHO	No. 4 sieve (4.76 mm.)	No. 10 sieve (2.0 mm.)	No. 200 sieve (0.074 mm.)				
						Inches per hour	*Inches per inch of depth*	*pH*	
Fine sandy loam	SM	A-4	100	100	35 to 50	2.5 to 5.0	.12	5.0	Low.
Silty clay loam	CL	A-6	100	100	75 to 85	0.8 to 2.5	.13	5.0 to 5.5	Moderate.
Micaceous parent material.			(6)	(6)	(6)	(6)	.08	(6)	Low.
Sandy loam	SM	A-2, A-4	95 to 100	90 to 95	25 to 40	2.5 to 5.0	.10	5.5 to 6.0	Low.
Sandy clay loam to clay loam.	ML, CL	A-6, A-7	95 to 100	90 to 95	50 to 65	0.8 to 2.5	.14	5.0 to 5.5	Moderate.
(7)	ML, CL	A-7		100	60 to 70	0.8 to 2.5	.11	5.5	Moderate.
Sandy loam	SM	A-4	100	100	35 to 50	0.8 to 2.5	.11	5.0 to 5.5	Low.
Sandy clay loam to silty clay loam.	CH, CL	A-6, A-7	100	100	55 to 65	0.2 to 0.8	.15	4.5 to 5.0	High.
(6)	(6)	(6)	(6)	(6)	(6)	0.2 to 0.8	(6)	5.0	Low.

[5] The shrink-swell potential is an indication of the volume change to be expected with a change in moisture content. It is estimated primarily on the basis of the amount and type of clay. In general, soils classified as CH and A-7 have a high shrink-swell potential. Clean sands and gravels (single-grain structure) and those having small amounts of nonplastic to slightly plastic fines, as well as most other nonplastic to slightly plastic soil materials, have low shrink-swell potential.

[6] Information not available or not applicable.

[7] Partially weathered rock.

interpretations

Soil features affecting—					
Farm ponds		Irrigation	Diversions and terraces	Waterways	Highway location
Reservoir area	Embankment				
Slow seepage	Moderate strength and stability; moderately slow permeability.	Moderately slow infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.	No unfavorable features.
Moderate seepage	Moderate to high strength and stability; moderate permeability.	Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.	No unfavorable features.
Rapid seepage	Moderate strength and stability; rapid permeability.	Rapid infiltration; low water-holding capacity.	Erodible where sloping.	Erodible where sloping.	Shallow to bedrock; steep.
Rapid seepage	Low strength and stability; rapid permeability.	Rapid infiltration; low water-holding capacity.	(Not applicable)	(Not applicable)	Subject to overflow.
Moderate seepage	Moderate to high strength and stability; moderate permeability.	Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.	No unfavorable features.
Moderate seepage	Low strength and stability; moderate permeability.	Slow infiltration; medium to high water-holding capacity.	(Diversions may be needed.)	(Not needed)	Subject to overflow; somewhat poorly drained.
Moderate to rapid seepage.	Low strength and stability; moderate to rapid permeability.	Moderate infiltration; moderate water-holding capacity.	(Not applicable)	(Not applicable)	Subject to overflow.
Moderate seepage	Moderate strength and stability; moderate permeability.	Low to moderate infiltration; high water-holding capacity.	Erodible where sloping.	Erodible where sloping.	No unfavorable features.

TABLE 8.—*Engineering*

Soil series	Adaptability to winter or wet-weather grading [1]	Suitability of soil material for—		Suitability as source of—	
		Road subgrade [2]	Road fill [3]	Topsoil	Sand and gravel
Halewood	Fair to good	Good in surface soil; fair in subsoil.	Good	Good	Poor
Hayesville	Fair to good	Good	Good	Good	Poor
Hiwassee	Fair	Fair to good	Fair	Poor to fair	Unsuitable; sparse gravel.
Lloyd	Fair in surface soil; poor in subsoil.	Good in surface soil; poor in subsoil.	Good in surface soil; fair in subsoil.	Poor to fair	Unsuitable
Lloyd, moderately shallow.	Fair in surface soil; poor in subsoil.	Good in surface soil; poor in subsoil.	Good in surface soil; poor to fair in subsoil.	Poor to fair	Unsuitable
Local alluvial land	Good	Fair	Fair	Good	Unsuitable
Madison	Fair to good in surface soil; poor in subsoil.	Good in surface soil; poor in subsoil.	Good in surface soil; poor to fair in subsoil.	Good	Poor
Madison, high	Fair to good in surface soil; poor in subsoil.	Good in surface soil; poor in subsoil.	Good in surface soil; poor to fair in subsoil.	Good	Poor
Mixed alluvial land	Good	Fair	Fair	Fair	Poor; poorly graded sandy loams.
Mixed wet alluvial land	Poor	Poor	Poor	Poor	Poor; poorly graded soil material.
Porters	Good	Fair to good	Good	Fair to good	Unsuitable; sparse gravel.
State	Fair	Fair	Fair	Poor	Unsuitable
Stony land	Fair	Poor	Poor	Poor	Poor
Talladega	Fair	Fair	Fair	Poor to fair	Unsuitable
Watauga	Poor	Fair	Fair	Fair	Unsuitable
Wickham	Poor to fair	Fair	Fair	Fair	Unsuitable
Worsham	Poor	Poor	Poor	Poor	Unsuitable

[1] Depends on texture of the soil and on depth to water table. When wet, plastic, clayey soils are difficult to handle; they must be dried to the proper moisture content for compaction. When frozen, they may be difficult to excavate; they should not be used in the compacted road section. Therefore, these soils are rated "poor."

[2] Based on texture of the soil. Soils with plastic, clayey layers impede internal drainage and have low stability when wet. Hence, they are rated "poor."

interpretations—Continued

Soil features affecting—					
Farm ponds		Irrigation	Diversions and terraces	Waterways	Highway location
Reservoir area	Embankment				
Moderate to rapid seepage.	Variable strength and stability; moderate to rapid permeability.	Moderate to rapid infiltration; medium to low water-holding capacity.	Erodible where sloping.	Erodible where sloping.	Rolling to hilly.
Moderate seepage.	Variable strength and stability; moderate to rapid permeability.	Moderate to rapid infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.	Rolling to steep.
Moderate seepage.	Low to moderate strength and stability; moderate permeability.	Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.	No unfavorable features.
Moderate seepage.	Moderate to high strength and stability; moderate permeability.	Moderate infiltration; high water-holding capacity.	Erodible where sloping.	Erodible where sloping.	No unfavorable features.
Moderate seepage.	Moderate strength and stability; moderate permeability.	Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.	Hilly to steep; bedrock at 30 to 60 inches.
Moderate seepage.	Low strength and stability; moderately rapid permeability.	Moderate infiltration; high water-holding capacity.	(Not applicable)	Erodible where sloping.	Short periods of overflow.
Moderate seepage.	Moderate to high strength and stability; moderate permeability.	Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.	Rolling to hilly; bed rock at 48 inches.
Moderate seepage.	Moderate strength and stability; moderate permeability.	Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.	Rolling to steep; bed rock at 48 inches.
Moderately rapid seepage.	Low strength and stability; moderately rapid permeability.	Moderately rapid infiltration.	Erodible where sloping.	Erodible where sloping.	Subject to overflow.
Slow seepage	Low to moderate strength and stability; moderate to slow permeability.	Slow infiltration; medium water-holding capacity.	(Not generally needed.)	(Not needed)	Wet; subject to over flow.
Moderate seepage.	Moderate strength and stability; moderately rapid permeability.	Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.	Hilly to steep; bedrock at 36 inches.
Moderate to rapid seepage.	Low strength and stability; moderate to rapid permeability.	Moderate to rapid infiltration; moderate water-holding capacity.	Erodible where sloping.	Erodible where sloping.	No unfavorable features.
Rapid seepage	Low strength; rapid permeability.	Variable; stony; rapid permeability; low stability.	Unsuited, stony	Unsuited, stony	Strongly sloping to steep; abundant stones.
Moderate to rapid seepage.	Low to moderate strength and stability; moderate permeability.	Moderate to rapid infiltration; moderate to low water-holding capacity.	Erodible where sloping.	Erodible where sloping.	Hilly to steep; bedrock at 24 inches.
Moderate to rapid seepage.	Low to moderate strength and stability; moderate to rapid permeability.	Moderate infiltration; moderate water-holding capacity.	Erodible where sloping.	Erodible where sloping.	Hilly; bedrock at 30 inches.
Moderate seepage.	Moderate strength and stability; moderate permeability.	Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.	No unfavorable features.
Slow seepage	Slow to moderately slow permeability.	Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible	Wet; subject to seepage.

[3] Depends largely on texture and water content of soils. Wet, plastic soils are difficult to handle and to dry and compact. Hence, they are rated "poor." Highly erodible soils, such as those composed primarily of fine sand or silt, require flatter slopes, closer control of moisture during compaction, and fast-growing vegetation on slopes to prevent erosion. These soils are rated "poor to fair."

Engineering Test Data

Soil samples from the principal types of each of five extensive soil series were tested in accordance with standard procedures to help evaluate the soils for engineering purposes. The test data are given in table 9. Because the samples tested generally were obtained from depths of less than 6 feet, they do not represent materials encountered in earthwork at a greater depth. The test data, therefore, may not be adequate for estimating the suitability of a soil for engineering work necessitating deep cuts in rolling, hilly, or mountainous areas. Of the soils sampled, Appling sandy loam, Halewood fine sandy loam, and Hayesville fine sandy loam are underlain by granite and gneiss; Lloyd sandy loam is underlain by hornblende gneiss; and Wickham sandy loam, by alluvium (terrace).

The engineering soil classifications in table 9 are based on data obtained by mechanical analyses and by tests made to determine liquid limits and plastic limits. Mechanical analyses were made by combined sieve and hydrometer methods.

The tests for plastic limit and liquid limit measure the effect of water on the consistence of the soil material. As

TABLE 9.—*Engineering*

[Tests performed by the Bureau of Public Roads in accordance with

Soil [1] and location of sample	BPR report no.	Depth	Horizon	Moisture-density data [2]		Mechanical analysis [3]			
				Maximum dry density	Optimum moisture	Percentage passing sieve—			
						1½-in.	1-in.	¾-in.	⅜-in.
		Inches		*Lb. per cu. ft.*	*Percent*				
Appling sandy loam—									
W. H. Davis farm NE. of Fair Play.	S33744	2 to 10	A_p	123	10	------	------	------	------
	S33745	14 to 24	B_2	108	18	------	------	------	------
	S33746	40 to 60	C	105	19	------	------	------	------
Halewood fine sandy loam—									
1.75 miles S. of N.C. State line on Salem-Whitewater Highway. (*Modal*)	S33747	2 to 10	A_2	101	21	------	------	------	------
	S33748	14 to 25	B_2	106	19	------	------	------	------
	S33749	34 to 50	C	105	18	------	------	------	------
	S33750	96 to 100	D_r	103	18	------	------	------	------
DAR School (Green farm).	S33751	4 to 15	A_2	116	11	------	------	------	------
	S33752	17 to 29	B_2	108	18	100	99	99	98
	S33753	29 to 46	C	110	16	------	------	------	------
2.25 miles S. of N.C. State line on Salem-Whitewater Highway. (*Inclusion of Perkinsville*)	S33754	2 to 8	A_2	111	14	100	97	96	93
	S33755	10 to 22	B_2	112	16	------	------	------	------
	S33756	30 to 40	C	113	14	------	------	------	------
Hayesville fine sandy loam—									
0.75 mile S. of N.C. State line on Salem-Whitewater Highway. (*Modal*)	S33757	2 to 10	A_2	105	16	99	99	99	99
	S33758	14 to 28	B_2	104	21	100	99	99	98
	S33759	36 to 58	C	103	21	------	------	------	------
	S33760	60 to 84	D_r	103	18	------	------	------	------
50 ft. S. of Moody Cemetery. (*Significant B_3 horizon*)	S33761	1. 5 to 6	A_2	118	11	------	------	------	------
	S33762	16 to 40	B_3	108	18	------	------	------	------
	S33763	40 to 70	C	105	20	------	------	------	------
Winfield Corbin Road. (*Very thick B_3 horizon*)	S33764	2 to 11	A_2	111	15	------	------	------	------
	S33765	11 to 27	B_2	109	17	------	------	------	------
	S33766	60 to 70	C	114	14	97	97	97	97
Lloyd sandy loam—									
0.75 mile W. of Burnt Tavern bridge on the Little River. (*Modal*)	S33767	2 to 7	A_2	118	12	99	97	96	95
	S33768	10 to 24	B_2	95	26	------	------	------	------
	S33769	40 to 60	C	115	15	------	------	------	------
Wickham sandy loam—									
0.5 mile SE. of Utica Mohawk Mills and 0.25 mile W. of Col. Anderson's grave.	S33770	2 to 8	A_p	125	9	99	98	97	96
	S33771	14 to 26	B_2	106	20	99	99	99	98
	S33772	50 to 65	C	110	18	------	------	------	------

[1] Appling sandy loam, Halewood fine sandy loam, and Hayesville fine sandy loam are underlain by granite and gneiss; Lloyd sandy loam is underlain by hornblende gneiss; and Wickham sandy loam, by alluvium (terrace).

[2] Based on AASHO Designation: T 99–57—The Moisture-Density Relations of Soils Using a 5.5-lb. Rammer and a 12-in. Drop, Method A (*1*).

[3] Mechanical analyses according to AASHO Designation: T 88—Mechanical Analysis of Soils. Results obtained by this procedure may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including

the moisture content of a clayey soil increases from a very dry state, the material changes from a solid to a semisolid, or plastic, state. As the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material passes from a solid to a plastic state. The liquid limit is the moisture content at which the material passes from a plastic to a liquid state. The plasticity index is the numerical difference between the plastic limit and liquid limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

Table 9 also gives compaction (moisture-density) data for the tested soils. If a soil material is compacted at successively higher moisture content, and the compactive effort remains constant, the density of the compacted material will increase until the optimum moisture content is reached. After that, the density decreases with increase in moisture content. The highest dry density obtained in the compaction test is termed maximum dry density. Moisture-density data are important in earthwork, 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.

test data

standard procedures of the American Association of State Highway Officials]

Mechanical analysis [3]—Continued									Liquid limit [4]	Plasticity index [4]	Classification	
Percentage passing sieve—					Percentage smaller than—						AASHO [5]	Unified [6]
No. 4 (4.76 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.				
	100	67	50	25	22	16	9	7	NP	NP	A-2-4(0)	SM.
	100	81	72	59	57	54	48	45	47	26	A-7-6(12)	CL.
	100	78	71	58	54	45	35	33	52	21	A-7-5(10)	MH.
	100	89	79	59	55	46	35	29	39	13	A-6(6)	ML-CL.
	100	86	75	53	49	40	30	25	42	13	A-7-6(5)	ML.
	100	88	75	39	32	21	12	8	NP	NP	A-4(1)	SM.
	100	86	73	39	31	21	8	6	NP	NP	A-4(1)	SM.
	100	88	77	36	29	19	13	10	NP	NP	A-4(0)	SM.
98	97	88	80	54	50	44	40	36	39	18	A-6(7)	CL.
	100	92	83	50	45	37	32	29	36	16	A-6(5)	SC.
91	88	72	59	30	25	18	12	9	NP	NP	A-2-4(0)	SM.
	100	88	76	49	43	34	27	24	28	7	A-4(3)	SM-SC.
	100	83	68	35	30	22	15	11	NP	NP	A-2-4(0)	SM.
99	99	90	78	52	48	41	30	24	31	11	A-6(4)	CL.
97	96	88	80	60	57	49	41	36	45	19	A-7-6(9)	ML-CL.
	100	92	81	58	53	44	34	26	41	14	A-7-6(6)	ML-CL.
	100	81	66	38	33	23	13	10	NP	NP	A-4(1)	SM.
	100	96	88	48	38	24	16	11	NP	NP	A-4(3)	SM.
	100	95	89	61	54	42	36	32	40	17	A-6(8)	CL.
	100	96	90	63	55	45	37	33	45	18	A-7-6(10)	ML-CL.
	100	87	72	36	31	24	18	14	24	4	A-4(0)	SM-SC.
	100	91	79	55	51	45	37	32	36	13	A-6(5)	ML-CL.
97	97	83	71	38	32	24	19	16	30	7	A-4(1)	SM-SC.
94	93	87	79	35	30	23	19	16	20	4	A-2-4(0)	SM-SC.
	100	97	93	71	69	67	63	58	52	24	A-7-6(15)	MH-CH.
	100	95	82	38	34	29	23	18	29	7	A-4(1)	SM-SC.
95	93	76	61	26	20	14	10	7	NP	NP	A-2-4(0)	SM.
97	93	77	69	53	51	50	45	42	50	23	A-7-6(10)	ML-CL.
	100	90	84	62	57	47	39	35	42	18	A-7-6(9)	ML-CL.

that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming texture classes for soils.

[4] NP=Nonplastic.

[5] 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.

[6] Based on the Unified Soil Classification System, Tech. Memo. No. 3-357, v. 1, Waterways Expt. Sta., Corps of Engineers, March 1953.

Descriptions of Soils

In this section the soil series of Oconee County are described in alphabetical order. Following the general description of each series is a profile description of one of the mapping units in that series. Each of the other mapping units of that series is compared with that soil for which a profile is described, and additional facts about each are given. Further information on the use and management of each soil is given in the section "Management of the Soils." Terms used to describe the soils are defined in the Glossary.

A list of the soils mapped is given at the back of the report, along with the capability unit and woodland suitability group of each. The approximate acreage and the proportionate extent of the soils are given in table 10. The location and distribution of the soils are shown on the soil map at the back of this report.

TABLE 10.—*Approximate acreage and proportionate extent of the soils*

Soil	Acres	Percent	Soil	Acres	Percent
Altavista sandy loam, 0 to 6 percent slopes, eroded	371	0.1	Hayesville and Cecil fine sandy loams, 10 to 15 percent slopes, eroded	6,819	1.6
Appling sandy loam, 2 to 6 percent slopes	684	.2	Hayesville and Cecil fine sandy loams, 15 to 25 percent slopes	21,529	5.0
Appling sandy loam, 2 to 6 percent slopes, eroded	503	.1	Hayesville and Cecil fine sandy loams, 15 to 25 percent slopes, eroded	10,352	2.4
Appling sandy loam, 6 to 10 percent slopes, eroded	675	.2	Hayesville and Cecil fine sandy loams, 25 to 45 percent slopes	55,642	13.0
Appling sandy loam, 10 to 15 percent slopes, eroded	247	.1	Hayesville and Cecil fine sandy loams, 25 to 45 percent slopes, eroded	1,540	.4
Appling sandy loam, 15 to 30 percent slopes	434	.1	Hayesville and Cecil loams, 6 to 10 percent slopes, severely eroded	415	.1
Ashe sandy loam, 25 to 50 percent slopes	1,794	.4	Hayesville and Cecil loams, 10 to 15 percent slopes, severely eroded	738	.2
Buncombe loamy sand	475	.1	Hayesville and Cecil loams, 15 to 45 percent slopes, severely eroded	4,252	1.0
Cecil sandy loam, 2 to 6 percent slopes	1,397	.3	Hayesville, Cecil, and Halewood sandy loams, shallow, 15 to 25 percent slopes	449	.1
Cecil sandy loam, 2 to 6 percent slopes, eroded	14,061	3.3	Hayesville, Cecil, and Halewood sandy loams, shallow, 25 to 60 percent slopes	7,298	1.7
Cecil sandy loam, 6 to 10 percent slopes	1,358	.3	Hiwassee sandy loam, 2 to 6 percent slopes, eroded	392	.1
Cecil sandy loam, 6 to 10 percent slopes, eroded	19,694	4.6	Hiwassee sandy loam, 6 to 10 percent slopes, eroded	409	.1
Cecil sandy loam, 10 to 15 percent slopes	1,932	.4	Hiwassee sandy loam, 15 to 25 percent slopes, eroded	292	.1
Cecil sandy loam, 10 to 15 percent slopes, eroded	9,767	2.3	Hiwassee clay loam, 10 to 15 percent slopes, severely eroded	360	.1
Cecil sandy loam, 15 to 25 percent slopes	9,213	2.1	Lloyd sandy loam, 2 to 6 percent slopes, eroded	7,954	1.8
Cecil sandy loam, 15 to 25 percent slopes, eroded	8,414	2.0	Lloyd sandy loam, 6 to 10 percent slopes	572	1
Cecil sandy loam, 25 to 35 percent slopes	3,220	.7	Lloyd sandy loam, 6 to 10 percent slopes, eroded	8,996	2.1
Cecil sandy loam, 25 to 35 percent slopes, eroded	2,112	.5	Lloyd sandy loam, 10 to 15 percent slopes, eroded	5,824	1.4
Cecil clay loam, 2 to 6 percent slopes, severely eroded	716	.2	Lloyd sandy loam, 15 to 25 percent slopes, eroded	14,661	3.4
Cecil clay loam, 6 to 10 percent slopes, severely eroded	4,356	1.0	Lloyd sandy loam, 25 to 35 percent slopes	7,647	1.8
Cecil clay loam, 10 to 15 percent slopes, severely eroded	9,148	2.1	Lloyd clay loam, 2 to 6 percent slopes, severely eroded	360	.1
Cecil clay loam, 15 to 25 percent slopes, severely eroded	15,422	3.6	Lloyd clay loam, 6 to 10 percent slopes, severely eroded	4,093	.9
Chewacla silt loam	3,013	.7	Lloyd clay loam, 10 to 15 percent slopes, severely eroded	5,711	1.3
Congaree fine sandy loam	3,399	.8	Lloyd clay loam, 15 to 35 percent slopes, severely eroded	8,891	2.1
Congaree silt loam	2,670	.6	Lloyd loam, moderately shallow, 15 to 25 percent slopes, eroded	402	.1
Davidson loam, 2 to 10 percent slopes, eroded	277	.1	Lloyd loam, moderately shallow, 25 to 40 percent slopes	734	.2
Gullied land, rolling	449	.1	Local alluvial land	1,729	.4
Gullied land, hilly	8,447	2.0	Madison fine sandy loam, high, 2 to 6 percent slopes	156	(1)
Halewood fine sandy loam, 2 to 6 percent slopes	575	.1	Madison fine sandy loam, high, 6 to 10 percent slopes	562	.1
Halewood fine sandy loam, 6 to 10 percent slopes, eroded	1,422	.3	Madison fine sandy loam, high, 6 to 10 percent slopes, eroded	1,193	.3
Halewood fine sandy loam, 10 to 15 percent slopes	815	.2	Madison fine sandy loam, high, 10 to 15 percent slopes	1,129	.3
Halewood fine sandy loam, 10 to 15 percent slopes, eroded	768	.2	Madison fine sandy loam, high, 10 to 15 percent slopes, eroded	1,620	.4
Halewood fine sandy loam, 15 to 25 percent slopes	3,223	.7			
Halewood fine sandy loam, 15 to 25 percent slopes, eroded	917	.2			
Halewood fine sandy loam, 25 to 45 percent slopes	38,559	9.0			
Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes	1,072	.2			
Hayesville and Cecil fine sandy loams, 6 to 10 percent slopes	1,756	.4			
Hayesville and Cecil fine sandy loams, 6 to 10 percent slopes, eroded	5,003	1.2			
Hayesville and Cecil fine sandy loams, 10 to 15 percent slopes	3,251	.8			

See footnote at end of table.

TABLE 10.—*Approximate acreage and proportionate extent of the soils—Continued*

Soil	Acres	Percent	Soil	Acres	Percent
Madison fine sandy loam, high, 15 to 25 percent slopes	2, 694	. 6	Watauga fine sandy loam, 2 to 6 percent slopes, eroded	109	(1)
Madison fine sandy loam, high, 15 to 25 percent slopes, eroded	1, 565	. 4	Watauga fine sandy loam, 6 to 10 percent slopes, eroded	81	(1)
Madison fine sandy loam, high, 25 to 40 percent slopes	10, 206	2. 4	Watauga fine sandy loam, 10 to 25 percent slopes, eroded	138	(1)
Madison loam, high, 15 to 25 percent slopes, severely eroded	336	. 1	Watauga fine sandy loam, 25 to 40 percent slopes	293	. 1
Madison sandy loam, 6 to 10 percent slopes, eroded	136	(1)	Wickham sandy loam, 2 to 6 percent slopes	472	. 1
Madison sandy loam, 10 to 15 percent slopes, eroded	174	(1)	Wickham sandy loam, 2 to 6 percent slopes, eroded	1, 713	. 4
Madison sandy loam, 15 to 30 percent slopes, eroded	386	. 1	Wickham sandy loam, 6 to 10 percent slopes, eroded	681	. 2
Mixed alluvial land	11, 694	2. 7	Wickham sandy loam, 10 to 15 percent slopes, eroded	429	. 1
Mixed wet alluvial land	3, 189	. 7	Wickham sandy loam, 15 to 25 percent slopes, eroded	260	. 1
Porters loam, 25 to 45 percent slopes	2, 071	. 5	Wickham clay loam, 6 to 10 percent slopes, severely eroded	282	. 1
Porters stony loam, 25 to 45 percent slopes	1, 188	. 3	Worsham sandy loam, 0 to 6 percent slopes	934	. 2
State fine sandy loam	334	. 1	Worsham sandy loam, 6 to 15 percent slopes, eroded	108	(1)
Stony land	377	. 1			
Talladega and Chandler loams, 10 to 25 percent slopes	625	. 1			
Talladega and Chandler loams, 25 to 60 percent slopes	23, 995	5. 6	Total	428, 800	100. 0

[1] Less than 0.1 percent.

Altavista Series

The Altavista series consists of deep, moderately well drained soils that developed in old alluvium on terraces along the larger streams. The dark yellowish-brown surface layer is friable sandy loam. The mottled, yellowish-brown subsoil is sandy clay loam. The slope range is 0 to 6 percent. The original vegetation was mainly hardwoods but included some pine.

These soils generally are at slightly higher elevations than the State soils and at slightly lower elevations than the Wickham soils. They have a mottled, yellowish-brown subsoil, which indicates moderately good drainage. The State soils have a dark-brown subsoil, the Wickham soils have a red to dark-red subsoil, and both are better drained than the Altavista soils.

There is only one Altavista soil mapped in Oconee County.

Altavista sandy loam, 0 to 6 percent slopes, eroded (AdB2).—This deep, moderately well drained soil is on low stream terraces.

Profile in a moist, cultivated area:

- A_p 0 to 9 inches, dark yellowish-brown (10YR 4/4) sandy loam; weak, medium, crumb structure; very friable; boundary abrupt and smooth.
- B_1 9 to 11 inches, yellowish-brown (10YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; slightly sticky; roots plentiful; some krotovinas; boundary abrupt and smooth.
- B_2 11 to 31 inches, yellowish-brown (10YR 5/8) sandy clay loam mottled with strong brown (7.5YR 5/8); medium, subangular blocky structure; slightly sticky; roots fewer than in B_1 horizon; boundary gradual and smooth.
- B_3 31 to 38 inches, yellowish-brown (10YR 5/4) sandy clay loam mottled with very pale brown (10YR 7/3); weak, medium, subangular blocky structure; firm; boundary gradual and smooth.
- C 38 inches +, yellowish-brown (10YR 5/6) sandy clay loam mottled with very pale brown (10YR 8/3); no apparent structure.

The depth of the profile ranges from 36 to 42 inches. The horizons vary in thickness. In some small areas there is waterworn gravel. Included are small areas that have a surface soil of loamy sand, fine sandy loam, or silt loam.

This soil is moderately low in organic-matter content and moderately low in fertility. It is medium acid to strongly acid. The moisture supply generally is favorable for crops that need large amounts of water.

This soil has good tilth but is limited in its use for row crops because of the hazard of erosion. To help control erosion, half the acreage should be kept in close-growing crops. Crops respond to adequate amounts of lime and fertilizer. They are seldom damaged by drought.

Well-suited crops include truck crops, cotton, corn, sweetpotatoes, soybeans, grapes, grain sorghum, small grain, and pasture grasses and clovers. Loblolly pine grows well. *Capability unit B10–IIe–2. Woodland suitability group 4.*

Appling Series

The Appling series consists of deep, well-drained soils that developed in residuum derived from granite, gneiss, and some schist. These soils are in the Piedmont section. The surface layer is friable sandy loam that ranges in color from dark gray in undisturbed areas to pale brown in cultivated areas. The subsoil is mottled, dark yellowish-brown to yellowish-red sandy clay loam to clay loam. The slope range is 2 to 30 percent. The original vegetation was native hardwoods and included an understory of shrubs.

These soils commonly are adjacent to the Cecil soils, which have a red, moderately permeable subsoil.

Appling sandy loam, 2 to 6 percent slopes (ApB).—This deep, well-drained soil has a dark yellowish-brown to yellowish-red subsoil of clay loam. It is in scattered areas on the Piedmont uplands.

Profile in a moist area of undisturbed hardwood forest:

A_1 0 to 3 inches, dark-gray (10YR 4/1) sandy loam; moderate, medium, crumb structure; loose; roots abundant; pH 6.0; boundary abrupt and smooth.

A_2 3 to 11 inches, yellowish-brown (10YR 5/4) sandy loam; weak, medium, granular structure; friable; roots abundant; many medium pore spaces; pH 6.0; boundary abrupt and smooth.

B_1 11 to 13 inches, strong-brown (7.5YR 5/8) sandy clay loam; weak, medium, subangular blocky structure; friable; roots abundant; many small pore spaces; pH 5.5; lower boundary clear and smooth.

B_{21} 13 to 21 inches, yellowish-red (5YR 5/6) clay loam; moderate, medium, subangular blocky structure; firm; a few small pore spaces; few roots; pH 5.5; lower boundary clear and smooth.

B_{22} 21 to 33 inches, red (2.5YR 4/6) clay loam; strong, medium, subangular blocky structure; firm; some roots; a few small pore spaces; pH 5.5; lower boundary clear and wavy.

B_3 33 to 42 inches, red (10R 4/6) clay loam mottled with yellowish brown (10YR 5/6); moderate, medium, platy structure; firm; no observable roots; pH 5.0; lower boundary gradual and irregular.

C 42 inches +, deeply weathered, disintegrated granite and some gneiss.

Quartz gravel occurs in some places but does not seriously interfere with cultivation. There are some variations in the thickness of the horizons and in the depth of the profile. The amount of mottling also varies. Included are small areas that are lighter colored and some that are severely eroded.

This soil is moderately low in fertility, low in organic-matter content, and medium acid to strongly acid. The rate of infiltration is moderate, permeability is moderately slow, and the moisture-holding capacity is moderate.

Most of the acreage is in woods. Only a small acreage is cultivated. In cultivated areas, half the acreage should be kept in close-growing crops because of the moderate hazard of erosion. Crops respond to adequate applications of fertilizer and lime.

Suitable crops are truck crops, cotton, corn, sweetpotatoes, soybeans, grapes, grain sorghum, small grain, and pasture grasses. Alfalfa is not well suited, because water tends to back up in the subsoil and damage the roots.

This soil is fairly well suited to pine. Many areas are suitable for ponds. *Capability unit B10–IIe–2. Woodland suitability group 4.*

Appling sandy loam, 2 to 6 percent slopes, eroded (ApB2).—The profile of this soil is similar to that of Appling sandy loam, 2 to 6 percent slopes, except that from 25 to 75 percent of the original surface layer has been removed by erosion. The present surface layer contains some former subsoil and is finer textured and browner than the original. Included are small areas that are severely eroded and that have a surface layer of clay loam.

Because the surface layer is thinner than that of Appling sandy loam, 2 to 6 percent slopes, infiltration is slower, runoff is greater, and fertility is lower. Crops are more likely to be damaged by drought, and yields are lower.

Most of the acreage is in crops. To help control erosion, close-growing crops should be planted on half the acreage each year. Conservation practices are needed to control water.

This soil is suited to the same crops as the uneroded soil, but it needs more fertilizer. Tillage is more difficult because of the texture of the plow layer. *Capability unit B10–IIe–2. Woodland suitability group 4.*

Appling sandy loam, 6 to 10 percent slopes, eroded (ApC2).—This soil is steeper than Appling sandy loam, 2 to 6 percent slopes, and it has lost from 25 to 75 percent of the original surface layer through erosion. The present surface layer has been mixed by tillage with some of the former subsoil and is finer textured than the original and slower in infiltration. Runoff is greater than on Appling sandy loam, 2 to 6 percent slopes, fertility is lower, and the organic-matter content is lower. Tillage is more difficult and is delayed for longer periods after rains.

There are variations in the intensity of mottling and the depth at which it occurs. Some gravelly areas are included.

About 60 percent of the acreage is cultivated, 15 percent is in pasture, and 25 percent is in woods. Because of the moderately severe hazard of erosion, two-thirds of the cultivated acreage should be in close-growing crops. Crops should be grown in contour strips and rotated. All draws should be in close-growing perennial vegetation. Under prevailing management, a traffic pan may form. Occasional deep tillage or growing a deep-rooted legume in the crop rotation will help to prevent the formation of pans.

Suitable crops include truck crops, cotton, corn, sweetpotatoes, soybeans, grapes, grain sorghum, small grain, and a mixture of pasture grasses and legumes. Alfalfa is not well suited, because of the moderately slow permeability of the subsoil. Crops respond to lime and fertilizer.

This soil is suitable for the construction of ponds and affords many favorable sites for ponds. It is well suited to plants that supply food and cover for wildlife, and fairly well suited to pine trees. *Capability unit B10–IIIe–2. Woodland suitability group 4.*

Appling sandy loam, 10 to 15 percent slopes, eroded (ApD2).—This soil is steeper than Appling sandy loam, 2 to 6 percent slopes, and has lost from 25 to 75 percent of the original surface soil through erosion. Runoff is greater than on the more gently sloping soil, infiltration is slower, the organic-matter content is lower, and fertility is lower. Crops are more likely to be damaged by drought, and yields are lower. This soil is less well suited to mechanized farming than the more gently sloping Appling soils, and it is more difficult to till because the surface layer is thin.

Included are small areas that have a surface layer of gravelly sandy loam. Also included are a few severely eroded areas that have a surface layer of clay loam. There are variations in the intensity of mottling and in the depth at which it occurs.

About a third of the acreage is cultivated, a third is in pasture, and a third is in woods. This soil is too steep for terracing but can be stripcropped on the contour. Because of the severe hazard of erosion, three-fourths of the acreage should be in close-growing crops, and all draws and drains should be kept in close-growing perennial vegetation.

Crops respond to adequate amounts of fertilizer and lime. Rotations should include crops that provide liberal amounts of organic residue. Grass-based rotations are desirable.

Traffic pans may form but are less common than in the more gently sloping Appling soils.

Suitable crops are cotton, corn, small grain, annual lespedeza, sericea lespedeza, grain sorghum, grapes,

peaches, and pasture mixtures commonly used in this area. *Capability unit B10–IVe–1. Woodland suitability group 4.*

Appling sandy loam, 15 to 30 percent slopes (ApE).—This soil is much steeper than Appling sandy loam, 2 to 6 percent slopes, and the profile is only about 36 to 37 inches deep instead of 43 inches. Runoff is rapid.

Included are some small areas that have a surface layer of clay loam or gravelly sandy loam.

All of the acreage is in woods. Because of the very severe erosion hazard, this soil should be kept in permanent vegetation. Loblolly pine is well suited.

Although suitable for the construction of ponds, this soil affords few favorable pond sites because it is of limited extent. *Capability unit B10–VIe–2. Woodland suitability group 4.*

Ashe Series

The Ashe series consists of shallow, excessively drained soils that occur mainly in extremely steep, broken, mountainous areas, generally at altitudes of more than 2,000 feet.

The surface layer is 1 to 2 inches thick. It is very dark grayish-brown to black sandy loam that is stained with organic matter. It is underlain by very dark grayish-brown to dark-brown sandy loam, 4 to 30 inches thick, that grades through 2 to 6 inches of weathered rock to hard rock. The parent material is chiefly coarse-grained granite that has a high content of quartz.

The original vegetation was hardwoods, principally beech, ash, chestnut, chestnut oak, hickory, and red oak. Much of this vegetation was destroyed by fires started intentionally by early settlers to clear the land and to improve range grazing. The present vegetation is dominantly small, second-growth hardwoods, and except for the lack of chestnut is similar to the original. There are some chestnut sprouts.

These soils are associated with the shallow Hayesville and Halewood soils but are not so well developed.

There is only one Ashe soil mapped in Oconee County.

Ashe sandy loam, 25 to 50 percent slopes (AsF).—This shallow, excessively drained soil occurs mainly in extremely steep, broken, mountainous areas at altitudes of more than 2,000 feet. It occurs mostly near Lower Falls on the Whitewater River in the northeastern part of the county.

Profile in a moist, wooded area:

- A_{00} 1 to ½ inch, loose leaves and organic matter, mostly undecomposed.
- A_0 ½ inch to 0, organic debris, partially decomposed and matted.
- A_1 0 to 1 inch, black (10YR 2/1) mineral-organic sandy loam; moderate, fine, crumb structure; friable; some mica flakes; pH 6.0; boundary abrupt and smooth.
- A_2 1 to 5 inches, very dark grayish-brown (2.5Y 3/2) sandy loam; weak, fine, crumb structure; very friable; very rapid permeability; roots abundant; a few mica flakes; pH 5.7; boundary clear and irregular.
- B 5 to 18 inches, yellowish-brown (10YR 5/6) sandy loam; weak, fine, subangular blocky structure; friable; roots abundant; some mica flakes; pH 5.5; boundary abrupt and wavy.
- C 18 inches +, about 4 inches of partially disintegrated weathered rock over hard rock; fractures common in underlying rock.

The profile is 4 to 20 inches thick. In some small, irregular areas there are outcrops of rock, and in places there are large boulders. Coarse quartz gravel is common. Included are some areas that have a surface layer of loam or coarse sandy loam. Also included are very small areas of Hayesville and Halewood soils that have abnormally shallow profiles.

The surface layer of the Ashe soil is medium acid in the upper part and strongly acid in the lower part. The upper part of the surface layer is high in organic-matter content. Fertility is moderately low, infiltration is extremely rapid, and permeability is extremely rapid. The moisture-holding capacity is very low. The shallow profile, underlain by hard rock, can store only a limited amount of water. Once the surface layer becomes saturated, additional rainfall causes rapid runoff. Flash floods are then likely to occur.

Because of the steep topography, limited water-holding capacity, and erosion hazard, this soil should be kept in permanent cover, preferably trees. White pine probably is best suited, but the site index for all trees is low because of the low moisture supply. *Capability unit B13–VIIe–2. Woodland suitability group 11.*

Buncombe Series

The Buncombe series consists of deep, excessively drained, sandy soils on wide flood plains. These soils consist of recent alluvium, some deposited as natural levees by floodwaters, and some deposited uniformly over the wide bottom lands by streams emerging from steep gorges. All areas are subject to overflow. The slope range is 0 to 6 percent.

There is only one Buncombe soil mapped in Oconee County.

Buncombe loamy sand (Bu).—This deep, droughty, sandy soil is on flood plains.

Profile in a moist, abandoned field, now covered with 17-year-old pine, that is adjacent to the Toxaway River:

- A_1 0 to 7 inches, light yellowish-brown (10YR 6/4) loamy sand; structureless; loose; roots abundant; pH 6.0; boundary clear and smooth.
- A_2 7 to 40 inches, very pale brown (10YR 7/4) loamy sand; structureless; very friable; roots abundant; some mica flakes; pH 6.0; boundary gradual and smooth.
- C 40 inches +, lenses of loamy sand and sand, unconsolidated alluvial deposits; a little waterworn gravel.

This soil varies in texture and in color. It is not subject to erosion, but when the streams overflow it may be scoured or more material may be deposited. It is subject to excessive leaching of plant nutrients.

The organic-matter content is low, fertility is low, and the reaction is slightly acid to medium acid. The moisture-holding capacity is very low, permeability is rapid, and infiltration is rapid.

This soil is not suited to frequent cultivation. Only about a third of the acreage is cultivated, and the rest is in woods. The most suitable crops are truck crops, corn, beans, apples, bermudagrass, sudangrass, sericea lespedeza, bicolor lespedeza, cowpeas, rye, crotolaria, tall fescue, and sweetclover. *Capability unit B10–IIIs–1. Woodland suitability group 10.*

Cecil Series

The Cecil series consists of deep, well-drained soils that developed in residuum weathered from granite, gneiss, and schist. The parent rock is high in potash and has imparted a relatively high potash content to the subsoil. These soils are dominant in the Piedmont section of the county. The surface layer is friable, grayish-brown to very dark brown sandy loam. The subsoil is moderately permeable, red sandy clay loam to clay loam. The original vegetation was predominantly hardwoods but included some pine.

These soils occur in association with the Appling soils and to a lesser extent with the Lloyd and Madison soils. They developed from parent material similar to that of the Appling soils but are redder than the Appling. They are not so red as the Lloyd soils, which developed from material derived from hornblende gneiss and diorite. Their profile is slightly deeper than that of the Madison soils, which developed from material derived from quartz mica schist.

Cecil sandy loam, 2 to 6 percent slopes (CdB).—This deep, well-drained soil developed in material derived from granite, gneiss, and schist and is in the Piedmont. The subsoil is red clay to clay loam.

Profile in a moist area of undisturbed hardwood forest:

- A_{00} 1½ to 1 inch, loose leaves and organic debris, mostly undecomposed.
- A_0 1 inch to 0, organic debris, partially decomposed or matted.
- A_1 0 to 4 inches, dark-brown (10YR 4/3) sandy loam; weak, fine, subangular blocky structure; very friable; roots abundant; pH 5; boundary abrupt and smooth.
- A_2 4 to 8 inches, yellowish-red (5YR 5/6) sandy loam; weak, medium, subangular blocky structure; friable; roots abundant; pH 6; boundary abrupt and smooth.
- A_3 8 to 11 inches, yellowish-red (5YR 4/6) sandy clay loam; weak, medium, subangular blocky structure; friable; roots abundant; pH 5.5; lower boundary clear and smooth.
- B_1 11 to 13 inches, red (2.5YR 4/8) sandy clay loam; moderate, medium, subangular blocky structure; friable; roots abundant; pH 6.0; boundary abrupt and smooth.
- B_2 13 to 32 inches, red (10R 4/6) clay loam; moderate, medium, subangular blocky structure; firm; roots abundant; pH 5.6; boundary gradual and wavy.
- B_3 32 to 44 inches, weak-red (10R 4/4) clay loam; medium, subangular blocky structure; firm; roots fewer than in B_2 horizon; some mica; pH 5.4; boundary gradual and wavy.
- C 44 to 60 inches +, deeply weathered, structureless, disintegrated material derived from granite and gneiss.

There are some variations in the thickness of the horizons. The thickness of the A horizon ranges from 8 to 12 inches. In some places the A_3 horizon is not present. The subsoil is clay loam to clay. The depth to the parent material ranges from 34 to 48 inches. In nearly level areas, the depth to bedrock generally is more than 25 feet. Included are very small areas that have a surface layer of gravelly sandy loam or clay loam.

This soil is moderately high in fertility, medium in organic-matter content, and high in moisture-holding capacity. The rate of infiltration is moderate. The reaction is medium acid to very strongly acid.

About two-thirds of the acreage is cultivated, and the rest is in woods. This soil responds to good management and is the most productive in the Cecil series. It is well suited to mechanized farming. Because of the hazard of erosion, its use for row crops is limited. Close-growing crops should be grown on half the acreage each year. Crops should be grown in contour strips and should be rotated. All natural draws should be kept in close-growing perennial vegetation.

Suitable crops include truck crops, cotton, corn, grain sorghum, small grain, annual lespedeza, sericea lespedeza, alfalfa, soybeans, peaches, grapes, and pasture grasses and clovers commonly grown in the Piedmont section. *Capability unit B10–IIe–1. Woodland suitability group 6.*

Cecil sandy loam, 2 to 6 percent slopes, eroded (CdB2).—This soil is similar to Cecil sandy loam, 2 to 6 percent slopes, except that it has lost from 25 to 75 percent of the original surface soil through erosion and, consequently, is slightly lower in fertility and slightly lower in organic-matter content. Because infiltration is slower and the water-holding capacity is slightly lower, runoff is greater and the erosion hazard is more serious. This soil is more droughty than the uneroded soil and is more difficult to till because of the thinner surface layer. Crops need more fertilizer, and yields are about a third lower.

Included are small areas that have a surface layer of clay loam or gravelly sandy loam.

About 85 percent of the acreage is cultivated, and the rest is in pasture or woods. Because of the hazard of erosion, the use of this soil for row crops is limited. Half the acreage should be kept in close-growing crops. Crops should be grown in contour strips and should be rotated. All natural draws should be in perennial vegetation.

Suitable crops include cotton, grain sorghum, corn, small grain, annual lespedeza, sericea lespedeza, alfalfa, peaches, grapes, pimiento peppers, Turkish tobacco, and pasture grasses and legumes commonly grown in this area. *Capability unit B10–IIe–1. Woodland suitability group 6.*

Cecil sandy loam, 6 to 10 percent slopes (CdC).—This soil is similar to Cecil sandy loam, 2 to 6 percent slopes, except the slope is steeper. Consequently, runoff is more rapid and the erosion hazard more serious. More intensive practices are needed to control erosion. Included are small areas that are gravelly. Also included are a few areas of soils that have a fine sandy loam surface layer or a shallower subsoil.

About 30 percent of the acreage is cultivated, and the rest is in small, widely scattered, wooded areas. The use of this soil for row crops is limited. Because of the erosion hazard, two-thirds of the acreage should be kept in close-growing crops. Crops should be grown in strips on the contour and should be rotated. All natural draws and waterways should be in close-growing perennial cover.

Crops respond to lime and fertilizer. Rotations should include crops that supply organic debris.

Suitable crops include truck crops, cotton, corn, grain sorghum, small grain, annual lespedeza, sericea lespedeza, alfalfa, soybeans, peaches, grapes, and pasture grasses and legumes commonly grown in the Piedmont. *Capability unit B10–IIIe–1. Woodland suitability group 6.*

Cecil sandy loam, 6 to 10 percent slopes, eroded (CdC2).—This soil is similar to Cecil sandy loam, 2 to 6 percent slopes, except that it is steeper and has lost from 25 to 75 percent of the original surface soil through erosion. Infiltration is slower, runoff is greater and more rapid because of the slope, and less water is available for infiltration. The moisture-absorbing and moisture-holding capacities are lower. This soil is more droughty than

the uneroded soil and is less well suited to shallow-rooted plants that need large amounts of water.

The fertility is lower than that of Cecil sandy loam, 2 to 6 percent slopes, and more fertilizer is needed for the same crops. Yields of most crops generally are about a third less.

About 85 percent of the acreage is cultivated, and the rest is in woods. The use of this soil for row crops is limited. Because of the erosion hazard, two-thirds of the acreage should be kept in close-growing crops. Crops should be grown in contour strips and rotated. All draws and waterways should be kept in close-growing perennial vegetation.

Crops that are best suited are cotton, corn, small grain, grain sorghum, annual lespedeza, sericea lespedeza, alfalfa, peaches, grapes, and pasture grasses and legumes commonly grown in the Piedmont. *Capability unit B10–IIIe–1. Woodland suitability group 6.*

Cecil sandy loam, 10 to 15 percent slopes (CdD).—The profile of this soil is from 2 to 5 inches shallower than that of Cecil sandy loam, 2 to 6 percent slopes, the horizons are slightly less distinct, and the depth to bedrock ranges from 6 to 18 feet. The rate of infiltration is slightly lower, and the amount of water that infiltrates is less because of rapid runoff. Permeability normally is slightly higher because the subsoil is more porous.

Included are small areas that have a surface layer of fine sandy loam and some areas that are gravelly. Also included are a few colluvial deposits of well-drained sandy loam in shallow depressions.

This soil is only moderately well suited to mechanized farming. About 20 percent of the acreage is cultivated, and the rest is in small, widely scattered, wooded areas. The erosion hazard is severe and limits the use of this soil for row crops. Close-growing crops should be grown on three-fourths of the acreage each year. A 4-year rotation is suitable. Crops should be grown in contour strips. All draws and waterways should be kept in close-growing perennial vegetation.

Crops that supply organic debris should be included in the rotation. Crops respond to lime and fertilizer.

Suitable crops include cotton, corn, small grain, common lespedeza, sericea lespedeza, peaches, grapes, grain sorghum, truck crops, and pasture grasses and legumes that are commonly grown in the Piedmont. *Capability unit B10–IVe–1. Woodland suitability group 6.*

Cecil sandy loam, 10 to 15 percent slopes, eroded (CdD2).—This soil is steeper than Cecil sandy loam, 2 to 6 percent slopes, and it has a slightly shallower profile. From 25 to 75 percent of the original surface layer has been removed by erosion.

Infiltration is slower than on the more gently sloping soil, runoff is more rapid, the moisture-holding capacity is lower, the organic-matter content is lower, and fertility is lower. Greater amounts of fertilizer are needed for crops, and yields of most crops generally are about a third lower.

Included are small areas that have a clay loam, fine sandy loam, or gravelly surface layer. Also included are a few small areas of a shallower soil that has no B horizon.

About 85 percent of the acreage is in crops or pasture, and the rest is in woods. The use of this soil for row crops is limited by the severe erosion hazard. Close-growing crops should be grown on three-fourths of the acreage each year. A 4-year rotation is suitable. Crops should be grown in contour strips. All draws and waterways should be kept in close-growing perennial vegetation.

Crops that are best suited include truck crops, cotton, corn, grain sorghum, small grain, common lespedeza, sericea lespedeza, peaches, grapes, peppers, Turkish tobacco, and pasture grasses and legumes commonly grown in the Piedmont. *Capability unit B10–IVe–1. Woodland suitability group 6.*

Cecil sandy loam, 15 to 25 percent slopes (CdE).—This soil is much steeper than Cecil sandy loam, 2 to 6 percent slopes, and its profile generally is 6 to 8 inches shallower. The depth to bedrock ranges from 5 to 15 feet.

Infiltration is slower than on the more gently sloping soil, runoff is much more rapid, permeability is slightly more rapid, and the moisture-holding capacity is slightly less.

Included are small, scattered areas that have a surface layer of clay loam or fine sandy loam. Some gravelly areas are also included.

About 10 percent of the acreage is used for pasture, and the rest is in woods. This soil is not suited to cultivation, because of the severe hazard of erosion. It can be used for permanent pasture or hay crops, but the plants selected should be perennials that need reseeding only once in 6 years. On long slopes, the initial planting or reseeding should be in contour strips, and the strips should be planted alternately over a 2-year period. Adequate amounts of lime and fertilizer are needed. Care should be taken to prevent overharvesting forage crops and overgrazing pastures. Most areas need cross-fencing if used for pasture.

Best-suited crops include alfalfa, sericea lespedeza, tall fescue, Coastal bermudagrass, common bermudagrass, bahiagrass, white clover, and crimson clover. *Capability unit B10–VIe–2. Woodland suitability group 6.*

Cecil sandy loam, 15 to 25 percent slopes, eroded (CdE2).—This soil is much steeper than Cecil sandy loam, 2 to 6 percent slopes, and its profile generally is 11 to 14 inches shallower. From 25 to 75 percent of the original surface soil has been removed by erosion. The present surface layer generally is finer textured because it contains some of the former subsoil.

Runoff is greater and more rapid, infiltration is slower, and the water-holding capacity is lower because of the shallower profile. The organic-matter content generally is lower, and the reaction is higher. Fertility has been greatly reduced, and heavier applications of fertilizer are needed.

Included are a few small areas of a shallower soil that has no B horizon. Also included are small areas that have a clay loam or fine sandy loam surface layer, and small areas that are stony or gravelly.

About 12 percent of the acreage is cultivated, 28 percent is in forage crops or pasture, and the rest is in woods. Because of the serious erosion hazard, the use of this soil is limited to permanent pasture or close-growing perennial forage crops. Plants that need reseeding only once in 6 years should be selected. Crops respond to fertilizer and lime. Pastures should not be overgrazed.

Alfalfa, sericea lespedeza, tall fescue, bermudagrass, bahiagrass, white clover, and crimson clover are the best

suited crops. *Capability unit B10–VIe–2. Woodland suitability group 6.*

Cecil sandy loam, 25 to 35 percent slopes (CdF).—The profile of this soil generally is 12 to 15 inches shallower than that of Cecil sandy loam, 2 to 6 percent slopes, and the horizons are less distinct.

Infiltration is slower than on the more gently sloping soil, but permeability is slightly more rapid in the subsoil. Runoff is greater and more rapid and creates a serious erosion hazard. The moisture-holding capacity is slightly lower because of the shallowness of the profile and the more permeable subsoil.

Included are a few small areas of a shallower soil that has no B horizon. Also included are areas that have a surface layer of fine sandy loam and some areas that are gravelly or stony.

All of the acreage is in woods, and this is the best use for this soil. Trees provide a protective cover that helps to control erosion. Detailed information concerning the management of selected species is given in the section "Woodland." *Capability unit B10–VIIe–1. Woodland suitability group 6.*

Cecil sandy loam, 25 to 35 percent slopes, eroded (CdF2).—This soil has lost from 25 to 75 percent of the original surface layer through erosion, and its profile is from 17 to 22 inches shallower than that of Cecil sandy loam, 2 to 6 percent slopes.

The moisture-holding capacity is much lower than that of the uneroded soil because of the shallower profile. Infiltration is slower, runoff is greater and more rapid, the organic-matter content is lower, and fertility is lower. The reaction is medium acid.

Included are some areas that have a surface layer of fine sandy loam and other areas that have a surface layer of clay loam. Also included are some gravelly and stony areas.

About 12 percent of the acreage is in pasture, and the rest is in forest. The forest consists mostly of second-growth pine. Because of the severe hazard of erosion, this soil is not suited to pasture or hay crops. Its best use is forest consisting of mixed stands of pine and hardwoods, with pine predominating. Detailed information concerning the management of selected species is given in the section "Woodland." *Capability unit B10–VIIe–1. Woodland suitability group 6.*

Cecil clay loam, 2 to 6 percent slopes, severely eroded (CcB3).—This soil has a much shallower profile than Cecil sandy loam, 2 to 6 percent slopes, and a finer textured surface layer. It has lost from 75 to 100 percent of the original surface layer through erosion and, in places, as much as 25 percent of the former subsoil. Shallow gullies are common, and there are a few deep gullies.

Infiltration is considerably slower than on the uneroded soil, permeability is slower, and runoff is more rapid. The water-holding capacity is much lower, and the organic-matter content is lower.

Included are areas that have a sandy loam, fine sandy loam, or gravelly surface layer.

This soil is droughty and tends to bake, crust, and crack when drying. Tillage is more difficult than on the uneroded soil, and periods when conditions are favorable for tillage are shorter. The germination of seed is lower and is delayed. Crops do not respond so well to fertilizer, and they need more fertilizer and lime. More green-manure crops should be grown to supply organic matter.

About 30 percent of the acreage is in crops, 45 percent is in pasture, and the rest is in woods. The use of this soil for crops is limited. Close-growing crops should be grown on two-thirds of the acreage each year. Crops should be grown in contour strips and rotated. Strips should be narrower than on Cecil sandy loam, 2 to 6 percent slopes, and terraces should be spaced at closer vertical intervals. All water outlets and draws should be in close-growing perennial vegetation.

Shallow-rooted plants that have high moisture requirements are not suitable. Although not well suited, small grain, annual lespedeza, sericea lespedeza, cotton, peppers, Turkish tobacco, grapes, grain sorghum (if planted early), peaches, and the common pasture grasses and legumes can be grown. *Capability unit B10–IIIe–1. Woodland suitability group 7.*

Cecil clay loam, 6 to 10 percent slopes, severely eroded (CcC3).—This soil has lost from 75 to 100 percent of the original surface layer and, in places, as much as 25 percent of the former subsoil through erosion. It is highly susceptible to drought. Runoff is more rapid than on Cecil sandy loam, 2 to 6 percent slopes, infiltration is considerably slower, permeability is slower, and the moisture-holding capacity is much lower. Reaction generally is higher. The organic-matter content is very low, and fertility is very low.

Included are small areas that are gravelly or that have a surface layer of sandy loam or fine sandy loam. Also included are a few areas of a soil that has a shallower subsoil.

Tillage is difficult because of the texture of the plow layer. Clods form if tillage is undertaken when moisture conditions are not favorable, and periods when conditions are favorable are short. The subsoil is subject to compaction by farm machinery. Subsoiling or deep plowing generally helps to prevent packing and to provide better aeration.

About 30 percent of the acreage is in crops, 40 percent is in pasture, and the rest is in woods. Because of the severe erosion hazard, crops should be grown in contour strips and rotated; close-growing crops should be grown on three-fourths of the acreage each year; and all draws and water outlets should be kept in close-growing perennial vegetation.

This soil is not so responsive to lime and fertilizer as Cecil sandy loam, 2 to 6 percent slopes, because of moisture limitations. Yearly applications and larger amounts of lime and fertilizer are needed. Germination of seed is delayed, and a larger proportion of the seed fails to germinate. The mortality of young seedlings is higher, and yields are much lower.

Crops that are fairly well suited include small grain, common lespedeza, sericea lespedeza, peaches, grain sorghum, bermudagrass, white clover, crimson clover, alfalfa, tall fescue, and cotton. *Capability unit B10–IVe–1. Woodland suitability group 7.*

Cecil clay loam, 10 to 15 percent slopes, severely eroded (CcD3).—This soil has lost from 75 to 100 percent of the original surface layer through erosion and as much as 25 percent of the subsoil. There are some shallow gullies and a few deep ones.

Infiltration is much slower than on Cecil sandy loam, 2 to 6 percent slopes, permeability is slower, the moisture-holding capacity is very much lower, and the organic-matter content is much lower. Runoff is greater and much more rapid. The reaction is higher.

Included are small areas that are gravelly or stony, and some areas that have a sandy loam or fine sandy loam surface layer.

Tillage is more difficult than on Cecil sandy loam, 2 to 6 percent slopes, because of the texture of the surface layer. Periods when moisture conditions are favorable for tillage are short. This soil tends to crust, bake, and crack. This tendency is not favorable for the germination of seed and contributes to the high mortality of seedlings.

About 15 percent of the acreage is cultivated, 60 percent is in pasture, and the rest is in woods. This soil is not suited to cultivation and should be kept in permanent vegetation at all times. It can be used for permanent pasture or hay consisting of perennial plants that need reseeding only once in 6 years. Long slopes should be stripcropped on the contour, and the strips planted alternately over a period of 2 years or more. Fertilizer in relatively large amounts is needed annually to maintain fertility. For pastures, controlled grazing is necessary and cross-fencing is desirable.

Alfalfa, sericea lespedeza, fescue, bermudagrass, white clover, and crimson clover are the best suited crops. *Capability unit B10–VIe–2. Woodland suitability group 7.*

Cecil clay loam, 15 to 25 percent slopes, severely eroded (CcE3).—This soil has lost from 75 to 100 percent of the original surface soil through erosion, and in places as much as 25 percent of the former subsoil. The profile is 24 to 34 inches deep.

Runoff is great and is very rapid, infiltration is very slow, permeability is moderately slow, the organic-matter content is very low, and the moisture-holding capacity is low. The reaction is strongly acid.

Included are small areas that have a sandy loam, fine sandy loam, or gravelly surface layer.

This soil has very poor tilth and is highly susceptible to drought. It is easily compacted by farm animals or machinery. Fertility has been greatly decreased by the erosion of the original surface soil.

About 15 percent of the acreage is in pasture, and the rest is in woods. A permanent cover of trees is the best use for this soil, but the site index for all trees is low. Loblolly pine is the best suited species. Shortleaf pine generally has a high mortality rate because of littleleaf disease. Virginia pine is highly resistant to this disease but has a low site index.

Fire protection is of primary importance. Information concerning management of woodlands and selective harvesting cycles is given in the section "Woodland." *Capability unit B10–VIIe–1. Woodland suitability group 7.*

Chewacla Series

This series consists of somewhat poorly drained soils on first bottoms along streams. The surface layer is dark-brown to reddish-brown silt loam and is 18 to 30 inches thick. This layer is well drained. It is underlain by mottled yellowish-brown to brown silty clay loam that is poorly drained. The slope range is 0 to 3 percent. A sharp line of demarcation generally exists between the A and C horizons.

These soils commonly are near the well-drained Congaree soils.

The Chewacla soils are frequently flooded but generally only for short periods. The water table is at a depth of 24 to 36 inches, and crayfish holes are common in undisturbed areas.

Supplemental drainage is needed if crops are grown, but adequate outlets are not always available. In many places, silt and debris need to be removed from stream channels to provide drainage outlets.

There is only one Chewacla soil in Oconee County.

Chewacla silt loam (Ch).—This deep, somewhat poorly drained soil is on first bottoms along small and large streams. It is frequently flooded, generally for short periods.

Profile in a moist, permanent pasture of dallisgrass. This soil has not been tilled in 14 years:

- A_1 0 to 1 inch, dark-brown (7.5YR 4/2) silt loam, relatively high in organic matter; weak, fine, crumb structure; friable; roots abundant; fine flakes of mica; open pore spaces easily visible; pH 5.5; boundary abrupt and smooth.
- A_{12} 1 to 6 inches, reddish-brown (5YR 4/4) silt loam faintly mottled with yellowish brown (10YR 5/4); moderate, fine, granular structure; friable; roots abundant; very small pore spaces; some mica flakes; pH 5.5; boundary gradual and wavy.
- A_{13} 6 to 23 inches, reddish-brown (2.5YR 4/4) silt loam mottled with red (10Y 4/6); weak, fine, granular structure; friable; roots plentiful; small flakes of mica; pH 5.0; boundary abrupt and smooth.
- C_1 23 to 30 inches, yellowish-brown (10YR 5/4) silty clay loam mottled with yellowish red (5YR 4/8); weak, medium, platy structure; firm; some mica; a few roots; pH 5.0; boundary gradual and wavy.
- C_2 30 to 58 inches, brown (10YR 5/3) silty clay loam heavily mottled with brownish yellow (10YR 6/6); structureless; firm; a few roots in upper part; water table at depth of 33 inches; pH 4.7.

The A horizon is from 14 to 28 inches thick. The water table is subject to seasonal variations but generally is at a depth of 18 to 36 inches.

Some areas where stream channels have become clogged are constantly under water, but they have not been flooded long enough for poor oxidation to bring about changes in the profile. Channel improvement is needed to reclaim these areas.

Infiltration is slow, and permeability is slow. The surface layer is strongly acid, and the lower part of the profile is very strongly acid.

About 30 percent of the acreage is in crops, 30 percent is in pasture, and the rest is in woods. This soil is suitable for cultivation, but yields are greatly increased if supplemental drainage is provided.

The best suited crops are dallisgrass, tall fescue, white-clover, beans, and corn. *Capability unit B10–IIIw–2. Woodland suitability group 1.*

Congaree Series

This series consists of deep, well-drained soils on first bottoms bordering the larger streams. These immature soils have weak horizonation and no B horizon. The soil

material was transported by floods from areas within the watershed and deposited along stream bottoms. The slope range is 0 to 3 percent. The original vegetation consisted mainly of hardwoods.

These soils are associated with the Chewacla and State soils. They are on higher bottoms than the Chewacla soils and are better drained. They are on lower bottoms than the State soils, which have a better developed profile. The Congaree soils are occasionally flooded; the Chewacla soils are frequently flooded; and the State soils are seldom flooded.

Because of their topographic position, the Congaree soils have favorable moisture conditions. The water table generally is at a depth of 5 to 10 feet.

These soils are friable and have excellent tilth. They can be tilled relatively soon after a normal rainfall. When they are flooded, however, a long period is needed for excess water to drain off. Erosion is not a hazard, but some flood damage is to be expected. Flooding tends to maintain fertility.

About 60 percent of the acreage is cultivated, 20 percent is in pasture, and the rest is in woods, predominantly pine.

Congaree fine sandy loam (Co).—This deep, well-drained, friable, medium-textured soil is on first bottoms along the larger streams.

Profile in a moist area:

A_p 0 to 9 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, fine, granular structure; very friable; roots abundant; some small mica flakes; pH 6.7; boundary clear and smooth.

C_1 9 to 42 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular structure; friable; roots abundant; some small mica flakes; pH 6.5; boundary clear and smooth.

C_2 42 to 50 inches +, friable alluvial material that contains some lenses of sand and silt.

All the horizons vary in thickness. In some horizons there are thin layers of sand or silt. The C horizon is variable and in some places contains rounded gravel. Included is about 15 acres of Congaree fine sandy loam that is eroded or scoured.

Infiltration is moderate, permeability is rapid, and the moisture-holding capacity is moderately low. Fertility is moderate, the content of organic matter is moderate, and the reaction is slightly acid.

This soil is suitable for sprinkler irrigation. Row crops can be grown continuously if normal amounts of fertilizer are used and if the amount of crop residue is sufficient to maintain a moderate content of organic matter.

Well-suited crops include corn, soybeans, grain sorghum, and small grain, and also potatoes, string beans, and other truck crops. Well-suited pasture grasses include tall fescue, dallisgrass, Coastal bermudagrass, and common bermudagrass. Crimson clover and white clover are well suited for pasture mixtures. *Capability unit B10–IIw–2. Woodland suitability group 2.*

Congaree silt loam (Cs).—This soil has a finer textured surface layer than Congaree fine sandy loam. Consequently, infiltration is slightly slower, and permeability is slightly slower. Tillage must be delayed for longer periods after rainfall. The moisture-holding capacity is slightly higher than that of the coarser textured soil, and fertility is slightly higher.

Suitable crops are corn, soybeans, grain sorghum, small grain; beans, peas, potatoes, and other truck crops; and pasture grasses and legumes. *Capability unit B10–IIw–2. Woodland suitability group 2.*

Davidson Series

This series consists of deep, well-drained soils that developed in residuum weathered from basic igneous rock, chiefly diabase, gabbro, hornblende gneiss, and diorite. Consequently, these soils are relatively high in calcium and low in potassium. The surface layer is friable, dusky-red loam, and the subsoil is firm to very firm, dark-red clay. The original vegetation consisted of white oak, post oak, red oak, walnut, hickory, dogwood, cedar, and pine.

These soils are associated with the Lloyd soils. They have a thicker profile than the Lloyd soils and are darker colored.

There is only one Davidson soil in Oconee County. About 80 percent of the acreage is in crops, and the rest is in woods consisting predominantly of pine and cedar.

Davidson loam, 2 to 10 percent slopes, eroded (DaC2).—This deep, well-drained soil developed from dark-colored basic rock and is on the Piedmont uplands. It characteristically has a surface layer of dusky-red loam and a dark-red, clayey subsoil.

Profile in a moist area:

A_p 0 to 6 inches, dusky-red (10R 3/2) loam; moderate, fine, crumb structure; very friable; relatively high in organic matter; very friable when dry, but slightly sticky when wet; boundary abrupt and smooth.

B_2 6 to 42 inches, dusky-red (10R 3/4) clay; strong, medium, subangular blocky structure; firm; roots plentiful; some krotovinas; boundary gradual and wavy.

B_3 42 to 51 inches, dark-red (2.5YR 3/6) clay; strong-brown (7.5YR 5/6), common, medium, distinct mottles; moderate, medium, subangular blocky structure; very firm; roots fewer than in B_2 horizon; boundary gradual and wavy.

C 51 inches +, weathered structureless material derived from diabase, gabbro, and hornblende schist.

The thickness of the horizons varies slightly. The depth to bedrock varies but generally is more than 25 feet. Included are some severely eroded areas where the surface layer is clay or clay loam. Also included are areas where the surface layer contains some fine quartz gravel.

This soil is slightly acid but is more nearly neutral in reaction than the other soils on the uplands. Fertility is high, the organic-matter content is moderately high, infiltration is moderate, permeability is moderate, and the moisture-holding capacity is relatively high. Tilth generally is good.

This soil is well suited to mechanized farming and to sprinkler irrigation. It is productive but needs larger amounts of potash than most of the other soils in the county. Because of the hazard of erosion, half the acreage should be in close-growing crops. Crops should be grown in contour strips and rotated. All draws and water outlets should be kept in close-growing vegetation.

Suitable crops include alfalfa, small grain, common lespedeza, sericea lespedeza, grain sorghum, white clover, crimson clover, grapes, corn, cotton, soybeans, and peaches. The soil material is suitable for the construction of ponds. *Capability unit B10–IIe–1. Woodland suitability group 8.*

Gullied Land

Gullied land, rolling (Gr).—This miscellaneous land type consists of severely gullied areas having slopes of 6 to 10 percent. The gullies are moderately deep to deep and occupy 15 to 40 percent, or more, of the delineated area. In some places, the areas between gullies are not eroded, but in others, they are moderately eroded or severely eroded. The soil in these gullied areas generally is similar to the adjacent soil. Included are some small areas that have slopes of 2 to 6 percent.

Gullied land, rolling, commonly occurs in association with well-defined waterways. The gullies were formed by water passing rapidly over soils that had an inadequate vegetative cover.

Gullies that extend into friable parent material are difficult to stabilize. In a single rainfall, many tons of earth and some large trees may be engulfed when the banks of a gully cave in.

These gullied areas are a source of sediment. They contribute to the clogging of stream channels and to the deposition of silt on bottom lands. Because of the clogging of streams, many areas that were once fertile and well drained have become wet and have been abandoned.

This land needs the protective cover of forest trees, but the site index for pine is low, and the deep gullies tend to lower the water table.

To stabilize these silt-producing areas, it may be necessary to construct diversion waterways, slope gully walls, install gully plugs, reforest areas above the watershed, and establish a close-growing vegetative cover (fig. 17). *Capability unit B10–VIIe–1. Woodland suitability group 20.*

Gullied land, hilly (Gh).—This miscellaneous land type consists of severely eroded areas having slopes of 10 to 40 percent. The gullies are deep to moderately deep and occupy 15 to 40 percent, or more, of the delineated area. In some places, the area between the gullies is not eroded, but in others it is moderately eroded or severely eroded. The soil in these gullied areas generally is similar to the adjacent soil.

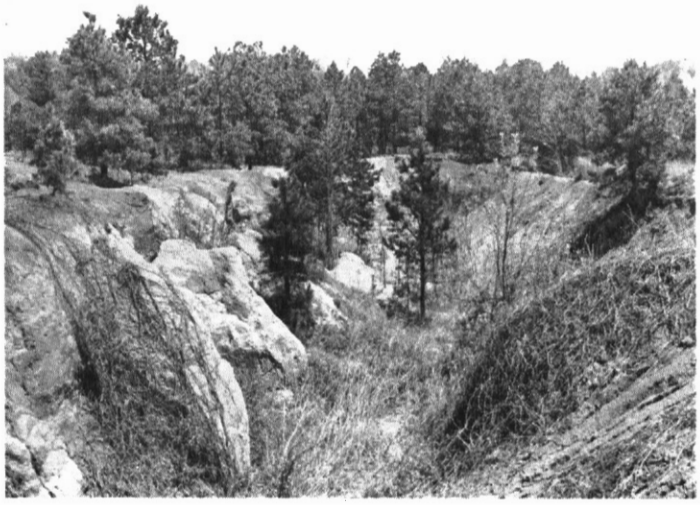

Figure 17.—**Gullied land, rolling. Kudzu will soon stabilize this area.**

These gullied areas commonly developed where runoff was concentrated and the vegetative cover was not adequate to prevent erosion. Once started, the gullies increased rapidly in size and became major silt-producing areas. The clogging of streams caused some bottom lands to become swamped.

These areas need the protective cover of forest trees, but the site index for trees generally is very low.

To stabilize these gullied lands, it may be necessary to construct diversion terraces, slope gully walls, install gully plugs, reforest areas within the watershed, and plant suitable trees to provide a vegetative cover. *Capability unit B10–VIIe–1. Woodland suitability group 20.*

Halewood Series

The Halewood series consists of moderately deep, well-drained soils that developed in residuum derived mainly from granite, granite gneiss, and biotite mica. These soils are on the foothills and mountains.

The very dark brown to dark grayish-brown surface layer of fine sandy loam is friable. The yellowish-brown, clayey subsoil is friable to firm. There are generally a few mica flakes throughout the moderately well developed profile.

The original vegetation was mostly hardwoods—chestnut, chestnut oak, southern red oak, northern red oak, white oak, hickory, poplar, gum, beech, and dogwood—but included some pine. The present forest is similar to the original, except that the chestnut trees have been replaced by other species and the understory includes some rhododendron and mountain-laurel.

These soils are associated with the Hayesville soils and to a lesser extent with the Porters soils. They have a lighter colored, less permeable subsoil than the Hayesville soils. They contain less organic matter than the Porters soils and have a more yellowish-brown subsoil.

About 18 percent of the acreage of the Halewood soils in the county is used for agriculture. The rest is in forest.

Halewood fine sandy loam, 2 to 6 percent slopes (HaB).—This moderately deep, well-drained soil has a yellowish-brown subsoil and generally has a few mica flakes throughout the profile.

Profile in a moist area:

- A_{00} 1 to ½ inch, loose leaves and undecomposed organic matter.
- A_0 ½ inch to 0, matted organic debris, partially decomposed.
- A_1 0 to 4 inches, dark grayish-brown (2.5Y 4/2) fine sandy loam; weak, fine, crumb structure; very friable; roots abundant; a few mica flakes; pH 6.5; boundary abrupt and smooth.
- A_2 4 to 11 inches, yellowish-red (5YR 5/6) fine sandy loam; weak, fine, granular structure; friable; roots abundant; a few mica flakes; pH 6.0; boundary clear and smooth.
- B_1 11 to 17 inches, yellowish-brown (10YR 5/6) fine sandy clay loam; moderate, medium, subangular blocky structure; friable; roots abundant; a few mica flakes; pH 5.7; boundary abrupt and smooth.
- B_2 17 to 32 inches, yellowish-brown (10YR 5/4) silty clay loam; moderate, medium, subangular blocky structure; firm to friable; roots plentiful; some krotovinas; pH 5.5; boundary gradual and wavy.
- C 32 to 50 inches, partially disintegrated material derived from granite and gneiss; very few roots.

The solum is 24 to 36 inches thick. The colors tend to be browner at higher elevations where temperatures are cooler. The A_2 horizon is yellowish red to yellowish brown. In some places the profile has an A_3 horizon, and in other places it has a B_3 horizon. No profile has been observed, however, that has both an A_3 horizon and a B_3 horizon.

Infiltration is moderately rapid, permeability is moderately rapid, and the moisture-holding capacity is moderate. The content of organic matter is moderately low, fertility is moderately low, and the reaction is medium acid. Included are some small areas that have a loam surface layer and some that are gravelly.

About 50 percent of the acreage is in crops, and the rest is in forest. This soil is well suited to mechanized farming. It is easily tilled and can be tilled relatively soon after rainfall. Because of the moderate hazard of erosion, crops should be grown in a 2-year rotation that keeps half the acreage in close-growing crops each year. Row crops should be grown in strips on the contour, and close-growing crops should be grown in the alternate strips. Then, the following year, the crops should be reversed. All draws and waterways should be kept in perennial close-growing vegetation.

Suitable crops include apples, corn, grain sorghum, small grain, common lespedeza, sericea lespedeza, truck crops, alfalfa, tall fescue, orchardgrass, whiteclover, grapes, common bermudagrass, and Turkish tobacco. *Capability unit B13–IIe–2. Woodland suitability group 18.*

Halewood fine sandy loam, 6 to 10 percent slopes, eroded (HaC2).—This soil is steeper than Halewood fine sandy loam, 2 to 6 percent slopes, and it has lost from 25 to 75 percent of the original surface layer through erosion. Infiltration is slightly slower, and runoff is greater and more rapid. Consequently, erosion is a more serious hazard. The organic-matter content is lower than that of the uneroded soil, and the moisture-holding capacity is lower. Fertility is also lower, and more fertilizer is needed. Yields of most crops are about a third less. Included are some small areas that have a loam surface layer and some that are gravelly.

About 60 percent of the acreage is used for agriculture, and the rest is in forest. The erosion hazard limits the use of this soil for row crops. Close-growing crops should be grown on two-thirds of the acreage each year. Crops should be planted in contour strips and rotated. Rotations should include crops that supply enough residue to maintain a moderate content of organic matter. All draws should be kept in close-growing perennial vegetation. *Capability unit B13–IIIe–2. Woodland suitability group 18.*

Halewood fine sandy loam, 10 to 15 percent slopes (HaD).—This soil is steeper than Halewood fine sandy loam, 2 to 6 percent slopes. Runoff is greater and more rapid; consequently, the hazard of erosion is more serious. Included are some small areas that have a loam surface layer and some that are gravelly.

Most of the acreage occurs in relatively remote mountainous areas and is in forest. This soil has good tilth but is not well suited to mechanized farming. Because of the severe erosion hazard, close-growing crops should be grown on three-fourths of the cultivated acreage. Crops should be planted in contour strips and rotated. All draws should be kept in close-growing perennial vegetation.

Suitable crops include apples, corn, grain sorghum, small grain, common lespedeza, sericea lespedeza, alfalfa, truck crops, tall fescue, orchardgrass, common bermudagrass, crimson clover, white clover, grapes, and Turkish tobacco. *Capability unit B13–IVe–1. Woodland suitability group 18.*

Halewood fine sandy loam, 10 to 15 percent slopes, eroded (HaD2).—This soil is much steeper than Halewood fine sandy loam, 2 to 6 percent slopes, and its profile is about 6 inches thinner. From 25 to 75 percent of the original surface layer has been removed by erosion. Runoff is greater and much more rapid than on the more gently sloping soil, and the hazard of erosion is more severe. Infiltration is slower, and the moisture-holding capacity is lower because of the thinner profile. The organic-matter content is low, and permeability is moderately rapid. Included are some small areas that have a loam surface layer and some that are gravelly.

Fertility is low because of the loss of soil material. More fertilizer is needed annually than on the uneroded soil, and yields of most crops are about a third less. Tillage is more difficult because of the thinner surface layer.

About 60 percent of the acreage is in crops, and the rest is in woods. This soil is not suited to mechanized farming because of slope. The severe hazard of erosion limits its use for row crops. Crops should be grown in contour strips in a 4-year rotation that keeps close-growing crops on three-fourths of the acreage each year. All draws and waterways should be kept in close-growing perennial vegetation.

Suitable crops include apples, corn, grain sorghum, small grain, common lespedeza, sericea lespedeza, alfalfa, grapes, common bermudagrass, tall fescue, white clover, crimson clover, Turkish tobacco, and truck crops. *Capability unit B13–IVe–1. Woodland suitability group 18.*

Halewood fine sandy loam, 15 to 25 percent slopes (HaE).—This soil has a thinner profile than Halewood fine sandy loam, 2 to 6 percent slopes, and the horizons are less distinct. Infiltration is slower, runoff is greater and more rapid, and the moisture-holding capacity is lower. Permeability is moderately rapid, and the organic-matter content is medium. Included are some small areas that have a loam surface layer and some that are gravelly.

All of the acreage is in forest. This soil is not suited to mechanized farming. If it is cultivated, three-fourths of the acreage should be kept in close-growing crops. Crops should be grown in contour strips and rotated. A 4-year rotation is most suitable. All draws and waterways should be kept in close-growing perennial vegetation.

Suitable crops include small grain, common lespedeza, sericea lespedeza, cowpeas, sudangrass, tall fescue, bermudagrass, white clover, crimson clover, apples, and grapes. *Capability unit B13–IVe–1. Woodland suitability group 18.*

Halewood fine sandy loam, 15 to 25 percent slopes, eroded (HaE2).—This soil is much steeper than Halewood fine sandy loam, 2 to 6 percent slopes, and the horizons are less distinct. From 25 to 75 percent of the original surface layer has been removed by erosion.

Infiltration is much slower, and runoff is greater and much more rapid. The moisture-holding capacity is

lower because of the thinner profile. Permeability is moderately rapid, and the organic-matter content is low. Fertility is lower because of the loss of part of the surface layer. Consequently, more fertilizer is needed annually than for the same crops on the uneroded soil, and yields of most crops generally are about a third less. Included are some small areas that have a loam surface layer and some that are gravelly.

About 10 percent of the acreage is cultivated, 35 percent is in pasture, and the rest is in pine trees. Because of the severe hazard of erosion, this soil should be kept in a permanent vegetative cover. It can be used for permanent pasture or for perennial forage crops that need reseeding only once in 6 years. On long slopes, the initial reseeding should be in strips on the contour. Only half the strips should be planted the first year, and the alternate strips the next year. *Capability unit B13–VIe–1. Woodland suitability group 19.*

Halewood fine sandy loam, 25 to 45 percent slopes (HaF).—This soil is much steeper than Halewood fine sandy loam, 2 to 6 percent slopes, the profile is thinner, and the horizons are less distinct.

Runoff is very rapid, and the hazard of erosion is severe. Infiltration is slower than on the more gently sloping soil because of rapid runoff. The moisture-holding capacity is lower because of the thinner profile. The organic-matter content is moderate, and permeability is moderately rapid. Included are some small areas that have a loam surface layer and some that are gravelly.

All of the acreage is in forest, mostly of hardwoods but including some pine. Because of the severe erosion hazard, this soil should be kept in a permanent vegetative cover. It can be used for permanent pasture if perennial plants are grown and the vegetative cover is maintained. Grazing should be limited.

Suitable plants include sericea lespedeza, tall fescue, orchardgrass, bermudagrass, white clover, and crimson clover. *Capability unit B13–VIe–1. Woodland suitability group 19.*

Hayesville Series

The Hayesville series consists of deep, well-drained soils on foothills and mountains. These soils developed in residuum derived from granite and gneiss. The surface layer is very dark gray fine sandy loam, and the subsoil is red, friable clay loam. The slope range is 2 to 45 percent, but slopes of 15 to 35 percent predominate.

The original vegetation was predominantly mixed hardwoods but included some white pine in the higher areas and some shortleaf pine in the lower areas. Because of frequent burning, the vegetation in uncleared areas now includes some pine and an understory of rhododendron and mountain-laurel. Many abandoned fields support good stands of shortleaf pine.

These soils occur along with Halewood and Cecil soils. They have a red subsoil, whereas the Halewood soils have a yellowish-brown subsoil. They generally are not so deep as the Cecil soils and have a more friable subsoil.

The Hayesville soils make up about 27 percent of the acreage of the county. More than 85 percent of this acreage is in forest. The less sloping Hayesville soils are among the best agricultural soils in the foothills and mountains, but much of the acreage remains in forest because of its remote location.

These soils are mapped with the Cecil soils and with the Cecil and Halewood soils as undifferentiated units.

Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes (HcB).—These gently sloping, well-drained soils are mapped as an undifferentiated unit. They are on the foothills and mountains. Both soils developed in residuum derived from granite and gneiss, and their profiles are similar in color and texture. The Hayesville soil commonly is not so deep as the Cecil soil and has a more friable and generally a slightly less distinct B horizon.

Because of their similarity, it was not practical to map these soils separately. The Hayesville soil makes up about 75 percent of the acreage. Many areas consist of only the Halesville soil, a few of only the Cecil soil, and some include both soils. A profile representative of the Cecil soil is included in the description of the first mapping unit in the Cecil series.

Following is a profile of Hayesville fine sandy loam, 2 to 6 percent slopes, in a moist, wooded area:

A_{00} 1 to ½ inch, loose leaves and undecomposed organic matter.
A_0 ½ inch to 0, matted organic matter that is partially decomposed.
A_1 0 to 1½ inches, very dark gray (5YR 3/1) fine sandy loam; high content of organic matter; weak, medium, crumb structure; loose; pH 6.5; boundary abrupt and smooth.
A_2 1½ to 6 inches, dark-brown (10YR 4/3) fine sandy loam; weak, medium, granular structure; friable; pH 6.0; boundary abrupt and smooth.
A_3 6 to 9 inches, yellowish-red (5YR 5/6) fine sandy loam; weak, medium, subangular blocky structure; friable; roots abundant; pH 6.0; boundary abrupt and smooth.
B_2 9 to 26 inches, red (2.5YR 4/8) clay loam; moderate, medium, subangular blocky structure; friable; roots plentiful; pH 5.5; boundary clear and wavy.
B_3 26 to 33 inches, red (2.5YR 4/8) silty clay loam; moderate, medium, subangular blocky structure; friable; roots noticeable; pH 5.5; boundary clear and wavy.
C 33 to 50 inches +, disintegrated granite, gneiss, and schist; structureless.

The surface layer ranges from very dark gray and dark brown in wooded areas to yellowish red in cultivated fields. The B_2 horizon ranges in color from red to dark red and in texture from fine sandy clay loam to clay loam. The solum is from 28 to 34 inches thick. The depth to bedrock is from 4 feet to more than 50 feet. Included are small areas on which there is some gravel or a few boulders, but this does not interfere with tillage. Also included are small areas that have a surface layer of sandy loam or loam.

Runoff is moderately slow, permeability is moderately rapid, and the moisture-holding capacity is moderate. The organic-matter content commonly is moderate but ranges from high on some northerly exposures to low on some southerly exposures. Fertility is moderate, and the reaction is medium acid. Tilth is good.

Less than 50 percent of the acreage is cultivated, because of the remote location of the areas. These soils are among the better agricultural soils in the foothills and mountains and are well suited to most crops locally grown. If cultivated, however, they have a slight to moderate erosion hazard. *Capability unit B13–IIe–2. Woodland suitability group 12.*

Hayesville and Cecil fine sandy loams, 6 to 10 percent slopes (HcC).—These soils are steeper than Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes, infiltration is slower, and runoff is more rapid. Permeability is moderately rapid, the moisture-holding capacity is moderately high, and the organic-matter content is moderately high. Included are some small areas that have a surface layer of loam or sandy loam and some areas that are gravelly.

About 10 percent of the acreage is cultivated, and the rest is in forest. These soils are moderately well suited to mechanized farming. They are subject to erosion, however, and close-growing crops should be grown 2 out of every 3 years. Crops should be planted in contour strips and rotated. All draws should be kept in close-growing perennial vegetation. Crops respond to lime and fertilizer.

Suitable crops include corn, grain sorghum, small grain, common lespedeza, sericea lespedeza, apples, truck crops, grapes, pimiento peppers, Turkish tobacco, and grasses and legumes commonly grown in the area. *Capability unit B13–IIIe–2. Woodland suitability group 12.*

Hayesville and Cecil fine sandy loams, 6 to 10 percent slopes, eroded (HcC2).—These soils are steeper than Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes, and their profile is about 6 inches thinner. The 4- to 6-inch surface layer commonly is yellowish-red fine sandy loam. In a few severely eroded areas the red clay loam subsoil is exposed. Included are a few small areas that have a loam or sandy loam surface layer and some areas that are gravelly.

Infiltration is somewhat slower than on the uneroded soils, and the water-holding capacity is somewhat lower. The organic-matter content is lower, and fertility is lower.

About 60 percent of the acreage is cultivated, and the rest is in forest. These soils are moderately well suited to mechanized farming and are moderately responsive to lime and fertilizer. Because of the severe hazard of erosion, however, close-growing crops should be grown 2 out of every 3 years. Crops should be planted in contour strips and rotated. All drains should be in close-growing perennial vegetation.

Suitable crops include corn, small grain, grain sorghum, common lespedeza, sericea lespedeza, pimiento peppers, apples, grapes, truck crops, Turkish tobacco, and the grasses and legumes commonly grown. *Capability unit B13–IIIe–2. Woodland suitability group 12.*

Hayesville and Cecil fine sandy loams, 10 to 15 percent slopes (HcD).—These soils are steeper than Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes, and their profile is about 4 inches thinner. Runoff is more rapid. Permeability is moderately rapid, and the moisture-holding capacity is moderate. The organic-matter content is moderate, fertility is moderately high, and the reaction is medium acid. Tilth is good. Included are a few small areas that have a loam or sandy loam surface layer and some areas that are gravelly.

About 40 percent of the acreage is cultivated, and the rest is in forest, principally hardwoods. These soils are not well suited to mechanized farming. Because of the serious erosion hazard, close-growing crops should be grown 3 out of every 4 years. Crops should be planted in contour strips and rotated. All draws should be kept in close-growing perennial vegetation.

Suitable crops include apples, grapes, corn, grain sorghum, small grain, common lespedeza, sericea lespedeza, pimiento peppers, Turkish tobacco, truck crops, and the grasses and legumes commonly grown in the area. *Capability unit B13–IVe–1. Woodland suitability group 12.*

Hayesville and Cecil fine sandy loams, 10 to 15 percent slopes, eroded (HcD2).—These soils are steeper than Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes, and their profile is about 6 inches thinner. The surface layer to a depth of 3 to 6 inches commonly is yellowish-red fine sandy loam. In a few severely eroded areas, the red clay loam subsoil is exposed. There are some shallow gullies and a few deep ones. Included are a few small areas that have a surface layer of loam or sandy loam and some areas that are gravelly.

Infiltration is slower than on the more gently sloping soils, the moisture-holding capacity is lower, and the organic-matter content is lower. Fertility is lower, and yields of most crops are about a third less.

About 60 percent of the acreage is cultivated, and the rest is in forest. These soils are moderately responsive to lime and fertilizer. They should be kept in close-growing crops 3 out of every 4 years because of the severe erosion hazard. Crops should be grown in contour strips and rotated. All draws should be in close-growing perennial vegetation. Crop residues should be adequate to maintain a moderate content of organic matter and to provide a cover to help control erosion.

Suitable crops include corn, small grain, grain sorghum, common lespedeza, sericea lespedeza, pimiento peppers, Turkish tobacco, truck crops, apples, grapes, and the grasses and legumes commonly grown in this area. *Capability unit B13–IVe–1. Woodland suitability group 13.*

Hayesville and Cecil fine sandy loams, 15 to 25 percent slopes (HcE).—These soils are steeper than Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes, and they have slightly thinner profiles. Runoff is more rapid, and, consequently, infiltration is slower. The moisture-holding capacity is slightly lower. Included are a few small areas that have a surface layer of sandy loam or clay loam and some areas that are gravelly.

Most of the acreage is in forest consisting predominantly of hardwoods. These soils have good tilth but are not well suited to mechanized farming. Their use for row crops is limited because of the severe erosion hazard. Three-fourths of the cultivated acreage should be in close-growing crops. Crops should be grown in contour strips and rotated. All draws should be kept in close-growing perennial vegetation.

Suitable crops include small grain, common lespedeza, sericea lespedeza, alfalfa mixed with orchardgrass, tall fescue, whiteclover, common bermudagrass, apples, and grapes. *Capability unit B13–IVe–1. Woodland suitability group 13.*

Hayesville and Cecil fine sandy loams, 15 to 25 percent slopes, eroded (HcE2).—These soils are much steeper than Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes, and their profile is about 8 inches thinner. The surface layer to a depth of 4 to 6 inches commonly is yellowish-red fine sandy loam. In some severely eroded spots, the red clay loam subsoil is exposed. Included are some small areas that have a surface layer of loam or sandy loam and some areas that are gravelly.

Infiltration is much slower than on the more gently sloping soils, and runoff is greater and much more rapid. Permeability is moderately rapid. The organic-matter content is low, and the reaction is medium acid. Fertility has been lowered by the loss of some of the surface soil. Consequently, more fertilizer is needed than for the same crops on the more gently sloping soils. Yields of most crops are only about half as much.

About 20 percent of the acreage is in pasture, and the rest is in forest. These soils are not well suited to cultivation but can be used for perennial forage crops or for permanent pasture. The perennial plants selected should need reseeding only once in 6 years. On long slopes, the initial planting or reseeding should be in strips on the contour. Only half the strips should be planted the first year, and the alternate strips the next year.

Suitable crops include sericea lespedeza, tall fescue, white clover, crimson clover, orchardgrass, alfalfa mixed with orchardgrass, and common bermudagrass. *Capability unit B13–VIe–1. Woodland suitability group 13.*

Hayesville and Cecil fine sandy loams, 25 to 45 percent slopes (HcF).—These soils are much steeper than Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes. Their profile is 8 to 12 inches thinner, and the horizons are less distinct. Runoff is greater and much more rapid. Infiltration is slower because of the steeper slopes, but permeability is slightly more rapid. The moisture-holding capacity is lower because of the thinner profile. The organic-matter content is moderately high, and fertility is moderately high. Included are some small areas that have a surface layer of loam or sandy loam and some areas that are gravelly.

All of the acreage is in forest, predominantly of hardwoods but including some pine. These soils have good tilth but are not well suited to mechanized farming. They are highly susceptible to erosion. They can be used for restricted grazing or for forage crops if fertility is maintained so that crop stands will be thick enough to help control erosion.

Suitable crops include tall fescue, sericea lespedeza, orchardgrass, white clover, crimson clover, or combinations of these plants. *Capability unit B13–VIe–1. Woodland suitability group 13.*

Hayesville and Cecil fine sandy loams, 25 to 45 percent slopes, eroded (HcF2).—These soils are much steeper than Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes. Their profile is 12 to 14 inches thinner, and their horizons are less distinct. Runoff is greater and much more rapid. Infiltration is slow because of steep slopes, but permeability is moderately rapid. The moisture-holding capacity is moderately low, and the organic-matter content is moderately low. Fertility has been lowered by the loss of much of the original surface layer through erosion. The reaction is medium acid. Included are some small areas that have a surface layer of loam or sandy loam and some areas that are gravelly.

These soils are not well suited to mechanized farming. They can be used for permanent pasture or for perennial forage crops, but the plants selected should need reseeding only once in 6 years. Adequate fertilizer should be applied to maintain the thick stands needed to control erosion. Long slopes should be seeded in alternate contour strips over a 2-year period. *Capability unit B13–VIe–1. Woodland suitability group 13.*

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Hayesville and Cecil loams, 6 to 10 percent slopes, severely eroded (HdC3).—These soils are steeper than Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes, and their profile is about 10 inches thinner. The 3- to 5-inch surface layer is yellowish-red to red loam. It consists mostly of former subsoil material mixed with the remaining surface layer. In places the red clay loam subsoil is exposed. Included are some small areas that have a surface layer of sandy loam or clay loam and some areas that are gravelly.

Infiltration is slower than on the uneroded soils, and the moisture-holding capacity is lower. Runoff is moderately rapid, permeability is moderately rapid, the organic-matter content is low, and the reaction is strongly acid. Fertility is very low because of the loss of much of the original surface soil; consequently, more fertilizer is needed annually than for the same crops on the uneroded soils. Yields generally are only about half as much.

The finer textured surface layer makes tillage more difficult, and periods when moisture conditions are favorable for tillage are relatively short. The mortality of seedlings is higher because the surface layer tends to crack and crust soon after rains. When these soils freeze, many young plants are spewed out of the ground. These soils tend to be "cold natured," or slow to warm up in spring.

Because of the severe erosion hazard, the use of these soils for row crops is limited. Three-fourths of the acreage should be kept in a close-growing vegetative cover. Crops should be grown in contour strips and rotated. All draws should be in close-growing perennial vegetation.

Moderately well suited crops include grain sorghum, small grain, apples, grapes, corn, alfalfa, cowpeas, common lespedeza, sericea lespedeza, common bermudagrass, orchardgrass, white clover, crimson clover, and tall fescue. *Capability unit B13–IVe–1. Woodland suitability group 14.*

Hayesville and Cecil loams, 10 to 15 percent slopes, severely eroded (HdD3).—These soils are steeper than Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes, and their profile is 10 to 12 inches thinner. The 4- to 6-inch surface layer commonly is yellowish-red loam. It consists mostly of former subsoil material mixed with the remaining surface layer. In places the red clay loam subsoil is exposed. There are some shallow gullies and a few deep ones. Included are a few small areas that have a surface layer of gravelly clay loam.

Runoff is greater and more rapid than on the uneroded soils, and the hazard of erosion is severe. Infiltration is slow, permeability is moderately rapid, and the moisture-holding capacity is moderately low. The organic-matter content is low, the reaction is medium acid, and tilth is poor. Fertility is low because of the loss of much of the original surface layer. Consequently, more fertilizer is needed than for the same crops on the uneroded soils, and yields of most crops are only about half as much.

Tillage is more difficult because of the finer textured surface layer. The mortality of seedlings is much higher because the surface layer tends to crack and crust after rains. These soils spew, or frost heave, readily during cold winter months.

These soils are only moderately well suited to mechanized farming. Their use for row crops is limited because of the severe erosion hazard. Three-fourths of the culti-

vated acreage should be kept in a close-growing vegetative cover. Crops should be grown in contour strips and rotated. All natural draws should be in close-growing perennial vegetation.

Moderately well suited crops include grain sorghum, small grain, annual lespedeza, sericea lespedeza, bicolor lespedeza, tall fescue, whiteclover, common bermudagrass, cowpeas, and sudangrass. *Capability unit B13–IVe–1. Woodland suitability group 14.*

Hayesville and Cecil loams, 15 to 45 percent slopes, severely eroded (HdF3).—These soils are much steeper than Hayesville and Cecil fine sandy loams, 2 to 6 percent slopes, and their profile is only 16 to 22 inches thick. The upper part of the profile, to a depth of 4 to 6 inches, is reddish loam. It consists mostly of subsoil material mixed with the remaining surface layer. There are some shallow gullies and a few deep ones.

Infiltration is slow, permeability is moderately rapid, and runoff is very rapid. The organic-matter content is low, the moisture-holding capacity is low, and the reaction is medium acid.

Because of the very severe erosion hazard and the steep slopes, these soils need a well-managed protective cover. Trees are the best use, but the site index for pine is low. *Capability unit B13–VIIe–1. Woodland suitability group 14.*

Hayesville, Cecil, and Halewood sandy loams, shallow, 15 to 25 percent slopes (HhE).—These well-drained soils are on strong slopes on the foothills and mountains. They were mapped as an undifferentiated unit because they commonly are adjacent to each other in remote areas, are not suited to cultivation but have other uses in common, and require similar management. Some of the delineated areas are made up of only one of these soils; others are made up of all three soils. A representative profile of each soil is shown in the first soil description following the respective series descriptions.

These soils have a thinner profile than is normal for the series and a thinner, less distinct B horizon. Their surface layer commonly is 8 to 10 inches thick but ranges in thickness from 4 to 18 inches. The Hayesville and Cecil soils have a thin, red subsoil, and the Halewood soil has a thin, yellowish-brown subsoil. These soils generally are underlain by dense or partially weathered boulders of bedrock material.

Infiltration is moderate, permeability is rapid, and the moisture-holding capacity is very low. Fertility is very low, the organic-matter content is moderately low, and the reaction is strongly acid. A few loose boulders are on the surface or just below the surface.

These shallow soils tend to be droughty but do not remain droughty for long periods because rainfall is ample and well distributed during the growing season. If rainfall is in excess of the amount that can be stored by these shallow soils, flash floods may occur.

These soils can be used for permanent pasture or for perennial forage crops. Fertilizer is needed to help maintain the thick stands needed to control erosion.

Suitable crops include tall fescue, sericea lespedeza, whiteclover, orchardgrass, and alfalfa mixed with orchardgrass. *Capability unit B13–VIe–2. Woodland suitability group 11.*

Hayesville, Cecil, and Halewood sandy loams, shallow, 25 to 60 percent slopes (HhF).—These soils have steeper slopes, faster runoff, thinner and less distinct B horizons, and generally a slightly thinner and more variable profile than Hayesville, Cecil, and Halewood sandy loams, shallow, 15 to 25 percent slopes.

All of the acreage is in forest. This is the best use for these soils because a permanent cover is needed at all times. The site index for pine is low, and logging roads are difficult to construct. *Capability unit B13–VIIe–2. Woodland suitability group 11.*

Hiwassee Series

This series consists of deep, well-drained, alluvial soils on high terraces bordering large streams. The soil material was deposited when the streams flowed at higher levels. It washed from soils that developed largely in material derived from basic igneous rock. Waterworn gravel occurs in places. The original vegetation consisted mostly of mixed hardwoods but included some pine.

These soils have a dark reddish-brown, friable surface layer and a dark-red, moderately permeable, clayey subsoil. They are not subject to flooding.

The Hiwassee soils are closely associated with the Wickham soils but occur at higher elevations and have a darker colored surface layer. They closely resemble the Davidson soils, which are on the uplands.

Much of the acreage in this county is used for agriculture.

Hiwassee sandy loam, 2 to 6 percent slopes, eroded (HsB2).—This deep, well-drained soil has a dark reddish-brown surface layer and a dark-red, clayey subsoil.

Profile in a moist area bordering Coneross Creek near Richland:

A_p 0 to 7 inches, dark reddish-brown (2.5YR 2/4) sandy loam; weak, moderate, crumb structure; friable; upper part high in organic matter because of decomposition of weeds and grass; roots abundant; boundary clear and smooth.

B 7 to 55 inches +, dark-red (2.5YR 3/6) clay; moderate, medium, subangular blocky structure; slightly sticky; no visible change in structure or consistence to a depth of 50 inches, except for slight increase in sand content in lower part; some roots at 50 inches.

This soil is moderately high in organic-matter content, moderately high in fertility, and medium acid. The rate of infiltration is moderate, permeability is moderately rapid, runoff is moderately slow, and the moisture-holding capacity is moderate. Included are some gravelly areas and a few severely eroded areas. In some places, waterrounded gravel occurs throughout the profile. In others it is in irregular deposits.

This soil is in widely scattered areas. Most of the acreage is used for agriculture. Because of the moderate erosion hazard, the use of this soil for row crops is limited. Close-growing crops should be grown on half the acreage each year. Crops should be planted in contour strips and rotated. All draws should be kept in close-growing perennial vegetation. Yields of most crops are relatively high.

Suitable crops include cotton, corn, grain sorghum, grapes, small grain, common lespedeza, sericea lespedeza, truck crops, apples, peaches, soybeans, tall fescue, bahiagrass, common bermudagrass, Coastal bermudagrass, dallisgrass, white clover, crimson clover, and alfalfa. *Capability unit B10–IIe–1. Woodland suitability group 8.*

Hiwassee sandy loam, 6 to 10 percent slopes, eroded (HsC2).—This soil is steeper than Hiwassee sandy loam, 2 to 6 percent slopes, eroded, and the hazard of erosion is greater because of more rapid runoff. Included are some gravelly areas and some severely eroded areas.

This soil is moderate in fertility, moderate in organic-matter content, and medium acid. The rate of infiltration is moderate, permeability is moderately rapid, and the moisture-holding capacity is moderately high. Tilth is good.

This soil is suited to mechanized farming, but its use for row crops is limited because of the moderately severe erosion hazard. Close-growing crops should be grown on two-thirds of the acreage each year. Crops should be planted in contour strips and rotated. All draws should be kept in perennial vegetation. Lime and fertilizer are needed.

Suitable crops include alfalfa, cotton, corn, small grain, grapes, apples, peaches, common lespedeza, sericea lespedeza, soybeans, tall fescue, bahiagrass, white clover, and crimson clover. *Capability unit B10–IIIe–1. Woodland suitability group 8.*

Hiwassee sandy loam, 15 to 25 percent slopes, eroded (HsE2).—This soil is much steeper than Hiwassee sandy loam, 2 to 6 percent slopes, eroded, and its profile is shallower. Infiltration is slower, and runoff is greater and more rapid. Permeability is moderately rapid, the moisture-holding capacity is moderate, the organic-matter content is moderate, and fertility is moderate. The reaction is medium acid. Included are some gravelly areas and some severely eroded areas.

Because of the serious erosion hazard, this soil should be kept in close-growing perennial vegetation that will need reseeding only once in 6 years. The initial seeding or reseeding, particularly on long slopes, should be in strips on the contour. Only half the strips should be planted the first year, and the alternate strips the next year. Lime and fertilizer are needed.

The best suited crops are tall fescue, white clover, crimson clover, common bermudagrass, Coastal bermudagrass, and sericea lespedeza. *Capability unit B10–VIe–2. Woodland suitability group 9.*

Hiwassee clay loam, 10 to 15 percent slopes, severely eroded (HmD3).—This soil is steeper than Hiwassee sandy loam, 2 to 6 percent slopes, eroded, and it has lost from 75 to 100 percent of the original surface layer and in places as much as 25 percent of the former subsoil through erosion. Consequently, fertility is lower and more fertilizer is needed annually than for the same crops on the less eroded soil. The moisture-holding capacity is lower. Infiltration is slow, permeability is moderately rapid, and the organic-matter content is low. The reaction is medium acid. Included are some gravelly areas.

Tilth is poor, and tillage is more difficult than on the less eroded soil because of the finer textured surface layer. Periods when moisture conditions are favorable for tillage are relatively short. Seedling mortality is much higher because the surface layer tends to bake and crack. During a hard freeze, many small plants are heaved out of the ground.

This soil is poorly suited to mechanized farming. Three-fourths of the cultivated acreage should be kept in close-growing crops. Crops should be grown in contour strips and rotated. All draws should be in close-growing perennial vegetation.

This soil is not well suited to any crop, but alfalfa, grain sorghum, small grain, common lespedeza, sericea lespedeza, tall fescue, white clover, crimson clover, and common bermudagrass can be grown. *Capability unit B10–IVe–1. Woodland suitability group 9.*

Lloyd Series

This series consists of deep, well-drained soils in the Piedmont. These soils formed in residuum weathered from basic igneous rock, chiefly hornblende gneiss, diorite, schist, and mixtures of acid granite. They have well-developed profiles. The brown to reddish-brown surface layer is friable sandy loam. The red to dark-red, firm, clayey subsoil is hard when dry but slightly plastic when wet. Depth to bedrock generally is more than 20 feet. The original vegetation consisted mainly of oak, hickory, cedar, pine, dogwood, and sourwood. Abandoned fields commonly reseed to pine and cedar.

These soils are closely associated with the Cecil and Davidson soils. They are darker red than the Cecil soils, which developed in material derived from acidic igneous rock. They are lighter red than the Davidson soils, which developed in material derived from more basic rock.

Lloyd sandy loam, 2 to 6 percent slopes, eroded (LdB2).—This deep, well-drained soil has a dark-red subsoil.

Profile in a moist area in a forest of mixed hardwoods and pine:

- A_1 0 to 1 inch, dark reddish-brown (2.5YR 3/4) sandy loam; moderate, medium, crumb structure; loose; high in organic-matter content; many roots; much open pore space; some small quartz gravel; pH 5.5; boundary abrupt and smooth.
- A_2 1 to 6 inches, reddish-brown (2.5YR 4/4) sandy loam; weak, medium, granular structure; friable; open pore space; many roots; some krotovinas; some small quartz gravel; pH 5.0; boundary abrupt and smooth.
- B_1 6 to 10 inches, dark-red (2.5YR 3/6) sandy clay loam; weak, medium, subangular blocky structure; friable; many fine pore spaces; fewer roots than in A_2 horizon; pH 5.5; lower boundary clear and smooth.
- B_{21} 10 to 15 inches, dark-red (10R 3/6) sandy clay loam; weak, medium to coarse, angular blocky structure; firm; some small, angular quartz gravel; some clay skins; some fine pore spaces; roots end abruptly in lower part of horizon; pH 5.0; boundary clear and smooth.
- B_{22} 15 to 32 inches, dusky-red (10R 3/4) clay loam; moderate to strong, subangular blocky structure; firm; few roots; pore space limited; pH 5.5; boundary clear and smooth.
- B_3 32 to 38 inches, dark-red (10R 3/6) clay loam; slight tendency toward weak, coarse, platy structure; firm; no roots; pH 5.5; boundary diffuse and irregular.
- C 38 inches, disintegrated, deeply weathered hornblende gneiss and some diorite.

When moist, this soil is as red as the Davidson soils. When dry, the subsoil is red (2.5YR 5/6) and is similar in color to that of the Lloyd soils. The B_2 horizon ranges from clay loam to clay. There are variations in the depth of the profile and in the number and thickness of horizons. Included are some small areas that are severely eroded and some that are gravelly.

Fertility is moderate to moderately high, the organic-matter content is moderate, and the moisture-holding capacity is high. Infiltration is moderate, but permeability is moderately slow. Consequently, plant nutrients are not readily leached. When the soil becomes saturated, however, runoff causes a serious erosion hazard. A traffic pan commonly develops and restricts the growth of roots. Deep tillage, subsoiling, and growing deep-rooted legumes help to correct this condition.

About 60 percent of the acreage is in crops, 10 percent is in pasture, and the rest is in woods. Because of the moderate erosion hazard, the use of this soil for crops is limited. Crops should be planted in contour strips and rotated. Close-growing crops should be grown on half the acreage each year. All draws and waterways should be kept in close-growing perennial vegetation. Crops respond to lime and fertilizer.

Suitable crops include cotton, corn, small grain, alfalfa, common lespedeza, sericea lespedeza, cowpeas, soybeans, grain sorghum, grapes, peaches, common bermudagrass, Coastal bermudagrass, dallisgrass, tall fescue, bahiagrass, white clover, crimson clover, truck crops, and pecans. *Capability unit B10–IIe–1. Woodland suitability group 8.*

Lloyd sandy loam, 6 to 10 percent slopes (LdC).—This soil is steeper than Lloyd sandy loam, 2 to 6 percent slopes, eroded, but it is not eroded. The surface layer is about 9 to 11 inches thick. Included are some small areas that have a surface layer of loam or clay loam and some areas that are gravelly.

The rate of infiltration is moderate, but permeability is moderately slow. Consequently, plant nutrients are not readily leached, but when the soil becomes saturated, runoff increases the erosion hazard. Tilth is good, fertility is moderately high, and the organic-matter content is moderate. The reaction is medium acid.

Most of the acreage is in forest. This soil is fairly well suited to mechanized farming, but in cultivated areas two-thirds of the acreage should be kept in close-growing crops because of the erosion hazard. Crops should be planted in contour strips and rotated. All draws should be in close-growing perennial vegetation. Crops respond to lime and fertilizer.

Suitable crops include cotton, corn, small grain, grain sorghum, common lespedeza, sericea lespedeza, alfalfa, pimiento peppers, grapes, peaches, truck crops, soybeans, cowpeas, common bermudagrass, dallisgrass, tall fescue, bahiagrass, white clover, and crimson clover. *Capability unit B10–IIIe–1. Woodland suitability group 8.*

Lloyd sandy loam, 6 to 10 percent slopes, eroded (LdC2).—This soil is steeper than Lloyd sandy loam, 2 to 6 percent slopes, eroded. Runoff is greater and more rapid, and the erosion hazard is more severe. The rate of infiltration is moderate, permeability is moderately slow, and the water-holding capacity is moderately high. The organic-matter content is moderately low, and fertility is moderate to moderately high. The reaction is medium acid. Included are some gravelly areas and some small areas that have a loam surface layer.

This soil is moderately well suited to mechanized farming. It has fairly good tilth, but in tillage the upper part of the subsoil is mixed with the surface layer. Traffic pans that restrict the growth of roots are common. Where they occur, yields are less and crops are more readily affected by drought. Deep tillage, subsoiling, and growing deep-rooted legumes help to break up the pans.

About 80 percent of the acreage is in crops, and the rest is in pine forest. The use of this soil for row crops is limited. Close-growing crops should be grown on two-thirds of the acreage. Crops should be planted in contour strips and rotated. All draws should be kept in close-growing perennial vegetation.

Suitable crops include alfalfa, corn, cotton, soybeans, grain sorghum, common lespedeza, sericea lespedeza, truck crops, peaches, grapes, and the grasses and legumes commonly grown in the area. *Capability unit B10–IIIe–1. Woodland suitability group 8.*

Lloyd sandy loam, 10 to 15 percent slopes, eroded (LdD2).—This soil is steeper than Lloyd sandy loam, 2 to 6 percent slopes, eroded. Runoff is greater and more rapid. From 25 to 75 percent of the original surface layer has been removed by erosion.

The organic-matter content is moderate, the rate of infiltration is moderate, and the moisture-holding capacity is moderately high. Permeability is moderately slow. Consequently, plant nutrients are not readily leached, but when the soil is saturated, runoff increases the erosion hazard. Included are some small areas that are severely eroded.

This soil is only fairly well suited to mechanized farming, because of slope. Tilth is fairly good, but in tillage part of the subsoil is mixed with the surface layer. Traffic pans are common. Where they occur, root growth is restricted and crops are more readily affected by drought. Deep plowing, subsoiling, and growing deep-rooted legumes help break up the pans.

About 60 percent of the acreage is in crops and pasture, and the rest is in pine forest. Because of the hazard of erosion, three-fourths of the cultivated acreage should be in close-growing crops. Crops should be grown in contour strips and rotated. All draws should be in close-growing vegetation. Crops respond to lime and fertilizer.

Suitable crops include cotton, corn, alfalfa, pimiento peppers, grapes, peaches, grain sorghum, small grain, common lespedeza, sericea lespedeza, and the grasses and legumes commonly grown in the area. *Capability unit B10–IVe–1. Woodland suitability group 8.*

Lloyd sandy loam, 15 to 25 percent slopes, eroded (LdE2).—This soil is much steeper than Lloyd sandy loam, 2 to 6 percent slopes, eroded. Its profile is about 4 to 6 inches thinner, and the horizons are less distinct.

Infiltration is slower than on the less sloping soil, and runoff is greater and more rapid. Permeability is moderately slow, the moisture-holding capacity is moderate, the organic-matter content is moderate, and fertility is moderate. The reaction is medium acid.

About 12 percent of the acreage is in crops, 40 percent is in pasture, and the rest is in forest. This soil has good tilth but is poorly suited to mechanized farming because of slope. It is not well suited to row crops but can be used for forage crops or pasture. Plants selected should be

close-growing perennials that need reseeding only once in 6 years. Long slopes should be seeded in contour strips over a period of 2 years. Only half the strips should be seeded the first year, and the alternate strips the following year. Crops respond to lime and fertilizer.

Suitable crops include tall fescue, white clover, crimson clover, sericea lespedeza, common bermudagrass, and Coastal bermudagrass. Peaches can be grown if an adequate ground cover is maintained. *Capability unit B10–VIe–2. Woodland suitability group 9.*

Lloyd sandy loam, 25 to 35 percent slopes (LdF).—This soil is much steeper than Lloyd sandy loam, 2 to 6 percent slopes, eroded, and runoff is much more rapid. Because of slope, its profile generally is 14 to 16 inches thinner and the horizons are less distinct.

Infiltration is slow, permeability is moderately slow, the moisture-holding capacity is moderate, and the organic-matter content is moderately high. Fertility is moderately high because this soil is not eroded. The reaction is medium acid. Included are some small areas that have a surface layer of loam or clay loam and some areas that are gravelly.

Most of the acreage is in forest consisting predominantly of hardwoods. In some areas, the hardwoods are undesirable and should be removed. Because of the erosion hazard the best use for this soil is forest. Information on woodland management is in the section "Woodland." *Capability unit B10–VIIe–1. Woodland suitability group 9.*

Lloyd clay loam, 2 to 6 percent slopes, severely eroded (LcB3).—This soil is much more eroded than Lloyd sandy loam, 2 to 6 percent slopes, eroded, and the surface layer consists mostly of the upper part of the former subsoil. Consequently, the moisture-holding capacity is lower, fertility is lower, and more fertilizer is needed than for the same crops on the less eroded soil. Yields of most crops are low. There are some shallow gullies and a few deep ones. Included are some small areas that have a loam surface layer and some areas that are gravelly.

Infiltration is slow, runoff is moderately rapid, the organic-matter content is low, and the reaction is medium acid.

This soil tends to crack and crust shortly after rains, and it spews, or heaves, readily when temperatures are below freezing. Consequently, the mortality of seedlings is much higher than on the less eroded soil. Tillage is more difficult because of the finer textured surface layer. Periods when moisture conditions are favorable for tillage are short. Clods form if the soil is tilled when too wet or too dry. Preparing good seedbeds is difficult and costly

Two-thirds of the acreage should be kept in close-growing crops. Crops should be grown in contour strips and rotated. All draws and waterways should be kept in close-growing perennial vegetation.

Crops that are best suited are small grain, white clover, crimson clover, common lespedeza, sericea lespedeza, grain sorghum, common bermudagrass, tall fescue, dallisgrass, alfalfa, peaches, pecans, and cowpeas. *Capability unit B10–IIIe–1. Woodland suitability group 9.*

Lloyd clay loam, 6 to 10 percent slopes, severely eroded (LcC3).—This soil is steeper than Lloyd sandy loam, 2 to 6 percent slopes, eroded, and the surface layer consists mostly of the upper part of the former subsoil. Consequently, the moisture-holding capacity is lower, fertility is lower, and more fertilizer is needed annually. Runoff is rapid, infiltration is slow, and the organic-matter content is very low. Included are some small areas that have a surface layer of loam or sandy loam and some areas that are gravelly.

Tillage is more difficult than on the less eroded soil because of the thinner surface layer. Periods when moisture conditions are favorable for tillage are short. If this soil is tilled when too wet or too dry, the soil structure is damaged and clods form. Preparing good seedbeds is difficult and costly.

Seedling mortality is high because this soil crusts and cracks after rains. Also, it spews readily during hard freezes. Before freezing weather, plants should have as much as 4 inches of growth to protect them from surface heaving.

About 50 percent of the acreage is in crops and pasture, and the rest is in pine forest. Because of the erosion hazard, close-growing crops should be grown on two-thirds of the cultivated acreage each year. Crops should be planted in contour strips and rotated. All draws should be kept in close-growing perennial vegetation.

Suitable crops include grain sorghum, small grain, common lespedeza, sericea lespedeza, peaches, pecans, white clover, crimson clover, tall fescue, dallisgrass, and bahiagrass. *Capability unit B10–IIIe–1. Woodland suitability group 9.*

Lloyd clay loam, 10 to 15 percent slopes, severely eroded (LcD3).—This soil is steeper than Lloyd sandy loam, 2 to 6 percent slopes, eroded. From 75 to 100 percent of the original surface layer and in places as much as 25 percent of the former subsoil have been removed by erosion. There are some shallow gullies and a few deep ones. Included are some small areas that have a surface layer of loam or sandy loam and some areas that are gravelly.

This soil is lower in fertility than the less eroded soil, the moisture-holding capacity is lower, infiltration is slower, and runoff is greater and more rapid. The organic-matter content is very low. The reaction is medium acid.

Tillage is more difficult because of the texture of the surface layer, and periods when moisture conditions are favorable for tillage are very short. Clods form if this soil is tilled when too wet or too dry. Preparing good seedbeds is difficult and costly.

Seedling mortality is high because this soil cracks and crusts after rains. Also, it heaves readily during hard freezes. Small grain should be planted early so a good ground cover will develop before freezing weather. The surface layer commonly is compacted; consequently, infiltration is slow, runoff is rapid, and the soil is droughty. Increasing the organic-matter content is the primary management need. More fertilizer is required than on Lloyd sandy loam, 2 to 6 percent slopes, eroded. Yields of all crops are low.

The use of this soil for row crops is limited because of the severe hazard of erosion. Three-fourths of the cultivated acreage should be kept in close-growing crops. Crops should be planted in contour strips and rotated. All draws should be in close-growing perennial vegetation.

Crops that are best suited include small grain, common lespedeza, sericea lespedeza, grain sorghum, peaches, com-

mon bermudagrass, tall fescue, and whiteclover. *Capability unit B10–IVe–1. Woodland suitability group 9.*

Lloyd clay loam, 15 to 35 percent slopes, severely eroded (LcE3).—This soil is steeper than Lloyd sandy loam, 2 to 6 percent slopes, eroded, and its profile is 8 to 10 inches thinner. From 75 to 100 percent of the original surface layer and, in places, as much as 25 percent of the former subsoil have been removed by erosion. There are some shallow gullies and a few deep ones. Included are some small areas that have a surface layer of sandy loam or loam and some areas that are gravelly.

Runoff is rapid, infiltration is slow, the organic-matter content is very low, permeability is moderately slow, and the moisture-holding capacity is low. Tilth is poor, tillage is difficult, and periods when moisture conditions are favorable for tillage are very short.

Seedling mortality is high because this soil crusts after rains. It tends to spew readily during hard freezes, and seedlings or plants that have been overgrazed commonly are heaved out of the ground.

Most of the acreage is in pine forest. Because of the severe erosion hazard, this soil should be kept under permanent vegetative cover. It can be used for restricted grazing or, to a limited extent, for forage crops. Plants selected should be perennials that need reseeding only once in 6 years. Economic returns from this soil, even under good management, are low.

The best suited crops include tall fescue, sericea lespedeza, crimson clover, kudzu, white clover, and common bermudagrass. *Capability unit B10–VIe–2. Woodland suitability group 9.*

Lloyd loam, moderately shallow, 15 to 25 percent slopes, eroded (LmE2).—This moderately deep, well-drained soil is in mountainous areas. It developed in material derived from basic rock, such as hornblende gneiss, orthoclase feldspars, and dioritic intrusions.

Profile in a moist area of second-growth pine forest:

- A_1 0 to 2 inches, dark reddish-brown (5YR 3/4) loam; strong, medium, crumb structure; friable; many roots; pore space is open; pH 6.5; boundary clear and smooth.
- A_3 2 to 6 inches, dark reddish-brown (5YR 3/3) loam; weak, medium, granular structure; friable; roots abundant in upper part but seem fewer in lower part; fine pore space; some quartz gravel; boundary gradual and wavy.
- B_2 6 to 18 inches, dark reddish-brown (5YR 3/4) clay loam; moderate, medium, subangular blocky structure; firm; few roots; pore space negligible; some small fragments of quartz; pH 6.0; boundary clear and wavy.
- B_3 18 to 32 inches, dark reddish-brown (5YR 3/4) silty clay loam; moderate, coarse, angular blocky structure; firm; very few roots; pH 7.0; boundary diffuse and wavy.
- C 32 inches +, reddish-brown (5YR 4/4) deeply weathered material derived from hornblende gneiss and an admixture of diorite; structureless; pH 6.0.

This soil is moderately high in organic-matter content, moderately high in fertility, and medium acid. Runoff is moderately rapid, infiltration is moderate, permeability is moderate, and the moisture-holding capacity is moderate.

About 20 percent of the acreage is in pasture, and the rest is in pine forest. Because of the severe erosion hazard, this soil should be kept in close-growing crops that need reseeding only once in 6 years. Crops respond to lime and fertilizer.

The best suited crops include sericea lespedeza, tall fescue, orchardgrass, and alfalfa mixed with orchardgrass and whiteclover. *Capability unit B13–VIe–1. Woodland suitability group 9.*

Lloyd loam, moderately shallow, 25 to 40 percent slopes (LmF).—This soil is steeper than Lloyd loam, moderately shallow, 15 to 25 percent slopes, eroded, and the surface layer is 2 to 6 inches thicker.

The water-holding capacity is higher, because of the thicker surface layer, but the steeper slope causes runoff to be greater and more rapid. Infiltration is moderately slow, permeability is moderate, and the moisture-holding capacity is moderate. The organic-matter content is relatively high, and the reaction is slightly acid. Included are some small areas that have a surface layer of stony loam and some areas that are gravelly.

All of the acreage is in hardwood forest. Because of the severe erosion hazard, this soil should be kept in permanent close-growing vegetation. If it is used for pasture or forage crops, the plants selected should need reseeding only once in 6 years.

The most suitable crops include tall fescue, orchardgrass, sericea lespedeza, and alfalfa mixed with orchardgrass and whiteclover. *Capability unit B13–VIe–1. Woodland suitability group 9.*

Local Alluvial Land

Local alluvial land (Lo).—This miscellaneous land type consists of young, deep, well-drained, fertile soils that have weakly developed horizons. These soils occur in low, flat depressions and at the base of slopes where soil material is washed from higher areas. New material is constantly being deposited; it helps maintain fertility.

In the Piedmont, the surface layer is dark-brown, dark-gray, or reddish-brown sandy loam to loam and is 12 to 24 inches thick. It is underlain mostly by undifferentiated material varying in thickness. In places clay loam is underlain by accumulations of top soil.

Local alluvial land that occurs in mountainous areas is higher in organic-matter content, is very high in fertility, and is not subject to erosion. Moisture conditions are favorable for plant growth.

Considerable variations occur, and two profiles are shown that represent much of the acreage in the Piedmont.

Profile in a moist area in the Piedmont:

- A_{1p} 0 to 14 inches, dark-brown (10YR 4/3) sandy loam; weak, medium, granular structure; friable; roots plentiful; boundary abrupt and smooth.
- A_{12} 14 to 20 inches, reddish-brown (5YR 4/4) sandy loam; weak, medium, granular structure; friable; roots plentiful; boundary gradual and wavy.
- B 20 to 58 inches, red (2.5YR 4/6) sandy clay loam; moderate, medium, subangular blocky structure; friable; some roots; some krotovinas.
- C 58 inches +, red (2.5YR 4/6) partially decomposed granite and gneiss; structureless.

Profile in another moist area in the Piedmont:

- A_p 0 to 18 inches, very dark brown (10YR 2/2) loam; structureless; friable; roots abundant; some krotovinas; pH 6.0; boundary clear and smooth.
- B 18 to 40 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, medium, angular blocky structure; friable; some roots; pH 6.0; boundary clear and smooth.
- C 40 inches +, residual weathered granite.

Remote areas are in forest; other areas are used for farming. Local alluvial land is well suited to most crops commonly grown in the area. Crops that are poorly suited are Turkish tobacco and apples. If conveniently located, this alluvial land is favored for garden sites. Crops are seldom damaged by drought. *Capability unit B10–I–1. Woodland suitability group 2.*

Madison Series

The Madison series consists of moderately deep to deep, well-drained soils that developed in residuum derived from quartz mica schist. These soils have a friable sandy loam surface layer underlain by a firm to friable clayey subsoil. On gentle slopes the depth to bedrock is about 12 feet. The slope range is from 2 to 40 percent.

The original vegetation consisted primarily of chestnut, chestnut oak, white oak, northern red oak, southern red oak, hickory, ash, poplar, sourwood, and dogwood. It included some shortleaf pine and some white pine. The white pine was mainly at higher elevations. In undisturbed areas, the present vegetation is similar to the original, except that the chestnut trees have been replaced by other dominant species. Shortleaf pine, pitch pine, and Virginia pine are dominant in disturbed areas.

These soils resemble the Cecil soils, and they commonly are near or adjacent to the Cecil soils, which developed in residuum derived from granite and gneiss. They differ from the Cecil soils in that the mica in the surface layer has a brownish cast and there are some small fragments of brown schist throughout the profile. Their profile is slightly shallower than that of the Cecil soils.

Madison fine sandy loam, high, 2 to 6 percent slopes (MfB).—This well-drained, moderately deep soil is on the foothills and mountains. It developed in residuum derived from phyllite and schist. Mica and small fragments of schist occur throughout the profile.

Profile in a moist, wooded area:

- A_1 0 to 1 inch, dark-brown (7.5YR 4/2) fine sandy loam; moderately high organic-matter content; moderate, medium, crumb structure; very friable; roots abundant; mica flakes noticeable; pH 4.5; boundary abrupt and smooth.
- A_2 1 to 7 inches, dark-brown (7.5YR 4/4) fine sandy loam; moderate, fine, granular structure; friable; roots abundant; many mica flakes; pH 5.0; boundary clear and smooth.
- B_2 7 to 20 inches, yellowish-red (5YR 5/6) clay loam; moderate, medium, subangular blocky structure; friable; roots numerous; numerous very small mica flakes; pH 5.0; some krotovinas; boundary clear and wavy.
- B_3 20 to 27 inches, strong-brown (7.5YR 5/8) loam; weak, coarse, angular blocky structure; friable; numerous mica flakes; few roots; pH 5.0; boundary gradual and wavy.
- C 27 to 45 inches +, weathered, friable parent material derived from mica schist or sericitic phyllite.

There are variations in the thickness of the profile and of the separate horizons. The profile is 18 to 30 inches thick. The A horizon is 4 to 10 inches thick. The B_2 horizon is 7 to 18 inches thick and contains enough mica to feel slick or greasy. In places there is no B_3 horizon. The depth to bedrock is 5 to 18 feet. In some places the parent material was derived from mica schist, talcose schist, fine-grained gneiss, or sericitic phyllite and is deeply weathered. In other places, it was derived from chloritic schist and is weathered to only moderate depth. Included are some areas that have a loam surface layer and some areas that are gravelly.

This soil has only moderate water-holding capacity but is seldom affected by droughts because of the well-distributed rainfall. The rate of infiltration is moderate, permeability is moderate, the organic-matter content is moderate, and fertility is moderate. The reaction is strongly acid.

Most of the acreage is in forest. This soil has good tilth and is well suited to mechanized farming (fig. 18). Because of the moderate erosion hazard, however, half the cultivated acreage should be in close-growing crops. Crops should be planted in contour strips and rotated.

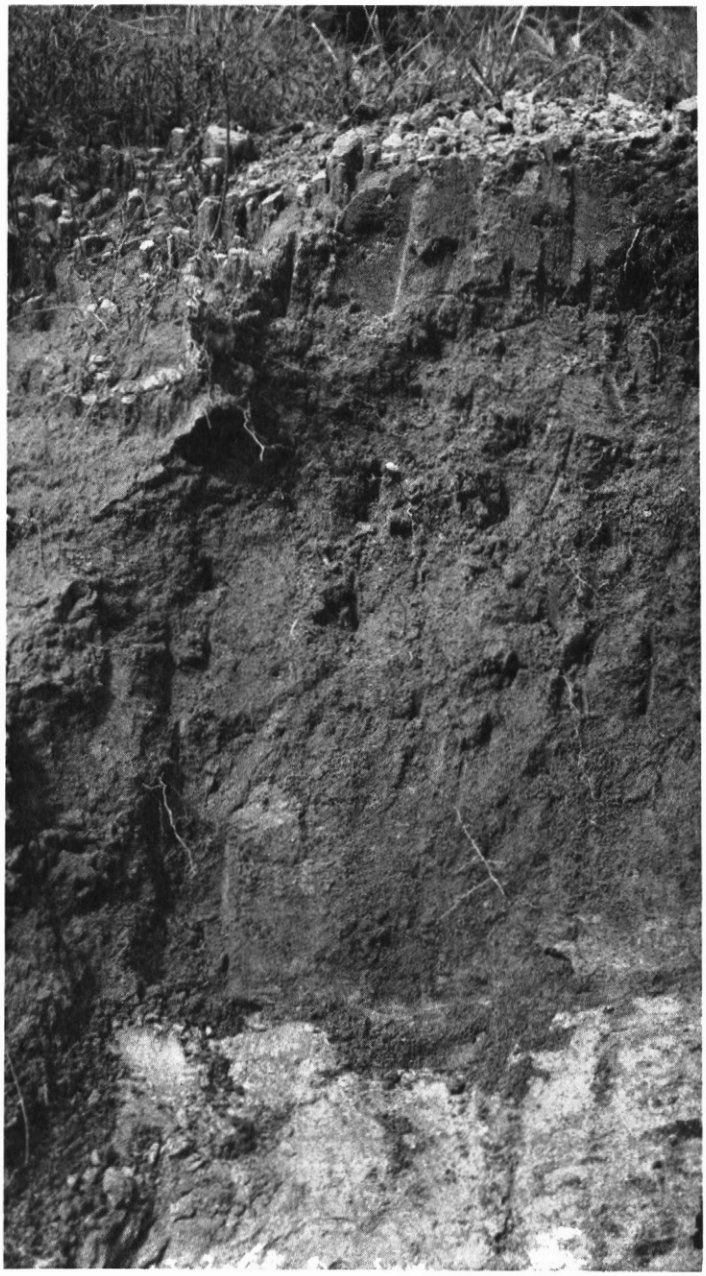

Figure 18.—**Profile of Madison fine sandy loam, high, 2 to 6 percent slopes. The friable surface layer is about 7 inches thick. It is underlain by a clayey subsoil.**

All draws and waterways should be kept in close-growing perennial vegetation. Crops respond to lime and fertilizer.

Suitable crops include apples, corn, grain sorghum, grapes, small grain, common lespedeza, sericea lespedeza, truck crops, alfalfa, white clover, crimson clover, pasture grasses, and Turkish tobacco. *Capability unit B13–IIe–3. Woodland suitability group 16.*

Madison fine sandy loam, high, 6 to 10 percent slopes (MfC).—This soil is steeper than Madison fine sandy loam, high, 2 to 6 percent slopes, runoff is more rapid, and the erosion hazard is more serious. Included are areas on which there are small amounts of gravel and some small areas that have a loam surface layer.

About 25 percent of the acreage is used for agriculture. This soil is well suited to sprinkler irrigation and is suitable for the construction of ponds. Because of the erosion hazard, two-thirds of the cultivated acreage should be in close-growing crops. Crops should be planted in contour strips and rotated. All draws and waterways should be kept in close-growing perennial vegetation.

Suitable crops include apples, corn, grain sorghum, grapes, small grain, common lespedeza, sericea lespedeza, truck crops, pasture grasses and legumes, and Turkish tobacco. *Capability unit B13–IIIe–3. Woodland suitability group 16.*

Madison fine sandy loam, high, 6 to 10 percent slopes, eroded (MfC2).—This soil is steeper than Madison fine sandy loam, high, 2 to 6 percent slopes, and the surface layer is from 2 to 4 inches thinner. Included are some small areas that have a loam surface layer and some areas that are gravelly.

Runoff is greater and more rapid than on the more gently sloping soil, and erosion is a more serious hazard. The water-holding capacity is lower because of the thinner profile. Infiltration is lower, fertility is lower, and the organic-matter content is lower. This soil is less well suited to mechanized farming. It has poorer tilth, and tillage is more difficult because of the thinner surface layer.

About 35 percent of the acreage is used for agriculture, and the rest is in forest. Because of the erosion hazard, this soil should be kept in close-growing crops 2 out of every 3 years. Crops should be planted in contour strips and rotated. All drains should be kept in close-growing perennial vegetation. Rotations should include crops that supply enough residue to maintain a moderate content of organic matter. Crops respond to fertilizer and lime.

Suitable crops include apples, corn, grain sorghum, small grain, common lespedeza, truck crops, grapes, pimiento peppers, Turkish tobacco, and pasture grasses and legumes. *Capability unit B13–IIIe–3. Woodland suitability group 16.*

Madison fine sandy loam, high, 10 to 15 percent slopes (MfD).—This soil is steeper than Madison fine sandy loam, high, 2 to 6 percent slopes, its profile is 2 to 4 inches thinner, and the horizons are less well developed. Runoff is much more rapid, and the erosion hazard is more serious. Because of rapid runoff, infiltration is less and slower. Permeability is slightly higher because of the more porous subsoil. Included are some small areas that have a loam or clay loam surface layer and some areas that are gravelly.

Most of the acreage is in forest. Because of the severe erosion hazard, three-fourths of the cultivated acreage should be in close-growing crops. Crops should be grown in contour strips in a 4-year rotation. Enough crop residue should be left to keep the organic-matter content at about 1 percent. Crops respond to lime and fertilizer. All draws and waterways should be kept in close-growing perennial vegetation.

Suitable crops include corn, grain sorghum, small grain, common lespedeza, sericea lespedeza, pimiento peppers, Turkish tobacco, apples, grapes, and pasture grasses and legumes. *Capability unit B13–IVe–2. Woodland suitability group 16.*

Madison fine sandy loam, high, 10 to 15 percent slopes, eroded (MfD2).—This soil is steeper than Madison fine sandy loam, high, 2 to 6 percent slopes, and the profile is thinner. From 2 to 4 inches of the original surface layer has been removed by erosion. Runoff is greater and more rapid, and the erosion hazard is more serious. Infiltration is slower, but permeability is slightly higher because of the more porous subsoil. The moisture-holding capacity is lower, the organic-matter content is lower, and fertility is lower. More fertilizer is needed annually, and yields are lower. Tillage is more difficult because of the thinner surface layer. Included are some small areas that have a surface layer of loam or clay loam and some areas that are gravelly.

About 30 percent of the acreage is in crops and pasture, and the rest is in forest. This soil is only moderately well suited to mechanized farming. Because of the severe erosion hazard, three-fourths of the cultivated acreage should be in close-growing crops. Crops should be grown in contour strips in a 4-year rotation. Enough crop residue should be left to keep the organic-matter content at about 1 percent. Crops respond to lime and fertilizer. All draws and waterways should be kept in close-growing perennial vegetation.

Suitable crops include apples, corn, grain sorghum, small grain, common lespedeza, sericea lespedeza, pimiento peppers, Turkish tobacco, and mixtures of pasture grasses and legumes. *Capability unit B13–IVe–2. Woodland suitability group 16.*

Madison fine sandy loam, high, 15 to 25 percent slopes (MfE).—This soil is much steeper than Madison fine sandy loam, high, 2 to 6 percent slopes, its profile is thinner, the horizons are less strongly developed, and the subsoil is more permeable. Runoff is more rapid, and infiltration is slower. Fertility is slightly lower, and the moisture-holding capacity is lower because of the thinner profile and more porous subsoil. The organic-matter content is moderate, and the reaction is strongly acid. Included are some small areas that have a surface layer of loam or clay loam and some areas that are gravelly.

Most of the acreage is in forest. Because of the severe erosion hazard, this soil should be kept in a permanent vegetative cover. For forage crops or pasture, plants should be selected that need reseeding only once in 6 years. On long slopes, the initial planting or the reseeding should be in contour strips. Only half the strips should be planted the first year, and the alternate strips the next year. Fertility should be maintained, and the ground cover should be dense. Cross-fencing is desirable on pastures so that grazing can be rotated.

Suitable plants include sericea lespedeza, tall fescue, common bermudagrass, orchardgrass, white clover, crimson clover, and alfalfa mixed with orchardgrass. Apples are well suited, but orchards need a ground cover adequate to control erosion. *Capability unit B13–VIe–1. Woodland suitability group 16.*

Madison fine sandy loam, high, 15 to 25 percent slopes, eroded (MfE2).—This soil is much steeper than Madison fine sandy loam, high, 2 to 6 percent slopes, and the profile generally is only about 18 to 24 inches thick. Infiltration is slower, permeability is slightly higher, and runoff is greater and more rapid. The erosion hazard is serious. Included are some small areas that have a surface layer of loam or clay loam and some areas that are gravelly.

This soil is moderately low in moisture-holding capacity, low in organic-matter content, and medium acid. It is low in fertility because of the loss of much of the surface layer. More fertilizer is needed annually than on the less sloping soil, and yields are lower.

Because of the severe erosion hazard, this soil should be kept under permanent vegetative cover. It can be used for pasture or forage crops if stands are dense. Precautions should be taken to prevent overgrazing.

The best suited crops are sericea lespedeza, common bermudagrass, orchardgrass, white clover, and crimson clover. Apples are fairly well suited, but orchards need a ground cover adequate to control erosion. *Capability unit B13–VIe–1. Woodland suitability group 16.*

Madison fine sandy loam, high, 25 to 40 percent slopes (MfF).—This soil is much steeper than Madison fine sandy loam, high, 2 to 6 percent slopes, its profile is much thinner, and the horizons are less well developed. Runoff is much more rapid and creates a serious erosion hazard. Included are some small areas that have a surface layer of loam or clay loam and some areas that are gravelly.

Infiltration is moderately slow, the rate of permeability is moderate, the moisture-holding capacity is low, and fertility is low. The reaction is strongly acid.

All of this soil is in forest, consisting mostly of hardwoods but including some shortleaf pine, pitch pine, Virginia pine, and white pine. Because of the severe erosion hazard, this soil should be kept in forest. It is well suited to hardwoods and pine. *Capability unit B13–VIIe–1. Woodland suitability group 17.*

Madison loam, high, 15 to 25 percent slopes, severely eroded (MhE3).—This soil is much steeper than Madison fine sandy loam, high, 2 to 6 percent slopes, and the profile is much thinner. The present surface layer consists mostly of former subsoil that has been mixed with what remains of the original surface layer.

Runoff is very rapid, and the erosion hazard is serious. Infiltration is slow, the rate of permeability is moderate, the moisture-holding capacity is low, and the organic-matter content is low. The reaction is strongly acid.

All of the acreage is in forest. Because of the serious erosion hazard, this soil should remain in forest. The site index for all trees is low, but the best suited trees are loblolly pine, Virginia pine, and white pine. *Capability unit B13–VIIe–1. Woodland suitability group 17.*

Madison sandy loam, 6 to 10 percent slopes, eroded (MaC2).—This moderately deep to deep, well-drained soil is in the Piedmont. It has a high content of mica, and there are some fragments of brown schist throughout the profile.

Profile in a cultivated area:

- A_p 0 to 6 inches, yellowish-red (5YR 5/6 dry) sandy loam; weak, fine, crumb structure; loose; fragments of quartz mica schist comprise about 15 percent of volume; few mica flakes; boundary abrupt and smooth.
- B_1 6 to 9 inches, yellowish-red (5YR 4/8 dry) sandy loam; weak, medium, subangular blocky structure; soft; fragments of schist comprise 10 percent of volume; many mica flakes; boundary abrupt and smooth.
- B_2 9 to 23 inches, dark-red (2.5YR 3/6 moist) clay to clay loam; moderate, coarse, subangular blocky structure; firm to friable; fragments of quartz mica schist; numerous mica flakes; boundary abrupt and wavy.
- B_3 23 to 34 inches, dark-red (2.5YR 3/6 moist) fine sandy clay loam; moderate, medium, subangular blocky structure; slight tendency to platy structure in lower part; firm to friable; roots plentiful; numerous mica flakes; boundary clear and irregular.
- C 34 inches +, partially disintegrated red and purplish-red quartz mica schist.

The subsoil ranges from sandy clay loam to light clay and from red to dark red. Included are some severely eroded soils that have a thin, discontinuous B horizon. Also included are some gravelly areas.

This soil has lost from 25 to 75 percent of the original surface layer through erosion. Nevertheless, it has good tilth and is moderately fertile. It is well suited to mechanized farming. Yields of most crops are moderately high.

The rate of infiltration is moderate, permeability is moderately rapid, the moisture-holding capacity is moderate, the organic-matter content is low, and the reaction is medium acid.

All of the acreage has been used for agriculture. This soil is well suited to all crops commonly grown in the Piedmont. Because of the erosion hazard, however, close-growing crops should be grown on two-thirds of the acreage each year. Crops should be planted in contour strips and rotated. All draws should be kept in a close-growing perennial cover.

Suitable crops include cotton, corn, small grain, grain sorghum, common lespedeza, sericea lespedeza, Turkish tobacco, pimiento peppers, peaches, grapes, soybeans, tall fescue, dallisgrass, bahiagrass, common bermudagrass, Coastal bermudagrass, white clover, crimson clover, and truck crops. *Capability unit B10–IIIe–1. Woodland suitability group 6.*

Madison sandy loam, 10 to 15 percent slopes, eroded (MaD2).—This soil is steeper than Madison sandy loam, 6 to 10 percent slopes, eroded, and the hazard of erosion is severe. The rate of infiltration is moderate, permeability is moderately rapid, the organic-matter content is low, and the moisture-holding capacity is moderate.

Included are some severely eroded soils that have a surface layer of clay loam. In some places the subsoil is thin and discontinuous. Also included are some gravelly areas.

This soil has good tilth and is moderately fertile, but it is only fairly well suited to mechanized farming. Half the acreage is used for agriculture, and the rest is in forest. Because of the severe erosion hazard, three-fourths of the cultivated acreage should be in close-growing crops. Crops should be planted in contour strips in a 4-year ro-

tation. Crops respond to lime and fertilizer. Crop residues should be enough to keep the organic-matter content at about 1 percent. All draws should be in close-growing perennial vegetation.

Suitable crops include cotton, corn, small grain, grain sorghum, common lespedeza, sericea lespedeza, soybeans, cowpeas, peaches, grapes, truck crops, pimiento peppers, Turkish tobacco, common bermudagrass, Coastal bermudagrass, tall fescue, dallisgrass, bahiagrass, white clover, and crimson clover. *Capability unit B10–IVe–1. Woodland suitability group 6.*

Madison sandy loam, 15 to 30 percent slopes, eroded (MaE2).—This soil is much steeper than Madison sandy loam, 6 to 10 percent slopes, eroded, its profile is 4 to 6 inches thinner, and the horizons are less strongly developed. From 25 to 75 percent of the original surface layer has been removed by erosion. Included are some areas where the B horizon is thin and discontinuous. Also included are some gravelly areas and some areas that are severely eroded.

Runoff is greater and more rapid than on the less sloping soil, and the erosion hazard is more serious. Infiltration is moderately slow, permeability is moderately rapid, the moisture-holding capacity is moderate, the organic-matter content is low, and fertility is moderate.

Most of the acreage is in pine forest. This soil can be used for forage crops or pasture if plants are selected that need reseeding only once in 6 years. On long slopes, the initial planting or reseeding should be in contour strips. Only half the strips should be planted the first year, and the alternate strips the next year. A protective cover should be maintained at all times, and only the surplus growth harvested. Crops respond to lime and fertilizer.

Suitable crops include tall fescue, sericea lespedeza, common bermudagrass, Coastal bermudagrass, white clover, and crimson clover. Alfalfa is suitable if seeded with a grass mixture that provides adequate cover to control erosion. *Capability unit B10–VIe–2. Woodland suitability group 6.*

Mixed Alluvial Land

Mixed alluvial land (Mv).—This miscellaneous land type consists of deep, well drained to moderately well drained alluvial soils on first bottoms along the larger streams.

These soils occur near the Congaree soils and are subject to the same overflow hazard. They consist mainly of Congaree soil material. They are suited to the same crops as the Congaree soils, and they yield about as much.

Mixed alluvial land differs from the Congaree soils in that the microrelief is more irregular and the soil material throughout the profile varies in texture and has no pattern. This material apparently was deposited by turbulent floodwater. Although the texture is variable, silt loam and sandy loam are common. Lenses of different textures are also common. In places there are small amounts of rounded gravel.

About 80 percent of the acreage is in crops, and the rest is in woods. Mixed alluvial land has favorable moisture conditions because of its topographic position, and it is productive. Yields are high, but the occasional loss of a crop from flooding is to be expected.

Suitable crops include corn, small grain, truck crops, and the grasses and legumes commonly grown in the area. *Capability unit B10–IIw–2. Woodland suitability group 2.*

Mixed wet alluvial land (Mw).—This miscellaneous land type consists of undifferentiated, poorly drained alluvial soils on low, wet bottoms along the larger streams. The surface layer commonly is fine sandy loam but ranges from silty clay loam to sandy loam. It is underlain by soil material that varies in texture but is predominantly silty clay loam.

These soils are moderately fertile, moderately high in organic-matter content, and strongly acid. Infiltration is moderately slow, and permeability is slow to very slow. The water table commonly is within a few inches of the surface.

About 10 percent of the acreage is in range-type pasture, and the rest is in woods. Generally, it is not economically feasible to reclaim these soils for agricultural purposes. The areas are difficult to drain because of their fine texture, and in most places suitable outlets are not available. Where outlets are available, tile lines and open drains would have to be closely spaced. Areas that are drained can be used for growing corn, grain sorghum, tall fescue, cowpeas, annual lespedeza, bicolor lespedeza, and browntop millet. *Capability unit B10–IVw–1. Woodland suitability group 5.*

Porters Series

The Porters series consists of moderately deep, well-drained soils that occur at relatively high elevations in mountainous areas, mostly on northerly slopes. These soils developed in residuum weathered from granite, gneiss, and hornblende gneiss. They have a dark brown to very dark brown, friable surface layer that is 3 to 10 inches thick, and a strong-brown, friable subsoil of fine sandy loam to fine sandy clay loam that is 8 to 34 inches thick. They formed under a predominantly hardwood forest in a cool climate with abundant, well-distributed rainfall. Consequently, the organic-matter content is high—about 4 percent.

These soils are closely associated with the Hayesville and Halewood soils. They have a browner surface layer than the associated soils, and they are higher in organic-matter content.

The Porters soils are the most productive in the mountainous section of the county. Rainfall is adequate. Droughts seldom occur.

Porters loam, 25 to 45 percent slopes (PoF).—This moderately deep, well-drained soil developed from granite and gneiss at relatively high elevations. It has a dark brown to very dark brown surface soil and a strong-brown to yellowish-red subsoil.

Profile in a moist forest of hardwoods:

- A_1 0 to 2 inches, very dark grayish-brown (10YR 3/2) loam; strong, medium, crumb structure; loose; high organic-matter content; roots abundant; infiltration rate very high; pH 5.5; boundary abrupt and smooth.
- A_2 2 to 5 inches, dark-brown (10YR 3/4) loam; weak, medium, crumb structure; very friable; roots abundant; open pore spaces; pH 5.5; boundary abrupt and smooth.
- B_2 5 to 22 inches, strong-brown (7.5YR 4/6) light fine sandy clay loam; weak, medium, subangular blocky structure; firm; roots abundant; pore spaces noticeable; pH 5.5; boundary clear and smooth.

B_3 22 to 30 inches, brown (7.5YR 5/4) light fine sandy clay loam; weak, medium, subangular blocky structure; friable; fewer roots than in B_2 horizon; pH 5.0; boundary gradual and wavy.

C 30 inches +, light olive-brown (2.5Y 5/4) fine sandy loam; parent material weathered from granite and gneiss; some fragments of quartz.

The color of the B horizon ranges from strong brown and dark brown to brown. Infiltration is moderately rapid, and permeability is rapid. The organic-matter content is high, the moisture-holding capacity is moderate, fertility is very high, and the reaction is medium acid to strongly acid. Included are some small areas that have a surface layer of sandy loam and some areas that are gravelly.

This soil has excellent tilth and is highly productive. Because of the steepness of the slopes and the severe erosion hazard, however, it is best suited to pasture or forest. The present forest consists of hardwoods and some white pine and hemlock. If this soil is used for forage crops or pasture, a complete cover is needed at all times to control erosion. The plants selected should need reseeding only once in 6 years. The initial planting or reseeding should be in contour strips. Only half the strips should be planted the first year, and the alternate strips the next year. Crops respond to lime and fertilizer.

Suitable crops include tall fescue, ladino clover, orchardgrass, bluegrass, alfalfa seeded with orchardgrass, and sericea lespedeza. *Capability unit B13–VIe–1. Woodland suitability group 15.*

Porters stony loam, 25 to 45 percent slopes (PsF).—This soil is similar to Porters loam, 25 to 45 percent slopes, except that stones as much as 10 inches in diameter or larger occur throughout the profile.

All of the acreage is in forest consisting of hardwoods and some white pine and hemlock. This soil can be used for forage crops or pasture, but a complete cover is needed at all times to control erosion. The plants selected should need reseeding only once in 6 years. Crops respond to lime and fertilizer.

Suitable crops include tall fescue, orchardgrass, ladino clover, bluegrass, sericea lespedeza seeded with tall fescue, and alfalfa seeded with orchardgrass. *Capability unit B13–VIe–1. Woodland suitability group 15.*

State Series

The State series consists of deep, well-drained, alluvial soils on low second bottoms or terraces along larger streams. The soil material was deposited when the streams flowed at higher levels. The dark-brown to brown, friable surface layer is 8 to 18 inches thick. The weakly developed subsoil is dark-brown to yellowish-brown, friable loam to silty clay loam and is 20 to 34 inches thick. It is underlain by undifferentiated alluvial material. Mica generally occurs throughout the profile. The original vegetation was mostly hardwoods but included some gum and poplar.

The State soils resemble the Congaree soils but are at slightly higher elevations. They are at lower elevations than the Wickham and Altavista soils.

There is only one State soil in Oconee County. This soil is seldom flooded.

State fine sandy loam (Sf).—This deep, well-drained soil is on low terraces or second bottoms. It has a thick, very friable, dark-brown to brown surface layer and a dark-brown to yellowish-brown, friable subsoil.

Profile in a moist pasture:

A_p 0 to 18 inches, dark-brown (7.5YR 3/2) fine sandy loam; weak, medium, granular structure; friable; roots plentiful; some mica flakes; pH 6.5; boundary abrupt and smooth.

B 18 to 50 inches, dark-brown (7.5YR 4/2) loam; weak, coarse, angular blocky structure; friable; some roots; some mica flakes; pH 6.5; boundary diffuse and wavy. This horizon is weakly developed.

D 50 inches +, unconsolidated alluvial fine sandy loam material; poor oxidation causes rust-brown mottling; resembles Wehadkee material.

This soil is relatively high in fertility and is medium to slightly acid. The rate of infiltration is moderate, permeability is moderately rapid, the organic-matter content is medium, and the moisture-holding capacity is moderate.

All of the acreage is in crops or pasture. This soil is seldom flooded, because of its topographic position. It is productive and is well suited to most crops grown in the area, particularly those having high moisture requirements. Under good management, it can be used continuously for row crops.

Suitable crops include corn, cotton, peanuts, soybeans, small grain, grain sorghum, common lespedeza, sericea lespedeza, grapes, truck crops, and all the grasses and legumes commonly grown in the area. *Capability unit B10–I–3. Woodland suitability group 3.*

Stony Land

Stony land (St).—This miscellaneous land type consists of areas, irrespective of soil type, that are too stony to allow the use of agricultural machinery.

In some areas, the stones occupy about 3 to 15 percent of the land surface, are about 1 foot in diameter, and are spaced about 2½ to 5 feet apart. Machinery other than hand tools cannot be used. These areas are suitable for forest. Other areas are steeper and more stony and are of limited use even for forestry. *Capability unit B13–VIIe–2. Woodland suitability group 20.*

Talladega Series

The Talladega series consists of excessively drained, shallow to very shallow soils in mountainous areas. These soils developed in residuum derived from mica schist, chloritic schist, and sericitic phyllite. The very dark grayish-brown to strong-brown surface layer of friable loam is 4 to 20 inches thick. It is underlain by partially weathered rock at a depth of about 16 inches.

These soils commonly are adjacent to the lighter colored and shallower Chandler soils, which are on narrow ridges and steep, broken slopes. They also are adjacent to the deeper, redder, and more strongly developed Watauga and Madison (high phases) soils, which are on smoother slopes and broad ridgetops.

All of the acreage of the Talladega soils in the county has been mapped in undifferentiated units with the Chandler soils.

Talladega and Chandler loams, 10 to 25 percent slopes (TcE).—These excessively drained soils are on narrow ridges and steep, broken slopes. They developed from similar parent material. The Talladega soil is shal-

low and in places has a thin, discontinuous B horizon. The Chandler soil is very shallow, generally is lighter colored than the Talladega, and has no B horizon. The Chandler soil makes up about 25 percent of the acreage.

Profile of Talladega loam, 10 to 25 percent slopes:

A_1 0 to 4 inches, very dark grayish-brown (10YR 3/2) loam; moderate, fine, crumb structure; very friable.
AB 4 to 16 inches, olive (5Y 5/6) micaceous loam; weak, medium, subangular blocky structure; friable; roots plentiful.
C 16 inches +, rock fragments from the parent material.

The thin, weakly developed, discontinuous subsoil is most common on intermediate slopes. In many places, there is no subsoil.

Profile of Chandler loam, 10 to 25 percent slopes:

A_1 0 to 2 inches, very dark grayish-brown (10YR 3/2) loam; moderate, medium, crumb structure; very friable; some mica; roots abundant; large pore spaces; high organic-matter content; pH 5.0; thickness ranges from 1 to 4 inches, lower boundary abrupt and smooth.
A_3 2 to 10 inches, very pale brown (10YR 7/4) loam; weak, medium, granular structure; friable; some fine mica; roots abundant; numerous medium to large pore spaces; pH 5.5; thickness ranges from 4 to 10 inches; boundary clear and smooth.
C 10 inches +, partially weathered mica schist or phyllite.

These soils are low in organic-matter content, very low in fertility, and strongly acid. The rate of infiltration is moderate, permeability is rapid, and the moisture-holding capacity is very low.

All of the acreage is in forest. Trees are subject to windthrow during high winds. These soils should be kept under a permanent vegetative cover because of the severe erosion hazard. For forage crops or pasture, plants should be selected that need reseeding only once in 6 years. Crops would respond only moderately to lime and fertilizer, and economic returns would be low. Only limited grazing can be expected. Rainfall is well distributed, but crops are damaged by lack of moisture because of the low moisture-holding capacity of these soils.

Suitable crops are sericea lespedeza, tall fescue, white-clover, and orchardgrass. *Capability unit B13–VIe–2. Woodland suitability group 11.*

Talladega and Chandler loams, 25 to 60 percent slopes (TcF).—These soils are much steeper than Talladega and Chandler loams, 10 to 25 percent slopes, and consequently runoff is very rapid. In most places the profile is less than 10 inches thick, but on some concave slopes it is 10 to 20 inches thick.

These soils should be kept in a forest cover at all times. The site index for trees, however, is low, and windthrow is common when the wind velocity is high. Littleleaf disease is prevalent on shortleaf pine. Information on forest management is in the section "Woodland." *Capability unit B13–VIIe–2. Woodland suitability group 11.*

Watauga Series

The Watauga series consists of moderately deep, well-drained, light-colored, highly micaceous soils in the Blue Ridge Mountains. These soils developed in residuum derived from quartz mica schist, talcose schist, and micaceous granite. The surface layer is dark grayish-brown, friable fine sandy loam that becomes browner with depth. The subsoil is yellowish-red to yellowish-brown fine sandy loam to silty clay loam and is 8 to 20 inches thick. The slope range is 2 to 40 percent.

These soils commonly occur among the Chandler, Talladega, and Madison (high phases) soils. In color they are similar to the Chandler soils, but they are deeper than either the Chandler or the Talladega soils. They have a distinct B horizon, which the Chandler and Talladega soils lack. They are lighter colored than the Madison soils.

Much of the acreage of the Watauga soils is in pine forest.

Watauga fine sandy loam, 2 to 6 percent slopes, eroded (WaB2).—This moderately deep, well-drained, highly micaceous soil is in the Blue Ridge Mountains.

Profile in a moist, forested area:

A_1 0 to 2 inches, dark grayish-brown (2.5Y 4/2) fine sandy loam; weak, medium, crumb structure; very friable; roots abundant; some mica flakes; pH 6.0; boundary abrupt and smooth.
A_2 2 to 12 inches, brown (7.5YR 5/4) fine sandy loam; structureless; friable; roots plentiful; open pore space; many mica flakes; pH 5.5; boundary clear and smooth.
B_2 12 to 28 inches, yellowish-red (5YR 5/6) silty clay loam; weak, medium, subangular blocky structure; friable; some roots; noticeable pore space; many mica flakes; pH 5.5; boundary gradual and wavy.
C 28 inches +, deeply weathered micaceous parent material derived from granite, mica schist, and talcose schist; some roots.

This soil is moderate in fertility, moderate in organic-matter content, moderate in infiltration, and moderately rapid in permeability. It is well suited to mechanized farming. Included are some small gravelly areas.

Most of this soil is in second-growth forest. Because of the moderate hazard of erosion, close-growing crops should be grown on half the cultivated acreage each year. Crops should be planted in contour strips and rotated. All draws should be kept in close-growing perennial vegetation.

Suitable crops include truck crops, corn, grain sorghum, small grain, common lespedeza, sericea lespedeza, Turkish tobacco, apples, and burley tobacco. *Capability unit B13–IIe–2. Woodland suitability group 18.*

Watauga fine sandy loam, 6 to 10 percent slopes, eroded (WaC2).—This soil is steeper than Watauga fine sandy loam, 2 to 6 percent slopes, eroded, and runoff is more rapid. Infiltration is moderate, permeability is moderately rapid, fertility is moderate, and the organic-matter content is moderate. Included are some small gravelly areas.

This soil occurs in small areas in remote locations, and most of the acreage is in pine forest. If any is used for crops, two-thirds of the cultivated acreage should be in close-growing crops each year. Crops should be planted in contour strips and rotated. All draws should be kept in close-growing perennial vegetation.

Suitable crops include truck crops, corn, grain sorghum, small gain, common lespedeza, sericea lespedeza, Turkish tobacco, burley tobacco, apples, tall fescue, orchardgrass, and alfalfa. *Capability unit B13–IIIe–2. Woodland suitability group 18.*

Watauga fine sandy loam, 10 to 25 percent slopes, eroded (WaE2).—This soil is steeper than Watauga fine sandy loam, 2 to 6 percent slopes, eroded, and the erosion

hazard is more serious. Infiltration is slower, and runoff is greater and more rapid. The moisture-holding capacity is moderate, permeability is moderately rapid, fertility is moderate, and the organic-matter content is moderate.

This soil occurs in remote locations. It is only fairly well suited to mechanized farming. Most of the acreage was farmed by early settlers but is now in second-growth pine. Because of the severe hazard of erosion, the use of this soil for row crops is limited. Three-fourths of the cultivated acreage should be kept in close-growing crops. The slopes are too steep for terracing but can be strip-cropped on the contour. Crops should be rotated, and all draws should be in close-growing perennial vegetation. Crops respond to lime and fertilizer.

Suitable crops include truck crops, corn, grain sorghum, small grain, Turkish tobacco, burley tobacco, apples, tall fescue, orchardgrass, and alfalfa mixed with orchardgrass. *Capability unit B13–IVe–1. Woodland suitability group 19.*

Watauga fine sandy loam, 25 to 40 percent slopes (WaF).—This soil is much steeper than Watauga fine sandy loam, 2 to 6 percent slopes, eroded. The surface layer is not eroded and is about as thick as that of the eroded soil, but the subsoil generally is thinner and more weakly developed because of the steeper slopes. When this soil becomes saturated, runoff is very rapid. The rate of infiltration is moderate, and permeability is moderately rapid. Included are some small gravelly areas.

All of the acreage is in forest of mixed hardwoods and pine. Because of the severe erosion hazard, this soil is not suited to cultivation. It can be used for permanent pasture or forage crops if plants are selected that need reseeding only once in 6 years. Long slopes should be planted or reseeded in contour strips. Half the strips should be planted the first year, and the alternate strips the next year. Crops respond to lime and fertilizer. To maintain a protective cover, the harvesting of pasture and forage crops should be limited.

Suitable plants include sericea lespedeza, tall fescue, orchardgrass, and the clovers commonly grown in the area. *Capability unit B13–VIe–1. Woodland suitability group 19.*

Wickham Series

The Wickham series consists of deep, well-drained soils that developed in old alluvium on second bottoms or low terraces along the larger streams. The surface layer commonly is brown to dark-brown, friable sandy loam, and the subsoil is red to dark-red clay loam. The slope range is 2 to 25 percent but is mostly less than 6 percent. The original vegetation consisted of hardwoods mixed with pine and cedar.

These soils occur at slightly higher elevations than the Altavista soils, which are lighter colored and only moderately well drained. They commonly are at lower elevations than the dark reddish-brown Hiwassee soils and at higher elevations than the lighter colored Congaree soils.

Wickham sandy loam, 2 to 6 percent slopes (WkB).—This deep, well-drained soil is on low terraces or second bottoms. It has a brown to dark-brown, friable surface layer and a red to dark-red subsoil.

Profile in a moist area:

- A_p 0 to 9 inches, brown to dark-brown (7.5YR 4/4) sandy loam; weak, medium, crumb structure; very friable; roots abundant; boundary abrupt and smooth.
- B_1 9 to 15 inches, yellowish-red (5YR 4/8) sandy clay loam; weak, coarse, subangular blocky structure; friable; roots plentiful; numerous krotovinas; boundary abrupt and smooth.
- B_2 15 to 27 inches, dark-red (2.5YR 3/6) clay loam; moderate, medium, subangular blocky structure; slightly sticky; roots plentiful; boundary is abrupt and smooth.
- B_3 27 to 39 inches, dark-red (2.5YR 3/6) sandy clay loam mottled with strong brown (7.5YR 5/8); moderate, medium, subangular blocky structure; friable; some roots; boundary gradual and smooth.
- C 39 to 48 inches +, reddish-yellow (7.5YR 6/8) sandy clay loam mottled with red (2.5YR 4/8); structureless; deep.

The color of the B_2 horizon ranges from red to dark red. Runoff is moderate, infiltration is moderate, permeability is moderately rapid, and the moisture-holding capacity is moderate. The organic-matter content is moderate, fertility is moderately high, and the reaction is medium acid. Included are some small areas on which there is waterworn gravel. Also included are some small areas that have a surface layer of fine sandy loam and a few spots that are eroded.

Except for areas in remote locations, all of this soil is in crops and pasture. It has good tilth, and yields of suitable crops are relatively high. Because of the moderate erosion hazard, however, the use of this soil for row crops is limited. Close-growing crops should be grown on half the acreage each year. Crops should be planted in contour strips and rotated. All draws and waterways should be in close-growing perennial vegetation. Crops respond to lime and fertilizer.

Suitable crops include cotton, corn, small grain, grain sorghum, alfalfa, soybeans, truck crops, grapes, peaches, and the grasses and legumes commonly grown in the area. *Capability unit B10–IIe–1. Woodland suitability group 6.*

Wickham sandy loam, 2 to 6 percent slopes, eroded (WkB2).—This soil is similar to Wickham sandy loam, 2 to 6 percent slopes, but from 25 to 75 percent of the original surface layer has been removed by erosion. Consequently, infiltration is slower, the moisture-holding capacity is lower, and fertility is lower. More fertilizer is needed than for the same crops on the uneroded soil, and yields are less. Because of the thinner surface layer, tillage is more difficult.

Permeability is moderate to moderately rapid, and the organic-matter content is low. There is some tendency for a compact tillage pan to form at plow depth. Included are small areas on which there is some waterworn gravel and some small areas that have a surface layer of fine sandy loam.

This soil is suited to mechanized farming, but its use for row crops is limited because of the erosion hazard. Close-growing crops should be grown on half the acreage each year. Crops should be planted in contour strips and rotated. All draws should be in close-growing perennial vegetation.

Suitable crops include cotton, corn, small grain, common lespedeza, sericea lespedeza, alfalfa, grain sorghum, soybeans, grapes, peaches, and the grasses and legumes com-

monly grown in the area. *Capability unit B10–IIe–1. Woodland suitability group 6.*

Wickham sandy loam, 6 to 10 percent slopes, eroded (WkC2).—This soil is steeper than Wickham sandy loam, 2 to 6 percent slopes, and from 25 to 75 percent of the original surface layer has been removed by erosion. Consequently, fertility is lower, and more fertilizer is needed than for the same crops on the uneroded soil. Yields are about a third less. Tillage is more difficult because of the thinner surface layer.

Infiltration is slower than on the uneroded soil, and runoff is more rapid. Permeability is moderately rapid, and the organic-matter content is low. Included are some small areas that have a surface layer of fine sandy loam and some areas that are gravelly.

This soil is fairly well suited to mechanized farming. Because of the moderately severe erosion hazard, however, two-thirds of the cultivated acreage should be in close-growing crops each year. Crops should be grown in contour strips and rotated. All draws and waterways should be in close-growing perennial vegetation.

Suitable crops include cotton, corn, small grain, common lespedeza, soybeans, sericea lespedeza, truck crops, tall fescue, bahiagrass, cowpeas, common bermudagrass, Coastal bermudagrass, grapes, peaches, crimson clover, white clover, and alfalfa. *Capability unit B10–IIIe–1. Woodland suitability group 6.*

Wickham sandy loam, 10 to 15 percent slopes, eroded (WkD2).—This soil is steeper than Wickham sandy loam, 2 to 6 percent slopes, and its profile is 4 to 6 inches thinner. From 25 to 75 percent of the original surface layer has been removed by erosion. Fertility is lower, and more fertilizer is needed annually than for the same crops on the uneroded soil. Yields of most crops are about a third less. Tilth is poorer because part of the former subsoil commonly is mixed with the surface layer by tillage. Tillage is more difficult.

Runoff is more rapid, and infiltration is slower. Permeability is moderately rapid, and the moisture-holding capacity is moderate. Included are some areas that are gravelly and some spots that are severely eroded. Also included are a few small areas of Altavista sandy loam and Altavista fine sandy loam.

Because of the severe erosion hazard, three-fourths of the cultivated acreage should be in close-growing crops. Crops should be planted in contour strips and rotated. All draws should be kept in close-growing perennial vegetation.

Suitable crops include cotton, corn, small grain, common lespedeza, sericea lespedeza, truck crops, grapes, peaches, and the pasture grasses and legumes commonly grown in the area. *Capability unit B10–IVe–1. Woodland suitability group 6.*

Wickham sandy loam, 15 to 25 percent slopes, eroded (WkE2).—This soil is much steeper than Wickham sandy loam, 2 to 6 percent slopes, and its profile is slightly thinner. From 25 to 75 percent of the original surface layer has been removed by erosion.

Tilth is poorer than on the uneroded soil, and tillage is more difficult because of the thinner surface layer. Fertility is lower, and more fertilizer is needed annually than for the same crops on the uneroded soil. Yields of most crops are about a third less.

The rate of infiltration is moderate, permeability is moderately rapid, the organic-matter content is low, and the moisture-holding capacity is moderate. When the soil becomes saturated, runoff is very rapid. Included are some small areas of Altavista sandy loam and Wickham fine sandy loam. Also included are some gravelly areas.

This soil is poorly suited to mechanized farming, and most of the acreage is in forest. Because of the severe erosion hazard, it should be kept under protective vegetative cover at all times. It is not suited to row crops but can be used for forage crops or pasture. The plants selected should need reseeding only once in 6 years. Long slopes should be planted or reseeded in contour strips over a period of 2 years. Only half the strips should be planted the first year, and the alternate strips the next year. Crops respond to lime and fertilizer.

Suitable crops include tall fescue, sericea lespedeza, common bermudagrass, Coastal bermudagrass, peaches, and grapes. *Capability unit B10–VIe–2. Woodland suitability group 6.*

Wickham clay loam, 6 to 10 percent slopes, severely eroded (WcC3).—This soil is steeper than Wickham sandy loam, 2 to 6 percent slopes, and the profile is thinner. The present surface layer consists mostly of the upper part of the former subsoil. The organic-matter content is very low, infiltration is slow, and runoff is rapid. Permeability normally is moderately rapid, but in places the movement of water through the soil is restricted by traffic pans.

Fertility is very low, and crops respond only moderately well to fertilizer. Tillage is difficult, and periods when moisture conditions are favorable for tillage are short. The mortality of seedlings is high because this soil crusts after rains. Also, it spews, or heaves, when temperatures are below freezing. Crops are affected by drought much sooner than those on the uneroded soil because of the low moisture-holding capacity. Included are some small areas that have a sandy loam surface layer and some areas that are gravelly.

Because of the severe erosion hazard, close-growing crops should be grown on three-fourths of the cultivated acreage each year. Crops should be planted in contour strips and rotated. All draws should be in close-growing perennial vegetation.

Although not well suited, cotton, small grain, grain sorghum, common lespedeza, sericea lespedeza, tall fescue, bahiagrass, common bermudagrass, crimson clover, white clover, and cowpeas can be grown. *Capability unit B10–IVe–1. Woodland suitability group 7.*

Worsham Series

The Worsham series consists of poorly drained soils in the Piedmont. These soils are at the heads of drainageways and on lower slopes along drainageways. They developed in residuum derived from granite, gneiss, and schist. The surface layer is light olive-gray sandy loam, and the subsoil is light brownish-gray, mottled silty clay loam. The slope range is 0 to 15 percent but is mostly less than 6 percent.

These soils are adjacent to or near the well-drained Cecil and Appling soils, which are at higher elevations.

The Worsham soils are not well suited to cultivated crops and can be used only to a limited extent for pasture. They generally are suitable for the construction of ponds.

Worsham sandy loam, 0 to 6 percent slopes (WoB).—This poorly drained soil is at the head of drainageways and on lower slopes along drainageways.

Profile in a moist area:

- A_1 0 to 6 inches, light olive-gray (5Y 6/2) sandy loam; weak, medium, crumb structure; very friable; some organic stains in uppermost inch; boundary abrupt and smooth.
- B_1 6 to 12 inches, grayish-brown (10YR 5/2) sandy clay loam mottled with light brownish gray (10YR 6/2); weak, medium to coarse, subangular blocky structure; slightly hard; roots plentiful; some krotovinas; boundary gradual and smooth.
- B_2 12 to 24 inches, light brownish-gray (10YR 6/2) silty clay loam mottled with light red (2.5YR 6/6); moderate, coarse, subangular blocky structure; hard; roots plentiful; boundary gradual and smooth.
- B_3 24 to 32 inches, gray (10YR 6/1) sandy clay loam mottled with light reddish brown (2.5YR 6/4); moderately strong, coarse, subangular blocky structure; hard; boundary abrupt and wavy.
- C 32 inches +, light-gray (10YR 7/2) sandy clay loam of considerable depth; structureless; firm.

This soil is low in fertility and is strongly acid. The rate of infiltration is moderate, permeability is moderately slow, the organic-matter content is moderate, and the moisture-holding capacity is moderate.

Because of its topographic position, this soil has a relatively high water table. It commonly receives runoff from adjacent soils of the uplands. Some slopes can be used for permanent pasture.

Tall fescue, dallisgrass, and carpetgrass are some of the better suited pasture plants. *Capability unit B10–Vw–1. Woodland suitability group 5.*

Worsham sandy loam, 6 to 15 percent slopes, eroded (WoD2).—This soil is steeper than Worsham sandy loam, 0 to 6 percent slopes, and from 25 to 75 percent of the original surface layer has been removed by erosion. The hazard of erosion is more serious because of rapid runoff.

This soil can be used for permanent pasture if an adequate vegetative cover is maintained. Lime and fertilizer should be applied according to soil tests. *Capability unit B10–VIe–2. Woodland suitability group 6.*

Formation and Classification of Soils

Soils are the outer crust of the earth's surface and are the natural media for the growth of plants. They consist of partly or wholly weathered rocks, minerals, organic matter, water, and air, in varying proportions. Soils have more or less distinct layers, called horizons, that form under the influence of climate and living organisms. The cross section extending from the surface into the parent material is called the profile. The degree of development of the profile is influenced by the intensity of the soil-forming factors and the length of time they have been acting on the parent material. Soils are constantly undergoing change but may reach a stage of near equilibrium with their environment after a long period of exposure to a given set of conditions.

Factors of Soil Formation

True soil is the product of five principal factors of soil formation: *parent material*, *climate*, *living organisms* (*vegetation and animal life*), *relief*, and *time*.

Each of the five factors interacts with, and modifies the influence of, the other four.

Climate and living organisms are the active forces in the formation of a soil from parent material. Relief is a conditioning factor; it largely controls natural drainage and influences the effectiveness of climate, vegetation, and animal life. The influence of climate is modified by the physical characteristics of the parent material and by relief. If the climate, vegetation, and animal life have not been operating long enough to produce a soil in near equilibrium with its environment, the soil is considered young or immature. Well-drained alluvial and recent colluvial soils are considered very young in their development. Climate, animal life, and vegetation have not had sufficient time to produce any apparent morphological results. When a soil has acquired certain definite characteristics, it is said to be a mature soil.

Classification of Soils

Soils are placed in narrow classes to facilitate the organization and application of knowledge about their use and management on individual farms. They are placed in broader, more inclusive classes to facilitate study and comparison of larger areas, such as countries or continents. The soil classification used in the United States has six categories. Beginning with the most inclusive category, these are the order, the suborder, the great soil group, the family, the series, and the type.

There are three orders and thousands of types. The suborder and family categories have never been fully developed and thus have been little used. Attention has been concentrated on the classification of soils by types and series within counties or comparable areas and on the subsequent grouping of series into great soil groups and orders.

The classes in the highest category of the classification scheme are the zonal, intrazonal, and azonal orders.

Zonal soils have well-developed characteristics that reflect the influence of climate and living organisms (chiefly vegetation). These characteristics are best developed on gently sloping, well-drained uplands. The parent material is not of extreme texture or chemical composition, and it has been in place long enough for biological forces to have expressed their full influence. Zonal soils have moderately well to well developed profiles that are in equilibrium with the climate as well as with the other soil-forming factors. The zonal soils in Oconee County are members of the Red-Yellow Podzolic, Reddish-Brown Lateritic, Gray-Brown Podzolic, and Sols Bruns Acides great soil groups (table 11).

Intrazonal soils have more or less well developed characteristics that reflect the dominating influence of some local factor, such as relief or parent material, over the normal effect of climate and vegetation. The intrazonal soils in Oconee County are members of the Low-Humic Gley great soil group (table 11).

Azonal soils lack well-developed profile characteristics because of youth, resistant parent material, or relief that has prevented the formation of definite horizons. The azonal soils in Oconee County are members of the Lithosol and Alluvial great soil groups (table 11).

TABLE 11.—*Classification of soil series into great soil*

[Characteristics described are of profiles

ZONAL

Great soil group and series	Brief profile description	Position
Red-Yellow Podzolic soils.		
Representative—		
Altavista	Dark yellowish-brown, friable sandy loam, underlain by yellowish-brown sandy clay loam mottled with brown.	Intermediate terraces along large streams.
Appling	Dark-gray to pale-brown, friable sandy loam, underlain by yellowish-brown to yellowish-red sandy clay loam to clay loam.	Piedmont Uplands
Cecil	Grayish-brown to very dark brown, friable sandy loam, underlain by red sandy clay loam to clay loam.	Piedmont Uplands
Halewood	Very dark brown to grayish-brown, friable fine sandy loam, underlain by yellowish-brown, clayey subsoil.	Mountains and foothills
Hayesville	Dark-gray, friable fine sandy loam, underlain by red, firm but brittle, clayey subsoil.	Mountains and foothills
Madison	Grayish-brown to yellowish-red, friable sandy loam, underlain by dark-red, clayey subsoil.	Piedmont Uplands
Madison (high phases)	Very dark grayish-brown to reddish-brown, friable fine sandy loam, underlain by red to yellowish-brown, micaceous, clayey subsoil.	Mountains and foothills
Watauga	Dark grayish-brown, friable, micaceous fine sandy loam, underlain by yellowish-red to pale-olive silty clay loam.	Mountains
Wickham	Brown to dark-brown sandy loam, underlain by red to dark-red clay loam.	Intermediate terraces along large streams.
Grading toward Reddish-Brown Lateritic soils—		
Lloyd	Dark-gray to reddish-brown, friable sandy loam, underlain by red to dark-red, firm clay loam to sandy clay loam.	Piedmont Uplands
Lloyd (moderately shallow phases).	Dark reddish-brown, friable loam, underlain by dark reddish-brown clay loam.	Mountains and foothills
Reddish-Brown Lateritic soils.		
Representative—		
Davidson	Dusky-red, friable loam, underlain by dark-red, firm to very firm clay loam.	Piedmont Uplands
Hiwassee	Dark reddish-brown, friable sandy loam, underlain by dark-red, clayey subsoil.	Old, high terraces along large streams.
Gray-Brown Podzolic soils.		
Representative—		
State	Dark-brown to brown, friable fine sandy loam, underlain by weakly developed, dark-brown to yellowish-brown loam or silty clay loam.	Low first terraces along large streams.
Grading toward Lithosols—		
Porters	Dark brown to very dark brown, very friable loam and stony loam, underlain by strong-brown fine sandy clay loam to clay loam.	Mountains
Sols Bruns Acides.		
Grading toward Lithosols—		
Ashe	Very dark grayish-brown to black, organic-matter stained sandy loam, underlain by very dark grayish-brown to dark-brown sandy loam.	Steep, broken, mountainous areas.

INTRAZONAL

Low-Humic Gley soils.		
Representative—		
Worsham	Light olive-gray sandy loam, underlain by light brownish-gray silty clay loam.	Heads of small drainageways

groups, and distinguishing characteristics of soil series

not materially affected by accelerated erosion]

ZONAL—Continued

Drainage class	Slope range	Parent material	Degree of development [1]
	Percent		
Moderately well drained	0 to 6	Old alluvial deposits	Strong.
Well drained	2 to 30	Residuum from granite, gneiss, and schist	Strong.
Well drained	2 to 35	Residuum from granite, gneiss, and schist	Strong.
Well drained	2 to 45	Residuum from granite, granite gneiss, and biotite schist.	Moderate.
Well drained	2 to 60	Residuum from granite and gneiss	Moderately strong to strong.
Well drained	6 to 30	Residuum from quartz mica schist	Strong.
Well drained	2 to 40	Residuum from phyllite, mica schist, talcose schist, and chloritic schist.	Moderately strong.
Well drained	2 to 40	Residuum from quartz mica schist, talcose schist, and granite with high mica content.	Moderately weak.
Well drained	2 to 25	Old alluvial deposits	Strong.
Well drained	2 to 35	Residuum from hornblende gneiss and diorite	Strong to very strong.
Well drained	15 to 40	Residuum from hornblende gneiss, orthoclase feldspar, and diorite.	Moderately strong.
Well drained	2 to 10	Residuum from basic igneous rock—gabbro, diorite, and hornblende gneiss.	Strong to very strong.
Well drained	2 to 25	Very old alluvial deposits	Strong.
Well drained, subject to occasional overflow.	0 to 2	Young alluvial deposits	Weak.
Well drained	25 to 45	Residuum from granite, gneiss, and hornblende gneiss	Moderately strong.
Excessively drained	25 to 50	Coarse-grained granite with high quartz content	Very weak.

INTRAZONAL—Continued

Poor	0 to 15	Residuum from granite, gneiss, schist (partly alluvial)	Moderately strong.

Table 11.—*Classification of soil series into great soil groups,*

[Characteristics described are of profiles

AZONAL

Great soil group and series	Brief profile description	Position
Lithosols.		
Representative—		
Chandler	Light-brown to grayish-yellow, friable, shallow, loamy soils that have no subsoil development.	Steep, broken, mountainous areas.
Talladega	Very dark grayish-brown to strong-brown, friable loam, underlain by weathered rock. Shallow soils that have no profile development.	Steep, broken, mountainous areas.
Alluvial soils.		
Representative—		
Buncombe	Light yellowish-brown loamy sand, 36 to 70 inches thick. Recent alluvial deposits.	First bottoms along large streams.
Congaree	Dark-gray to yellowish-brown fine sandy loam to silt loam, underlain by yellowish-brown fine sandy loam.	First bottoms along large streams.
Grading toward Low-Humic Gley soils—		
Chewacla	Dark-brown to reddish-brown silt loam that is 18 to 30 inches thick and well drained, underlain by mottled yellowish-brown to brown silty clay loam that is poorly drained.	First bottoms along streams

[1] Determined by the number of important genetic horizons and the degree of contrast between them.

Detailed descriptions of typical profiles of each series are given in the section "Descriptions of Soils." The main distinguishing features of each soil series, and the great soil group to which it belongs, are listed in table 11. Following is a discussion of each of the great soil groups in Oconee County.

Red-Yellow Podzolic soils

The Red-Yellow Podzolic soils are well-developed, well-drained, acid soils that have thin organic (A_0) and organic-mineral (A_1) horizons, a light-colored, bleached (A_2) horizon, and a red, yellowish-red, or yellow, more clayey (B_2) horizon. The parent material is more or less siliceous. Coarse, reticulate streaks, or mottles, of red, brown, and light gray are characteristic of the deeper horizons in places where the parent material is thick (*18*). Kaolinite is the dominant clay mineral. The cation exchange capacity is low, and the percentage of base saturation is very low. The subsoil has moderate, subangular blocky structure and colors of high chroma. The Red-Yellow Podzolic soils in Oconee County generally have a cation exchange capacity of less than 15 milliequivalents per 100 grams of soil and a base saturation of 5 to 30 percent. All of these soils have high chromas in the B_2 layer, except the Altavista soils.

The representative Red-Yellow Podzolic soils in Oconee County originally had a dark-colored, thin A_1 horizon and a well-defined A_2 horizon. Plowing and erosion have disturbed these horizons so that the present surface layer consists (1) of a mixture of material from the original A_1 and A_2 horizons, (2) predominantly of a mixture of material from the A_2 and B horizons, or (3) predominantly of material from the B horizon. The surface layer commonly is strongly acid, granular sandy loam to sandy clay loam. The B horizon has moderate, medium, subangular blocky structure. It generally contains from 2 to 6 times as much clay as the A horizon and nearly twice as much clay as the C horizon. This characteristic is not common in some Red-Yellow Podzolic soils in other sections. Clay films are common to prominent in the B_2 horizon. The C horizon has weak structure or is structureless. It is mottled and variable in color and commonly is more strongly acid than the B horizon.

The Altavista, Appling, Cecil, Halewood, Hayesville, Madison, Watauga, Wickham, and Lloyd soils are members of the Red-Yellow Podzolic great soil group in Oconee County. The Cecil, Madison, Hayesville, and Wickham soils have moderate, medium, subangular blocky structure. They are good examples of the Red-Yellow Podzolic soils that have a subsoil that is red (2.5YR) in hue and high (6 or more) in chroma. The high phases of the Madison soils have a yellowish-red subsoil. The Madison soils are more micaceous than the Wickham soils, which developed from old alluvium on stream terraces. The Cecil soils have a thicker profile than the Hayesville soils, but the latter have a more friable subsoil.

The Watauga soils have weak, medium, subangular blocky structure and a yellowish-red (5YR 5/6) subsoil.

The Appling and Halewood soils are less red than the Cecil, Hayesville, Madison, and Wickham soils. In the Appling and Halewood soils, the subsoil is predominantly yellowish brown. The Appling soils are reticulated, or mottled, below the B horizon. They have a few yellowish-brown mottles at a depth of 30 inches.

The Altavista soils are moderately well drained. There is a strong contrast in color (especially value) between the A_1 and A_2 horizons, and the B horizon is predominantly mottled with pale brown to yellowish brown, with little or no red.

The low contrast between the A_1 and A_2 horizons of the Lloyd soils characterizes them as gradations to Reddish-Brown Lateritic soils. The subsoil has the color, struc-

and distinguishing characteristics of soil series—Continued

not materially affected by accelerated erosion]

AZONAL—Continued

Drainage class	Slope range	Parent material	Degree of development[1]
	Percent		
Excessively drained	10 to 60	Residuum from mica schist and phyllite	Very weak.
Excessively drained	10 to 60	Residuum from mica schist, talcose schist, and phyllite	Very weak.
Excessively drained	0 to 6	Sandy alluvium	None.
Well drained, subject to overflow.	0 to 3	Recent alluvial deposits	Very weak.
Imperfectly drained	0 to 3	Recent alluvium	Moderately weak.

ture, and clay characteristics of the reddest of the Red-Yellow Podzolic soils. The color of the subsoil is like that of the Reddish-Brown Lateritic soils. The parent material generally is less micaceous than that of the Red-Yellow Podzolic soils.

Reddish-Brown Lateritic soils

The soils in this great soil group have a dark reddish-brown to reddish-brown mineral surface layer and a dark-red, clayey, illuvial (B) horizon. They lack the light-colored eluvial (A_2) horizon characteristic of the Red-Yellow Podzolic soils, and they have a redder B horizon. They developed in a moist, warm-temperate climate, apparently under a forest of deciduous hardwoods. These soils are medium acid to strongly acid and are low in organic-matter content. The base exchange capacity of their subsoil is less than 15 milliequivalents per 100 grams of soil, and the base saturation is more than 30 percent.

The Davidson and Hiwassee soils are the only Reddish-Brown Lateritic soils in Oconee County. They developed in residuum derived from basic igneous and metamorphic rocks. The Davidson soils are distinguished chiefly by their dark reddish-brown A horizon and by the lower content of coarse fragments, sand, and mica. Kaolinite and vermiculite are the dominant clay minerals. The Hiwassee soils occur on old high stream terraces.

Gray-Brown Podzolic soils

The Gray-Brown Podzolic soils have comparatively thin organic and organic-mineral layers, a grayish-brown leached horizon, and a brown illuvial horizon. These soils developed under a deciduous forest in a temperate, moist climate. They generally have a somewhat darker colored, less leached A_2 horizon than the Red-Yellow Podzolic soils. Their B horizon is higher in percentage of base saturation. is lower in chroma, and is less red in hue. The difference in characteristics between the Gray-Brown Podzolic soils and the Red-Yellow Podzolic soils apparently is due to the fact that the Gray-Brown Podzolic soils have been subjected to active soil-forming processes for a shorter time.

The State and Porters soils are the only Gray-Brown Podzolic soils in Oconee County. The State soils occur on low stream terraces. The Porters soils are at relatively high elevations in mountainous areas. These soils have less contrast between the A_1 and A_2 horizons than the Red-Yellow Podzolic soils. The B horizon is weaker in structure and the clay films are less prominent. The organic-matter content in the A horizon ordinarily is not so low. The reaction is medium acid to slightly acid in the State soils and strongly acid to medium acid in the Porters soils.

Sols Bruns Acides

The Sols Bruns Acides typically have a thin A_1 horizon and a faint to evident A_2 horizon. The B horizon contains little or no more clay than the horizons that lie above and below it. The B horizon is differentiated chiefly by color; it is redder in hue or of higher chroma than either the A or C horizons. Sols Bruns Acides have a very low degree of base saturation and are very strongly acid.

The Ashe soils in Oconee County are within this group but are too shallow to be considered typical of it. Thus, they are classified as Sols Bruns Acides intergrading to Lithosols.

Low-Humic Gley soils

Low-Humic Gley soils are imperfectly to poorly drained. They have a very thin surface horizon that is moderately high in organic matter and overlies mottled gray and brown gleylike mineral horizons that have a low degree of textural differentiation (*18*).

The Worsham soils are the only Low-Humic Gley soils in Oconee County. They occur at the head of drainageways and along small drainageways. The water table is at or near the surface during wet periods. During the driest periods, the water table is well below the surface. Virgin areas have a dark, but thin, A_1 horizon; the A_2 horizon is gray of medium to high value. There is not a strong textural contrast between the A_2 horizon and the underlying layer. The structure is weak, and clay films are not characteristic. These soils are strongly acid, and the percentage of base saturation is low.

Lithosols

Lithosols are very shallow to shallow soils that have a thin surface (A) horizon and little or no illuviation. These soils developed over stony material, under a hardwood forest cover, in a cool, humid climate.

The representative Lithosols in Oconee County are members of the Chandler and Talladega series. In undisturbed areas, these soils characteristically have a dark, organic-stained A_1 horizon, over a leached A_2 horizon. On steep slopes, there is no B horizon. On more gentle slopes there is a thin, weak, discontinuous B horizon that resembles the B horizon of the Red-Yellow Podzolic soils.

Alluvial soils

This group consists of soils that are developing in transported and fairly recently deposited material (alluvium). The original material has been modified little or not at all by soil-forming processes.

The Buncombe, Congaree, and Chewacla soils in Oconee County are classified as Alluvial soils. The first two are representative of this great soil group. Both consist of young material that has little profile development. The upper part of their profile is slightly darker colored than the rest, indicating some accumulation of organic matter. Both soils are medium acid to strongly acid and are low in percentage of base saturation. The Buncombe soils are low in content of clay, whereas the Congaree soils have enough clay in the upper 2 to 3 feet of the profile to make the texture loam or sandy loam. Both soils are subject to flooding.

The Chewacla soils are classed as Alluvial soils grading toward Low-Humic Gley soils. They are moderately well drained to somewhat poorly drained. The upper part of the profile, ranging from 10 to 20 inches in thickness, is free of gleying. The upper layer generally is slightly darker colored than that of the representative Alluvial soils. The Chewacla soils have no significant B horizon. The entire profile is strongly acid, and the percentage of base saturation is low.

Additional Facts About the County

For many centuries prior to settlement by the white man, the extreme northwestern part of South Carolina was Indian territory. The first Indians were prehistoric Caddoans. No one knows their tribal name, but their occupancy is established by the many fragments of pottery and stone implements that have been found. Nearly 400 years ago, Creek Indians, fleeing the cruelty of the Spaniards in Mexico, settled in what is now Oconee County.

Very little is known of the first white men in the area, but obviously they were hunters and traders in hides and furs. By 1755 the northern part of South Carolina was practically depleted of game.

The actual settlement of the area began when John A. Wagner, a German migrant to Charles Town (now Charleston), became interested in organizing a German settlement in the Piedmont area. In 1849 he purchased the West Union Tract and the High Falls Tract. A site for a town was selected near the western boundary of the West Union Tract. The town was named Walhalla, which means "paradise of the gods." Early history records the planting of tobacco, corn, wheat, grape vines, peach trees, and apple trees.

Soon settlers from other areas, primarily Virginia, Pennsylvania, and the southern part of South Carolina, moved into the area. With the general increase in available farm labor and the growing outlet for farm crops, farming operations became more intensive and the steeper soils began to erode.

Oconee County was established in 1868. "Oconee" is an Indian word and means "the place of springs."

The first cotton mill in the county was constructed in 1897. This mill provided a ready market for cotton lint. Prior to that time markets were distant and cotton had to be hauled by wagon train to Andersonville near the junction of the Seneca and Tugaloo Rivers. From this point it was floated by raft to Charles Town.

In 1950, the population of Oconee County was 39,050. By 1960, it had increased to 40,204.

Rural electrification provides electricity throughout the county, even to remote sections, and telephones are available to most areas.

Industries are attracted to Oconee County because of the healthful climate, abundant water supply, and availability of dependable labor. On September 4, 1959, records of the Oconee Development Board showed that 13 industries had plants in the county and employed more than 7,000 people.

The county has always had good educational facilities. Newberry College was located in Walhalla from shortly after the Civil War till 1877, when it was reestablished at Newberry, its original location. Adger College, organized in 1877, used the buildings formerly occupied by Newberry College. This college was replaced by a preparatory school in 1884–1885.

Clemson College was founded in 1889. It became a State Institution of Agriculture and Engineering. Its 1956–57 student register showed an enrollment of 3,285.

Agriculture

Even though Oconee County is young from the standpoint of settlement and agriculture, erosion has severely damaged its soils, particularly the steeper, finer textured soils that have been planted consistently to row crops. Consequently, these soils are low in fertility and low in moisture-holding capacity. Tilth is poor, and runoff is rapid. Yields of row crops have been greatly reduced. Permanent pasture has been established on many of the eroded and severely eroded soils. It is now more profitable to use these soils for pasture.

The principal crops of the county are cotton, corn, oats, and wheat. Table 12 shows the acreage and the average

TABLE 12.—*Acreage and average acre yields of principal crops for stated years*

Year	Cotton		Corn harvested for grain		Oats threshed		Wheat threshed	
	Acreage	Yield per acre	Acreage	Yield per acre	Acreage	Yield per acre	Acreage	Yield per acre
		Lb. lint		*Bu.*		*Bu.*		*Bu.*
1929	50, 161	211	25, 829	14. 4	2, 157	21. 8	786	7. 0
1939	24, 110	355	31, 671	14. 0	7, 246	23. 0	5, 253	12. 3
1949	16, 994	195	20, 177	16. 8	8, 509	24. 8	3, 672	14. 1
1954	8, 611	275	12, 610	11. 5	7, 908	27. 0	4, 605	16. 8

acre yields of these crops for stated years. The data are from the United States Census of Agriculture.

The acreage in row crops reached a peak in 1930. Since then the total acreage in cropland has been gradually decreasing. In 1929 the acreage in cropland amounted to 107,007 acres; in 1939 the acreage in cropland was 106,749 acres; in 1949 it was only 97,473 acres; and in 1954 it had decreased to 77,655 acres.

While the acreage in cropland has decreased, the acreage in pasture has increased. In 1929 the total acreage in pasture was 60,396 acres; in 1949 the acreage in pasture was 56,218 acres; by 1954 it had increased to 67,159 acres.

The acreage in pasture includes some cropland used for pasture. In 1929 it included 7,300 acres of cropland; in 1949 it included 6,233 acres; and in 1954 it included 9,844 acres.

Summer pasture commonly consists of common bermudagrass, dallisgrass, sericea lespedeza, common lespedeza, whiteclover, kudzu, and Coastal bermudagrass, or some combination of these plants. Winter pasture consists primarily of tall fescue, with white clover or crimson clover. Early planted small grain is grazed to a limited extent. Abruzzi rye grows well in winter and is used to a limited extent for grazing and grain.

Apples are well suited to the climate and soils of the foothills and mountains. The Long Creek section, in the western part of the county, has been especially progressive in producing apples of high quality. Acreages are constantly expanding. Nearly half the apples produced are shipped away, and the rest are sold in local markets.

Climate

Topography divides Oconee County into two climate belts, or thermal zones.

In the northern part, the climate is affected by the higher elevations. Rainfall is greater and is well distributed throughout the year. Winters are cold, and summers are mild. The Rock House Weather Bureau Station in Macon County, North Carolina, is near the northern Oconee County line and reflects climatic conditions in the mountainous area. Here, based on a 63-year record, the average temperature for January is 38.9° F., and the average temperature for July is 70.6° F. The average annual precipitation for this period is 84 inches. The growing season averaged 189 days over a 39-year period.

The climate in the southern part of the county is the humid, continental type. Summers are hot, and winters are cool. Dry periods are common. The average rainfall at Clemson College is 53.98 inches.

The climate at the U.S. Weather Bureau Station at Walhalla, in the central part of the county, is somewhere between these two extremes. Here, the average temperature for January, based on a 53-year record, is 42.5° F., and the average temperature for July is 77.4° F. The average rainfall is 59.65 inches.

The average frost-free period at Walhalla is 203 days. The average date of the last killing frost in spring is April 8, and the average date of the first frost in fall is October 28.

Table 13 shows the average temperature and precipitation at Walhalla, based on a record of more than 50 years.

TABLE 13.—*Temperature and precipitation at Walhalla, Oconee County, South Carolina*

[Elevation, 1,061 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1925)	Wettest year (1906)	Average snowfall
	°F.	°F.	°F.	*Inches*	*Inches*	*Inches*	*Inches*
December	43. 5	80	5	6. 30	2. 42	7. 71	0. 8
January	42. 5	80	−6	5. 30	8. 00	10. 60	1. 2
February	44. 1	81	−9	5. 34	1. 86	1. 56	. 9
Winter	43. 4	81	−9	16. 94	12. 28	19. 87	2. 9
March	51. 0	94	10	5. 78	2. 79	10. 25	. 5
April	58. 8	92	20	4. 52	3. 66	2. 10	[3]
May	67. 2	101	31	4. 03	2. 43	2. 82	[3]
Spring	59. 0	101	10	14. 33	8. 88	15. 17	. 5
June	75. 3	104	42	4. 75	3. 35	7. 80	0
July	77. 4	106	45	5. 84	3. 71	13. 87	0
August	76. 5	105	42	6. 21	. 60	7. 67	0
Summer	76. 4	106	42	16. 80	7. 66	29. 34	0
September	72. 0	102	34	4. 45	1. 00	14. 37	0
October	60. 8	96	20	4. 06	5. 20	5. 44	[3]
November	50. 4	86	9	3. 07	6. 13	2. 36	[3]
Fall	61. 1	102	9	11. 58	12. 33	22. 17	[3]
Year	60. 0	106	−9	59. 65	41. 15	86. 55	3. 4

[1] Average temperature based on a 53-year record, through 1955; highest and lowest temperatures on a 50-year record, through 1952.

[2] Average precipitation based on a 56-year record, through 1955; wettest and driest years based on a 52-year record, in the period 1897–1955; snowfall based on a 51-year record, through 1952.

[3] Trace.

Water

Oconee County, with its heavily forested mountain lands, has large supplies of fresh water. The high precipitation in the mountainous areas (approximately 80 inches) provides each acre with 2,196,240 gallons of water annually. The storage capacity for water is enormous because of the thick layer of saprolite beneath the soil, the favorable rates of infiltration, and the heavy forest cover (fig. 19). The supply of water released to streams from these soil reservoirs varies only slightly throughout the year. Runoff generally is moderate, except during torrential rains or rains of long duration. On a few soils that have a shallow profile, however, runoff contributes to flash floods.

The water resources of Oconee County are adequate to supply large cities and industries with ample water suitable for use without processing. Large quantities of water are now used downstream to produce hydroelectric power.

Figure 19.—**Thick layer of saprolite beneath Hayesville and Cecil fine sandy loams, 10 to 15 percent slopes, has enormous capacity to store water.**

Figure 20.—**Clogging of channel of Coneross Creek is the result of erosion.**

In areas where the soils have been extensively farmed and are severely eroded, silting of stream channels (fig. 20) has become a problem.

Geology

The bedrock of Oconee County consists of a complexly folded series of metamorphic and metasedimentary rocks intersected by a large number of igneous intrusions (fig. 21).

At the beginning of the Paleozoic era, the Appalachian and Piedmont provinces of the county were depressed below sea level, and sand, gravel, silt, and limestone were deposited. During late Paleozoic (Carboniferous) time, a large amount of granite was intruded into the schists, gneisses, and slates. At the end of the Paleozoic era, another period of intensive metamorphism occurred, with folding, faulting, and brecciation. In some places the degree of metamorphism is so intense that it is impossible to tell whether the original rocks were sedimentary or igneous.

The metamorphosed igneous rocks that weathered to produce parent materials of the soils included schistose and gneissoid granite, diorite, and volcanic rock.

Such rocks as granite, pyroxenite, peridotite, porphyrite, diorite, diabase, and gabbro occur as batholiths, sills, dikes, or surface flows.

Oligoclase-biotite schist, albite-chlorite schist, and their equivalents with igneous injections, crop out in considerable amounts in the northwestern part of the county. Mylonitized granite gneiss and hornblende gneiss occur in the northwestern part of the county.

The granites range in texture from fine grained to coarsely crystalline to porphyritic. Some are probably of Precambrian age; others may be Carboniferous (*16*).

Watson (*22*) classifies the granites as mixtures of

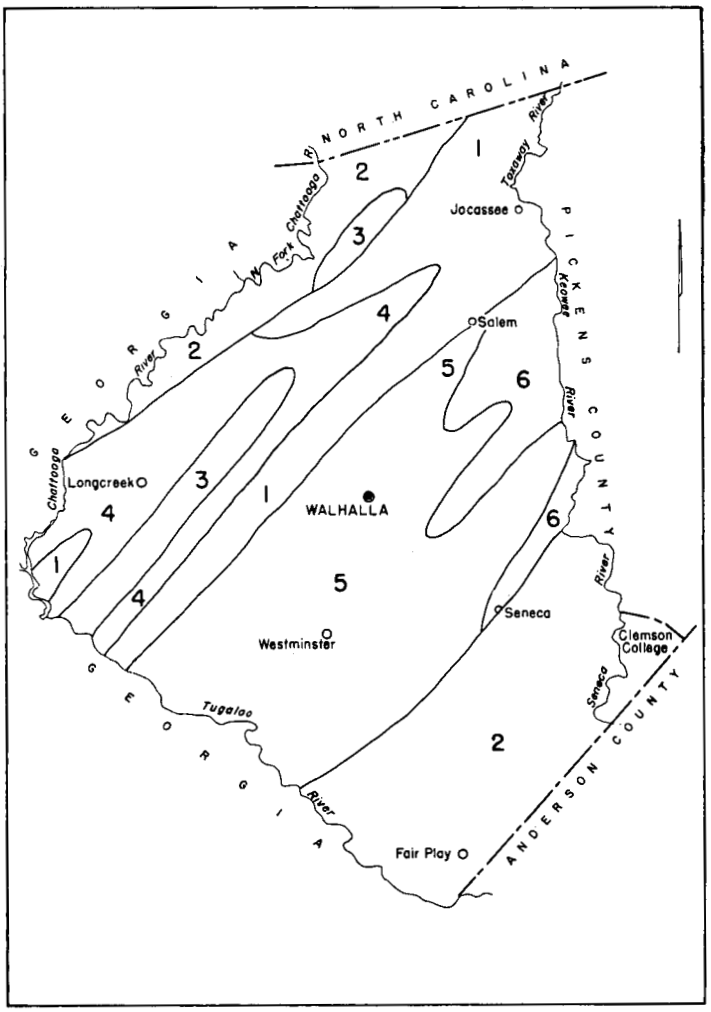

Figure 21.—**Geologic map of Oconee County: (1) Mylonitized granite gneiss and hornblende gneiss; (2) Oligoclase-biotite schist; (3) Cockeysville marble, Setters formation, and associated volcanic rocks; (4) Albite-chlorite schist and garnetiferous phyllonite; (5) Wissahickon schist with igneous injection; (6) Granite, gabbro, and hornblende gneiss. (Adapted from U.S. Geological Survey in cooperation with South Carolina Research, Planning, and Development Board.)**

quartz and feldspar, with biotite as the third essential component. On the basis of mineral composition, he groups the granites of South Carolina into (1) biotite granite that contains little or no muscovite; this group includes most of the granites in the State; (2) muscovite-bearing granites, of which there are only a few representatives; and (3) muscovite granite, which has been observed in only one place.

Aplitic granite and pegmatite are present in scattered localities.

During the field season of 1957, an attempt was made by J. W. Clarke, then of the University of South Carolina, to trace the metasedimentary rocks of the Kings Mountain and Brevard Belts across the State and to visit and appraise all the known outcrops of carbonate rocks in the Piedmont and Blue Ridge provinces. In Oconee County a large deposit of high-calcium marble was discovered in a series of metasedimentary rocks lithologically very similar to rocks of the southwestern extension of the Kings Mountain Belt in Abbeville County. In the course of the study it became apparent that a continuous sequence of thick metasedimentary rocks, lithologically similar and characterized by gentle folds and shallow dips, extends across much of the Piedmont (*6*).

Private exploration during 1958 for high-calcium marble at Poor Mountain in Oconee County has provided new information about the geology of the Blue Ridge scarp and the rocks of the northwestern edge of the Piedmont. Medium-grained white marble in beds as much as 30 feet thick is interbedded with several hundred feet of porphyroblastic quartz-biotite gneiss, chlorite-actinolite schist, hornblende gneiss, and mica gneiss. At the top of the scarp, this bedded sequence is nearly flat. At the foot of the scarp, the beds have a northeastern strike and a fairly uniform 25° dip to the southeast. Exposures are almost lacking along the lower part of the scarp because of soil cover, slump, and heavy vegetation. Cores from holes in this immediate area, however, contained tension fractures and tiny displacements not found in the rocks at the top of the scarp nor in the rocks 1,000 feet or more southeast of it. The fractures suggest a possible normal or steep reverse fault near the base of the scarp (*6*).

The Division of Geology, State Development Board, reports the following deposits in Oconee County: gold, silver-lead, corundum, tremolite, talc, soapstone, asbestos, graphite, feldspar, mica, granite-gneiss, granite, limestone, and marble. With the exception of limestone, few deposits have been of commercial significance.

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Glossary

Aggregate (of soil). Many fine soil particles held in a single mass or cluster, such as a clod, crumb, block, or prism.

Alluvium. Sand, mud, and other sediments deposited on land by streams.

Bedrock. The solid rock underlying soils and other earthy surface formations.

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

Colloid, soil. Colloid refers to organic or inorganic matter having very small particle size and a correspondingly large surface area per unit of mass. Most colloidal particles are too small to be seen with the ordinary compound microscope. Soil colloids do not go into true solution as sugar and salt do, but they may be dispersed into a relatively stable suspension and thus be carried in moving water.

Colluvial soil material. Soil material that has moved downhill and has accumulated on the lower parts of slopes at the foot of hills. Colluvial material is moved downhill by the force of gravity and, to some extent, by soil creep, frost action, and local wash. Means the same as colluvium.

Dieback. Death of tree branches or shoots beginning at the tips and moving back toward the trunk or stem.

Drainage, soil. (1) The rapidity and extent of the removal of water from the soil by runoff and flow through the soil to underground spaces. (2) As a condition of the soil, the frequency and duration of periods when the soil is free of saturation. For example, in well-drained soils, the water is removed readily, but not rapidly; in poorly drained soils, the root zone is waterlogged for long periods and the roots of ordinary crop plants cannot get enough oxygen; and in excessively drained soils, the water is removed so completely that most crop plants are damaged by lack of water.

Duck field. A field planted with duck food plants, such as browntop millet, smartweed, and corn, and then flooded to attract wild ducks.

Erosion. The wearing away or removal of soil material by water or wind.

First bottom. The normal flood plain of a stream.

Gravel. A mass of rounded rock fragments between 2.0 millimeters and 3 inches in diameter.

Horizon, soil. A layer, approximately parallel to the land surface, with distinct characteristics produced by soil-forming processes.

Horizon A. The surface horizon of a mineral soil, having maximum biological activity or eluviation (removal of materials dissolved or suspended in water), or both.

Horizon B. A soil horizon, usually beneath an A horizon, or surface layer, in which (1) clay, iron, or aluminum, with accessory organic matter, has accumulated as a result of removal of material in suspension from the A horizon or by clay development in place; (2) the structure is blocky or prismatic; or (3) there is some combination of these features. In soils that have distinct profiles, the B horizon is roughly equivalent to what is generally termed the subsoil.

Horizon C. The unconsolidated rock material in the lower part of the soil profile, like that from which the upper horizons (or at least a part of the B horizon) have developed.

Horizon D. Any stratum underlying the soil profile and unlike the material from which the soil has formed.

Immature soil. A soil that lacks clear individual horizons because of the relatively short time soil-building forces have been acting upon the parent material since its deposition or exposure.

Loam. Soil that consists of approximately equal amounts of sand, silt, and clay.

Mottled. Irregularly marked with spots of color. A common cause of mottling is imperfect or impeded drainage.

Normal soil. A soil having a profile in near equilibrium with its environment; developed under good, but not excessive, drainage from parent material of mixed mineral, physical, and chemical composition; and expressing in its characteristics the full effects of the forces of climate and living matter.

Parent material. The weathered rock or partly weathered soil materials from which a soil has formed. The C horizon.

Permeable. Easily penetrated by water and air.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction. The degree of acidity or alkalinity of the soil mass, expressed in pH values or in words, as follows:

	pH		*pH*
Extremely acid	below 4.5	Neutral	6.6–7.3
Very strongly acid	4.5–5.0	Mildly alkaline	7.4–7.8
Strongly acid	5.1–5.5	Moderately alkaline	7.9–8.4
Medium acid	5.6–6.0	Strongly alkaline	8.5–9.0
Slightly acid	6.1–6.5	Very strongly alkaline	9.1 and higher

Sand. As a soil separate, individual mineral particles, mostly of quartz, between 0.05 millimeter and 2.0 millimeters in size. As a textural class, soil that is 85 percent or more sand and not more than 10 percent clay.

Series, soil. A group of soils that have horizons similar in differentiating characteristics, except for texture of the surface soil, and in arrangement in the profile, and that formed from a particular type of parent material.

Silt. As a soil separate, individual mineral particles between 0.002 millimeter and 0.05 millimeter in size. As a textural class, soil that is 80 percent or more silt and less than 12 percent 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.

Solum. The upper part of the soil profile, above the parent material, in which the processes of soil formation are taking place.

Stripcropping. Growing crops in a systematic arrangement of strips or bands, as a means of controlling wind and water erosion.

Structure, soil. The aggregation of primary soil particles into compound particles or clusters of primary particles; the aggregates are separated by surfaces of weakness. Soil structure is classified according to grade, class, and type.

Grade. Distinctness of aggregation. Grade of structure is described as weak, moderate, or strong.

Class. Size of aggregates. Class of structure is described as very fine or very thin, fine or thin, medium, coarse or thick, and very coarse or very thick.

Type. Shape and arrangement of aggregates. The common types are platy, prismatic, columnar, blocky, subangular blocky, granular, and crumb.

Subsoil. The B horizons of soils with distinct profiles. In soils with weak profile development, the subsoil can be defined as the soil below the plowed soil (or its equivalent of surface soil), in which roots normally grow.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil; about 5 to 8 inches in thickness.

Texture, soil. The relative proportions of the various size groups of individual soil grains in a mass of soil. Specifically, it refers to the proportions of sand, silt, and clay. A coarse-textured soil is one high in content of sand; a fine-textured soil is one high in content of clay.

Topsoil. A general term used in at least four different senses: (1) A presumably fertile soil material, usually rich in organic matter, used to topdress roadbanks, lawns, and gardens; (2) the plow layer of a soil, and thus a synonym for surface soil; (3) the original or present dark-colored upper soil, which ranges in depth from a mere fraction of an inch to 2 or 3 feet in different kinds of soil; and (4) the original or present A horizon, varying widely among the different soils. If applied to soils in the field, the term has no precise meaning unless defined as to depth in relation to a specific kind of soil.

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